Report of

THE NINTH QUADRENNIAL REVIEW OF MILITARY COMPENSATION

VOLUME I

DEPARTMENT OF DEFENSE
Office of the Under Secretary of Defense
for Personnel and Readiness
Washington, DC

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MARCH 2002

This report is dedicated to the men and women who lost their lives in the September 11, 2001 terrorist attack on the Pentagon.

The 9th QRMC especially remembers two who were active participants in our deliberations.

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THE WHITE HOUSE

WASHINGTON

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July 20, 1999

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Ninth Quadrennial Review of Military Compensation

Under the provisions of section 1008(b) of title 37, United States Code, every 4 years the President must direct a complete review of the principles and concepts of the compensation system for members of the uniformed services. You shall be my Executive Agent for this review, consulting with me and my other senior advisors as required.

The past decade has been a time of dynamic change for our military. We achieved dramatic victories in the Persian Gulf and Kosovo, performed peacekeeping missions around the world, and completed a significant downsizing of our military forces. As the major superpower, we have maintained global commitments even as our forces have been reduced. Although our military compensation system remains competitive, enabling us to recruit and retain enough dedicated men and women to achieve the highest quality uniformed forces in the Nation's history, the restructuring of our military forces presents certain challenges. I have asked our smaller military to work even harder and therefore want to ensure that the compensation of military members is fair and effective as we enter the 21st century.

To that end, I have proposed significant enhancements to the compensation system in the FY 2000 budget. These changes include an across-the-board pay raise for all military members; reforms to the military retirement system; and a targeted pay increase for noncommissioned officers and mid-grade officers who gained the skills, education, and experience so valued by our thriving private sector.

The Ninth Quadrennial Review of Military Compensation should encompass a strategic review of the military compensation and benefits system, veterans benefits and services provided by the Department of Veterans Affairs, and other Federal entitlements directly affecting military members. The review should assess

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the effectiveness of current military compensation and benefits in recruiting and retaining a high-quality force in light of changing demographics, a dynamic economy, and the new military strategy. As Executive Agent, you shall ensure that representatives of other executive branch agencies participate in this review as appropriate.

I look forward to reviewing your progress in this important undertaking.

William J. Clinton

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PREFACE

The First Quadrennial Review of Military Compensation (QRMC) was convened in 1965 by Secretary of Defense Robert S. McNamara in response to newly enacted Congressional legislation. Section 1008(b) of Title 37, United States Code stated:

> *Whenever the President considers it appropriate, but in no event later than January 1, 1967, and not less than once each four years thereafter, he shall direct a complete review of the principles and concepts of the compensation systems for members of the uniformed services. Upon completion of such review he shall submit a detailed report to Congress summarizing the results of such review together with any recommendations he may have proposing changes in the statutory salary system and other elements of the compensation structure provided members of the uniformed services.*

Periodic review of the military compensation system is a valuable undertaking. In fiscal year 2002, military compensation comprised about one third of defense outlays, a total of nearly $110 billion. This investment is substantial and the Department of Defense must ensure that these resources are efficiently and effectively spent. Furthermore, the military compensation system includes a vast array of components. Ensuring that these components are used in a way that is consistent with their purpose and that they remain valid in light of changing economic and security environments is also essential. These topics have been the focus of past QRMCs.

Continuing in the tradition of its predecessors, the Ninth Quadrennial Review of Military Compensation (9^{th} QRMC) assesses the effectiveness of current military compensation policies in recruiting and retaining a high-quality force. The review takes place at a time of increasing pressure on military recruiting and retention. The downsizing of the active force in the 1990s, from over 2.1 million to its current level of 1.4 million, provided a respite for military manpower planners. Today, however, both enlisted recruiting and the retention of career personnel in some occupations have become more challenging. Furthermore, the Reserve component has experienced many of the same difficulties, as has the active force.

Recruiting and retention challenges are a result of both external and internal pressures. A sustained strong economy and changing private-

sector compensation practices along with changing missions and operational requirements create a complex environment for sustaining the All-Volunteer Force. This environment requires that military compensation and personnel policies become more flexible in order to meet emerging challenges—a fundamental theme of the 9th QRMC. The flexibility that exists in the current system may no longer be sufficient as the Department transforms into a 21st century force.

This document, Volume I of the 9th QRMC report, summarizes our findings and recommendations. The report focuses on three broad areas of compensation policy: regular military compensation, special and incentive pays and bonuses, and other measures of financial well-being such as educational benefits, the standard of living of junior enlisted families, and military retiree earnings. The centerpiece of the study is an analysis of basic pay—the foundation of compensation policy. The uniformed services are far more educated today than in the past, and traditional pay comparisons are no longer appropriate. The QRMC recommends fundamental changes in how military and civilian pay are compared, changes which in turn point to the need for targeted pay adjustments to "fix basic pay."

The 9th QRMC is unprecedented in that its major recommendations were accepted and enacted before the final report was released. President Bush has demonstrated strong support for the results of this report, and showed decisive action in recommending the largest military pay raise in two decades.

I thank the uniformed Services for actively participating in the deliberations of the 9th QRMC. Their willingness to evaluate empirical findings and collaborate to form recommendations that serve Department-wide interests was invaluable. I would also like to thank the staff of the Under Secretary of Defense for Personnel and Readiness for its timely contributions of data and review. Finally, I thank the staff members of the 9th QRMC, and especially their director, Dr. Curtis Gilroy, for developing and presenting issues before the Working Group and Senior Advisory Board. The impact of the 9th QRMC is a tribute to all who participated.

Donald Rumsfeld
Secretary of Defense

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The Executive Director thanks Captain Chris Kopang, Mr. Brad Loo, and Dr. W. S. Sellman and their staffs in the Office of the Secretary of Defense. Special thanks are extended to: Dr. Jane Arabian, Lieutenant Colonel Frank Bryceland, Mr. William Carr, Mr. Robert Clark, Jr., Lieutenant Colonel Thomas Emswiler, Ms. Nina Fountain, Lieutenant Colonel Gina Grosso, Lieutenant Colonel Lynda Jackson, Colonel Christine Knighton, Major Brenda Leong, Captain Gwen Rutherford, Mr. Stephen Westbrook, and Dr. Anita Lancaster and Dr. Timothy Elig of the Defense Manpower Data Center.

The Executive Director is particularly grateful for the continual support from Jeanne B. Fites, Deputy Under Secretary of Defense for Program Integration; for support from Lieutenant General John Van Alstyne and Vice Admiral Patricia Tracey, Deputy Assistant Secretaries of Defense for Military Manpower Policy; and for guidance from The Honorable David S.C. Chu, Under Secretary of Defense for Personnel and Readiness, The Honorable Charles Abell, Assistant Secretary of Defense for Force Management Policy, and former Under Secretaries of Defense for Personnel and Readiness, The Honorable Rudy de Leon and The Honorable Bernard Rostker.

The Executive Director is most grateful to Ms. Barbara Bicksler for her dedication to making the 9th Quadrennial Review of Military Compensation a solid foundation for the formulation of viable military compensation policy. Her efforts ensured that this review would be timely, empirically defensible, and policy relevant.

EXECUTIVE SUMMARY

Transformation in the Department of Defense involves not only the development of new warfighting strategies and weapon systems, but also the transformation of policies and practices. Ensuring an effective personnel management system—which includes both compensation and personnel policies—is part of this process. Personnel management policies have been in the spotlight in recent years, addressed by a number of high-level studies and commissions. A common theme has been a call for change in the Department's policies in the areas of recruiting, retention, compensation, and force management. The reason? To better adapt to changing economic forces, the increasing demands placed on military personnel, and the changing expectations and interests of America's youth.

It is against this backdrop that the Ninth Quadrennial Review of Military Compensation (9th QRMC) began its deliberations and considered its recommendations. The review focused on three broad areas.

- The centerpiece of the 9th QRMC is an analysis of regular military compensation, which describes the need to fundamentally change the way the Department evaluates the adequacy of basic pay.
- The QRMC examines the vast system of special and incentive pays and bonuses—the primary tools for creating pay differentials among service members. It also offers suggestions for alternative compensation tools that could provide the military Services greater flexibility in managing their force.
- The review discusses other aspects of compensation that affect the overall financial well-being of service members and their families; the standard of living of junior enlisted families, earnings of military spouses, educational benefits, and military retiree earnings are among the topics addressed.

SUSTAINING THE ALL-VOLUNTEER FORCE: THE ROLE OF COMPENSATION

The events of September 11, 2001, refocused America's attention on the security challenges facing the United States and the uniformed services. They underscored the need for transformation and the need to think and fight in new and different ways. The evolving security environment has already placed many new and more frequent demands on Department of Defense personnel—and this trend is likely to continue. The armed forces are crafting warfighting strategies that rely increasingly on high-technology weapon systems and on small, agile, and rapidly deployable forces that depend upon information superiority. These warfighting strategies will place increasing demands on the individual soldier, sailor, airman, and Marine.

The Need for Quality Personnel

The DoD will continue to require high-quality people, strongly motivated and able to deal with the more complex interactions required in today's world. Recruiting and retention policies must ensure that the uniformed services continue to maintain a high-quality force with a wide range of skills, many of which are highly valued in the private sector. Critical skills will include independence and innovation, the capacity for continuous learning, leadership and management, language and cultural understanding, technical competence, and an individual sense of commitment. The competition for excellence will be keen. The military compensation system must be able to accommodate the need for increasing diversity of skill requirements.

High-quality personnel are essential to the All-Volunteer Force. Empirical evidence shows that high-quality enlisted personnel are more likely to complete their initial term, have fewer disciplinary problems, are easier to train, and perform better on the job—not only initially, but they sustain this higher performance over the course of their careers. High quality personnel are simply more productive, and thus a better investment for the uniformed services.

Recruiting and Retention Environment

Enlisted recruiting and career officer retention have become increasingly challenging in recent years. Competition from private-sector employers, sustained economic expansion, the rise in college attendance among today's high school graduates, and wage growth for college-

educated workers all contribute to a more challenging recruiting and retention environment.

The percentage of accessions that are "high-quality" has fallen in general since its peak in 1992—a trend that cannot go unchecked. Furthermore, the cost of recruiting quality individuals has nearly doubled in the last 15 years. Retention difficulties in segments of the enlisted force have been ongoing since fiscal year (FY) 1997, in part because of decisions to access fewer recruits during the force drawdown of the early 1990s. As a result, the Services have had to retain more individuals from a smaller available pool—a requirement that is proving difficult to achieve.

Meeting force inventory requirements for officers has been a challenge for the Services as well. Of particular concern are shortages of those with critical skills, such as health care professionals, aviators, engineers, and intelligence and information technology professionals. The importance of technology and the associated demands placed on the force suggest an increasing requirement for highly technical skills in the officer corps.

During the past two years, the Services have focused a great deal of attention on recruiting and retention concerns. As a result, FY 2001 was a relatively successful recruiting year, and retention in all Services has improved. These successes required an increase in the level of investment in areas allowed to decline during the drawdown—advertising, recruiters and recruiting support, and enlistment and reenlistment incentives. They also required the Services to explore new ways to appeal to America's youth, which have led to new recruiting messages and innovative advertising campaigns. Recruiting and retaining a high-quality force will be no less challenging in the future. A sustained effort will be required in the years ahead.

A Compensation System for the Future: Focus on Balance and Flexibility

The military's compensation system dates from the post-World War II period and, in overall structure, has changed little since that time. The system is characterized by a base rate of pay, certain allowances for such items as housing and food, a host of special and incentive pays and bonuses for channeling personnel into particular skills or extending terms or service, and a retirement annuity generally payable at a minimum of twenty years of service. Despite these many components, about two-thirds of all compensation is generated by a single set of tables of basic pay and allowances for all Services and occupations. Thus, there are limits on how much flexibility the military Services have in differentiating pay among

their members. These limits can in turn increase the difficulty of attracting the required numbers and types of personnel—the basic purpose of the compensation system.

The 9th QRMC has based its analysis on two fundamental themes: ***balance*** and ***flexibility***.

- The military compensation system must achieve an appropriate ***balance*** between basic pay and special and incentive pays. Basic pay is the foundation upon which everything else rests. Thus, it is critically important to get basic pay right first. Once this goal is accomplished, special and incentive pays and other force-shaping tools become useful in attracting the right numbers of personnel to particular career fields, locations, and lengths of service. Moreover, ***balance*** must be achieved between compensation policies and personnel policies within the broader personnel management system.
- The compensation system must also have enough built-in ***flexibility*** to perform its traditional functions—to attract, retain, motivate, and separate personnel—under a wide range of scenarios. The flexibility in the system today comes largely from special and incentive pays and bonuses. While effective, these may not be sufficient as demands on the compensation system increase. New force-shaping tools such as alternative career lengths, changes to "up-or-out" policies, or even a more voluntary assignment system would add greater flexibility to the military compensation system.

REGULAR MILITARY COMPENSATION

To compete for talent, the Department of Defense must reexamine all of its recruiting and retention tools, the foundation of which is regular military compensation (RMC). RMC includes basic pay, basic allowance for housing, and basic allowance for subsistence, plus an additional amount to account for the fact that allowances for housing and subsistence are not subject to federal income tax. RMC is the basis for evaluating comparability between military and civilian compensation.

Is Regular Military Compensation Adequate?

Military and civilian pay comparability is critical to the success of the All-Volunteer Force. Military pay must be set at a level that takes into account the special demands associated with military life and should be set above average pay in the private sector. Pay at around the 70th percentile of comparably educated civilians has been necessary to enable the military to recruit and retain the quantity and quality of personnel it requires.

New data and analyses by the 9th QRMC suggest that military pay—particularly for mid-grade enlisted members and junior officers—has not kept pace with compensation levels in the private sector. Today's force is more highly educated than in the past and the current pay table may not include a high enough premium to sustain this more educated force. Adjustments in both the level and structure of the pay table are needed.

Enlisted Personnel

Over 60 percent of U.S. high school graduates attend college directly after high school. Students and their families realize that the returns to education, in terms of increased earnings, are significant. The value of education is not only understood by the population of high school graduates that are recruiting prospects, but also by those already serving in the force. Men and women who stay beyond their first enlistment display an increasing propensity to pursue advanced education. College enrollment trends suggest that an increasing percentage of future enlistees will have completed some college before enlisting in the armed forces or at least will have college aspirations.

Today the Department compensates the career enlisted force as a high-quality, high-school-educated force when, in fact, the actual composition of the force reflects a much higher education level—a phenomenon that is expected to continue. ***Thus, the existing basis for evaluating the adequacy of enlisted compensation is no longer valid. It is no longer appropriate to consider the high school graduate as the standard for pay comparability for much of the enlisted force.***

Instead, a composite of three education levels more appropriately depicts the correct civilian target populations over an enlisted member's career: high school graduates should be used as a comparison for junior enlisted personnel (E-1 to E-4); those with some college education for mid-grade personnel (E-5 to E-7); and college graduates for senior enlisted personnel (E-8 and E-9). Comparing enlisted pay to a composite profile of civilian earnings points to the need to both raise the level of pay and

alter the structure of the enlisted pay table. Recommended adjustments are as follows:

- ***Target large basic pay increases to enlisted members serving in the E-5 to E-7 grades with 6 to 20 years of service to raise basic pay toward the 70th percentile of civilian earnings.*** When RMC for mid-grade enlisted personnel is compared to the earnings of civilians with some college education, enlisted pay compares with only the 50th percentile of civilian earnings and is significantly below average civilian earnings. Between 6 and 20 years of service, enlisted RMC increases at a lower rate than do average civilian earnings. These comparisons highlight a clear need for pay table adjustment in the mid-level enlisted grades. Targeted pay raises will result in a steeper pay profile, altering the structure of the pay table.
- ***Raise basic pay for grades E-8 and E-9 to maintain incentives throughout the enlisted career and prevent pay inversion.*** RMC for these grades tracks well below average civilian earnings of college graduates throughout the 30-year career. These raises will close the differential toward the 70th percentile.
- ***Provide a modest increase in basic pay for junior enlisted personnel, coupled with strong enlistment incentives through bonuses and educational benefits where appropriate.*** Although pay for junior enlisted personnel tracks favorably with that of high school graduates, this increase reflects the importance of preventing further deterioration in the percentage of high-quality recruits. Increasing pay at the E-5 grade will serve as an additional incentive for members to remain in service beyond the first enlistment term.

Commissioned Officers

An examination of officer compensation issues shows a picture different from that encountered in the enlisted force analysis. Challenges in meeting manning objectives for officers tend to occur in the O-3 and O-4 pay grades and in particular occupational specialties. The rate at which junior officers are leaving the service is somewhat higher than during the 1980s, and this rate has been rising for almost five years. As a result, the Services are having increasing difficulty filling field-grade requirements.

The downward trend in officer continuation rates undoubtedly captures the effects of a strong civilian economy. But it may also represent a shift in the behavior of young officers and their reactions to the changes in missions and the frequency of deployments since the end of the Gulf War, as well as other aspects of military life. Thus, today's lower continuation rates may indicate a long-run change and a new level against which the Services need to plan to ensure adequate manning.

Historically, the adequacy of officer pay has been determined in part by comparing RMC to earnings of civilians with a baccalaureate degree, since this degree is a primary requirement for entry into the military's officer corps. However, as with the enlisted force, the education level of the officer corps has increased. A significant proportion of the officer corps has advanced degrees: 40 percent of O-3s, 70 percent of O-4s, and 90 percent of O-6s and above. ***Thus, the current comparison of officer earnings with earnings of civilian college graduates is no longer valid. A more appropriate comparison is to the earnings of civilians with either a baccalaureate or advanced degree in professional or managerial occupations—civilian jobs that most closely resemble the skill set of most officer career fields***.

Comparisons between officer pay and this new civilian pay profile suggest that adjustments in officer pay are needed as well. Officer pay compares favorably with civilian pay (at about the 70th percentile) until about the 8th year of service, at which point it drops toward average civilian pay. This drop occurs at the point when the Services are experiencing significant O-3 retention challenges. RMC lags civilian earnings until the sixteenth year of service. Specific recommendations include the following:

- ***Raise basic pay for all O-3s to improve the continuation rates of this group of junior officers***. A substantially larger increase at the 8th year of service is also recommended. This increase would help to alleviate the current inventory problems and address a persistent structural problem in the officer pay table that results from the relatively long time-in-grade between promotions from O-3 to O-4.
- ***An additional increase for O-4s*** would be appropriate to help stabilize, and perhaps reverse, the downward trend in O-3 continuation rates between 6 and 9 years of service. However, care needs to be taken not to provide an increase so large as to reduce the incentive for promotion to O-5.

- ***Make greater use of existing continuation bonus authorities or special pays to provide additional earnings over a full career in those skills with low manning levels***.

Warrant Officers

In addition to enlisted members and the officer corps, warrant officers round out the active-duty force. These officers "bridge the gap" between the technician levels of the enlisted member and the generalist and managerial functions of the officer. They also serve as rotary and fixed-wing aviators in the Army.

Warrant officer candidates are recruited primarily from the noncommissioned officer ranks. To attract enlisted members to the warrant officer community, pay must be sufficiently high to act as an incentive. It must also be commensurate with the level of education warrant officers possess and with the earnings they could obtain in the private sector. As with the enlisted force, the education level of warrant officers has increased over time. Among W-1s and W-2s, between 60 and 70 percent have some college education, and among W-3s, W-4s, and W-5s, 35 percent have a baccalaureate degree. Over 20 percent of W-5s have advanced degrees.

Much like for the enlisted force, a composite of civilian earnings is the most appropriate basis for comparing warrant officer pay to that of their civilian counterparts. Pay for grades W-1 and W-2 is best compared with the earnings of private-sector employees with some college; pay for grades W-3 through W-5 should be compared to civilian earnings for college graduates. These comparisons show the need for a targeted pay increase for the warrant officer force:

- ***Target the largest basic pay increase to warrant officers serving in grades W-1 to W-3.*** This increase would alter the pay structure for warrant officers in a manner consistent with the recommendation to target basic pay increases to enlisted members in grades E-5 through E-7. It will also raise pay for the W-3 grade closer to the average earnings of civilian college graduates.
- ***Raise basic pay for grades W-4 and W-5*** to maintain appropriate incentives throughout the warrant officer career and to prevent pay inversion.
- ***Provide authority for the payment of continuation bonuses to warrant officers in critical technical skills.***

Current pay tables do not reflect the educational attainment of the force and need to be adjusted as recommended in order to maintain pay comparability with civilian sector salaries. Ensuring adequate pay is essential if the military is to be competitive in attracting and retaining the best and the brightest. The recommendations put forward significantly improve the level and structure of the basic pay table. But the labor market today is very dynamic, reflecting the rapid pace of change fueled by the ongoing information revolution. Staying competitive means regularly evaluating pay comparability and using a combination of tools to respond to changing supply and demand for a more educated and technically skilled workforce.

CREATING DIFFERENTIALS IN MILITARY PAY

While the military compensation system is based on a common set of basic pay tables, it is necessary to be able to differentiate pay for particular members of the force. Special and incentive pays (S&I) and bonuses provide some flexibility in the military compensation system. They are used to:

- Attract and retain individuals with critical skills.
- Encourage retention in selected career fields, in certain locations, and in assignments involving arduous or unusual conditions.
- Recognize members who perform hazardous duties.

S&I pays and bonuses have been a relatively small proportion of total pay—historically, about four percent. How these pays are used differs by Service. The Navy makes the most extensive use of special pays and bonuses and also pays the highest amounts for enlisted members, reflecting the Navy's need to compensate its force for the arduous nature of sea duty. For officers, special pays are a significant proportion of total pay in the Navy and Air Force, due in large part to the need to retain pilots and individuals in other highly technical specialties.

The appropriate balance between regular military compensation and special pays is important to determine. Working from a common RMC base, which must be competitive with general civilian labor market conditions, each Service then establishes its own balance to meet its unique manpower requirements. The increases in RMC recommended by the 9th QRMC will improve pay comparability between military personnel and their civilian counterparts. But in particular skills, occupations, and

assignments, variance between civilian and military pay will remain. In those cases, the traditional response is to make use of the variety of special and incentive pays and bonuses available to the Services.

Overall, special and incentive pays and bonuses have been effective in recruiting and retaining the force required to meet current and past missions of the Department. However, if filling positions in technical occupations and other critical skill areas becomes increasingly difficult, the Services may have to make even greater use of special and incentive pays and/or offer even higher bonus amounts to maintain sufficient personnel levels. ***In the long run, however, increasing the use of existing pays may not be enough. New missions and changing operational patterns have already placed new demands on personnel and, in turn, on the military compensation system. Thus, the Department may find a need for new compensation tools such as those described below.***

Special Pays and Allowances for the Reserve Component

Many special and incentive pays, bonuses, and allowances are used to augment basic pay for the Reserve as well as the active component. Over the past few decades the Total Force policy has motivated a greater integration of the active and Reserve forces. No longer a "force in reserve," the Reserve components are in fact essential players in most operational missions. The QRMC reviewed several elements of pay for Reservists to determine whether changes are warranted in light of the evolving role of the Reserves.

- ***Special and Incentive Pays***. For each day of reserve service, Reservists generally receive special and incentive pays at a rate of 1/30th of the monthly amount paid to active-duty members. In some cases, a more consistent application of S&I pays for the Reserve and active components might be considered—where Reservists meet the same threshold as active-duty members or where critical skill deficiencies exist, for example.
- ***Payment of the Basic Allowance for Housing***. Reservists on active duty for less than 140 days receive a basic allowance for housing that is in most cases less than the allowance received by the active-duty force. The QRMC believes that the allowance for both components should be the same, in theory, but given cost considerations recommends that the threshold at which a Reserve component member is entitled to

receive the basic allowance for housing be lowered from 140 to 30 days.

Special Pays for Overseas Duty

The impact of more frequent deployments on retention has been a growing concern in recent years. This concern persists despite the large and growing number of programs designed to compensate members who are assigned and deployed overseas. An internal Department of Defense working group has identified a strategy to increase volunteerism for overseas assignments—one that focuses on providing the Services with greater flexibility in compensating members through a combination of pay and quality-of-life incentives. Many of the initiatives have promise, but should they fall short of meeting the challenges in filling overseas assignments, the Department may want to consider other options.

A Voluntary Assignment System

A more voluntary assignment system would allow career service members to sort themselves across assignment locations by preferences and circumstances as long as they are qualified for a position. The key to this system is to increase the use of monetary incentives—which can vary with changes in supply and demand—in difficult-to-fill locations until those positions are filled by sufficient numbers of volunteers. The system would be relaxed during cases of war and emergency, of course, but overall could have a positive effect on recruiting and retention as well as improve the performance and productivity of members at an assignment.

Deployment Pay

The military has used a variety of pays to compensate for the hardships associated with some military assignments, but to date offers no explicit "deployment pay." There are many policy options that could be considered in creating a deployment pay: among them are instituting a sea pay model; replacing the family separation allowance with one that is unrelated to dependency status; creating a hardship duty pay for tempo; and establishing tax relief policies. Should the Department determine the need for a new deployment pay, the QRMC believes that the best approach is one that is as flexible as possible—allowing the Services to respond to changing conditions as their individual needs warrant.

Alternative Tools for Shaping Pay

The 9th QRMC has identified four compensation tools that could add greater flexibility to the Department's current system of special and incentive pays and bonuses. The first two have been authorized and plans for implementation are being developed. The remaining two would add to the existing tools available to the Department.

- ***Critical Skill Retention Bonus***. New authority exists to implement a critical skill retention bonus—a financial incentive to increase officer and enlisted personnel retention in critical specialties with documented manning shortages. For enlisted members, it can augment the current Selective Reenlistment Bonus program. The Services have a great deal of flexibility in applying the bonus, and the QRMC believes that it will be a highly effective tool in meeting both short- and long-term personnel requirements.
- ***Thrift Savings Plan***. Service members are now eligible to participate in the Federal Thrift Savings Plan. Moreover, provision exists for the Service Secretaries to offer matching contributions to members in critical specialties. As manpower needs change in the future, the military may wish to consider alternative career lengths for particular skill or occupational specialties. In this context, some flexibility in retirement options, such as making use of a "contributory" thrift savings plan as a financial incentive to improve retention in critical skill areas, could be effective.
- ***Skill and Capability Pay***. Skill and capability pays could play a role in creating pay differentials in areas where they are needed on a permanent basis, as compared to bonuses which are intended to help alleviate shortages that tend to be more temporary in nature. Skill and capability pays would be helpful for dealing with persistent, large differences between military and private-sector pay in various skill areas and for encouraging higher performers to stay in service. Skill pay could vary across specialties or skill areas and thus create a means of varying career pay profiles, which could result in different retention profiles and career lengths.
- ***Aviation Career Savings Fund***. An aviation career savings fund could offer a more efficient means of increasing pilot retention and shaping aviator career paths in the future. The Service would contribute a percentage of a pilot's basic pay to

a fund for each year of aviation service. Pilots would be vested in the fund according to a specified schedule. The fund would attract more pilots to the fifteen-year point and could be used in concert with the current military retirement system. Moreover, this type of fund could be used to shape the force profiles of other occupational groups such as health care and information technology professionals.

OTHER MEASURES OF FINANCIAL WELL-BEING

When considering the financial well-being of the force, reference is often made to regular military compensation of a typical service member. But this measure can mask the financial condition of particular segments of the force or particular groups of individuals, all of special interest to the Department. The uniformed services care about their members in all phases of their careers—early in service, in overseas assignments, and when they separate, for example. The QRMC examined issues that involve five segments of the force: three involving members still in service and two that involve post-service experiences.

The Standard of Living of Junior Enlisted Families

The standard of living of junior enlisted families is of concern to the military Services. Junior enlisted pay—as measured by regular military compensation—is above the 70th percentile of earnings of civilian counterparts through the first four years of service. Yet data show that some families face financial stress, and the popular press reports periodically on the economic condition of these families, particularly those qualifying for food stamps. Close analyses show, however, that the number of these families is very small and their situation has more to do with the size of their families than with their level of income. Further, the financial hardship they endure is most often a temporary phenomenon. For those families that do experience financial hardship, the Services offer an array of support programs, including financial management.

Earnings of Military Spouses

Another concern is the employment and earnings situation of military spouses. The proportion of military spouses in the civilian labor market has grown along with the national trend among civilian spouses. But the unemployment rate of military spouses is higher and their earnings lower than comparably educated civilian spouses. A primary reason is the

frequent moves required of military families. In addition, many military installations are located in areas with earnings lower than the national average. Given that retention is a family decision, the employment and earnings situation of spouses plays a role in that decision. The military is becoming much more aware of this issue and is taking steps to improve employment opportunities for military spouses. The 9th QRMC presents, for the first time, a quantitative assessment of the situation.

Members Assigned Overseas

About 275,000 service members and their families are stationed outside the continental United States. The Department of Defense attempts to compensate these members for the differences in the cost of living between the United States and their assigned overseas location. The monthly cost-of-living allowance varies considerably from one location to another. The challenge is to make sure that the allowance is fair and members are not penalized for overseas assignments. Although the budgeted amount of the cost-of-living allowance—about $750 million—is a very small proportion of the defense budget, monthly payments to members and/or families can represent a sizable portion of their spendable earnings.

The QRMC believes that, conceptually, the methodology for determining the overseas cost-of-living allowance is sound, but the system can be improved in a number of ways. Several stand out as relatively important: creating a limited "safety net" that keeps the allowance payment from declining during a member's tour; adjusting the technical factors associated with calculating the allowance; and improving data collection and administrative processes for determining the allowance, particularly with regard to location-unique expenditures.

Post-Service Educational Benefits

Once members leave the military, many further their education under the All-Volunteer Force Educational Assistance Program, commonly referred to as the Montgomery GI Bill (MGIB). However, in recent years, the value of the benefit has declined relative to the cost of college education. Thus, the Department of Defense, together with the Department of Veterans Affairs, has recommended that the basic educational benefit of the MGIB be raised to cover the cost of an education at a public, four-year college or university. Supplemented by some of the Service's college funds, the stipend would permit veterans to attend more expensive private colleges.

If the military is to be competitive in the market for high-quality personnel, it must offer meaningful educational benefits and encourage members to further their education both during and after military service. The QRMC concurs with the recent increase in the MGIB basic benefit legislated by the Congress. Congress also granted authority to the Services to permit members to transfer some or all of the benefit to a spouse or child. The QRMC questions the cost-effectiveness of transferability but supports a pilot program to determine its efficacy.

Military Retiree Earnings

When members retire after 20 or more years of service, most begin a second career in the civilian sector. It is important to examine retirees' earnings because their experiences in the civilian labor force can have an impact on recruiting and retention. QRMC analyses show that earnings in civilian jobs are typically lower for retirees than those in their previous military job and lower, on average, than what civilians with comparable experience and education earn. However, the total income of retired enlisted personnel and officers—the combination of a member's retirement benefit together with earnings from a civilian job—is substantially above the average of comparable civilian earnings. In fact, the overwhelming majority of retirees have been satisfied with their military careers and satisfied with their civilian life as well.

FINAL THOUGHTS

The themes of ***balance*** and ***flexibility*** are woven throughout the analyses in this report. They influenced the recommendations proposed and new compensation tools the QRMC believes the Department should consider. The work of the 9th QRMC highlighted the following:

- The first priority is to "get basic pay right." It is the foundation of the compensation system and the basis for maintaining ***balance***.
- Once basic pay is set, special and incentive pays and bonuses provide needed ***flexibility*** in creating pay differentials to attract and retain personnel in particular career fields.
- As the needs of the Department evolve and as the external labor market changes, new tools may be required to add greater ***flexibility*** to the compensation system.
- The overall well-being of service members and their families is important to the Department. Other measures of financial

well-being can affect traditional compensation tools that can in turn help to maintain appropriate ***balance*** in the compensation system.

As the Department of Defense transforms for the 21st century, increasing demands on personnel may mean new demands on the military compensation system. While the QRMC believes the basic structure of the system is sound, innovative tools or new ways of implementing current tools may be required to add greater ***flexibility*** to the compensation system in the long run. As changes are considered, the impact of new tools and new approaches on the overall system must be evaluated to ensure the necessary ***balance*** is maintained.

CHAPTER I

SUSTAINING THE ALL-VOLUNTEER FORCE: THE ROLE OF COMPENSATION

The Department of Defense is fundamentally transforming its strategy, forces, and policies. This transformation is motivated by a vastly different security environment that has emerged over the last decade. Where once a single monolithic threat—the Soviet Union—dominated the nation's security planning and programming, today's environment contains a broader, more diffuse set of concerns: terrorism, biological warfare, regional tension, and an array of other transnational challenges. It is an environment characterized by uncertainty, but more importantly by a rapid pace of change.

Transformation of the Department of Defense includes not only strategy and forces—often the focus of public debate—but also policies and practices. An effective military compensation policy is among them. While the current compensation system has been effective thus far during this era of transformation, new missions and changing operational patterns place increasing demands on personnel, which will in turn place greater demands on the compensation system. The Department's military compensation policies must keep pace.

COMPENSATION POLICY IN THE SPOTLIGHT

The Department's human resources policies—which include compensation policies—have received much high-level attention in recent years. *The Defense Science Board Task Force on Human Resources Strategy*, *the U.S. Commission on National Security/21st Century*, and Secretary Rumsfeld's *Morale and Quality of Life Review* have all called for transformation of elements of DoD's human resources policy.

The Defense Science Board stated, "people are the Department's most important resource," and called for "a sustained transformation in the character and management of the human element of the force." The board called for "compensation structures and levels as well … that provide the right incentives to retain the right people in needed numbers." Its recommendations included restructuring the military pay system to further emphasize pay for performance and skills and variable career lengths for selected skilled personnel.[1]

[1] *Report of the Defense Science Board Task Force on Human Resources Strategy* (Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics), February 2000.

The *U.S. Commission on National Security/21st Century* recognized that "civilian and military institutions face growing challenges … in recruiting and retaining America's most promising talent."[2] The commission called for change in military personnel policies in the recruitment, promotion, compensation, and retirement systems based on a belief that the current systems do not fit contemporary realities. In particular, the commission emphasized the need for greater flexibility in the compensation system, and called for the elimination of pay compression in the middle enlisted grades. The Services need more authority and flexibility to manage careers, test new incentives, expand awards for service, and adapt personnel policies to meet requirements.[3]

Secretary Rumsfeld's *Morale and Quality of Life Review* echoed the recommendations of the Defense Science Board, stating that critical to the success of DoD's transformation "is transformation of the personnel structure of the Total Force to meet the Department's needs and fulfill the aspirations of the work force for productive careers." The panel called for "new approaches … to respond to changing economic forces and the desires and expectations of today's youth" and the need to "provide satisfactory compensation" that is "adequate to attract, retain, motivate and separate personnel."[4] Specifically, the panel called for the need to improve elements of the current pay structure.

The Ninth Quadrennial Review of Military Compensation (9th QRMC) began its deliberations against the backdrop of these recently completed studies. Midway through the QRMC's study, the election of President George W. Bush placed military compensation high on the Department's agenda—prominent because of the President's campaign pledge to spend $1 billion on pay raises for the uniformed services. Few QRMCs have been conducted amid such focus. The result is that implementation of many of the recommendations in this report preceded its publication—historic by QRMC standards. The final chapter of this report summarizes these achievements.

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2 *Road Map for National Security: Imperative for Change*, Phase III Report of The United States Commission on National Security/21st Century, February 15, 2001, p. xiv, http://www.nssg.gov.

3 *Road Map for National Security: Imperative for Change* (2001), pp. 102-105.

4 Unpublished report to the Secretary of Defense, *Improving Morale and Quality of Life: Overview*, March 2001, pp. 3-4.

THE NEED FOR QUALITY PERSONNEL

The events of September 11, 2001, refocused America's attention on the security challenges facing the United States and the armed forces. In an October, 2001, speech to cadets at the Citadel military college, President Bush spoke of a "new and essential mission" for the armed forces, referring to the terrorist threat. To respond to this threat, the military will have to think and fight in a new way—not only in overseas conflicts, such as the war in Afghanistan, but also in the expanded mission of homeland security. A new way of warfare will have an impact on the men and women in the uniformed services.

The evolving security environment has already placed many new and more frequent demands on Department of Defense personnel. Over the past decade, military personnel have been more frequently deployed to missions involving hostile duty. And peacetime operations have fundamentally changed the pace of activity for many military personnel, with deployments to peacemaking, peacekeeping, humanitarian, disaster relief, and nation-building operations. The pace of operations is not expected to lessen and could, in fact, increase.

The armed forces are crafting new warfighting strategies that rely increasingly on high-technology weapon systems such as precision strike systems and unmanned aircraft. These strategies stress small, agile, rapidly deployable forces. The military will depend on information superiority, which in part will mean rebuilding the nation's intelligence capabilities, particularly in human intelligence. Changing warfighting strategies will place increasing demands on the individual soldier, sailor, airman, and Marine.

AN EXPANDING DIVERSITY OF SKILLS

The DoD will continue to need high-quality people, strongly motivated and able to deal with the more complex interactions required in today's world. Recruiting and retention policies must ensure that the uniformed services continue to maintain a high-quality force with a wide range of skills, many of which are highly valued in the private sector as well. The competition for excellence will be keen. Enhanced skills and leadership capabilities will be in high demand, some of the most critical of which include:

- ***Independence and innovation*** to carry out increasingly complex operational missions and adapt to an increasingly commercial environment of advanced business practices and technology innovation.
- ***The capacity for continuous learning*** to keep pace with the rapid pace of technological change.
- ***Leadership and business management*** skills necessary for effective relationships with military counterparts in coalition operations, foreign governments, non-government organizations, or business partners.
- ***Language skills and cultural understanding*** of a wide range of military and business partners, including allies, friends, and potential adversaries.
- ***Technical competence*** to use and maintain more sophisticated technology integrated into the nation's arsenal of weapons and command-and-control systems and incorporated into new patterns of military operations.
- ***An individual sense of commitment***, important not only in maintaining individual leadership, motivation, and dedication to the task, but also as an example to younger service members.[5]

The skill requirements of the armed forces have become increasingly diverse over time—a trend that will likely continue. Much of the change in and diversity of skill requirements has been driven by changes in technology, changes in warfighting operations, and changes in the roles and use of military forces. Together these influences have increased the need for more educated and more able personnel in many skill areas. The military pay system must be able to accommodate the increasing diversity of skill requirements. As skill requirements change, more differentiation in pay by skill is likely to be needed as well.

THE LINK BETWEEN QUALITY AND PERFORMANCE

High-quality personnel are essential to the All-Volunteer Force. Over the last 15 years, there has developed a body of empirical evidence to show that high-quality enlisted personnel make better soldiers, sailors,

[5] These characteristics were described in the *Report of the Defense Science Board Task Force on Human Resources Strategy* (2000), p. 20.

airmen, and Marines. The Department of Defense defines high quality as individuals with at least a high school diploma who score in the upper half of the Armed Forces Qualification Test (AFQT).[6]

The Services seek quality personnel for several reasons. First, they are more likely to complete their initial term, so they are a better training investment. About 80 percent of recruits with a high-school diploma will complete their first three years of service, compared to only one-half of those who failed to complete high school. Similarly, only about 60 percent of those who hold an alternative credential—such as the General Education Development certificate and those schooled at home—will complete three years of service.[7] Second, quality personnel have fewer disciplinary problems, such as desertion, drug use, or criminal behavior. Third, high-quality personnel are easier to train and perform better on the job, as illustrated in Figure 1-1.[8]

In the figure, initial aptitude (based on scores from the AFQT) and job performance are compared for thirty occupational specialties across the Services. Performance scores for all personnel improve consistently with job experience, as one would expect, but these data also illustrate several other important trends.[9] High-quality personnel have consistently higher performance scores at each experience level; regardless of the level of experience on the job, the lower aptitude group lags behind its higher

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[6] All recruits take a written enlistment test called the Armed Services Vocational Aptitude Battery (ASVAB). One component of the ASVAB is the AFQT, which measures math and verbal skills. For reporting purposes, scores on the AFQT are divided into five categories or percentile ranges: I = 93-99, II = 65-92, III = 31-64, IV = 10-30, and V = 1-9. Category III is often divided into subcategories IIIA (percentiles 50-64) and IIIB (percentiles 31-49). By law, non-high school graduates in category IV and all individuals in category V are ineligible to enlist. DoD has established recruit quality benchmarks that require 90 percent of new enlistees be high school graduates and 60 percent score at or above average on the AFQT (categories I-IIIA). These benchmarks, specified in the *Defense Planning Guidance*, were established in 1993, verified in 1996, and reevaluated in 2000.

[7] U.S. Department of Defense, *Review of Minimum Active Enlisted Recruit Quality Benchmarks: Do They Remain Valid?* Report to Congress, Office of the Assistant Secretary of Defense (Force Management Policy), March 2000, p. 1.

[8] Data from the Joint Service project designed to link military enlistment standards to on-the-job performance demonstrated the importance of aptitude. U.S. Department of Defense, *Joint Service Efforts to Link Military Enlistment Standards to Job Performance*, Report to the House Committee on Appropriations, Office of the Assistant Secretary of Defense (Force Management and Personnel), April 1992.

[9] For a brief discussion of the relationship between aptitude and performance, see Curtis L. Gilroy and W. S. Sellman, "Recruiting and Sustaining a Quality Army: A Review of the Evidence," in Robert L. Phillips and Maxwell R. Thurman, eds., *Future Soldiers and the Quality Imperative* (Washington, DC: U.S. Government Printing Office), 1995, pp. 53-70.

aptitude counterpart. As members gain experience, initial aptitude remains an extremely important determinant of performance—the lines do not cross. Finally, high-aptitude personnel enter the military at a performance level that is higher than the lower aptitude personnel attain after three or more years of service.

Figure 1-1. Average Job Performance of First-Term Service Members

Source: U.S. Department of Defense, Joint Service Efforts to Link Military Enlistment Standards to Job Performance, April 1992.

Note: See Footnote 6 for an explanation of AFQT categories.

Studies conducted for the Army reinforce the findings that high-aptitude personnel perform better on the job. A study of soldiers operating the PATRIOT air defense system showed that high-quality soldiers are consistently better in their ability to both "kill" enemy aircraft and defend assets.[10] Another showed that higher-aptitude communication equipment operators are better at both radio operation and troubleshooting.[11] And

[10] B. R. Orvis, M. Childress, and J. M. Polich, *Effect of Personnel Quality on the Performance of PATROIT Air Defense System Operators*, R-3901-A (Santa Monica, CA: RAND Corporation), 1992.

[11] John Winkler, Judy Fernandez, and Michael Polich, *Effect of Aptitude on the Performance of Army Communications Operators*, R-4143-A (Santa Monica, CA: RAND Corporation), 1992.

high-quality tank crewmembers demonstrate significantly better performance on firing ranges.[12] For the Navy, there is evidence that ship downtime decreases as the proportion of high-aptitude personnel on board increases.[13] High-quality personnel are simply more productive.

RECRUITING AND RETENTION ENVIRONMENT

There is a strong relationship between military compensation policies and recruiting and retention success—particularly among high-quality personnel. Basic pay, special pays, bonuses, and retirement earnings are among many factors that are considered by those deciding whether to join the military or to stay after their initial term has been completed. The strength of the U.S. economy, private-sector employment and earnings opportunities, and perceptions of the value of military service—among the youth population and service members themselves—all have an impact on the recruiting and retention environment.

As the QRMC began its deliberations in January, 2000, the military services were still experiencing difficulties in recruiting and retaining quality people. But during the past two years, the Services have focused a great deal of attention on recruiting and retention concerns. Fiscal year (FY) 2001 was a successful recruiting year, and retention in all Services has improved. But the challenges are not over and a sustained effort will be required in the years ahead.

ENLISTED PERSONNEL

Recruiting

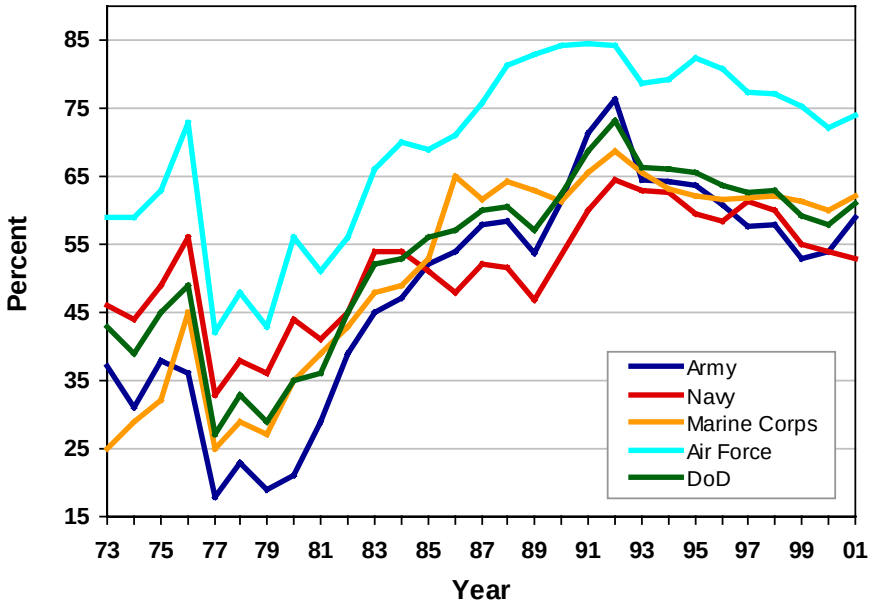
The ability to recruit high-quality individuals is a key indicator of recruiting success and the viability of the All-Volunteer Force. High-quality accessions peaked for the active-duty enlisted force in 1992, as

[12] Barry Scribner, D. Alton Smith, Robert Baldwin, and Robert Phillips, "Are Smarter Tankers Better: AFQT and Military Productivity," *Armed Forces and Society*, 12 (2), Winter 1986, 193-206.

[13] Stanley Horowitz and Alan Sherman, "A Direct Measure of the Relationship Between Human Capital and Productivity," *Journal of Human Resources* 15 (1), Winter 1980, 67-76; and Aline O. Quester, *Enlisted Crew Quality and Ship Material Readiness*, RM 88-254 (Alexandria, VA: Center for Naval Analyses), April 1989.

illustrated in Figure 1-2. This peak occurred at the end of a recession and near the beginning of the military drawdown. Since that time, the proportion of high-quality recruits has gradually declined. Although there was a slight increase in the percentage of quality recruits in 2001, quality has fallen comparable to that in the mid-1980s. This trend, if unchecked, is a cause for concern in the future, as a return to pre-1986 quality levels would be detrimental to readiness.

Figure 1-2. High-Quality Accessions to the Active-Duty Enlisted Force, 1973-2001



Source: Office of the Deputy Assistant Secretary of Defense (Military Personnel Policy).
Note: Data do not include individuals in the Army GED-Plus program.[14]

[14] The General Educational Development (GED)-Plus program is an experimental Army recruiting program that permits up to 4,000 non-high school graduate accessions annually in the Army active component. These individuals must have scored in the top half of the AFQT distribution and in the top 75 percent on a special motivational test. The Army sponsors these individuals in completion of their GED certificate. Because these individuals are not traditional high-school diploma graduates, they are not deemed high quality by the standard definition. As a result, the fraction of Army accessions with a high-school diploma fell from 90 percent in FY 1999 to 86 percent in FY 2000 and 85 percent in FY 2001. However, as shown in Figure 1-2, if participants in the GED-Plus program are excluded, the percent of Army recruits who were high quality rose slightly in FY 2000. The increase was even greater in FY 2001 as a result of an increase in the fraction that scored in the top half of the AFQT

In FY 2001, the Department recruited about 200,000 youth into the active force, of which 59 percent were high quality. In FY 1986, DoD accessed 50 percent more people, totaling 300,000 individuals, 55 percent of whom were high quality. What has changed significantly, however, is the cost of each high-quality recruit. The recruiting budget in 1986 was slightly smaller than in 2001 ($2.0 compared to $2.3 billion in constant dollars), but the cost per high-quality recruit has risen from $11,000 in 1986 to $20,000 in 2001 (with all costs in 2001 dollars). It is not only harder today to access high-quality recruits, but more expensive to do so as well.

In addition to the challenge of accessing high-quality recruits, the Services have often failed to achieve their numeric recruiting goals in recent years. The Army and Navy fell short of their recruiting goals in FY 1998 as did the Army and the Air Force in FY 1999. In FY 2000 and 2001, all Services struggled to meet their recruiting goals and came up short in particular specialties. FY 2002 will be an equally challenging year for recruiting as the target number of accessions has stabilized at around 200,000—more than 13 percent above its 1995 low.

Retention

The Services have been experiencing retention challenges as well, particularly in certain specialty skills. Reenlistment difficulties for all the Services have been ongoing since FY 1997, the first year after the end of the drawdown. Since that time, the Services have been managing their force to maintain a steady end-strength. Investments in retaining quality people over the last three years—including both monetary and non-monetary incentives to encourage enlisted members to stay in the force—yielded promising results in FY 2001.

Bonuses have been an increasingly important tool in achieving reenlistment goals, yet despite substantial increases some retention problems persist. The budget for initial reenlistment bonuses has more than tripled since FY 1997, with about $400 million being spent in FY 2001. As a result, in that year the Army, Navy, and Marine Corps all achieved planned levels of aggregate retention. The Air Force missed its aggregate retention goal by approximately 1,700 airmen. The Air Force did meet its first-term retention goal for the first time in three years but still fell below its second- and third-term retention targets.

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distribution. This drove the DoD high-quality percentage to 58 percent in FY 2000 and 61 percent in FY 2001.

In part, the retention problems that the Services face today are a result of manning decisions made during the drawdown. Military end-strength was reduced by one-third during the last decade through a combination of voluntary separations and reduced accessions. During that time, the Department experienced an unprecedented increase in operational missions and was able to successfully execute these missions because the force in place was highly experienced.

As senior personnel begin to separate, the resulting force will be less experienced. For example, in 1995, 28 percent of the enlisted force had between 6 and 12 years of service; today that proportion is 22 percent. The decrease is attributable to low accession levels during the drawdown as well as to lower mid-career retention over the past three years. Individuals with between 13 and 20 years of service constitute 22 percent of the force today; projections indicate that by 2005, this level will fall to 16 percent because of the number of members that will soon be eligible for retirement.

These factors are forcing the Services to increase their annual retention goals. Because of accession policies during the drawdown, the number of service members that can be targeted for retention is smaller than normal. Thus, the retention system is being asked to "do more with less"—to retain more individuals from a smaller pool. And this demand on the system is being made when the investment in time and money to achieve retention goals is at an all-time high.

OFFICER ACCESSION AND RETENTION

Meeting force inventory requirements for officers has been a challenge for the Services since FY 1997. In that year, the Air Force missed its end-strength target by nearly 500 officers. The Army and Air Force missed officer end-strength in FY 1998 through FY 2001 by combined totals of 1,500, 2,900, 2,700, and 2,900. The challenge in meeting end-strength goals reflects the changing recruiting environment and retention patterns with which the Services must contend in managing their force inventories.

Although the Services have met their aggregate accession goals for officers, the continuation rates of officers in grades O-3 and O-4 have declined since 1997. Of particular concern are shortages in critical skill categories, which are likely to continue even in less robust economic conditions or with a surge of interest in military service. This year, the Navy reports shortfalls for pilots, flight officers, civil engineers, chaplains, and most medical and related specialties—primarily specialty areas

requiring a specific educational background. The Air Force is falling short of its goals for navigators, intelligence officers, weather officers, physicists, and engineers. The Army is experiencing shortages in intelligence professionals, and all the Services are having difficulty retaining information technology professionals. The importance of technology and the associated demands placed on the force suggest an increasing requirement for highly technical skills in the officer corps.[15]

A related concern is a decline in interest among students to enroll in the Army Reserve Officer Training Corps (ROTC)—an important accession source particularly for officers with technical skill training.[16] Figure 1-3 shows the declining interest in the Army ROTC program among both men and women compared to a decade ago.[17] The Army also reports challenges in accessing officers from ROTC, and is concerned about attrition from ROTC programs.

LOOKING TO THE FUTURE

While the Services met their FY 2001 recruiting goals, success did not come easy. It required an increase in the level of investment in areas allowed to decline during the drawdown, such as advertising, recruiters and recruiting support, and enlistment and reenlistment incentives. It also required the Services to explore new ways to appeal to America's youth. In September, 2001, Army Secretary Thomas E. White attributed much of the Army's success in meeting its FY 2001 recruiting goals to a new ad campaign aimed at Generation Y—the "Army of One" campaign.[18] The other Services have revamped their recruiting messages as well. The Navy theme "Accelerate Your Life" is intended to connect with a generation raised with cellular telephones and instant messaging. The Air Force now promotes "Cross Into the Blue," and the Marines "The few. The proud. The Marines."

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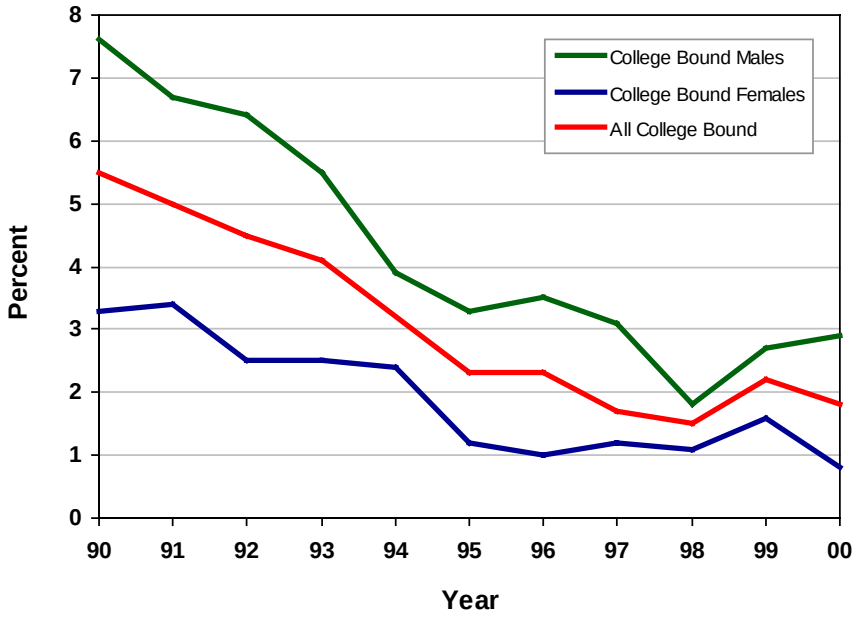
[15] Richard H. Kohn, "An Officer Corps for the Next Century," *Joint Forces Quarterly*, Spring 1998, 76-80; and the *Report of the Defense Science Board Task Force on Human Resources Strategy*, p. 20.

[16] ROTC accessions vary by Service. In FY 2001, 56 percent of Army accessions were drawn from ROTC, 36 percent for the Air Force, 22 percent for the Navy, and 13 percent for the Marine Corps.

[17] The reduction in the potential applicant pool, as measured by declining propensity, is offset by about 10 percent over the 1990-2000 decade by an increase in four-year college enrollment.

[18] "Army Meets Recruiting Goal of 75,800," *Washington Post*, September 5, 2001, p. A17.

Figure 1-3. Propensity to Enroll in the Army Reserve Officer Training Corps



Source: Teenage Research Unlimited and U.S. Army Cadet Command.
Note: Propensity data are based on 16-19 year old youth planning to attend or who are in college.

The Services are using innovative advertising to reach an American public that today has fewer role models with military experience. The Marine Corps sponsors a NASCAR team, which traveled to 47 states last year. The Air Force and the Army also sponsor stock cars on the Winston Cup circuit. The Services swear in enlistees at baseball games and advertise in movie theaters, with billboards, and on milk cartons.[19] Use of the Internet as a recruiting tool—or cyber-recruiting—has expanded in all Services. The Army even features a chat room on its site.

The resurgence in patriotism and increased interest in public service that arose after September 11, 2001, is encouraging. Yet whether this change in attitude will translate into more recruits is not yet clear. The surge in interest is not unlike what occurred in the early 1990s after the Gulf War—and was then followed by historically low levels of interest in military service in the mid-1990s. It is too soon to tell whether we are experiencing a sea change in the attitude of the American public or a temporary reaction to current events.

[19] Robert P. Hey, "Military Recruiters' New Message," *Christian Science Monitor*, July 9, 2001, p. 1.

Recruiting and retaining a high-quality force will be no less challenging in the future. Regardless of the state of the economy, competition with the private sector for high-quality individuals will continue, if not across-the-board then certainly in selected occupations. Maintaining sufficient manning levels in specialized career areas—such as languages, communication, information technology, aviation, and weapon system maintenance—will remain a challenge for some time. Therefore, the military must be competitive in recruiting and retaining a high-aptitude, more educated workforce.

In January, 2002, Army Chief of Staff Gen. Eric Shinseki remarked at an Army recruiting symposium, that "[r]ecruiters are in the frontline in the battle for talent"—an apt description of the challenges ahead.[20] Thus, for the foreseeable future, the Services will continue to meet recruiting and retention challenges through hard work, innovation, and investment. Effective military compensation policies are also critical to recruiting and retention success.

THE MILITARY PERSONNEL MANAGEMENT SYSTEM

Over the past three decades, the system for managing military personnel has evolved from one shaped primarily by the unlimited supply of manpower provided by the draft to one where the military must compete with the private sector to staff the All-Volunteer Force. During this period, recruiting and training for new recruits have changed significantly. Yet the management and compensation policies governing the career force retain much of the same character today that existed in the draft era. The key characteristics of the military personnel system are discussed below, followed by a description of the compensation system that supports personnel management.

[20] Joe Burlas, 'Recruiters must be ready to take the hill' ArmyLINK News http://www.dtic.mil/armylink/news/Jan2002/a20020128recruit012802.html

THE MILITARY PERSONNEL SYSTEM

The United States military maintains a uniformed force of about 1.4 million active-duty personnel and 875,000 members of the Selected Reserves and National Guard, as shown in Table 1-1. In addition, the 50,000 members of the United States Coast Guard, the United States Public Health Service (USPHS), and the National Oceanic and Atmospheric Administration (NOAA) are covered under the military compensation system.[21]

The military personnel system is largely a closed, hierarchical system where nearly all members enter at junior levels, are trained, and rise through the ranks based on merit, with leadership drawn from within. Three characteristics, discussed below, distinguish it from the private sector.[22]

No Lateral Entry

Lateral entry into the uniformed services does not often occur. The military loses about one-sixth of its active-duty personnel each year, requiring it to recruit and train about 200,000 new personnel to sustain force-level requirements. The military labor market is unique in that it is defined by its youthfulness. Less than 10 percent of its personnel are over 39 years of age, and only 3 percent are over 44. For both the enlisted and officer corps, there are distinct entry points, defined by education. New members generally enter service with high school diplomas or college degrees (enlisted and officers, respectively) and begin training for specific occupations. There is virtually no lateral entry into middle-level grades, except among some specialists such as doctors, dentists, lawyers, chaplains, and musicians. The senior officers and enlisted personnel in each Service are drawn exclusively from within—selected from among those who entered some 20 years earlier.

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[21] Though covered under the military personnel system, the U.S. Coast Guard is administratively located in the Department of Transportation, the USPHS in the Department of Health and Human Services, and NOAA in the Department of Commerce.

[22] Beth J. Asch and John T. Warner, *A Theory of Military Compensation and Personnel Policy*, MR-439-OSD (Santa Monica, CA: RAND Corporation), 1994.

Table 1-1. Active and Reserve Component Personnel in the Uniformed Services, September 2001

	Officer	Warrant Officer	Enlisted	Cadets/ Midshipmen	Total
Army	64,829	11,350	400,461	4,161	480,801
Navy	52,228	1,680	319,601	4,301	377,810
Marine Corps	16,174	1,888	154,872		172,934
Air Force	68,862		280,410	4,299	353,571
Coast Guard	5,552	1,414	28,580	833	36,379
USPHS	5,620				5,620
NOAA	239				239
Total Active	213,504	16,332	1,183,924	13,594	1,427,354
Army Reserve	38,118	2,750	164,760		205,628
Navy Reserve	18,808	233	68,872		87,913
Marine Corps Reserve	3,512	417	35,881		39,810
Air Force Reserve	16,938		56,819		73,757
Coast Guard Reserve	1,048	171	6,670		7,889
Total Reserve	78,424	3,571	333,002		414,997
Army National Guard	29,002	7,577	315,250		351,829
Air National Guard	13,425		95,060		108,485
Total National Guard	42,427	7,577	410,310		460,314
Total Active and Reserve Components	334,355	27,480	1,927,236	13,594	2,302,665

Source: Data for active-duty force from Directorate for Information Operations and Reports, Washington Headquarters Services. Data for Reserve and National Guard components from Defense Manpower Data Center.

Up-or-Out

Promotion in the military occurs according to an "up-or-out" policy. Once service members complete their initial training, they advance through the junior ranks (E-1 to E-3; O-1 to O-3) based on occupation qualifications, subject to minimum time-in-rank and time-in-service requirements. Promotions in these ranks occur "lock-step" and are based

primarily on calendar time in service. Once personnel reach the higher ranks, promotions are generally service-wide competitions with decisions made by centralized promotion boards. The "up-or-out" policy requires an individual to be promoted to the next highest grade within a specified period of time in order to remain in service.

Twenty-Year Retirement

The existence of a twenty-year retirement system is a central feature of the current personnel system. The system requires members to serve for 20 years before they are eligible to receive any retirement benefit. Unless they join the Reserves and accumulate enough Reserve credits to be eligible to receive Reserve retired pay at age 60, personnel who leave military service before completing 20 years of service receive no retirement benefit. This policy is in contrast to those of private-sector companies, which generally vest workers after five or seven years.

Impact on Personnel Management

Although some consider these characteristics to be impediments to more efficient personnel management, they are in place to support the unique nature of the military organization. However, they result in a relatively rigid system and limit the Services' flexibility in managing personnel. As the force changes over time, these characteristics may need to evolve to ensure that personnel requirements can be met.

For example, the lack of lateral entry implies several things for the structure of military compensation in a competitive labor market. First, the average pay for junior personnel will need to be above the average of civilian wages to attract enough high-quality personnel to join the military and remain in it long enough to be promoted to the senior ranks twenty years after entry. Second, the compensation package will need to be flexible enough, both in the short run *and* over a full twenty-year career, to adjust manpower supply to changes in the civilian labor market. Without sufficient flexibility, the Services could find it more difficult to meet career force requirements.

Under the "up-or-out" system, individuals who do not want, or are not qualified for, supervisory positions—but are able performers in non-supervisory roles—are generally forced out of the military. (There are some, but few, exceptions.) The "up-or-out" policy does serve a useful role in forcing out the least desirable personnel, but it is costly in terms of the loss of personnel who could continue to make a valuable contribution to the military's mission. Senior officers with extensive experience are

often lost because they do not make the cut for higher ranks. This does not mean that the "up-or-out" policy cannot continue, but introducing flexibility in how it is applied—by allowing personnel in some specialties to continue to serve without promotion, for example—could be beneficial.

Finally, although much has been written about the shortcomings of the current twenty-year retirement system, it has provided a stable cadre of career members willing to serve under all conditions.[23] As with the "up-or-out" system, the problem is not so much the fact that the twenty-year career is the dominant career length, but rather that alternatives in the current personnel management system are virtually non-existent.[24] The Services could consider introducing variable career lengths—allowing members in selected specialties to leave military service earlier with some benefits.

THE MILITARY COMPENSATION SYSTEM

The compensation system must necessarily support personnel policies. It should provide a collection of tools that can be flexibly applied to shape and adapt the military force under a wide range of both internal and external conditions—changing military requirements for personnel, a changing supply of personnel, and a strong civilian economy, for example.

The military's compensation system dates from the post-World War II period and, in overall structure, has changed little since that time.[25] The system is characterized by a base rate of pay; certain allowances for such items as housing and food; a host of special and incentive pays and bonuses for channeling personnel into particular skills or extending terms

[23] Beth J. Asch and John T. Warner, *A Policy Analysis of Alternative Military Retirement Systems*, MR-465-OSD (Santa Monica, CA: RAND Corporation), 1994; and Beth J. Asch, Richard Johnson, and John T. Warner, *Reforming the Military Retirement System*, MR-748-OSD (Santa Monica, CA: RAND Corporation), 1998.

[24] Congress provided the Department with a Temporary Early Retirement Authority in 1993 to facilitate the drawdown. Under this provision, the Services could offer members with between 15 and 20 years of service the opportunity to separate with a prorated and reduced retirement benefit. This authority had not been used in several years and, together with the other drawdown tools (Voluntary Separation Incentives and Special Separation Benefit), expired on January 1, 2002.

[25] However, previous Quadrennial Reviews of Military Compensation, beginning with the first in 1967, have made numerous recommendations for change. See Carl F. Witschonke, *Quadrennial Reviews of Military Compensation*, paper written for the Assistant Secretary of Defense (Force Management Policy), 1999.

of service; and a retirement annuity generally payable at a minimum of twenty years of service.[26]

The compensation system has four purposes: to

- ***Attract*** qualified people to military service.
- ***Retain*** a portion of the force in the right occupations for the right amount of time as they grow in experience and productivity.
- ***Motivate*** personnel to work hard and in the interest of the military while they serve.
- ***Induce*** personnel to separate on good terms when it is in the interest of the Service for them to do so.

Compensation is a reward to individuals, but it is also a critical tool for effectively shaping the force.

Compensation policy, viewed broadly, consists of four elements: pay level, pay composition, pay structure, and pay adjustment. *Pay level* refers to the amount military personnel are paid on average. *Pay composition* means the various components of pay, including basic pay and allowances, special pays, bonuses, fringe benefits in cash or in kind, and retired pay. *Pay structure* refers to how pay is differentiated by type of personnel, whether by grade, length of service, rank, occupation, or other characteristic. *Pay adjustment* refers to the mechanisms for adjusting military pay over time. These elements will be referred to throughout this report in analyzing current compensation policies.

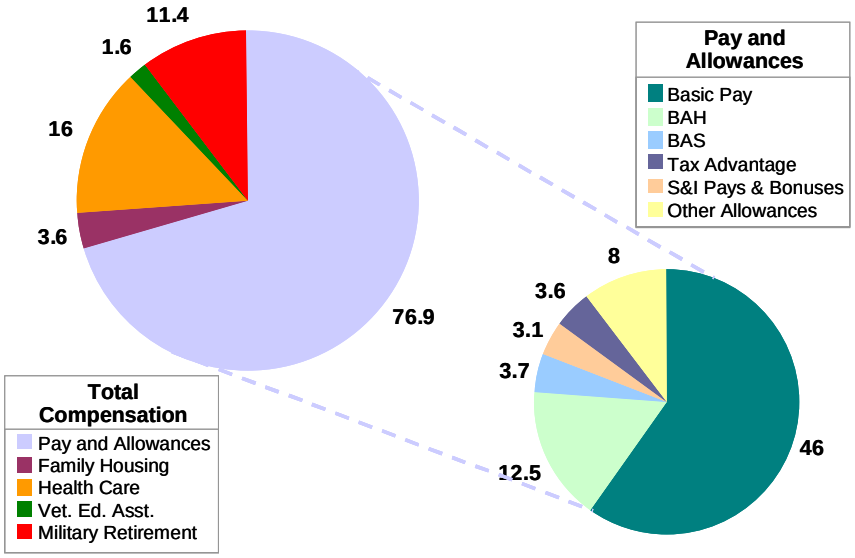
Components of Military Compensation

Military compensation totaled $109.5 billion in FY 2001. It is the single largest component of defense spending and the most important policy tool for influencing decisions to join and remain in the armed forces. The components of military compensation—representing current and deferred payments as well as cash and in-kind expenditures—are shown in Figure 1-4. Pay and allowances are the largest component of the compensation budget, at just over 70 percent. This area is the primary focus of the 9th QRMC. Health care and the military retirement benefit comprise another 25 percent of the budget, 14.5 and 10 percent respectively. Education benefits and health care at military treatment facilities are examples of compensation that are not part of the narrow

[26] A discussion of the compensation system can be found in Asch and Warner, *A Theory of Military Compensation and Personnel Policy*, 1994.

definition of military pay but, nonetheless, are very important to the service member.

Figure 1-4. Total Military Compensation for FY 2000



Source: Office of Management and Budget, Budget of the United States Government, Fiscal Year 2002, Table 22-1; U.S. Department of Defense, Selected Military Compensation Tables, Office of the Assistant Secretary of Defense (Force Management Policy), January 2000.

The main components of compensation are:

- ***Pay and Allowances***. The core of the military compensation system is regular military compensation (RMC), which includes basic pay, the basic allowance for housing (BAH), the basic allowance for subsistence (BAS), and the federal tax advantage (the basic allowances for housing and subsistence and certain additional allowances have non-taxable status). The largest share of RMC is basic pay, which is predicated on rank and tenure of service. There are over 60 separately authorized special and incentive pays (S&I) and bonuses, generally offered as incentives to undertake or continue service in a particular specialty or type of duty assignment. In addition, there are many other allowances, most of which are reimbursements similar to civilian expense accounts or allowances.

- ***Health Care***. Members are afforded full health care services, which are typically provided in kind at military treatment facilities. Benefits are also provided to dependents of active-duty members and retirees through the TRICARE system or on a space-available basis at military treatment facilities.[27]
- ***Military Retirement***. Members are eligible to retire after 20 years of service and, except for flag officers and exceptional cases, must retire on or before 30 years of service. Three sets of retirement provisions are in effect, based on when an individual entered the service.
- ***Family Housing***. About 71 percent of single members and about 34 percent of members with dependents live in government-furnished quarters. All other members receive housing allowances.
- ***Veterans Educational Assistance***. Popularly known as the Montgomery GI Bill, this program of educational assistance is based upon service on active duty or a combination of service on active duty and in the Selected Reserve. Service members contribute to the program while on duty and receive tuition assistance benefits after leaving service.

It is not surprising that there are so many components in the compensation package given the size of the military personnel system and the traditional policy of providing a complete support system for service members. Despite this apparent complexity, however, about two-thirds of all compensation is generated by a single set of tables of basic pay and allowances for all Services and occupations. As a consequence, and because of the key elements of the personnel management system described previously, there are limits to how much flexibility the military services have in differentiating pay among their members. These limits can in turn make it more difficult to attract the required numbers and types of personnel—the basic purpose of the compensation system.

[27] TRICARE is DoD's regional managed-care program for delivering health care to members of the Armed Services and their families, survivors, and retired members and their families, as defined in Peter H. Stoloff, Philip M. Luire, Lawrence Goldberg, and Michele Almendarez, *Evaluation of the TRICARE Program, FY 2000 Report to Congress*, http://www.defenselink.mil/pubs/tricare02202001.pdf, p. 2-1.

A COMPENSATION SYSTEM FOR THE FUTURE: FOCUS ON BALANCE AND FLEXIBILITY

The 9th QRMC has based its analysis, described in the following chapters, on two fundamental themes: ***balance*** and ***flexibility***. The military compensation system must achieve an appropriate ***balance*** between basic pay and special and incentive pays, in particular, and across the entire system in general. Even more important, the compensation system must have enough built-in ***flexibility*** to perform its traditional functions—attract, retain, motivate, and separate personnel—under a wide range of scenarios. It is against these tenets that changes to compensation policy should be evaluated.

BALANCE

The first priority is to ensure that the level and structure of basic pay are correct. It is essential to pay people what they are worth. As Under Secretary of Defense David S. C. Chu stated in a Congressional subcommittee hearing, "Securing pay raises is the foundation on which everything else rests."[28] Thus, it is critically important to get basic pay right first. Once this goal is accomplished, special and incentive pays and other force-shaping tools become useful in attracting the right numbers of personnel to particular career fields, locations, and lengths of service.

Not only must basic pay and special and incentive pays be adjusted in a balanced manner, balance must be preserved throughout the personnel management system—to include both personnel and compensation policies. Different parts of the system cannot be examined or adjusted in isolation, but must be considered in light of the system as a whole. For example, introducing alternatives to the 20-year career could not be implemented without considering its effect on the retirement system or special and incentive pays. Relaxing current "up-or-out" policies could require adjustments to compensation policy as well. So as military personnel management policies evolve, compensation policies must be balanced accordingly.

[28] Sandra Jontz, "Pentagon's Chu: Raise the Pay, Retain the People," *European Stars and Stripes*, July 20, 2001, p. 4.

FLEXIBILITY

The second priority is to ensure that there is enough flexibility in the array of tools available to adapt the skill and experience mix in the Services to changing requirements. Today flexibility is largely achieved using special and incentive pays and bonuses. In the future, flexibility could be augmented by employing a more voluntary assignment system or by introducing alternative career lengths or varied application of the military retirement benefit.

The ultimate success of the military personnel system is how robust and resilient it is under a broad range of conditions. Is the "tried and true" system in place today consistent with the fluid national security environment? Perhaps it is not. "If you want a military system that is more responsive to [these] conditions, you will need a more flexible system than "tried-and-true" policies are likely to give you."[29]

The basic issue surrounding the personnel management system is not one of radically changing lateral entry, "up-or-out" policies, or the retirement benefits system in the narrow sense, because the current system has demonstrated that these policies do work. Rather, the problem is in the rigidity with which these policies have been applied. In other words, the challenge for the future is how to expand the flexibility in the current system of personnel management policies, to encourage a wider variety of career paths and career lengths while maintaining the traditional values of equity and fairness for all who serve.

The theme of flexibility is not new to the 9th QRMC. In fact, this theme was promoted by the 8th QRMC, which noted that:

> *future DoD strategy may require more flexibility than currently exists in our human resources management system … because the different strategies needed to operate the different parts of an organization as large and diverse as the Department of Defense may lessen the need for pay egalitarianism.*[30]

More recently, the Defense Science Board (DSB) supported the theme of flexibility. Many of the DoD's force-shaping tools reflect a "one-size-

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[29] David S. C. Chu, "The American Military's Response to a Changing World Order: What Does It Imply for Manpower Requirements?" in *Professionals on the Front Line: Two Decades of the All-Volunteer Force*, J. Eric Fredland, Curtis L. Gilroy, Roger D. Little, and W. S. Sellman, eds. (Washington, DC: Brasseys), 1996.

[30] U.S. Department of Defense, *Report of the Eighth Quadrennial Review of Military Compensation: Working Papers*, Office of the Assistant Secretary of Defense (Force Management Policy), Washington DC, June 30, 1997, p. 25.

fits-all" approach. The DSB recommended that the Department "develop tools that allow flexibility for the different career patterns, compensation expectations, and motivations in different occupations. … [R]ecruiting and retaining the kind of force the Department needs will require incentives that are different from those that were useful in the past."[31] The *Morale and Quality of Life Review*, conducted for Defense Secretary Rumsfeld, concurred with the DSB in stating, "tools that allow for greater force shaping flexibility are essential."[32]

Balance and flexibility are the central themes of the 9th QRMC.

SCOPE OF THE REPORT

In July, 1999, the Ninth Quadrennial Review of Military Compensation was directed "to conduct a strategic review of the military compensation and benefits system." It was also asked to review veterans benefits and services provided by the Department of Veterans Affairs—principally the Montgomery GI Bill education benefit—and other federal entitlements directly affecting military members, such as the Thrift Savings Plan. Most importantly, the 9th QRMC was directed to "assess the effectiveness of current military compensation and benefits in recruiting and retaining a high-quality force in light of changing demographics, a dynamic economy, and the new military strategy."[33] This assessment was the focus of the QRMC's effort.

The following chapters present the findings and recommendations of the review. Chapter II is the centerpiece of the report. It describes the need to fundamentally change the way the Department evaluates the adequacy of basic pay, and it recommends adjustments to basic pay for both enlisted personnel and officers. Chapter III focuses on the vast system of special and incentive pays—the primary mechanism for creating pay differentials among service members—and offers suggestions for alternative force-shaping tools that could provide the military services greater flexibility in managing their force. In Chapter IV, the discussion turns to other aspects of compensation that affect the overall financial well-being of service members; the standard of living of junior enlisted families, earnings of military spouses, the overseas cost-of-living

[31] *Report of the Defense Science Board Task Force on Human Resources Strategy* (2000), pp. ix-x.
[32] *Improving Morale and Quality of Life: Overview* (2001), p. 1.
[33] Memorandum for the Secretary of Defense directing the 9th QRMC, signed by President William J. Clinton, July 20, 1999.

allowance, educational benefits, and military retiree earnings are addressed. The final chapter revisits the themes of balance and flexibility in light of the recommendations of the 9th QRMC and suggests areas for further research.

Four additional volumes contain background research on the range of topics covered by this QRMC. Volume II addresses regular military compensation. Volumes III and IV contain papers on special and incentive pays and bonuses as well as alternative tools that would provide the Department greater flexibility in shaping pay. Volume V presents research on other measures of financial well-being.

CHAPTER II

REGULAR MILITARY COMPENSATION

The Department of Defense faces a continuing challenge in maintaining a high-quality force—both in terms of its numbers and its diversity of skills. The military Services must recruit and retain their force amidst a highly competitive environment in which more young people are going to college and attractive opportunities in the private sector are increasing. Even as cyclical changes occur in the economy and interest among American youth in military service rises and falls, the information revolution of the past decade has fundamentally changed the labor market and career expectations. *To compete in this environment, the Department must reexamine all of its recruiting and retention tools, the foundation of which is regular military compensation.*

WHAT IS REGULAR MILITARY COMPENSATION?

Regular military compensation includes basic pay, basic allowance for housing, and basic allowance for subsistence, plus an additional amount to account for the fact that allowances for housing and subsistence are not subject to federal income tax. In addition to regular military compensation, service members receive a variety of separate pays, allowances, bonuses, and benefits—of which there are over 70 in existence, though individual members usually receive no more than seven or eight over the course of their careers.

Each member is entitled to receive the three basic elements of regular military compensation as well as the federal tax advantage. For this reason, in 1962 the Gorham Commission established the concept of RMC as a "rough yardstick to be used in comparing the compensation of members of the uniformed services to the compensation of civilian-sector employees."[34] This measure remains the basis for evaluating comparability between military and civilian compensation today and is the foundation of the analyses in this chapter.

BASIC PAY

The core of RMC is basic pay—the primary means of compensating members of the uniformed services for service to their country. Basic pay accounts for about 64 percent of RMC for enlisted personnel and 73

[34] *Military Compensation Background Papers*, Fifth Edition (Washington, DC: U.S. Government Printing Office), September 1996, p. 21.

percent for officers (in 1999). The uniformed services share the same basic pay tables for officers, enlisted personnel, and warrant officers (for those Services that have a warrant officer corps).

The amount of a service member's basic pay is determined by grade and length of service. Today's pay tables, the basic structure of which was established in the Career Compensation Act of 1949, thus includes an amount for each pay grade—E-1 through E-9 for enlisted personnel, O-1 through O-10 for officers, and W-1 through W-5 for warrant officers—as well as incremental "longevity steps" to reflect length of service. Together the pay levels in each grade and the longevity steps determine the structure of the basic pay table.

Thus, the increases in basic pay that service members receive at various points during their military careers are the result of both promotion and longevity. While both are important indicators of productivity, "…promotion [more] explicitly recognizes superior performance…."[35] Experience on the job should not be devalued, but pay raises that acknowledge additional experience (longevity) should naturally be less important since low as well as high performers receive longevity increases. Determining the appropriate balance between promotion and longevity is critical in designing an efficient and effective pay table.

Toward this end, the 7th QRMC established two criteria as the basis for restructuring the military pay tables:

- Promotion raises (in absolute terms) should increase with rank to provide performance incentives.
- Longevity raises should be relatively uniform (since increased performance derived from experience occurs relatively smoothly) and should be smaller than raises associated with promotion.

These criteria were the basis for changes to the structure of the pay table in the FY 2000 National Defense Authorization Act (Public Law 106-65) and are endorsed by the 9th QRMC.

ALLOWANCES

The basic allowance for housing constitutes about 20 percent of RMC for enlisted personnel and 17 percent for officers. The purpose of BAH is

[35] U.S. Department of Defense, *Report of the Seventh Quadrennial Review of Military Compensation*, Office of the Assistant Secretary of Defense (Force Management and Personnel), Washington, DC, August 21, 1992, p. 45.

to defray the cost of housing for the two-thirds of military personnel who must procure housing in the civilian economy because adequate, government-provided quarters are unavailable. The level of BAH is set according to the median housing costs by geographic location. Specific dollar amounts vary by marital status and pay grade. Historically, the percentage of housing costs covered by the allowance has averaged about 80 percent, with the difference being absorbed by the member. These extra expenses are often referred to as out-of-pocket costs.

The Department of Defense has recently begun to eliminate these out-of-pocket costs. The current schedule calls for a total elimination of out-of-pocket costs for the typical service member over a five-year period. The first reduction of about 4 percent occurred in FY 2001 and the final reduction will occur in FY 2005. This increase in BAH will imply an increase in RMC as well.

The basic allowance for subsistence is paid to members of the armed forces to defray a portion of the cost of food. BAS is a relatively small portion of RMC and is paid as a flat rate regardless of rank or time-in-service. All officers receive BAS. Enlisted personnel receive this allowance "(a) when rations in kind are not available, (b) when permission to mess separately is granted, or (c) when assigned to duty under emergency conditions where no Government messing facilities are available."[36] In 1999, eligible enlisted personnel received $2,738 per year (about 9 percent of RMC) and officers received $1,887 per year (3 percent of RMC). While BAS first was intended to approximate the government's cost of feeding its military personnel, in practice this linkage no longer exists.

IS REGULAR MILITARY COMPENSATION ADEQUATE?

A fundamental objective of compensation is to attract, retain, and motivate a workforce of sufficient quality. While members of the uniformed services serve for reasons other than pay, their perception of whether they are paid fairly is important. An understanding of private-sector compensation for roughly equivalent skills, experience, and education influences this perception.

[36] *Military Compensation Background Papers* (1996), p. 125.

Debate over the adequacy of military compensation is long standing. Indeed, one of the seminal studies of military compensation—the *Advisory Commission on Service Pay*, commonly known as the Hook Commission—set the terms of the debate more than 50 years ago.[37] The Hook Commission conducted a comprehensive review of military compensation that led to the passage of the Career Compensation Act of 1949. This act established that military compensation rates be set based on comparisons between military and private-sector positions with comparable levels of responsibility.

In keeping with the Hook Commission's findings, the *President's Commission on an All-Volunteer Armed Force*, convened in 1970, recognized that military and civilian pay comparability was critical to the success of the All-Volunteer Force and should take account of the special demands associated with military life.

> *While civilian high school or college graduates work in a variety of activities and under extremely divergent conditions, military personnel are likely to experience greater hazards and hardships in the service. For this reason, we are unable to claim that equality between military and civilian compensation represents true comparability. In fact, we suspect that higher levels of remuneration for military than for equally qualified civilian personnel will be necessary to achieve comparability in both monetary and non-monetary conditions of service.*[38]

A more recent study argued that military pay should be comparable to (and probably more than) average wages in the private sector for a variety of reasons.

> *First, the military is selective and prefers youth with higher aptitudes, excellent health, and no criminal records. Second, military duty requires the subordination of personal freedom to regimentation, military personnel are constantly on call, and military duty entails heightened risk of illness, injury, and death. Both the selectivity and the rigors of military service call for above-average pay, and pay at around the 70th percentile or above has historically been necessary to enable the military to*

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[37] *Career Compensation for the Uniformed Forces: A Report and Recommendation for the Secretary of Defense by the Advisory Commission on Service Pay* (Washington, DC: U.S. Government Printing Office), December 1948.

[38] *The Report of the President's Commission on an All-Volunteer Armed Force* (Washington, DC: U.S. Government Printing Office), February 1970, p. 201.

recruit and retain the quantity and quality of personnel it requires.[39]

In 1980 and 1981, across-the-board pay increases of 11.7 and 14.3 percent, respectively, were legislated because military pay had "fallen behind" civilian pay. Pay erosion and the elimination of other benefits were primary reasons for the dramatic decline in high-quality enlistments during the late 1970s and early 1980s. The number of total enlistments was down as well, as were reenlistments and the morale of the career force.[40] As a result, force readiness suffered; this situation is not one that the military services want to revisit.

Yet evidence suggests that military compensation is again falling behind. The QRMC examines the basis for this statement in the remainder of this chapter and offers recommendations for changes to the basic pay table for enlisted personnel, commissioned officers, and the warrant officer corps.

ENLISTED PERSONNEL

The National Defense Authorization Acts of FY 2000 (Public Law 106-65) and FY 2001 (Public Law 106-398) provided for higher than typical increases in basic pay over a seven-year period. A 4.8 percent pay increase took effect January 1, 2000, followed by supplemental adjustments in certain years-of-service and pay grades in July, 2000 (1.4 percent on average)—both of which are used in calculating the RMC profiles in the following analyses. The January, 2001, pay raise was 3.7 percent with a supplemental adjustment of 0.4 percent, on average, in July. Through fiscal year 2006, basic pay will increase half a percentage point more each year than the Employment Cost Index for private-sector wage costs.

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[39] Beth J. Asch, James R. Hosek, and John T. Warner, *An Analysis of Pay for Enlisted Personnel*, DB-344-OSD (Santa Monica, CA: RAND Corporation), 2001, p. vii.

[40] Edwin Dorn, "Sustaining the All-Volunteer Force," in J. Eric Fredland, Curtis L. Gilroy, Roger D. Little, and W. S. Sellman, eds. *Professionals on the Front Line: Two Decades of the All-Volunteer Force* (Washington, DC: Brassey's), 1996, p. 18. See also Maxwell R. Thurman, "Sustaining the All-Volunteer Force 1983-1992: The Second Decade," in William Bowman, Roger Little, and Eric Fredland, eds. *The All-Volunteer Force after a Decade: Retrospect and Prospect* (Washington DC: Pergamon-Brassey's), 1986, pp. 269-270; and Curtis L. Gilroy, Robert L. Phillips, and John D. Blair, "The All-Volunteer Army: Fifteen Years Later," *Armed Forces and Society*, 16 (3) Spring 1990, 329-350.

Despite these compensation improvements, enlisted pay is no longer appropriately structured to retain the highest-quality personnel needed in today's force. Problems exist with not only the level of pay, but also the structure and the assumptions upon which the Department bases compensation. The current basic pay structure does not adequately recognize the increase in education obtained by enlisted members as the All-Volunteer Force has evolved. Nor does today's pay structure reflect the need for an increasingly capable force in today's high-technology environment.

In addition, senior enlisted leaders suggest that the structure of the current pay table needs to be adjusted to give appropriate recognition to the significant increase in responsibility that occurs when personnel advance to the noncommissioned officer (NCO) corps (E-5) and to the senior enlisted ranks (E-8 and E-9). The frequency of financial problems among first-term enlisted personnel raises the question of whether changes in entry-level pay are needed as well. But more important, the relatively flat earnings profile in the mid-level enlisted grades may encourage personnel to seek other career alternatives, such as commission as an officer or private-sector options.

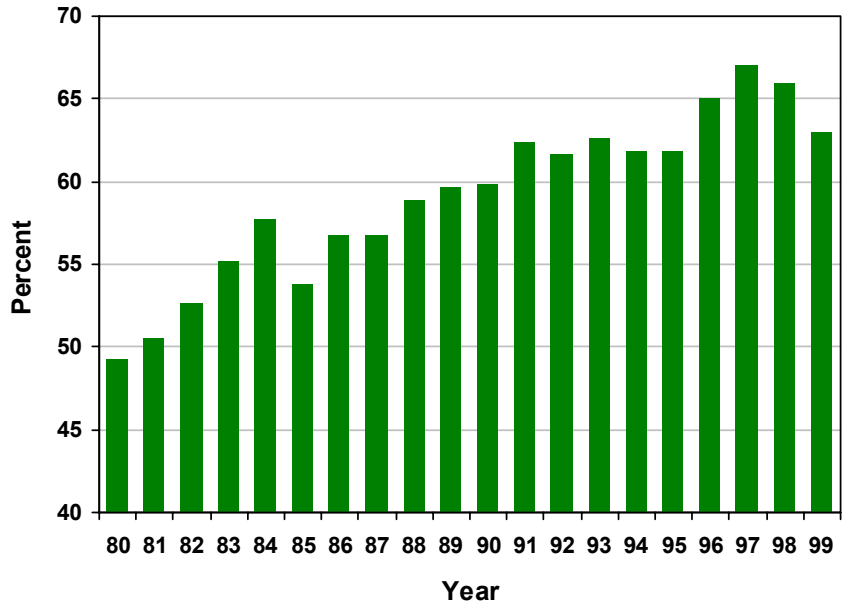
The analysis that follows addresses these concerns over the adequacy of enlisted pay and makes the case that the military cannot attract and retain the enlisted force needed for the future on the basis of today's compensation structure. We begin with an examination of trends in the youth labor market over the past 15 years, focusing on changes in educational attainment in general and college attendance in particular. The analysis then turns to a comparison of enlisted compensation with the earnings of comparably educated civilian workers. Finally, the QRMC evaluates the impact of the military and civilian pay comparisons on three components of the enlisted force—junior enlisted grades (E-1 to E-4), middle enlisted grades (E-5 to E-7), and senior grades (E-8 to E-9).

Labor Market Trends: Educational Attainment

While recruiting has always been more difficult when the economy is robust, today's recruiting and retention challenges are symptomatic of structural changes taking place in the civilian job market and labor supply—changes that are expected to continue in the long run. Thus, the military services are going to have to look for more fundamental solutions to meeting these challenges than have been considered in the past.

The most significant trend in the youth labor market is the dramatic rise in college attendance over the past 20 years, as shown in Figure 2-1. In 1980, 48 percent of high school seniors enrolled in college within 12 months of graduation. By 1990, that number had increased to 60 percent, and has generally continued to rise since that time. As a result, the recruiting pool is now limited to about three in every ten youth. In 1980, the Services could recruit from five out of every ten youth.

Figure 2-1. College Enrollment Rates for Recent High School Graduates, 1980-1999



Source: U.S. Department of Education, National Center for Education Statistics.
Note: Enrollment rates are within 12 months of high school graduation.

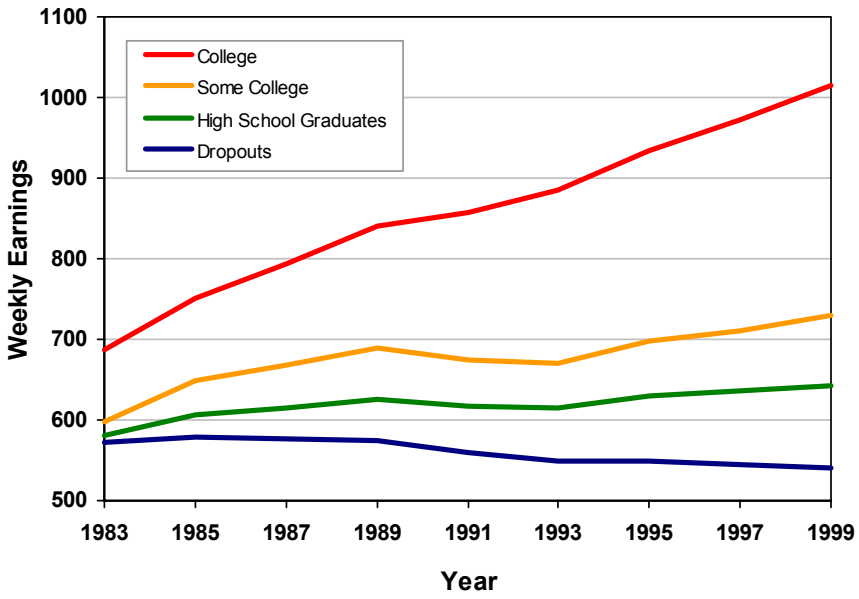
Thus, the traditional recruiting market—high school graduates who do not immediately enroll in college—is an ever-shrinking population. And within this market, the Services target youth with higher than average aptitude scores on the Armed Forces Qualification Test, further limiting the pool of eligible recruits. Given the requirements for high-aptitude recruits, an increasing number of individuals the Services would most like to recruit are more likely than in the past to be college-bound immediately after high school.

The trend in college enrollment is certain to continue. American families are increasingly able to finance post-secondary education.

Students and their families realize that the returns to education, in terms of increased earnings, are significant.[41]

As shown in Figure 2-2, the inflation-adjusted earnings for college graduates in technical and professional occupations have increased dramatically from 1983 to 1999 (47 percent). Earnings of individuals with some college education—that is, having completed more than one year of college but without completing a baccalaureate degree—who work in professional and technical occupations have risen as well, though at a lower rate (22 percent). Earnings for high school graduates have increased by only a small margin (11 percent), while individuals without high school diplomas actually earn less in real terms than they did 17 years ago.

Figure 2-2. Civilian Weekly Earnings in Professional and Technical Occupations by Education, 1983-1999 (1998 dollars)



Source: Hosek and Sharp (2001).

[41] Chinhui Juhn, Kevin M. Murphy, and Brooks Pierce, "Wage Inequality and the Rise in Returns to Skill," *Journal of Political Economy,* 101 (3), 1993, 410-442. A discussion of recent work by Murphy is in Ronald A. Wirtz, "Putting a Finger in the Grand (Income) Canyon," *The Region*, Federal Reserve Bank of Minneapolis, December 2000, http://minneapolisfed.org/pubs/region/00-12/income.html. Wage premiums for college graduates continued to rise throughout the 1990s. See also Jeff Grogger and Eric Eide, "Changes in College Skills and the Rise in the College Wage Premium," *Journal of Human Resources,* 30 (2), 1995, 280-310.

Forecasts of the job market suggest that these relative earnings trends will continue as the economy increasingly rewards more education.[42] Because the Services are going to have little influence on the propensity of youth to seek college education, they must adjust recruiting strategies to capitalize on this phenomenon. *New approaches must include compensation strategies that appeal to high-quality recruit prospects that have completed at least some college and want to continue to further their education.*

The value of education is not only understood by the population of high school graduates who are recruiting prospects, but also by those already serving in the enlisted force. For at least the last decade, 90 percent or more of enlisted accessions had a high school diploma upon entry into military service. Data from the 1985, 1992, and 1999 Surveys of Active Duty Personnel indicate that increasing numbers of enlisted personnel are acquiring at least some college education while in service. Today, over half of the first-term enlisted force has at least one year of college, as do about 90 percent of those with 20 or more years of service, as Figure 2-3 illustrates.

In fact, in the 1999 survey, 21 percent of E-8s and 27 percent of E-9s reported having either a college baccalaureate degree or an advanced degree, as shown in Figure 2-4. Data from Service administrative records show a similar correlation between educational attainment and rank, although the levels are somewhat lower than the survey results indicate, due in large part to a lag in reporting.[43] This pattern is similar for each of the Services, as well as across a wide range of skill groups.

While no specific study has been undertaken to explain the increasing educational attainment among men and women currently serving in the military, several contributing factors can be postulated:

- Service technical training carries college equivalencies. In some fields, completion of entry-level technical training brings a member to within a handful of general studies credits required to earn an associate's degree.

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[42] James Hosek and Jennifer Sharp, *Keeping Military Pay Competitive: The Outlook for Civilian Wage Growth and Its Consequences,* IP-205 (Santa Monica, CA: RAND Corporation), 2001, p. 8.

[43] Differences in education levels as estimated from administrative record data and survey self-reports are also due to "substantial underreporting in the record data of college credits as well as college and postgraduate degrees." See memorandum from Chief, Survey and Program Evaluation Division, Defense Manpower Data Center to Director, Ninth Quadrennial Review of Military Compensation, December 7, 2000, p. 3.

Figure 2-3. Enlisted Personnel with Higher Education

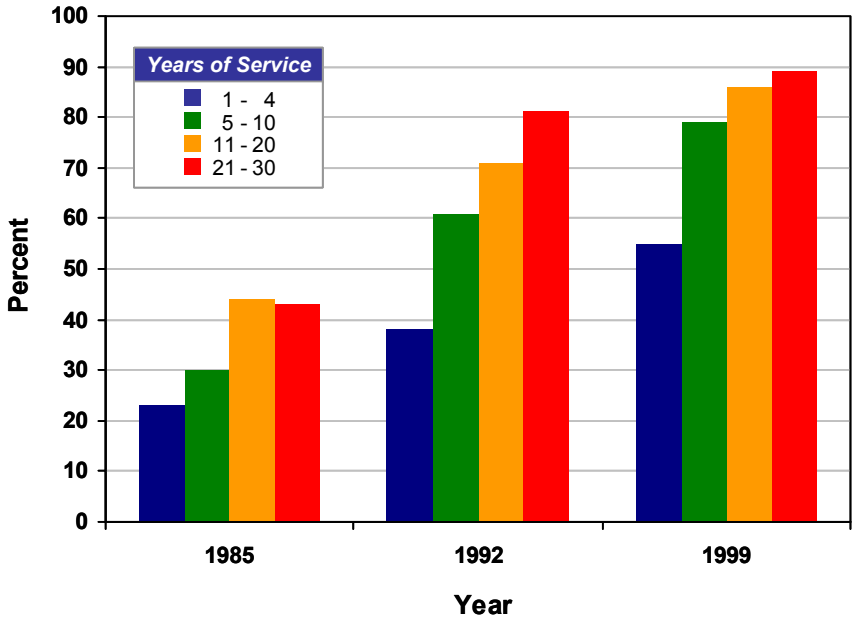
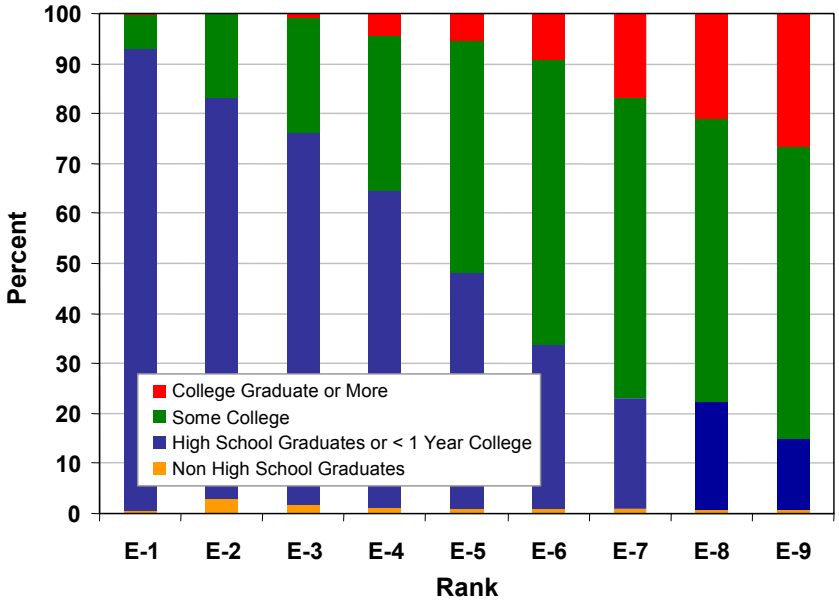


Figure 2-4. Educational Attainment of Enlisted Personnel by Rank, 1999



Source: Defense Manpower Data Center; 1985, 1992, and 1999 Surveys of Active Duty Personnel.
Note: Higher education is defined as more than one year of college.

- Services credit advanced education in their respective advancement processes, thereby clearly stating the value of education to members who desire promotion.
- Service members recognize that their post-service employment and earnings potential are enhanced by more education.

As mentioned, the military services focus their recruiting efforts on high school graduates with higher AFQT scores. There is a strong correlation between aptitude and educational attainment. That is, those with higher AFQT scores upon graduation from high school tend to pursue more education. Data from the National Longitudinal Surveys of Youth show that ten years after graduating from high school:

- Those with an average AFQT score at the 50th percentile did not increase their education.
- Those with an average score at the 65th percentile obtained some college education.
- Those with an average score at the 84th percentile completed a college degree.

As the Services strive to enlist more members with high AFQT scores, a growing percentage of the entering cohort will aspire to complete at least some college. As a result, the overall education level of the enlisted force in the future will likely be even higher than the levels reflected in Figure 2-4. This relationship between aptitude and education is important because, in order to recruit and retain higher aptitude personnel, the military must offer pay *and* educational opportunities comparable to what a service member might obtain in the private sector.[44]

COMPARING ENLISTED PAY TO CIVILIAN EARNINGS

The changes in educational attainment within the enlisted force raise an interesting question about pay comparability between military enlisted personnel and their civilian counterparts: is the enlisted pay table in use today based on the correct underlying assumptions? In other words, is the Department using the right civilian earnings as the basis for comparison? Today, the career enlisted force is being compensated as a high-quality, high-school-educated force when, in fact, the actual composition of the

[44] Asch, Hosek, and Warner (2001), p. 10.

force reflects a much higher level of education—a phenomenon that is expected to continue.

An assessment of military and civilian pay comparability can be conducted using a variety of methods. One method of examining pay comparability is in terms of "pay gaps" which have received significant attention recently, with the widely held conclusion that military pay has fallen behind.[45] If the growth in military pay over the last 20 years is compared to the growth in private-sector wages (as measured by the Employment Cost Index) over that same period, results show that military pay has increased at a rate between 5.5 to 13.5 percent slower than private-sector wages. How much slower depends upon the year chosen as the baseline for comparison as well as the index used. Other analyses make comparisons of distinct slices of the force and have found gaps that are either higher or lower than the figures cited; in some cases no gap exists at all.[46]

Because of weaknesses in the pay gap methodology, which examines annual *changes* in military compensation over time, a different technique was employed by the QRMC. This technique compares *levels* of military and civilian earnings. Thus, to determine whether changes in the pay table are warranted, and where those changes would be targeted, a comparison was made between the earnings of military personnel in grades E-1 to E-7 and the earnings of civilians with comparable education.[47]

The pay comparisons are based on estimates of full-time year-round earnings of civilian male high school graduates who are 18 to 59 years old. These estimates were derived from models using data from the Current

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[45] The *Army Times, Navy Times*, and *Air Force Times* periodically report the pay gap in the press, based on the empirical work found in James R. Hosek, Christine E. Peterson, Jeanette Van Winkle, and Hui Wang, *A Civilian Wage Index for Defense Manpower,* R-4190-FMP (Santa Monica, CA: RAND Corporation), 1992; and James R. Hosek, Christine E. Peterson, and Johanna Zorn Heilbrunn, *Military Pay Gaps and Caps*, MR-368 (Santa Monica, CA: RAND Corporation), 1994.

[46] Richard L. Fernandez, *What Does the Military 'Pay Gap' Mean?* (Washington, DC: Congressional Budget Office), June 1999. See also David F. Burelli, *Military and Civilian Pay: Is There a Gap?* CRS Report 95-492F (Washington, DC: Congressional Research Service), April 1995.

[47] To include E-8 and E-9 grades in this assessment would show a relatively sharp rise in average enlisted regular military compensation at about 20 years of service simply because there are few lower grade members in the service longer than 20 years. Although Fernandez (1999) included the senior grades in his earnings profiles, he noted this problem in a footnote. Asch, Hosek, and Warner (2001) chose to truncate the RMC profile at 20 years of service. The QRMC has chosen to truncate the profile at the E-7 grade through 26 years of service as very few E-7s remain in service past that point. The two senior grades are treated separately in a subsequent section.

Population Survey.[48] The models were also used to construct percentiles of civilian earnings. For example, civilian earnings for high school graduates range from less than $10,000 to more than $30,000 at entry level, with increases of 125 percent over a 20-year span.

The comparison of RMC with civilian pay for high school graduates, across a range of percentiles and for different years of experience, is displayed in Figure 2-5.[49] Using high school graduate earnings as a measure of comparability, enlisted RMC compares favorably with civilian earnings. For mid-grade enlisted personnel, RMC tracks reasonably well with the 70th percentile of earnings, and for the junior enlisted grades, RMC is actually above the 70th percentile.[50]

As posited earlier, however, comparing enlisted RMC with the earnings of high school graduates in the civilian population is no longer appropriate for much of the enlisted force. Instead, a composite of three education levels—that of a high school graduate, of those with some college, and of a college graduate—more appropriately depicts the correct civilian target populations over an enlisted member's career. In the first seven years of service, high school graduates are the appropriate comparison group. Within 8 to 20 years of service, earnings of civilians with some college education represent the best comparison. Among those senior members of the force with 20 or more years of service, an increasing number possess college or graduate degrees which, coupled with their high levels of responsibility, argues for comparison with college graduate earnings.

An assessment of whether current pay is adequate for these cohorts of the enlisted force—junior enlisted, mid-grade enlisted, and senior enlisted—particularly in light of the change in education levels, is addressed in the following sections. What is evident from this assessment is that the earnings of mid-grade and senior-grade enlisted personnel are most in need of adjustment.

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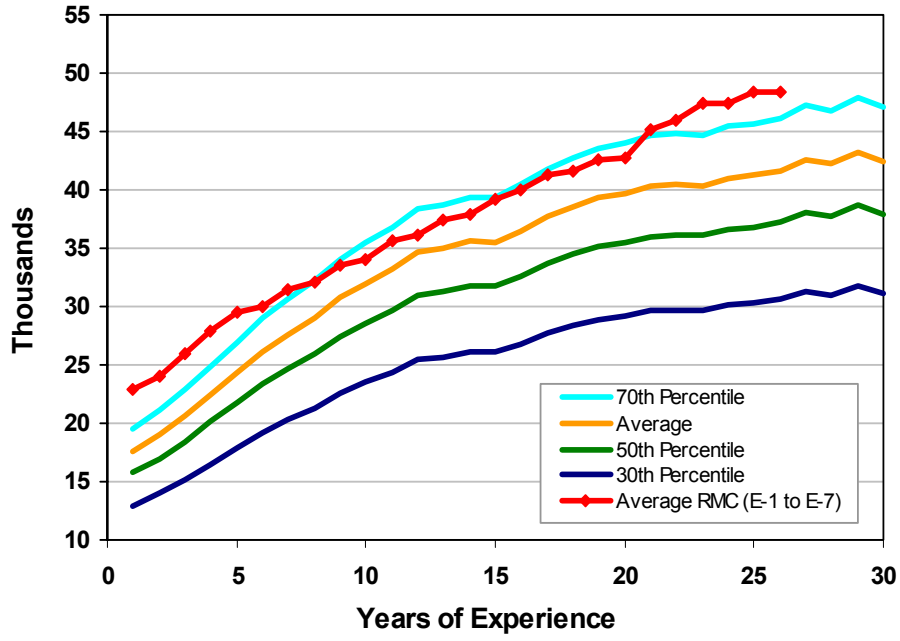
[48] The Current Population Survey is conducted by the Bureau of the Census for the Bureau of Labor Statistics. For more detailed discussion of the models and analytical techniques used in this analysis, see Asch, Hosek, and Warner (2001).

[49] Years of service in the military equate to years of experience in the private sector.

[50] Fernandez (1999, p. 32) finds a similar pattern using data for 1997. See also Richard V. L. Cooper, *Military Manpower and the All-Volunteer Force,* R-1450-ARPA (Santa Monica, CA: RAND Corporation), September 1977, p. 369.

Figure 2-5. Comparison of Enlisted RMC to Civilian Earnings for High School Graduates (2000 dollars)



Note: Data reflect July 2000 enlisted pay (RMC) for E-1 to E-7 compared with predicted year 2000 earnings of male high school graduates.

Junior Enlisted (E-1 to E-4)

Based on education levels of the majority of junior enlisted personnel, it is most appropriate to compare regular military compensation for junior enlisted members with earnings of civilians with high school diplomas. As shown in Figure 2-5, earnings of junior enlisted personnel (those with zero through four years of experience) are relatively high—above the 70th percentile of civilian workers with a high school diploma.

However, given the publicity that has focused for some time on whether junior enlisted members are able to maintain an adequate standard of living, further assessment of this matter has been conducted.[51] What this assessment shows is that overall, junior enlisted earnings still compare favorably to the earnings of high school graduates with the exception of a very small percentage of the force characterized by large family size and/or financial debt. A variety of measures support this conclusion:

[51] This topic is discussed further in Chapter IV.

- Some argue that RMC is not the appropriate comparison for junior enlisted members as many live in government quarters and do not receive the basic allowance for housing. Further, the "value" of government housing at this grade—usually a room in a barrack or a bunk on a ship—is likely to be less than the current level of BAH, which averages $500 per month. However, excluding BAH from RMC still results in a favorable comparison between civilian high school earnings and junior enlisted RMC.
- Comparing RMC for enlisted members with U.S. official poverty thresholds shows that only 0.04 percent, or about 500 service members, have compensation levels below poverty income thresholds. These service members tend to have large families of five or more children. [52]
- Food stamp usage in 1998 was limited to approximately 6,300 members of an active-duty force of 1.4 million. Again, eligibility tends to be linked to family size and whether the member lives on or off base. For members living on base, the value of their housing is not factored into food stamp eligibility calculations; if it were, the percentage of members receiving food stamps would fall from 0.5 to 0.2 percent of the force.
- Most junior enlisted personnel who report having substantial financial difficulties are more likely to have significant levels of debt. Thus, financial difficulties for these individuals are linked more to levels of debt than compensation.[53]

Despite these facts, which indicate that compensation for junior enlisted personnel compares favorably with their civilian counterparts (except for a small number of individuals), a case can be made for making some adjustment to pay at this level, given the recruiting challenges the Services have faced in recent years. *A modest pay adjustment for junior enlisted personnel, coupled with strong enlistment incentives through bonuses and educational benefits, should help to improve recruiting success*.

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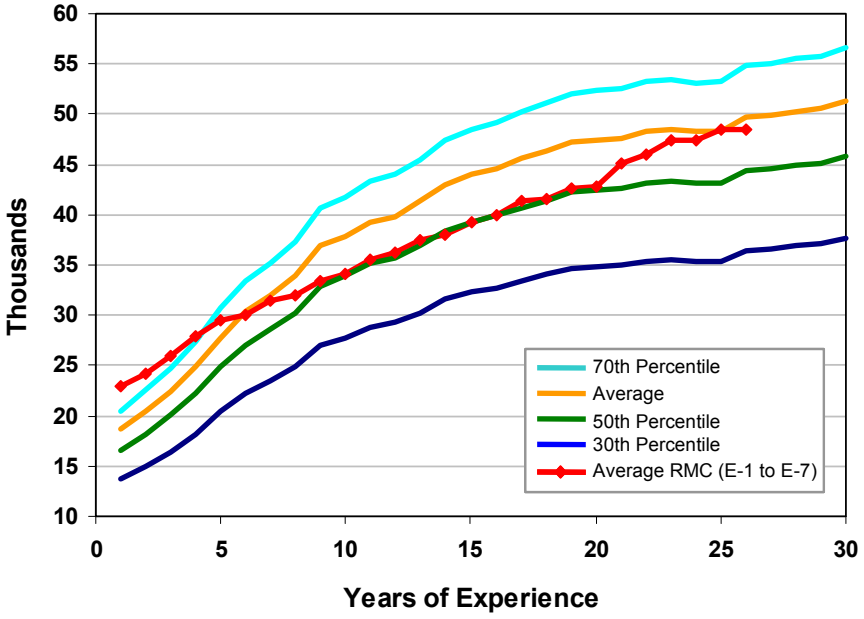
[52] See Thomas A. Husted and Michael L. Hansen, *Standard of Living of Enlisted Personnel*, CRM D0002907.A2 (Alexandria, VA: Center for Naval Analyses), March 2001.

[53] Peter Tiemeyer, Casey Wardynski, and Richard Buddin, *Financial Management Problems Among Enlisted Personnel*, DB-241-OSD (Santa Monica, CA: RAND Corporation), 1999.

Mid-Grade Enlisted (E-5 to E-7)

Military pay for mid-grade enlisted personnel is compared to the earnings of civilian males with some college education in Figure 2-6. The higher civilian earnings profiles in Figure 2-6 reflect the higher average earnings of those individuals with some college education as compared to those with high school diplomas.

Figure 2-6. Comparison of Enlisted RMC to the Earnings of Civilians with Some College Education (2000 dollars)



Note: Data reflect July 2000 enlisted pay (RMC) for E-1 to E-7 compared with predicted year 2000 earnings of males with some college.

For mid-grade enlisted personnel, military earnings now compare far less favorably with comparable wage opportunities in the private sector. Regular military compensation, which tracked at the 70th percentile when compared to the earnings for high school graduates in Figure 2-5, now compares with only the 50th percentile of civilian earnings and is significantly below average civilian earnings.[54] Moreover, between 6 and 20 years of service, enlisted RMC increases at a lower rate as compared to average civilian earnings—reflected in the relatively flat earnings curve.

[54] The average earnings of high school graduates are at about the 60th percentile.

This analysis highlights a clear need for pay table adjustment in the mid-level enlisted grades.

Senior Enlisted (E-8 to E-9)

The two senior enlisted grades, E-8 and E-9, deserve special attention, as they represent a select group of the enlisted force. The typical service member will not survive the highly competitive promotion process to reach these grades—representing both the highest levels of experience and highest levels of quality in the enlisted force. The law allows only 3 percent of all enlisted members to occupy these two ranks (about 36,000 individuals), with no more than 1 percent reaching the E-9 rank.

Between 20 and 30 percent of the members in the senior enlisted grades have college degrees. Between 70 and 80 percent have more than a year of college credits, as illustrated previously in Figure 2-4. Because of the amount of formal education and the vast amount of job experience these members possess (more than 22 years on average), the appropriate civilian earnings comparison group is those with a college degree. As Figure 2-7 shows, a composite average RMC for E-8s and E-9s tracks well below average civilian earnings of college graduates throughout the 30-year career.

Do We Need Another Pay Grade?

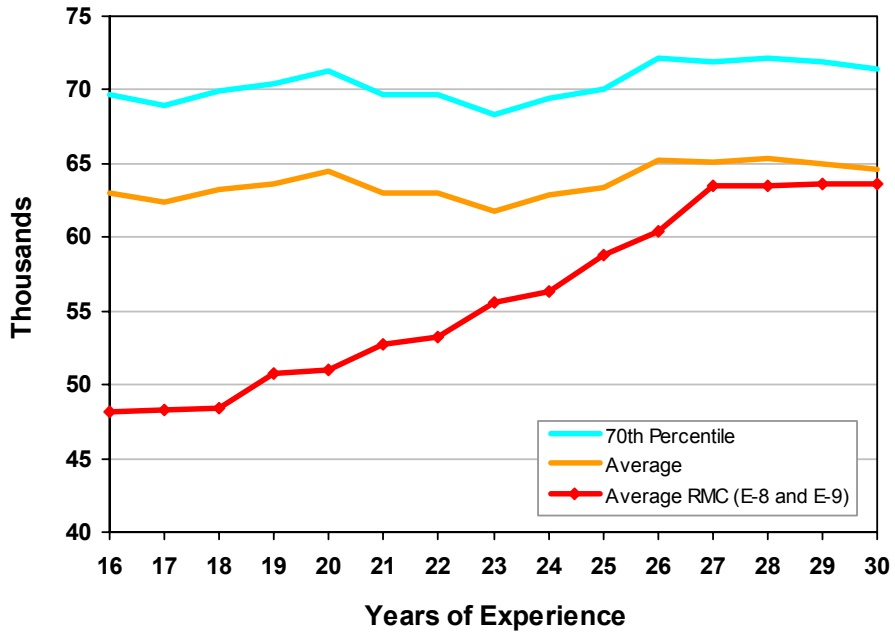
Given the high levels of responsibility assigned to the senior enlisted (E-9) grade, some have questioned whether the current grade structure is adequate and the compensation sufficient—even if increased as recommended—to retain the highest quality of the military's most elite enlisted members.[55] Whether E-9 members are technical experts, duty experts, or senior enlisted advisors to unit commanding officers, the community faces several challenges.

- The E-9 grade does not adequately distinguish among the varying responsibility levels of E-9 assignments. Today, E-9s supervise E-9s, who supervise other E-9s—similar to the situation in 1958 within the E-7 grade, which led to creation of the E-8 and E-9 grades.[56]

[55] Aline O. Quester and Gary Lee, *Senior Enlisted Personnel: Do We Need Another Grade?* CRM D0005072.A2 (Alexandria, VA: Center for Naval Analyses), December 2001.

[56] Quester and Lee (2001), pp. 2-3.

Figure 2-7. Comparison of E-8 and E-9 RMC to Civilian Earnings for College Graduates (2000 dollars)



Note: Data reflect July 2000 E-8 and E-9 enlisted pay (RMC) compared with predicted year 2000 earnings of male college graduates.

- E-9 compensation is based mostly on overall years of service. E-9s who are promoted faster than average have fewer years of service when they reach E-9 than do those who are promoted more slowly. This circumstance creates a pay inversion, with slower promotees earning more than faster promotees—a disincentive for fast-track promotion.
- Those who are promoted early tend to retire early as well. A small percentage of fast-track E-9s stay beyond 26 years of service; over 50 percent of slow promoters stay beyond 26 years.[57] After promotion to E-9, pay raises consist of only modest longevity increases, which provide little retention incentive. Because there is no more promotion opportunity for the next 12 to 17 years, the Services do not appear to be retaining their most capable E-9s.[58]

[57] Although these findings are for the Navy, Quester and Lee (2001, p. 24) suspect the same pattern holds for the other Services.

[58] Fast trackers can make E-9 with as few as 18 years of service.

- Challenges in retaining the most competitive of this group will likely continue, given increasing private-sector competition and higher levels of E-9 educational attainment.

How should this dilemma be resolved? A larger longevity pay increase for E-9s, or another longevity step increase at 28 years of service, would increase E-9 retention. But a longevity increase would do little to encourage the most capable E-9s to stay longer. A special duty pay could be targeted to particular E-9 billets, but this pay would not carry over into a member's retirement or be portable to another assignment.

Another alternative would be to establish a new grade of E-10—small in size (perhaps 0.2 percent of the enlisted force, or about 2,000 members) with a competitive promotion process structured to retain the most capable E-9s. An E-10 grade would offer monetary compensation and recognition for enlisted personnel who desire the highest levels of responsibility.[59]

Life-Cycle Earnings Profiles

In the previous sections, military pay levels were compared with those of comparably educated civilians. This comparison pointed to areas in the enlisted pay table that warrant adjustment. Because of the importance of compensation as a recruiting and retention tool, it is worth a second look at the question of pay adequacy for enlisted personnel. Pay structures can also be evaluated by examining *life-cycle earnings* by occupational group and forecasting those earnings into the future.[60] The advantage of this approach is two-fold. First, it assists the Services in planning, programming, and budgeting for future years, to determine whether budget projections are sufficient to recruit and retain required high-quality personnel. Second, examining different occupations is important because the earnings streams of different career paths vary. As military requirements for technical skills increase, the Services must make the correct pay comparisons for the job skills they require.

The life-cycle technique analyzes the earnings of individuals during the course of their career, beginning at the time they enter the military or civilian labor force. Future earnings are predicted based on analysis of past

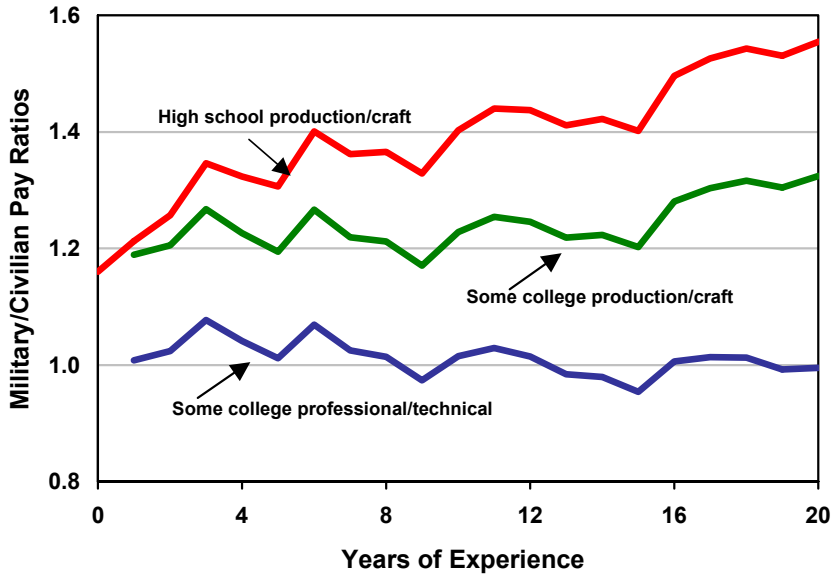
[59] The QRMC recognizes that there is not unanimous support for establishing an E-10 grade but believes the concept offers potential benefit. A countervailing view is that an E-10 grade could motivate individuals to depart at the same or greater rate than is currently the case because of a perception of limited opportunities at the E-10 level. From this perspective, a longevity increase at 28 years of service would be the preferred policy alternative.

[60] Asch, Hosek, and Warner (2001).

wage trends by demographic group. These predictions incorporate official forecasts of inflation and unemployment as well.

Figure 2-8 displays military-civilian pay ratios by years of experience (up to 20 years) for workers entering the labor force in 1998. In the top line, average pay over a military career is compared with the average pay of a high school graduate working in a production or craft occupation. The ratio of military to civilian pay is about 1.2 at the beginning of the career and rises to over 1.5 after 20 years of experience.

Figure 2-8. Comparison of Military to Civilian Pay



Source: Asch, Hosek, and Warner (2001).
Note: Military/civilian pay ratio for cohort entering in 1998 by education and occupation.

The middle line compares military pay to that of a civilian with some college working in a production or craft occupation. The pay ratio again starts at 1.2, but now rises only to 1.3. There is little increase in relative pay over most of the career and only a small rise between 15 and 20 years of service. The bottom line compares military pay to that of a person with some college working in a professional or technical occupation. In this case, the starting pay ratio is 1.0 but, after 20 years, the ratio has declined to slightly below 1.0. This ratio is significant because jobs for which this comparison is appropriate account for about 20 percent of the current

enlisted skills—a proportion expected to increase as technology plays a greater role in future weapons system development and procurement.

The life-cycle earnings analysis proves to be consistent with the previous analysis comparing trends in the level of military and civilian pay. The pay structure for an enlistee entering military service with a high school education compares favorably with potential civilian earnings. However, for an enlistee facing a reenlistment decision who has acquired some college credit while in service or for a recruit prospect who has attended at least some college, a military career looks substantially less attractive in terms of career pay opportunities—even though relative pay at entry is about the same. For a person planning on a professional or technical career after obtaining some college, the comparison is stark; there is no pay advantage at entry and no opportunity for relative pay growth over a military career.

ADJUSTING ENLISTED PAY

The existing basis for evaluating the adequacy of enlisted compensation is no longer valid. The current enlisted pay table is adequate to compensate a workforce of above-average high-school-educated individuals who serve for a career in functions primarily requiring skills comparable to production or craft workers in the civilian labor force. But that profile no longer reflects the education level and technical competence of the enlisted force. The proliferation of technology and information-based systems and the changing nature of warfare have increased the professional and technical content of many enlisted career fields. Technical training that equates in many cases to college-level course work is required prior to initial assignment by a majority of each year's new accessions.

Men and women who stay beyond their first enlistment display an increasing propensity to pursue advanced education. Not only has the nature of the military changed since the advent of the All-Volunteer Force, but the recruiting pool from which it draws has also changed. College enrollment trends among graduating high school seniors suggest that future enlistees will comprise an increasing percentage of men and women who have completed some college before enlisting in the armed forces or at least have college aspirations.

Making incremental changes to the existing pay table will not be sufficient to sustain the enlisted force in the needed numbers and skill mix in the coming years. The recruiting and retention environment reflect structural changes in the civilian labor market that will continue. Without

some adjustment to both the level and structure of enlisted pay, the military could face serious recruiting and retention difficulties.

Moreover, the after-effects of downsizing make sustaining manning levels in the NCO corps especially challenging in this decade. As those eligible for promotion to the NCO ranks reach reenlistment decisions in the next several years, extraordinary reenlistment rates will be necessary to maintain the current level of experienced personnel.

Comparison of military and civilian earnings levels and the life-cycle earnings analysis lead to several recommendations that both raise the level of pay and alter the structure of the enlisted pay table.[61] Structural modifications include targeting pay raises in the mid-grade ranks, resulting in a steeper pay profile that better matches career enlisted pay with that of comparably educated civilians.[62] Recommended adjustments are as follows:

- Target large basic pay increases for enlisted members serving in the E-5 to E-7 grades with 6 to 20 years of service to raise basic pay toward the 70th percentile. This change would alter the pay structure and thus the shape of the earnings profile, eliminating the relatively flat portion of the pay table for mid-grade enlisted members.
- Raise basic pay for grades E-8 and E-9, to maintain incentives throughout the enlisted career and prevent pay inversion. These raises are also targeted to increase pay toward the 70th percentile.
- Provide a modest increase in basic pay for junior enlisted personnel, coupled with strong enlistment incentives through bonuses and educational benefits where appropriate. This increase reflects the importance of preventing further deterioration in the percentage of high-quality recruits. Increasing pay at the E-5 grade (noted above), will serve as an

[61] The argument for a change in the structure of the pay table is to relieve pay compression between grades and to restore the significance of promotion as opposed to longevity pay increases. In other words, the balance needs to shift from rewarding longevity to rewarding promotion. A change to the structure of the pay table was also recommended by the 7th QRMC. See U.S. Department of Defense, *Report of the Seventh Quadrennial Review of Military Compensation* (1992).

[62] This structure will better attract, retain, and motivate personnel. See Beth J. Asch, *Designing Military Pay: Contributions and Implications from the Economics Literature,* WD-5734-FMP (Santa Monica, CA: The RAND Corporation), 1991; and Asch and Warner, *A Theory of Military Compensation and Personnel Policy* (1994).

additional incentive for members to remain in service beyond the first enlistment term.

In support of these changes, the existing standards by which enlisted compensation is compared to civilian earnings need to be modified to account for the patterns of educational achievement exhibited throughout the life cycle of the force. As shown in the previous analysis, a composite profile of civilian earnings for high school graduates, those with some college, and college graduates are appropriate comparisons for particular segments of the enlisted force. Together these changes will improve the earnings opportunity for enlisted personnel and should help to improve recruiting and retention.

COMMISSIONED OFFICERS

An examination of officer compensation issues shows a mixed picture compared to that encountered in the enlisted force analysis. Although the Army, Navy, and Air Force are experiencing challenges in meeting their overall manning objectives for officers, these challenges tend to occur mainly in the O-3 and O-4 grades and in particular occupational specialties. Ensuring an adequate level of officer pay is necessary, but it may not be sufficient in solving today's recruiting and retention challenges. Officer expectations regarding a military career are changing and "fixing basic pay" with across the board raises, even if targeted at particular pay grades, is not likely to result in complete success. Thus, the Services will also need to consider using more special pays, including bonuses, directed at selected officer shortages, as will be discussed in the following chapter.

JUNIOR OFFICERS: THE FOCUS OF CONCERN

Declining officer retention is not spread evenly across the officer corps. Indeed some cohorts appear to be leaving at higher rates than in the past, although aggregate retention data tend to mask the seriousness of the problem within particular occupations or grades. Today, the Services

report the most serious problems among junior officers, specifically at the O-3 level.[63]

As with the enlisted force, the Services' drawdown policies are an important factor in explaining the junior officer shortage. Officers usually complete their initial obligation (generally between four and six years of service, with the exception of pilots) after serving two to three years in grade O-3 and have another three to four years of service to fulfill before reaching the zone for O-4 selection. Thus, the retention decisions made between six and nine years of service are critical for maintaining adequate promotion flows into the senior ranks.

During the drawdown, the Services limited accessions, and these smaller cohorts make up the critical year groups now approaching the O-4 promotion point. As a result, fewer officers than were typically the case are flowing through the junior grades, making it more difficult to fill field grade officer requirements. The retention rates of these smaller cohorts of junior officers need to be at an all-time high to meet officer requirements in each of the Services; thus today's lower continuation rates are being felt more sharply. Management of these officer year groups is particularly important for developing the pool of senior military leaders over the next ten years.

For example, the Army reports it has an insufficient number of captains to fill requirements for majors over the next several years—illustrated in Figure 2-9 by the drop in the number of captains with between 5 and 10 years of service. This situation is expected to remain a problem through at least 2005 for the Army Competitive Category, which includes the combat arms occupations, and accounts for about 75 percent of all Army officers.[64] Although there are no shortages of lieutenants, the current promotion opportunities from lieutenant to captain are approaching 100 percent; therefore, simply promoting more lieutenants is not a short-run option. Eventually, the increased accessions that began in FY 2000 should be adequate to fill requirements for O-3 and O-4 positions, but it is

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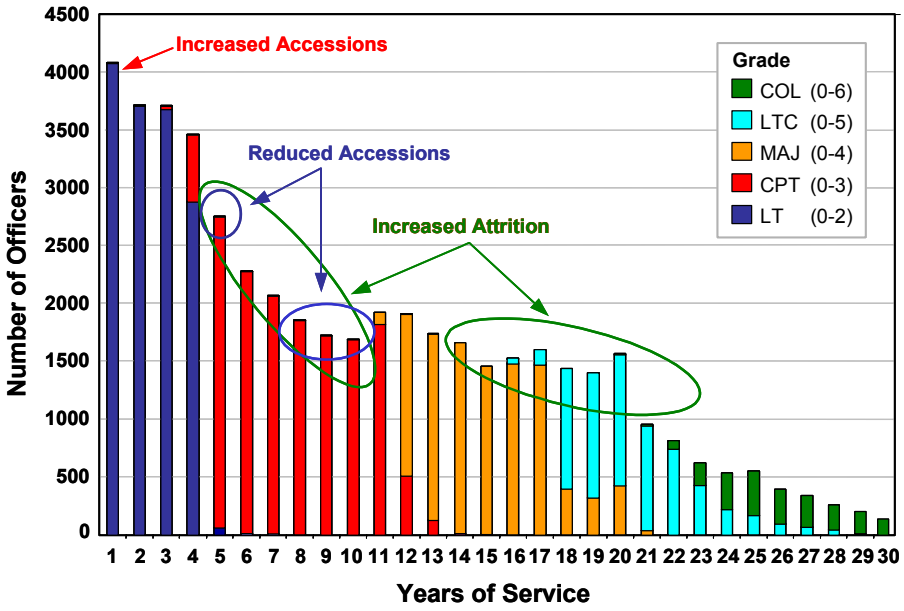
[63] The Defense Officer Personnel Management Act (DOPMA) of 1980 has provided for an officer management system shared by all Services since 1981. DOPMA contains specific rules relating to the training, appointment, promotion, separation, and retirement of officers. For example, it regulates the number of officers allowed in each grade above O-3, thus setting the officer grade distribution of the Services. See House Report No. 96-1462, p. G350 as found in Bernard Rostker, Harry Thie, James L. Lacey, Jennifer H. Kawata, and S. W. Purnell, *The Defense Officer Personnel Management Act of 1980: A Retrospective Assessmen*t, R-4246-FMP (Santa Monica, CA: RAND Corporation), 1993.

[64] The Army Competitive Category includes all officers except lawyers, chaplains, and health-care providers.

unlikely that the Army can simply wait for the problem to correct itself. As a result, the Army, along with the other Services, is pursuing different strategies to "get by" until the larger accession cohorts become available.[65]

Figure 2-9. Army Officer Inventory by Grade and Year of Service, September 2000



Source: Office of the Deputy Chief of Staff for Personnel, U.S. Army.

Declining Continuation Rates

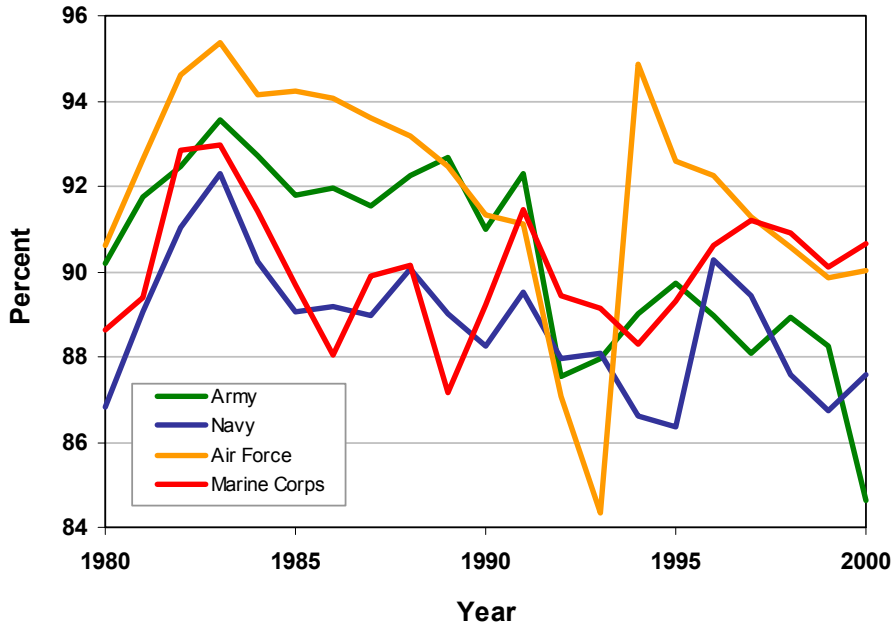
Declining officer continuation rates are due in large part to the pull of a strong economy and changing career expectations among junior officers and their spouses. The military recruits a high-quality officer corps, provides significant education and training with associated "hands-on" managerial and technical experience, and places the challenges of leadership and accountability on officers very early in their careers. Civilian employers, who offer higher salaries and a more predictable family lifestyle, are aware of these facts and aggressively recruit this

[65] The Army has introduced a number of measures. For example, it has increased selection rates for promotion to O-4, O-5, and O-6 pay grades, which in FY 2000 reduced the shortages in these grades by 250 officers. Captains who have been twice passed over for promotion are now allowed to continue to 20 years of service on a selective basis, and active-duty recall opportunities have been expanded.

force. According to a recent survey administered to military members voluntarily discharged, the two top reasons for leaving the armed forces were insufficient job satisfaction and desire to start a second career before becoming too old.[66]

Figures 2-10 and 2-11 display the annual continuation rates for officers with 5 to 9 and 10 to 13 years of service, respectively, over the past two decades. Continuation rates measure the percentage of officers in a particular grade at the start of a year who remained on active duty at the end of the year.

Figure 2-10. Continuation Rates of Commissioned Officers with 5 to 9 Years of Service, FY 1980-2000

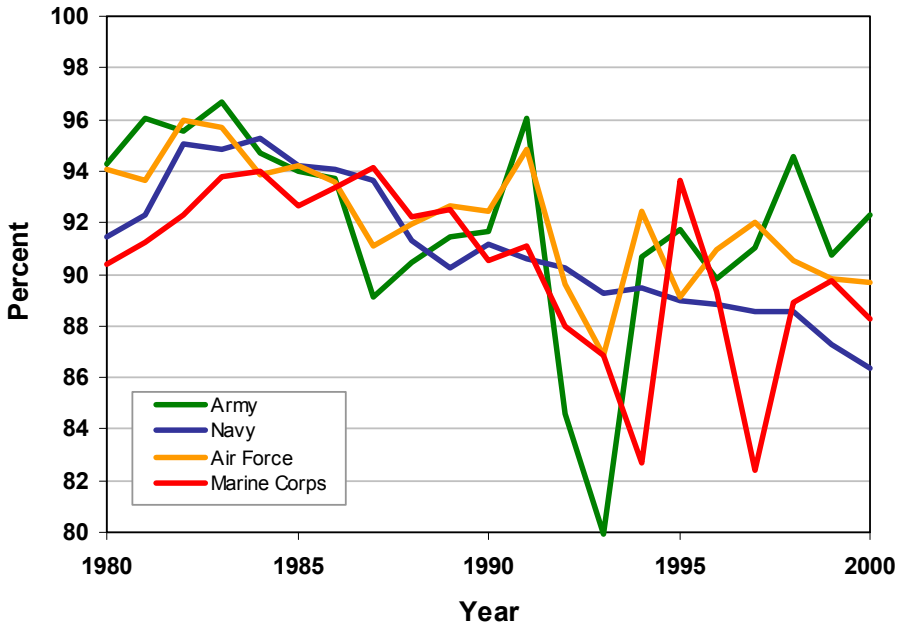


As seen in both figures, the highest continuation rates during the past two decades occurred in the early 1980s following the large pay raises in 1980 and 1981. In each Service, officer continuation rates for those with 5 to 9 years of service generally declined by 3 or more percentage points by the late 1980s, after which they spiked at the time of the Gulf War in 1991. Continuation rates then declined sharply as voluntary incentives for

[66] E. C. Hoover, J. S. Randolph, T. W. Elig, and P. M. Klein, *Overview of the 2000 Military Exit Survey*, Report 2001-001 (Arlington, VA: Defense Manpower Data Center), 2001.

separation were offered during the drawdown, which gained momentum between FY 1992 and FY 1996. Once drawdown incentives were terminated, O-3 continuation rates generally returned to pre-drawdown levels in 1997, but then began to decline again. The most recent Marine Corps, Navy, and Air Force continuation rates for officers with 5 to 9 years of service are about 3, 4, and 5 percentage points lower than their respective peak rates in the FY 1983-1984 time frame. The Army rate is about eight percentage points below the FY 1983-1984 rates.

Figure 2-11. Continuation Rates of Commissioned Officers with 10 to 13 Years of Service, FY 1980-2000



Continuation rates for those with 10 to 13 years of service followed a more modest, but similar pattern. Currently, continuation rates are slightly below the rates prevailing in the early 1980s. An exception is in the Air Force, where O-4 continuation rates remain about five percentage points below the peak achieved in FY 1982—likely a reflection of the difficulties the Air Force has recently experienced with pilot retention.

Further analysis supports these observations and helps to determine whether the changes are, in fact, statistically significant and therefore

warrant the Services' attention.[67] Results from this analysis, shown in Figure 2-12, indicate that officer continuation rates for those with 5 to 13 years of service have fallen by nearly 3 percentage points per year compared with officer continuation rates in FY 1987.[68] When examining individual occupations, the estimated declines differ somewhat, but the pattern is very similar. Although the percentage decline is small in any given year, the impact on the force is significant. Over a five-year period, the Services will lose about 15 percent more mid-career officers at FY 2000 continuation rates than at FY 1987 rates.[69] The decline in continuation rates is much larger if compared to the 1983-1984 period.

When the officer continuation rates are examined by commissioning source, academy graduates in the Army and Navy, as well as ROTC scholarship graduates in the Army, show the largest decline in recent years. In the Army, FY 1998 and FY 1999 cumulative retention rates following the completion of initial obligated service for academy and ROTC scholarship graduates were about 10 and 20 percent lower than those of ROTC non-scholarship and officer candidate school graduates, respectively. Continuation rates of academy graduates in the Navy, with six to nine years of service, were between 1 and 3 percent lower than rates of other commissioning sources during the period from FY 1996 to FY 2000. Because the academies and ROTC scholarship programs train many of the officers in technical skills, these higher losses may reflect the impact of competition for highly skilled professionals in the civilian economy.

The downward trend in officer continuation rates undoubtedly captures the effects of a strong civilian economy. But it may also represent a shift in the behavior of young officers and their reactions to the changes in missions, frequency of deployments, and other aspects of military life since the end of the Gulf War. Continuation rates have declined for almost five years, and there is little evidence that they will return to pre-drawdown rates. Thus, today's lower continuation rates may indicate a

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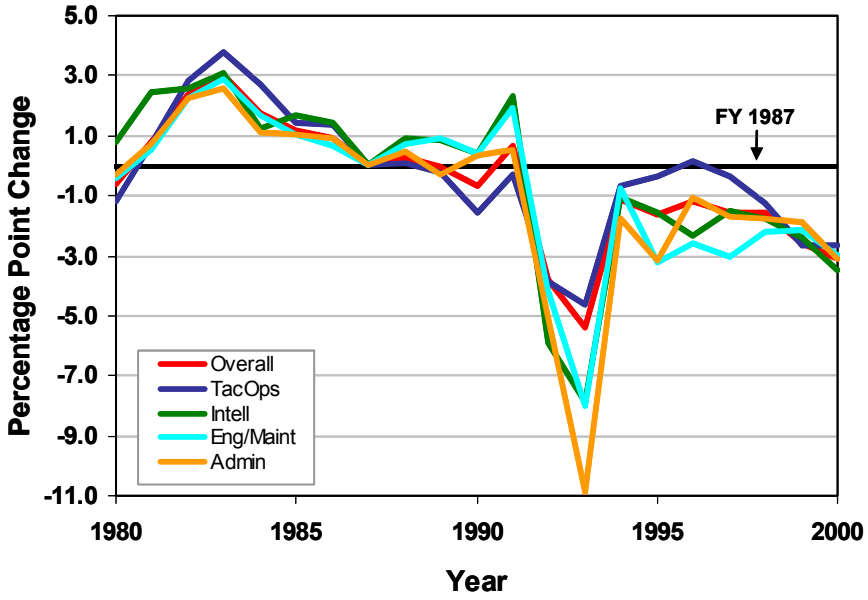
[67] Continuation rates were obtained for each Service by occupation and years of service (5 through 13) for each year from 1980-1999. An overall regression was estimated in which $C_{s,g,t,f}$ (the continuation rate in service s, occupation group g, years of service t, and fiscal year f) was regressed on dummy variables for service, occupation, years of service, and fiscal year. Regressions were also estimated by occupation.

[68] Another way of portraying declining continuation is to calculate survival rates by cohort, in which at each year of service the percentage of a particular cohort that survived is calculated. The predicted survival function for the cohort entering in FY 1999 was found to be generally lower than that for the 1995 cohort (when the drawdown ended) and lower still than that for the pre-drawdown cohort of 1987.

[69] The estimated declines in continuation rates were statistically significant at conventional levels.

long-term change and a new level against which the Services need to plan to ensure adequate manning. This statistic is clearly an indicator to watch in coming years.

Figure 2-12. Changes in Annual Continuation Rates of Commissioned Officers with 5 to 13 Years of Service for Selected Occupations, FY 1980-2000



Changing Career Expectations

Survey data from several Services provide evidence of changing attitudes and career expectations among the officer corps, providing further explanation for the decline in continuation rates. For example, the Army's Survey on Officer Careers found between 1996 and 2000 a steady and significant decrease in the percentage of captains in the Army Competitive Category who intend to make the Army a career.[70] The data show a decline from 68 percent to 50 percent among those who had planned to stay, and an increase from 9 to 16 percent among those who intended to leave. There have been steady increases in the proportion of service members, who both leave and stay, that:

[70] *Survey of Officer Careers—2000*, Survey Report No. 2000-9 (Alexandria, VA: U.S. Army Research Institute), October 2000. Other recent surveys point to similar concerns among junior officers.

- Report that job satisfaction, quality of life, spouse satisfaction, standard of living, and retirement would be better in the civilian sector.
- Are reluctant to accept the amount of time away from home and number of moves associated with being in the military, which are now higher than in the 1980s.[71]
- Believe it would be easy to transition into the civilian sector, given today's economy.

Even among all company grade officers, the story is the same. The number reporting that they will leave the Army upon completion of their current obligation has increased from 14 to 23 percent, while the proportion that intend to stay to retirement has declined from 55 to 37 percent.[72] The number who is "undecided" has also been steadily rising—from 31 percent in 1996 to 40 percent in 2000. Discussions with Navy junior officers provide further evidence that quality-of-life concerns are adversely affecting O-3 retention.[73]

How important, then, is compensation in this environment? Unlike the case for the enlisted force, most junior officers consider benefits and compensation less important than the other retention factors noted above. However, when taken together with quality-of-life concerns—which the Services will undoubtedly have to address—pay and benefits become the "tie-breaker."

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[71] A recent study also found that today's generation of young men are focusing more on family than previous generations and are, in fact, willing to accept some reduction in pay for a family-friendly job schedule. Paula Raman et al., *Life's Work: Generational Attitudes Toward Work and Life Integration* (Cambridge, MA: Radcliffe Public Policy Center), 2000.

[72] Similar results were found in another Army survey. In the mid-1980s, the percent of company grade officers who reported they probably or definitely would stay until retirement was more than double the proportion who said they would probably or definitely leave upon completion of their present obligation. Since 1996, these responses began to converge until 2000 when a greater proportion (37 percent) said they would leave than stay (33 percent). *Findings from the Spring 1999 Sample Survey of Military Personnel* (Alexandria, VA: U.S. Army Research Institute), October 2001.

[73] John T. Natter, Alan Lopez, and Doyle K. Hodges, "Listen to the JOs: Why Retention is a Problem," *U.S. Naval Institute Proceedings*, October 1998, 56-61.

COMPARING OFFICER PAY TO CIVILIAN EARNINGS

While individuals consider many factors when choosing a profession or career, pay is certainly among the more important. As a result, pay must be both comparable to that for similar jobs elsewhere and commensurate with one's education and experience. The methodology used to assess the adequacy of enlisted pay is used here to compare officer pay with civilian earnings. Full-time, year-round earnings of civilian males 18 to 59 years old were estimated using data from the Current Population Survey averaged over the years 1994 to 1999. These models were used to construct percentiles of civilian earnings (30th, 50th (median), 70th, and 90th) as well as the average of civilian earnings, which were then compared to officer RMC.

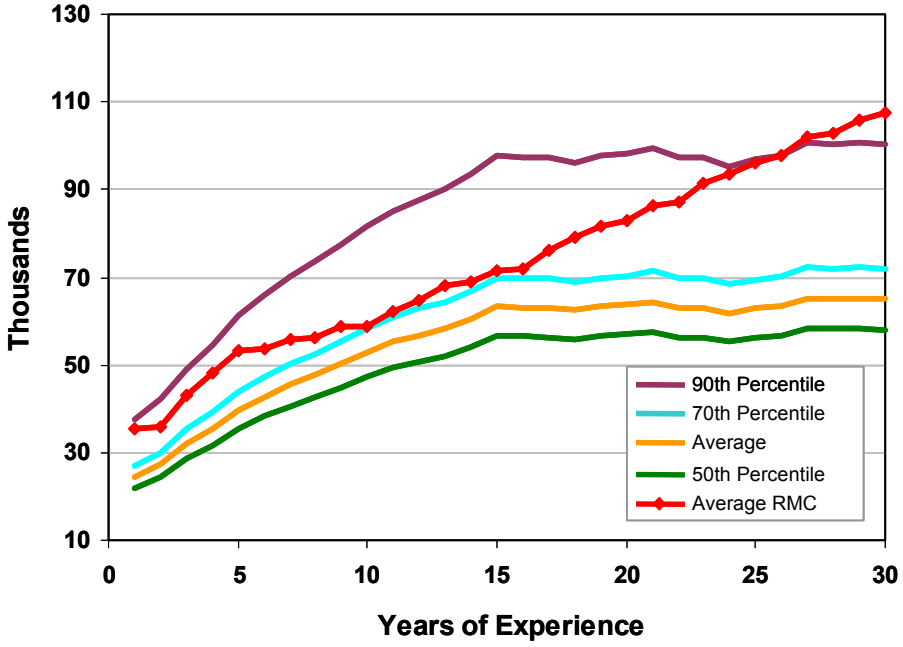
Historically, the adequacy of officer pay has been determined in part by comparing RMC to earnings of civilians with a baccalaureate degree, since this degree is a primary requirement for entry into the military's officer corps. Figure 2-13 shows that in FY 2000, officer RMC compares favorably with the earnings of civilian college graduates—tracking at or above the 70th percentile of civilian earnings.

However, examining officer education by rank calls into question the relevance of the bachelor's degree as the appropriate civilian comparison group, particularly after the 9th or 10th year of service. Data from the 1999 Survey of Active Duty Personnel, as shown in Figure 2-14, indicate that a significant proportion of the officer corps has advanced degrees: 40 percent of O-3s, 70 percent of O-4s, and 90 percent of O-6s and above.[74] Indeed, over the last 15 years, there has been an increase in the proportion of officers who have received advanced degrees while in service, as Figure 2-15 depicts. The Services need to retain those officers who continue to pursue education beyond the bachelor's degree and to pay them in accord with the increased returns to advanced education offered in the civilian sector.

To provide a more accurate comparison that reflects the current educational achievements of the officer force, officer pay was compared to the earnings of civilians with either a baccalaureate or advanced degree. In addition, civilian earnings were further limited to those employed in professional or managerial occupations—civilian jobs that most closely resemble the skill set of most officer career fields.

[74] Although 40 percent of O-3s, on average, have an advanced degree, 50 percent have obtained a post-graduate degree by the 10th year of service.

Figure 2-13. Comparison of Officer RMC to Civilian Earnings of College Graduates (2000 dollars)



Note: Data reflect July 2000 officer pay (RMC) compared with predicted year 2000 earnings of male college graduates.

These two changes produced a new set of civilian percentiles in Figure 2-16, all of which are higher than those of the earlier case in Figure 2-13. They reflect the higher average earnings of those individuals with advanced degrees who also work in professional and managerial jobs. This comparison of average officer RMC with more relevant civilian earnings is considerably less favorable. It reflects the fact that as officers complete post-graduate work, civilian wage opportunities rise faster than their average pay. RMC, which tracked at the 70th percentile for male college graduates with a bachelor's degree between 10 and 16 years of service, now tracks at only the average of civilian earnings for professionals and managers with a bachelor's or advanced degree.

One can observe, in Figure 2-16, the relatively lower level of military pay between 6 and 18 years of service. But it is at about the eighth year at which officer RMC crosses the 70th percentile and drops toward average civilian pay—the period during which the Services are experiencing significant O-3 retention challenges. Officer RMC continues to lag behind civilian earnings at the sixteenth year of service—about the time a service member is promoted from O-4 to O-5.

Figure 2-14. Educational Attainment of Officers by Rank, 1999

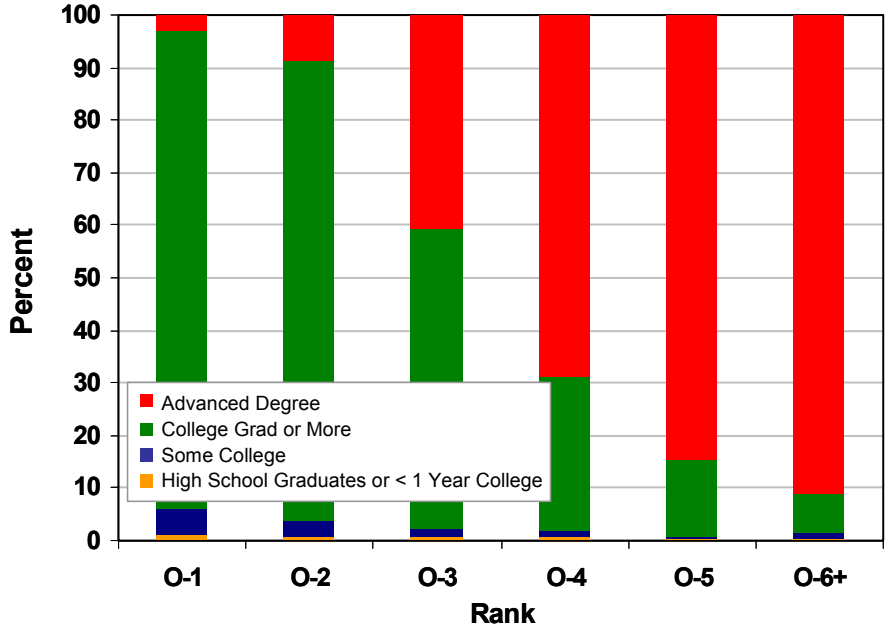
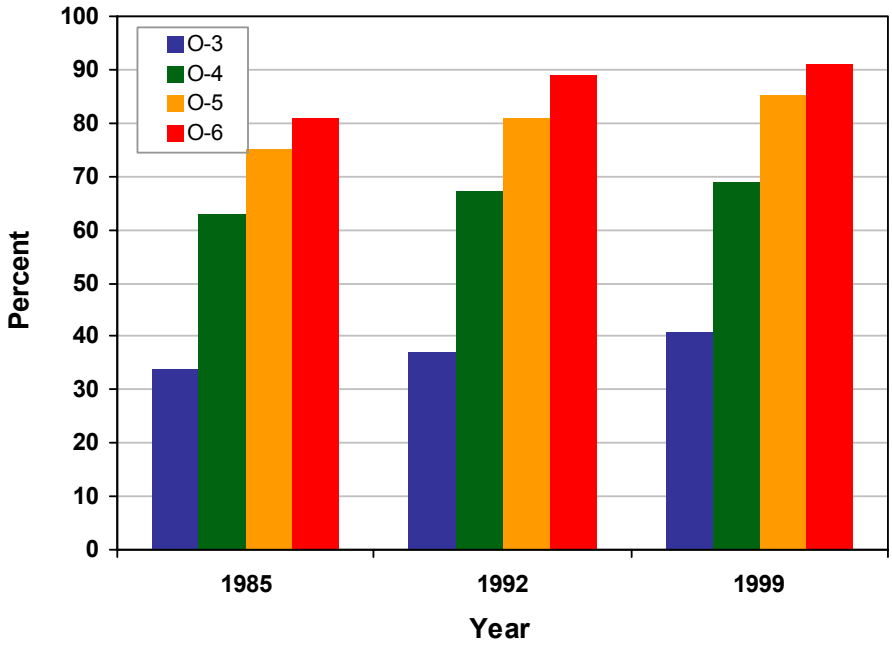
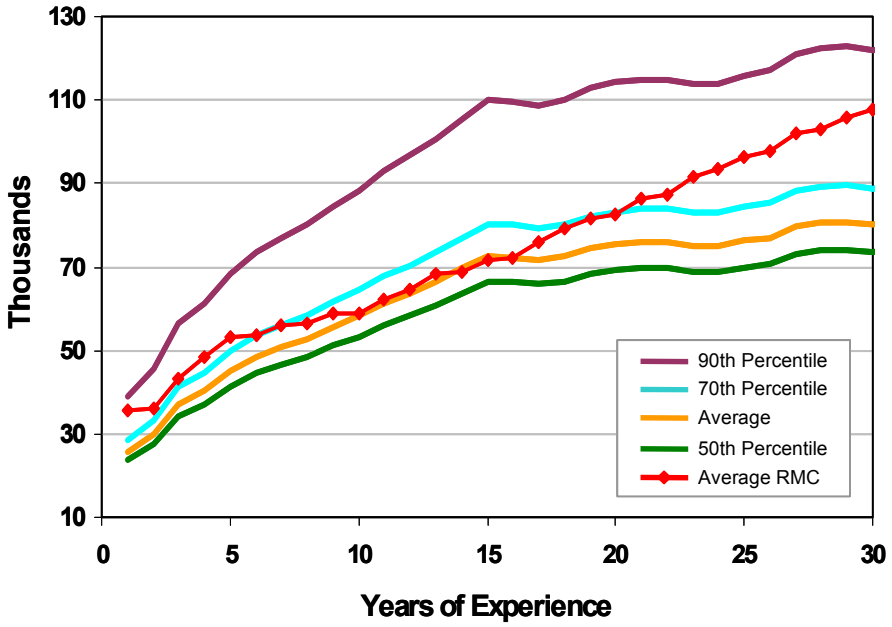


Figure 2-15. Officers with Advanced Degrees



Source: Defense Manpower Data Center; 1985, 1992, and 1999 Surveys of Active Duty Personnel.
Note: Advanced degree is defined as having a degree over and above the baccalaureate degree.

Figure 2-16. Comparison of Officer RMC to Civilian Earnings for Managers and Professionals with Baccalaureate or Advanced Degrees (2000 dollars)



Note: Data reflect July 2000 officer pay (RMC) compared with predicted year 2000 earnings of males in managerial and professional occupations with baccalaureate or advanced degrees.

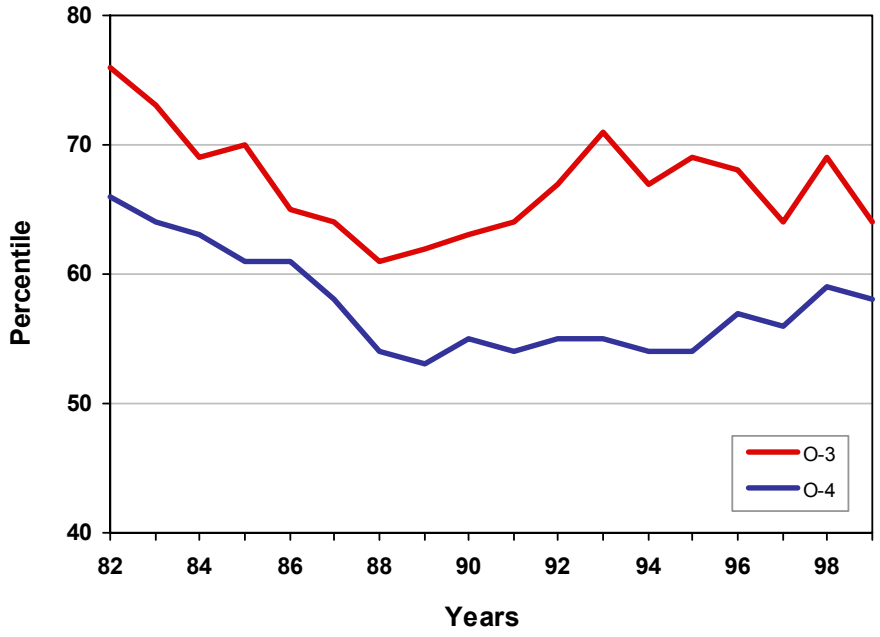
The first years of this interval coincide with the period at which most O-3s are completing their time-in-grade (having had two assignments) and anticipating promotion to O-4. But the promotion window from O-3 to O-4 spans two years (from 9 to 11 years of service) and the Services often wait until after this window to promote. The length of this promotion window creates uncertainty regarding future compensation increases for junior officers who have already spent considerable time in the O-3 pay grade.[75] Rather than wait for a promotion decision, junior officers have an incentive to seek private-sector employment where the earnings potential at this point in their career is greater.

Erosion in officer pay is also evident when comparing pay profiles of officers in grades O-3 and O-4 with comparable civilian pay. Figure 2-17 shows the comparison between O-3s with eight years of service and 27 to 31 year-old civilian workers with four or more years of college who are

[75] See U.S. Department of Defense, *Report of the Seventh Quadrennial Review of Military Compensation* (1992), p. 52.

employed in professional or technical occupations. O-4s with 10 years of service are compared with 32 to 36 year-old civilians with similar characteristics. Although O-3 pay in 1982 was at the 76th percentile of civilian pay, by 1999, it had dropped to the 64th percentile; O-4 pay had fallen from the 66th to the 58th percentile over the same period.[76] Thus, the pay differential evident today, as shown in Figure 2-17, has been growing for some time.

Figure 2-17. Officer Pay as a Percentile of Private-Sector Pay, 1982-1999



Source: Hosek and Sharp (2001).

Note: Comparisons are made against civilian males with four or more years of college in professional and technical occupations. O-3s with 8 years of service are compared to civilian males age 27 to 31; O-4s with 10 years of service are compared to civilian males age 32 to 36.

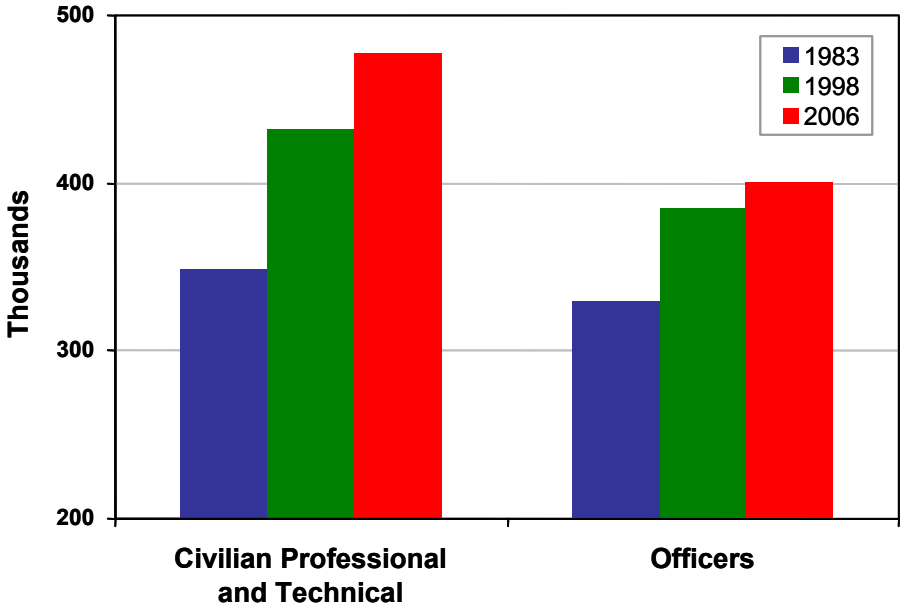
Long tours of duty in the O-3 pay grade, as noted earlier, are an example of another problem with the officer pay table that cannot be solved by simply increasing pay for all O-3s. The pay table's current structure produces relatively rapid pay growth during the first several

[76] The fact that the O-4 pay percentile line lies below the O-3 line indicates that private-sector pay rose more rapidly than military pay as workers obtained more job experience from ages 27-31 to 32-36. See James Hosek, *A Recent History of Military Compensation Relative to Private Sector Compensation*, PM-1225-OSD (Santa Monica, CA: RAND Corporation), July 2001, pp. 6-9.

years of military service followed by several years of slower pay growth. This pattern of increases can act as a disincentive for officers to consider a career after their initial active-duty commitment has been fulfilled, or even after serving at the O-3 level for several years. The 7th QRMC discussed this problem at length and proposed a larger longevity increase at the eight-year point to counter possible negative retention impacts. But additional targeted pay adjustments are needed to address this problem.[77]

Further evidence of military pay erosion is apparent when comparing civilian and military *career* earnings—a comparison that shows private-sector earnings rising faster than RMC. The career earnings for an officer who entered military service in 1983 have proved to be less than that of a civilian career by about 5 percent, to date, as shown in Figure 2-18.

Figure 2-18. Comparison of Civilian and Military Career Earnings (1998 dollars)



Source: Hosek and Sharp (2001).

Note: Career earnings are shown in present value. Dates indicate the year a civilian entered the workforce or an officer entered the military.

[77] For a discussion of alternatives, see U.S. Department of Defense, *Report of the Seventh Quadrennial Review of Military Compensation* (1992), pp. 52-53.

The differential is expected to widen over time for cohorts entering military service in 1998 and 2006. Men and women with four or more years of college can expect to earn more today in the private sector than in the military, compared to their predecessors who entered military service in the 1980s. Again, pay is not the only motivating factor for a person to become or remain an officer, but "… at some point pay makes a difference."[78]

REALIGNING OFFICER PAY

Changes in regular military compensation for officers could help to alleviate several current (and projected) problems in officer manning. But the size and type of adjustment depends on several factors. First, accessioning programs (academy, ROTC scholarship and non-scholarship, and officer candidate school) need to be reviewed in order to ascertain whether incentives for joining the military are adequate to meet projected officer recruiting goals. Second, the compensation offered to officers following completion of their initial obligation needs to be highly competitive with other employment options since, for O-3s, the draw of the military retirement system to remain in service for twenty years is still relatively weak.

Since the largest shortfalls are currently concentrated in the O-3 populations in each Service, raising basic pay for all O-3s would be a means to improve the continuation rates of this group of junior officers. A substantially larger longevity increase (currently less than $200 per month) targeted at the 8th year of service, would also help overcome the current inventory problems. In addition, it would help solve the more far-reaching problem—the long time-in-grade between promotions from O-3 to O-4 previously discussed—and help address that structural problem which persists in the officer pay table.

An additional increase for O-4s may also be appropriate, since today's O-3 population will become the O-4 selectees of tomorrow. Raising current and future pay of these officer grades over the next five years will help stabilize, and perhaps reverse, the downward trend in continuation rates at 6 to 9 years of service, noted earlier. However, care needs to be taken not to provide an increase so large as to reduce the incentive for promotion to O-5.

[78] Hosek and Sharp (2001), page 9.

As a complementary measure, the Services can make use of existing continuation bonus authorities or special pays that provide for additional payments over a full career in those skills with low manning levels. For example, the Air Force has been working to increase pilot compensation using Aviation Continuation Pay, by extending payments through the 25th year of service and increasing the cap for lump sum bonus payments. Similarly, the Navy has recently added a surface warfare continuation bonus to mirror the bonus paid for many years to the aviation and submarine communities. Finally, both the Air Force and Navy are planning to use the recently authorized critical skills retention bonus to address manning shortfalls.

An increase in RMC for the O-3 and O-4 pay grades, as well as greater use of special and incentive pays, should go a long way toward improving the Services' current officer shortages.

WARRANT OFFICERS

With enlisted members and the officer corps, warrant officers round out the active-duty force.[79] Though few in numbers—representing only 16,332 of the nearly 1.4 million active-duty service members—these officers are highly valued for their technical skills and knowledge. The Army has the largest number of warrant officers, some 11,350 (or about 75 percent of the total) in FY 2001. The Navy and Marine Corps have 1,680 and 1,888. In addition, the Coast Guard has nearly 1,400 warrant officers.[80] There are no warrant officers in the Air Force. Warrant officers "bridge the gap" between the technician levels of the enlisted member and the generalist and managerial functions of the officer. They also serve as rotary and fixed-wing aviators in the Army.

Warrant officer duties are most often technical in nature and require extensive knowledge, training, and experience with systems or equipment.

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[79] For a detailed discussion of the warrant officer management system, see Richard L. Fernandez, *The Warrant Officer Ranks: Adding Flexibility to Military Personnel Management* (Washington, DC: Congressional Budget Office), February 2002. The report presents options for using the warrant officer program to retain more mid-career personnel with critical skills for whom the current enlisted path—built around the "up-or-out" philosophy—may not be attractive. An expanded warrant officer program would target extra pay to top performers in specific occupations and thus be more cost-effective than either across-the-board raises or bonuses which are paid to all members who reenlist in a particular occupation.

[80] Table 1-1 contains further detail on warrant officers in the Reserve components.

These duties are less affected by rank than they are among enlisted members and commissioned officers. Warrant officers can serve in a single and specialized occupational field for an entire career. They can also assume leadership positions, providing guidance and expertise in their particular field to commanders and organizations. Warrants can command detachments, units, activities, and vessels as well as lead, coach, and train subordinates. Expanding the warrant officer community provides an excellent opportunity to offer higher compensation and greater job stability in technical occupations that are difficult to retain, costly to train, and critical to mission.

Because service members generally enter the warrant officer ranks from the enlisted force at grades E-5 and above, warrant officers tend to be older on average (37 years) than their enlisted and commissioned officer counterparts (27 years and 34 years, on average, respectively). They also have the most time-in-service. Whereas the average enlisted member and officer are in the 8th and 12th year of service, respectively, the average warrant officer is in the 17th year, as shown in Figure 2-19. Although the law permits members to serve as a warrant officer for 30 years, only the Army allows members to serve for up to 42 years of active federal service; all other Services cap active federal service at 30 years. The Army recognizes the investment it has made in its aviators and technicians, and is able to capitalize on this investment by offering longer career lengths.

Warrant officers are engaged in a wide variety of occupational areas, but more than half are concentrated in six key specialties, as shown in Figure 2-20. Nearly 3 in 10 warrant officers (4,245) are Army helicopter pilots. About 9 percent of warrants are in automotive and allied fields, 6 percent in supply, 5 percent in communications and radar, and 4 percent in aviation maintenance and related fields. At any given time, about 6 percent of the force is in training to become warrant officers. The remaining warrant officers are distributed across 37 occupational categories.

ACCESSION POLICIES

Warrant officers are used differently in each of the Services. These differences have an impact on how the Services manage their warrant programs and are reflected to some degree in accession policies. For example, the aviator program for warrant officers in the Army is designed to attract individuals with little prior enlisted experience (E-5/E-6). The Navy, in contrast, attracts enlisted members with an average of 14 to 16 years of service (E-7/E-8). These differences have implications for career progression as well, as is shown in Figure 2-21.

Figure 2-19. Distribution of Warrant Officers by Grade, September 2000

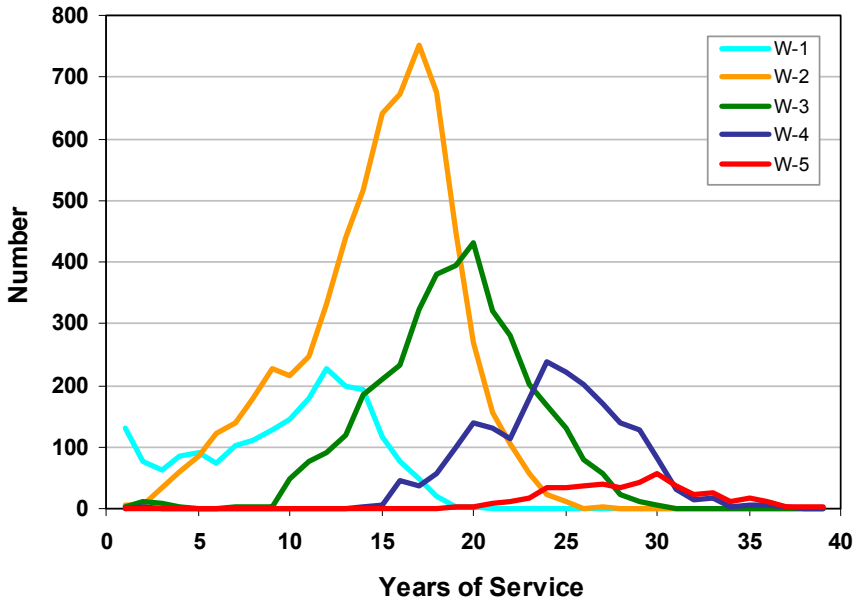
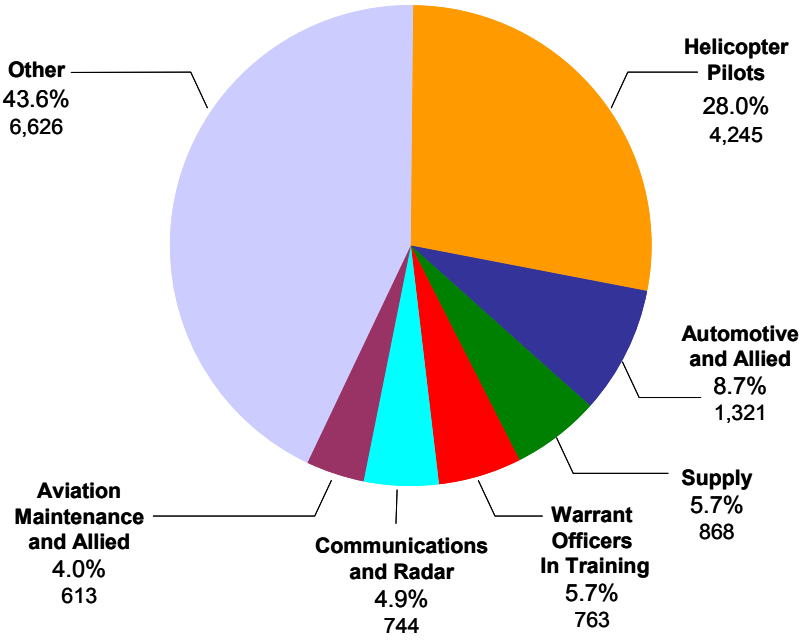
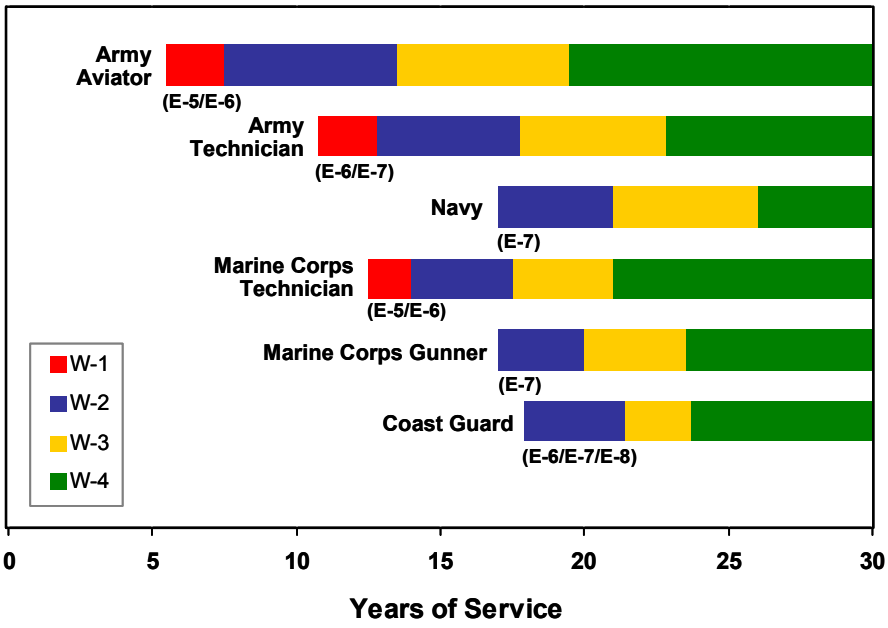


Figure 2-20. Distribution of Occupational Specialties, September 2000



Source: Defense Manpower Data Center.
Note: Data do not include warrant officers in the Coast Guard.

Figure 2-21. Service Warrant Officer Programs, FY 2000



Source: Uniformed Services.

Note: These timelines indicate the average entry point and promotion timing for each program. For example, on average, an Army Technician will enter the warrant officer program from the grade of E-6 or E-7 at 10.8 years of service.

Warrant officer candidates are recruited primarily from the noncommissioned officer ranks.[81] A centralized, competitive screening board selects the best-qualified applicants. Prerequisites for applicants are varied. In the Army, for example, most require four to six years of experience in a specific field, while some require college or other certification. All warrants must attend the Warrant Officer Candidate School upon completion of which they are conditionally appointed as W-1. Warrants then attend the Warrant Officer Basic Course (or Initial Entry Rotary Wing training for aviators) for specific training and technical certification. This course may vary in length from a month to over a year. Warrants receive additional training during the course of their career, and educational achievement is essential for promotion. Army warrant officers are expected to have a minimum of two years of college prior to selection to W-3 and a 4-year degree before selection to W-4.

[81] A very small number of warrant officers come from the commissioned officer corps and about 10 percent are accessed directly from the civilian population.

Warrant officers in the aviator specialty—both rotary and fixed wing—are found exclusively in the Army and comprise 50 percent of all Army warrants. These aviators stand apart from the typical warrant officer in several ways. Between 30 and 40 percent of aviation warrants are accessed directly from the civilian population and have no prior military service. They are also significant in that they make up 75 percent of the total authorizations in the Army's aviation warfighting structure. The Army's aviation warrant officers are the primary operators of all of its attack, reconnaissance, utility, and cargo helicopters and fixed-wing aircraft.

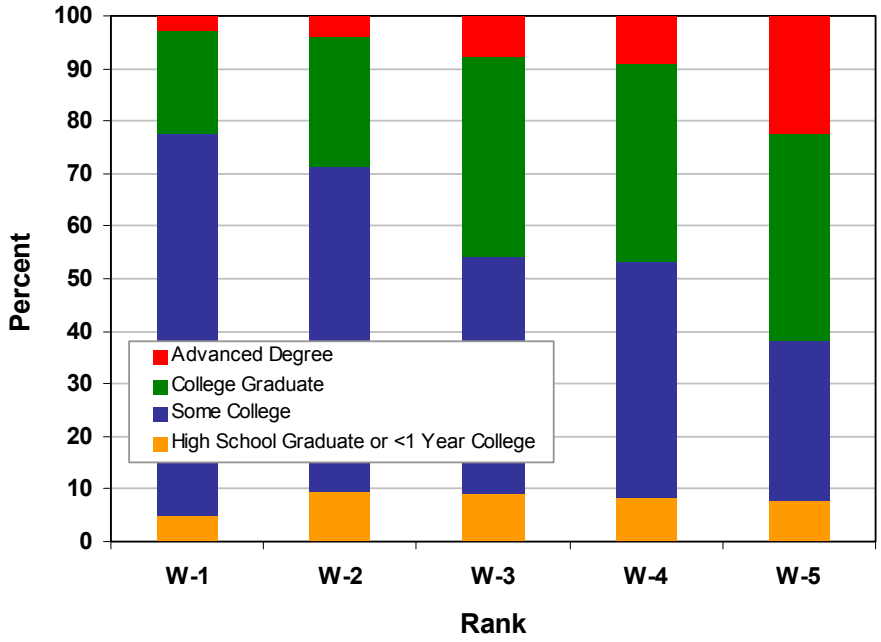
Technical warrant officers in all Services, as well as aviation warrants in the Army, are targeted by industry for their technical competence and disciplined work ethic. In addition, the applicant pool for many specialties has declined, in part because of the level of pay. Under some circumstances, for example, an NCO eligible for a reenlistment bonus in the Army might actually lose income by transferring to the warrant ranks. This situation can occur, in part, because there is no bonus authority available for the warrant officer community. Such disincentives need to be carefully addressed.

COMPARING WARRANT PAY TO CIVILIAN EARNINGS

To attract enlisted members to the warrant officer community, pay must be sufficiently high to act as an incentive. It must also be commensurate with the level of education warrant officers possess and with the earnings they could obtain in the private sector. Figure 2-22 depicts the education level of warrant officers and shows the typical pattern of increasing educational attainment with grade. Since the majority of warrants enter from the enlisted ranks, the relative increase in average education level has been as dramatic as that for the enlisted force described earlier.

Education levels for warrants are somewhat higher than those of their enlisted counterparts. Among W-1s and W-2s, between 60 and 70 percent have some college education, and among W-3s, W-4s, and W-5s, 35 percent have a baccalaureate degree. Over 20 percent of W-5s have advanced degrees.

Figure 2-22. Warrant Officer Education by Rank, 1999



Source: Defense Manpower Data Center; 1999 Survey of Active Duty Personnel.

When enlisted members face a reenlistment decision, the warrant officer community offers an alternative to leaving the military for a private-sector job. Thus, warrant officer earnings need to be competitive with those of their civilian counterparts in order for this alternative to be an attractive option.

Figure 2-23 shows the regular military compensation for warrant officers in grades W-1 and W-2 compared with the earnings of private-sector employees with some college education—their comparably educated civilian counterparts.[82] For grade W-1, RMC lies above average civilian earnings until 14 years of service, at which point it falls below. Earnings for grade W-1 fall below the 70th percentile civilian earnings at 9 years of service. Relatively high earnings prior to this point are due to the fact that warrant officers in grades W-1 and W-2 with less than 10 years of service are exclusively Army aviators. RMC for grade W-2 is above average civilian earnings for all years of service but falls below the 70th percentile after 15 years.

[82] The earnings profiles begin at 6 years of service for Army aviators. However, the vast majority of warrant officers enter after 10 years of service.

Figure 2-23. Comparison of Warrant Officer (W-1 and W-2) RMC to the Earnings of Civilians with Some College Education (2000 dollars)

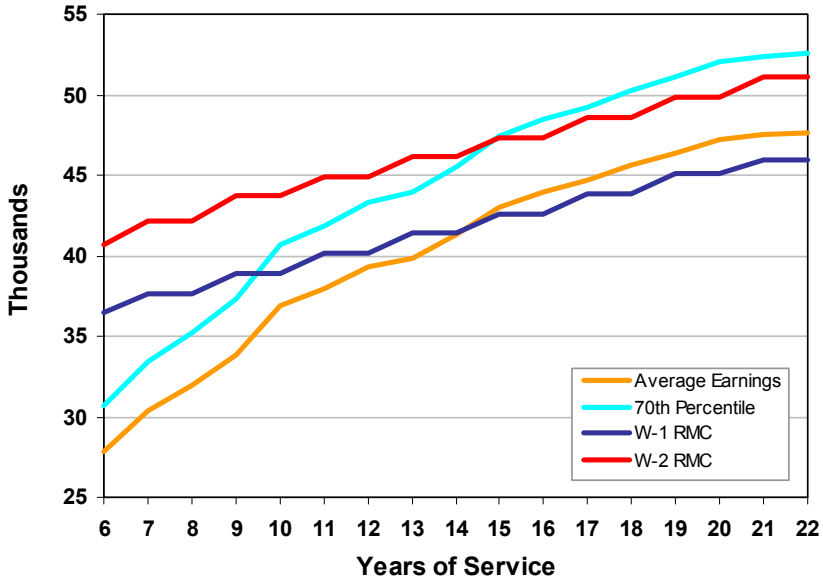
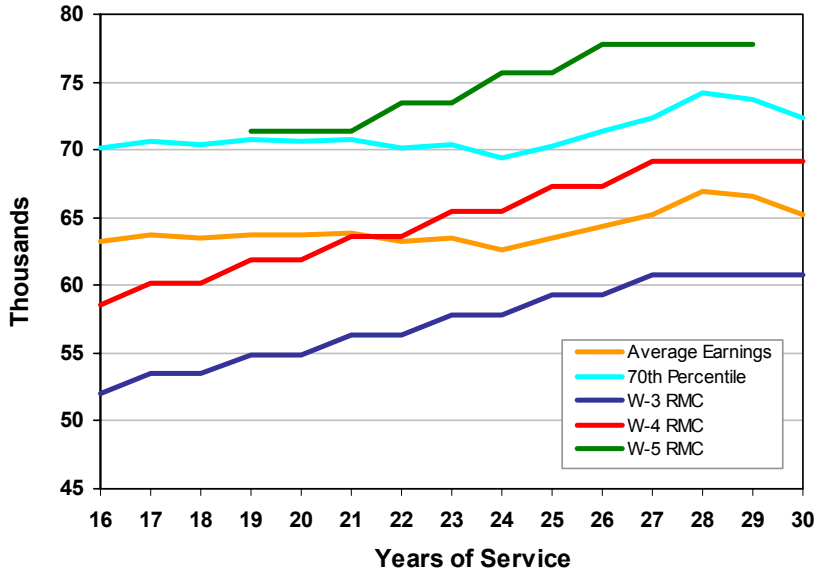


Figure 2-24. Comparison of Warrant Officer (W-3 through W-5) RMC to the Earnings of Civilians with a Baccalaureate Degree (2000 dollars)



Note: Data reflect July 2000 warrant officer pay (RMC) compared with predicted year 2000 civilian earnings. Data do not include warrant officers in the Coast Guard.

A comparison of RMC for grades W-3, W-4, and W-5 with civilian earnings for college graduates is shown in Figure 2-24. This comparison shows that W-4 RMC exceeds average civilian earnings after 20 years of service, while W-5 RMC exceeds the 70th percentile for the entire career. In contrast, W-3 RMC falls well below average earnings for all years of service.

ADJUSTING WARRANT OFFICER PAY

As with the enlisted force, making across-the-board changes to the existing pay table will not be sufficient to sustain the future warrant officer force. Maintaining the appropriate balance between enlisted, warrant officer, and commissioned officer pay levels leads to several recommendations:

- Target the largest basic pay increases to warrant officers serving in grades W-1 to W-3. This increase would alter the pay structure for warrant officers in a manner consistent with the recommendation to target basic pay increases to enlisted members in grades E-5 through E-7. It will also raise W-3 pay closer to the average earnings of civilian college graduates.
- Raise basic pay for W-4 and W-5 pay grades to maintain appropriate incentives throughout the warrant officer career and prevent pay inversion.
- Provide authority for the payment of continuation bonuses to warrant officers in critical technical skills.

IN SUMMARY

Our analysis shows a fundamental need to adjust the military pay tables for all communities—for enlisted members, commissioned officers, and warrant officers. Current pay levels do not reflect the educational attainment of the force and need to be appropriately adjusted in order to maintain comparability with civilian sector salaries. Ensuring adequate pay is essential if the military is to be competitive in attracting and retaining the best and the brightest.

The recommendations put forward will significantly improve the level and structure of the basic pay table. But the labor market today is very

dynamic, reflecting the rapid pace of change fueled by the ongoing information revolution. Staying competitive means regularly evaluating pay comparability and using a combination of tools to respond to changing supply and demand for a more educated and technically skilled workforce. This chapter discussed regular military compensation, with particular emphasis on basic pay. In the next chapter the QRMC examines special and incentive pays—a key element in compensation flexibility.

CHAPTER III

CREATING DIFFERENTIALS IN MILITARY PAY

In the previous chapter, the QRMC recommended changes to the *level* and *structure* of regular military compensation, the largest component of military pay. But another important component of military pay is the wide variety of special and incentive (S&I) pays and bonuses that service members receive during their careers. These pays have been established over many years and provide *flexibility* in the military compensation system. They are used to:

- Attract and retain individuals with critical skills.
- Encourage retention in selected career fields, in certain locations, and in assignments involving arduous or unusual conditions.
- Recognize members who perform hazardous duties.

Historically, special and incentive pays and bonuses have made up a relatively small proportion of military pay, around 4 percent.[83] Yet special pays have generally allowed the Services to remain competitive and respond to changing military missions and changing conditions in the civilian labor market. Used effectively, special and incentive pays have been and will continue to be an important key to flexibility, as this chapter will describe. However, the demands placed on service members are growing as the Department of Defense transforms to respond to new missions. As future manpower needs evolve, the Services may need new compensation tools to remain competitive.

This conclusion is consistent with that of the 7th QRMC, which reported that:

> *the current system [of special and incentive pays has] proved to be effective in manning the forces of the 1980s. However, because of the challenges expected in the 1990s and beyond, incentive pays must become even more responsive, flexible and cost-effective.*[84]

It is within this framework that the 9th QRMC evaluates special and incentive pays. This chapter begins with an overview of special and incentive pays and bonuses—their relationship to total military compensation and effectiveness in recruiting and retention. It also addresses several issues concerning special and incentive pays and allowances for the Reserve components. The chapter then examines the important and timely topic of special pays for overseas duty, which can be

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83 *Military Compensation Background Papers* (1996), pp. 16-17, 171.

84 U.S. Department of Defense, *Report of the Seventh Quadrennial Review of Military Compensation, Special and Incentive Pays, Volume 4* (1992), p. 4-3.

either a permanent change-of-station assignment or temporary deployment. It concludes with suggestions for alternative approaches to shaping pay that, in addition to or in place of existing special pays, could be useful tools in the future.

SPECIAL AND INCENTIVE PAYS AND BONUSES

As discussed in the previous chapter, military compensation is built on the foundation of a single basic pay table for the uniformed services. Basic pay is then augmented by various allowances, special and incentive pays, and bonuses.[85] For each year of service, Figure 3-1 shows average enlisted total pay by category.[86] Figure 3-2 shows a similar breakdown for officers whose commission source was either ROTC or a military academy.

When all categories of pay are included, average annual enlisted pay for a new recruit with one year of service is about $23,000. By 10 years of service, average pay grows to about $35,000 and to over $60,000 by 30 years of service. Average pay grows steeply after 20 years of service because many enlisted personnel either choose to or are required to retire at 20 years. Those who remain are primarily a highly select group of senior enlisted personnel in grades E-8 and E-9. Average pay also rises by years of service for officers, starting at around $35,500 and growing to $109,000 at 30 years of service.

The extent to which S&I pays and bonuses contribute to total pay is also shown in Figures 3-3 and 3-4, for enlisted personnel and officers, respectively. These figures highlight the different ways in which the Services use these pays.

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[85] Beth J. Asch, James R. Hosek, and Craig W. Martin, *A Look at Cash Compensation for Active Duty Military Personnel*, MR-1492-OSD (Santa Monica, CA: RAND Corporation), 2001.

[86] Total pay is defined as the cash elements of military compensation including basic pay, basic allowance for housing (BAH), basic allowance for subsistence (BAS), special and incentive pays, bonuses, miscellaneous allowances, and cost-of-living allowances (COLA). The only exception to limiting this analysis strictly to cash pay is to include a "tax advantage" attributable to the fact that BAH and BAS are not subject to federal income tax.

Figure 3-1. Components of Total Pay for Enlisted Personnel, 1999

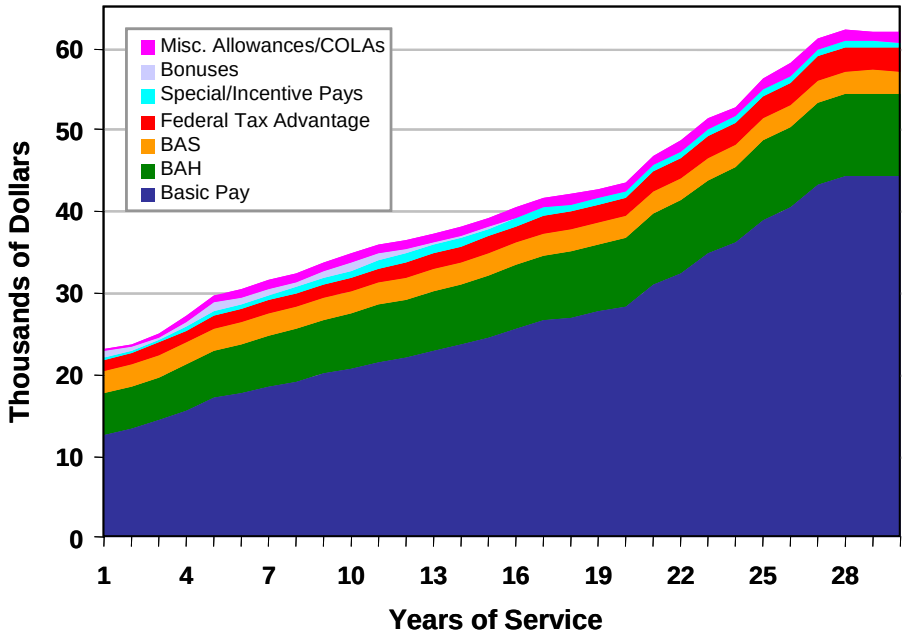
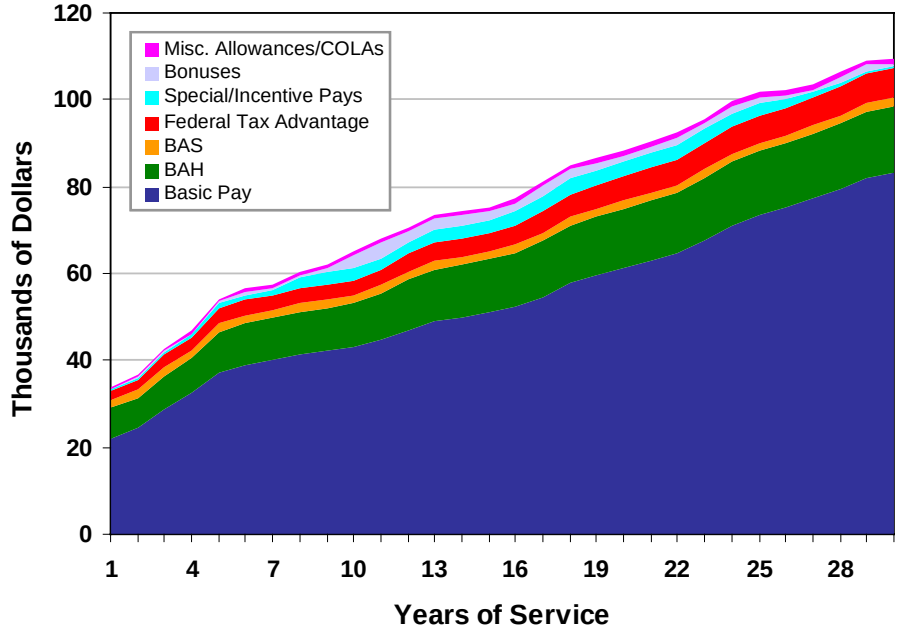


Figure 3-2. Components of Total Pay for Officers, 1999



Source: Special tabulations prepared by the RAND Corporation for the 9th QRMC.

Figure 3-3. Enlisted S&I Pays and Bonuses as a Percent of Total Pay, 1999

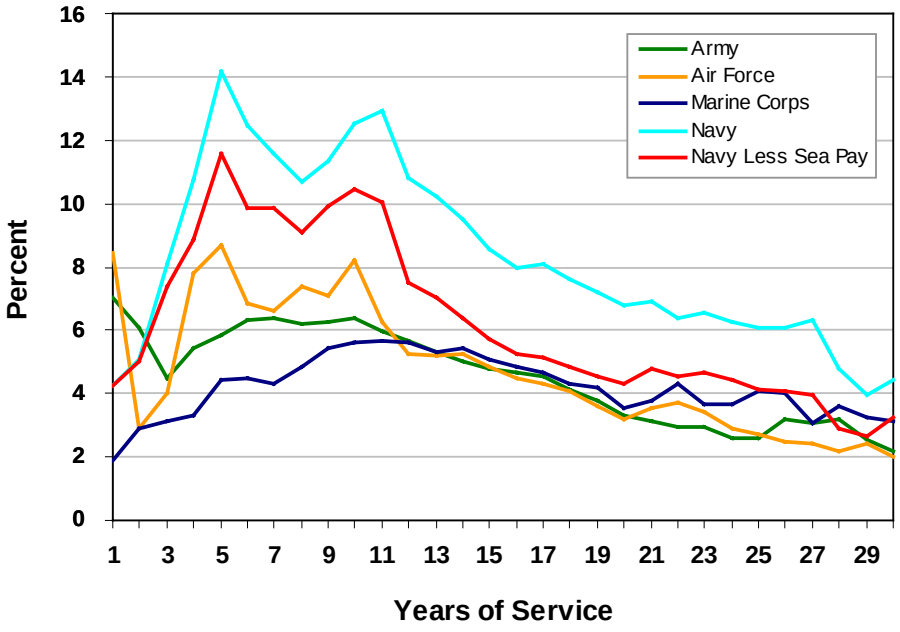
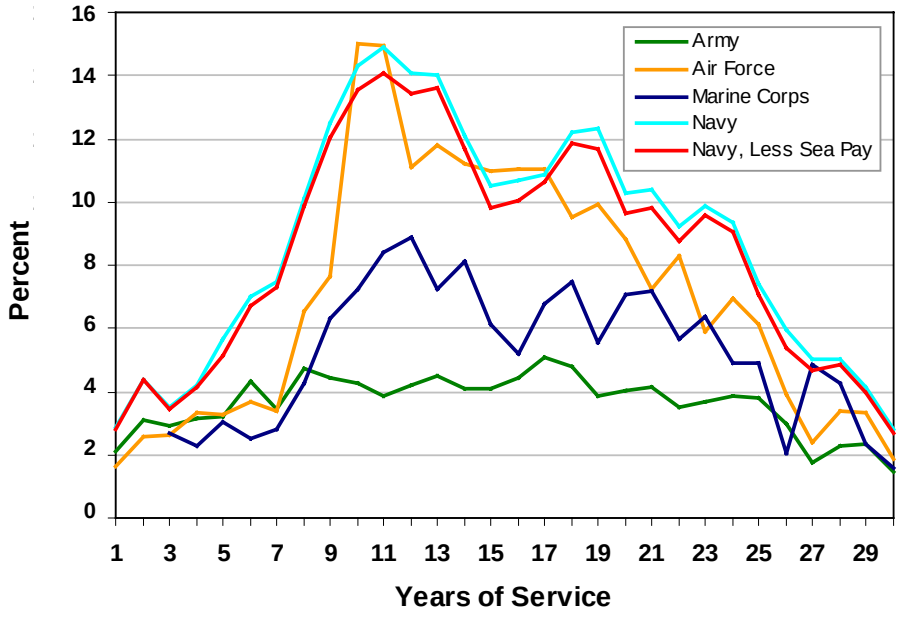


Figure 3-4. Officer S&I Pays and Bonuses as a Percent of Total Pay, 1999



Source: Asch, Hosek, and Martin (2001).

Of all of the Services, for example, the Navy makes the most extensive use of special pays and also pays the highest amounts to the enlisted force. In part, this fact reflects the Navy's need to compensate its force for the arduous nature of sea duty. In the Navy and Air Force, special pays and bonuses are also a significant proportion of total pay for officers, due in large part to the need to retain pilots and other individuals with highly technical skills.

The *balance* between RMC and S&I pays is important. Working from a common RMC base, which must be competitive with general civilian labor market conditions, each Service then establishes its own balance in using special and incentive pays to meet its unique manpower requirements.

SPECIAL AND INCENTIVE PAYS

Special and incentive pays, for both enlisted personnel and officers, are a small part of total pay. Yet special pays can have a significant impact on the ability of the Services to maintain sufficient quantity and quality of personnel in particular skill categories. The use of special pays varies considerably by Service, as illustrated for 1999 in Tables 3-1 and 3-2. This variation reflects both differences in the occupational mix of each Service and its preferences for using special pays.

As would be expected, Career Sea Pay is pervasive in the Navy. About 40 percent of enlisted personnel and 19 percent of officers received Career Sea Pay in 1999, and of these, 5 percent of enlisted personnel and 4 percent of officers also received Career Sea Pay Premiums.[87] Among enlisted personnel, no other special and incentive pay is so dominant as sea pay. Naturally, the Navy is also the only user of Submarine Duty Pay. These two pays largely explain why the Navy has the highest average for special pays among its enlisted force. Special pays are also higher in the Navy because its health-care professionals provide services to the Marine Corps as well as the Navy.

[87] For an extensive discussion of sea pay, see Heidi L. W. Golding and Susan C. McCarver, *Navy Sea Pay: History and Recent Initiatives*, CRM D0003611.A2 (Alexandria, VA: Center for Naval Analyses), December 2001. The Career Sea Pay Premium was created in 1981 as a means of encouraging sea duty extensions and rewarding lengthy sea tours. See also Martha E. Koopman and Anita U. Hattiangadi, *Do the Services Need a Deployment Pay*? CRM D0004458.A2 (Alexandria, VA: Center for Naval Analyses), December 2001, pp. 14-15.

Table 3-1. Enlisted Total Pay by Category and Service, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Percent Rec'g	Avg. Amount ($)	Percent Rec'g	Avg. Amount ($)	Percent Rec'g	Avg. Amount ($)	Percent Rec'g	Avg. Amount ($)
RMC								
Basic Pay	100.0	19,542	100.0	20,371	100.0	17,611	100.0	19,757
Basic Allowance for Housing	100.0	6,497	100.0	6,559	100.0	6,245	100.0	6,453
Basic Allowance for Subsistence	100.0	2,738	100.0	2,738	100.0	2,738	100.0	2,738
Tax Advantage	100.0	1,732	100.0	1,731	100.0	1,647	100.0	1,707
S&I Pays								
Certain Places Pay/Hardship Duty Pay-Location	28.1	73	25.2	65	10.3	35	5.3	90
Special Duty Assignment Pay	6.1	2,699	3.0	2,285	5.8	2,583	9.4	2,108
Overseas Extension Pay	0.4	696	0.1	434	1.5	1,212	0.4	675
Career Sea Pay	0.1	1,314	<1.0	112	9.0	205	40.5	1,624
Career Sea Pay Premium	<1.0	742	0.0		<1.0	734	5.1	684
Hostile Fire/Imminent Danger Pay	15.7	633	19.8	570	12.1	468	26.1	511
Diving Duty Pay	0.1	1,744	0.3	1,687	0.3	1,800	1.7	2,007
Submarine Duty Pay	0.0		0.0		0.0		7.5	2,094
Foreign Language Proficiency Pay (1)	1.5	675	1.5	806	0.7	620	0.5	715
Foreign Language Proficiency Pay (2)	0.2	332	0.1	360	0.0		<1.0	373
Flying Pay (Crew)	1.0	1,688	3.1	1,979	1.3	1,847	1.9	2,120
Flying Pay (Noncrew)	0.0		0.0		0.8	1,003	0.0	
Parachute Duty Pay	10.1	1,471	0.2	1,078	0.7	1,095	0.3	1,417
High Alt. Low Opening	0.3	2,297	0.3	2,399	0.2	2,207	0.5	2,498
Flight Deck Duty Pay	<1.0	1,200	<1.0	85	2.4	471	9.0	591
Demolition Duty Pay	0.4	1,567	0.4	1,641	0.3	1,475	0.5	1,406
Experimental Stress Duty Pay	<1.0	870	0.2	1,261	<1.0	1,387	0.2	747
Toxic Fuels Duty Pay	<1.0	261	0.3	1,507	0.0		<1.0	303
Toxic Pesticides Duty	<1.0	532	<1.0	1,166	0.0		<1.0	998
Chemical Munitions Duty Pay	0.1	927	<1.0	813	0.0		<1.0	546
Bonuses								
Enlistment Bonus	3.0	5,193	1.7	3,749	0.5	2,137	2.2	4,139
Selective Reenlistment Bonus	11.2	1,949	10.1	3,167	<1.0	5,329	15.4	4,452
Miscellaneous Allowances and COLAs								
Family Sep. Allow. I	1.4	181	0.7	308	0.0		0.8	180
Family Sep. Allow. II	19.9	417	17.1	333	19.2	385	23.0	399
CONUS COLA	0.6	730	0.6	355	1.4	612	0.7	697
Oversea COLA	24.6	1,849	24.1	2,904	21.4	2,240	19.4	2,748
Clothing/Uniform Allowance	87.2	329	90.8	281	97.9	229	99.7	336

Source: *Asch, Hosek, and Martin (2001).*
Note: *See note in Table 3-2 for description of column headings.*

Table 3-2. Officer Total Pay by Category and Service, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Percent Rec'g	Avg. Amount ($)	Percent Rec'g	Avg. Amount ($)	Percent Rec'g	Avg. Amount ($)	Percent Rec'g	Avg. Amount ($)
RMC								
Basic Pay	100.0	45,322	100.0	45,127	100.0	42,675	100.0	43,558
Basic Allowance for Housing	100.0	10,584	100.0	10,683	100.0	10,522	100.0	10,376
Basic Allowance for Subsistence	100.0	1,887	100.0	1,887	100.0	1,887	100.0	1,887
Tax Advantage	100.0	3,896	100.0	3,902	100.0	3,623	100.0	3,939
S&I Pays								
Variable Special Pay	0.3	8,141	0.1	8,517	0.0		<1.0	8,751
Board Certified Pay	1.8	3,236	1.0	3,435	0.0		0.4	3,656
Aviation Career Incentive Pay	9.4	5,917	41.8	6,155	33.0	5,370	38.5	5,456
Career Sea Pay	0.0		<1.0	150	0.2	418	18.9	1,272
Career Sea Pay Premium	0.0		<1.0	67	0.0		3.8	544
Hostile Fire/Imminent Danger Pay	17.6	621	21.8	576	15.5	474	24.8	525
Diving Duty Pay	0.1	1,599	0.1	1,682	0.5	1,650	2.8	2,249
Submarine Duty Pay	0.0		0.0		0.0		9.9	5,004
Foreign Language Proficiency Pay (1)	3.1	730	2.6	915	1.4	802	0.8	739
Foreign Language Proficiency Pay (2)	0.4	349	0.1	321	0.0		<1.0	400
Flying Pay (Crew)	0.1	1,735	0.8	1,551	0.0		0.1	1,722
Flying Pay (Noncrew)	0.1	1,047	0.1	604	0.1	774	0.1	728
Air Weapons Controller (Crew)	0.0		1.0	2,564	0.0		0.0	
Parachute Duty Pay	11.2	1,264	0.2	1,019	1.6	1,057	0.6	1,421
High Alt. Low Opening Pay	0.2	1,981	0.2	2,181	<1.0	2,700	0.7	2,504
Flight Deck Duty Pay	0.0		0.0		0.2	558	4.8	485
Demolition Duty Pay	0.3	1,413	0.1	1,374	0.1	547	0.8	1,360
Experimental Stress Duty Pay	<1.0	1,028	0.3	1,049	0.0		0.1	785
Toxic Fuels Duty Pay	0.0		0.1	1,438	0.0		0.0	
Chemical Munitions Duty Pay	<1.0	964	0.0		0.0		0.0	
Bonuses								
Medical Officer Retention	0.8	36,260	0.4	35,355	0.0		0.2	36,576
Nuclear Career Accession	0.0		0.0		0.0		1.2	2,039
Nuclear Career Annual Incentive	0.0		0.0		0.0		2.5	7,402
Add'l Spec'l Pay, Med. Off.	2.0	14,729	1.1	15,000	0.0		0.6	14,707
Incentive Spec. Pay, Med. Off.	0.4	20,852	0.3	18,304	0.0		0.1	22,195
Nuclear Officer Continuation	0.0		0.0		0.0		5.5	17,435
Aviation Officer Continuation	0.0		7.6	17,657	6.8	11,136	6.7	12,163
Miscellaneous Allowances and COLAs								
Family Separation Allow. I	1.3	520	0.6	603	0.0		0.7	189
Family Separation Allow. II	15.2	387	14.5	306	18.3	346	21.5	380
CONUS COLA	1.2	985	1.9	439	1.6	1,007	1.2	1,070
Overseas COLA	23.2	3,243	16.7	4,300	14.5	4,996	17.6	4,391
Clothing/Uniform Allowance	1.3	529	0.8	575	1.2	371	1.3	384
Personal Money Allowance	0.0	843	<1.0	321	0.0		<1.0	497

Source: *Asch, Hosek, and Martin (2001).*

Note: *The column labeled "percent receiving" indicates the percent of the force that received a particular pay in 1999. The column labeled "average amount" indicates the average payment received by those members eligible for that pay. Officers include those whose commission source is ROTC of a military academy.*

In the Army, not surprisingly, 10 percent of personnel received parachute duty pay, but less than 1 percent of enlisted personnel in the other Services received this pay.

The use of particular special pays varies widely even beyond those targeted toward certain occupations or skill areas. Some pays have fairly widespread use. Between Air Force and Army enlisted personnel, Certain Places Pay/Hardship Duty Pay-Location was paid to about a quarter of the force in 1999. Hostile Fire Pay/Imminent Danger Pay also covered a significant fraction of personnel, between 12 and 26 percent across the Services.

On the other hand, some special pays have very limited use among enlisted personnel. For example, less than 2 percent of Navy personnel and less than 1 percent of personnel in the other Services received Diving Duty Pay in 1999. Other examples of pays with limited use include those for demolition duty, experimental stress duty, toxic fuels duty, and chemical munitions. Some existing pays are no longer used at all.

Similar differences in the use of special pays are evident in the officer community as well. Special and incentive pays for medical officers are particularly high due to the above-average salaries paid to medical personnel in the private sector. For Air Force, Navy, and Marine Corps officers, Aviation Career Incentive Pay is among the most prevalent, covering between one-third and two-fifths of officers. The use and average dollar-amount of Aviation Continuation Pay is also relatively high, covering between 7 and 8 percent of officers in 1999.

BONUSES

Enlistment bonuses and selective reenlistment bonuses are an important part of the total military compensation system, providing pay differentials when arduous duties (combat arms) or competition from civilian industry (aviation maintenance) require additional incentives to attract and retain skilled manpower.[88] Bonus payments are usually divided between initial payments and anniversary payments, which are spread over a member's enlistment or reenlistment term. They may also be paid as a lump sum.

[88] For a brief review of the literature, see John T. Warner and Beth J. Asch, "The Economics of Military Manpower," in Keith Hartley and Todd Sandler, eds., *Handbook of Defense Economics, Volume I* (New York, NY: Elsevier), 1995, Chapter 13.

Enlistment Bonuses

Table 3-3 contains 1999 summary information on the use of enlistment and selective reenlistment bonuses. The number of service members receiving enlistment bonus payments in 1999 varies by Service. In the Army, 17 percent of all personnel in their first year of service received an enlistment bonus, compared with nearly 11 percent in the Navy, 21 percent in the Air Force, and less than 8 percent in the Marine Corps.[89]

Table 3-3. Use of Enlistment and Selective Reenlistment Bonuses, 1999

	Army	Navy	Air Force	Marine Corps
Enlistment Bonuses (EBs)				
Enlistments (non-prior service)	64,786	50,199	32,068	33,610
Number of EB's paid	11,093	5,506	6,573	2,566
Percent receiving EB's (initial payments)	17.1	11.0	20.5	7.6
Selective Reenlistment Bonuses (SRBs)				
Reenlistments	68,835	36,656	38,588	13,307
Number of SRB's paid	13,529	10,513	11,775	2777
Percent receiving SRB's (initial payments)	19.7	28.7	30.5	20.9

Source: Office of the Deputy Assistant Secretary of Defense (Military Personnel Policy).

Although the maximum enlistment bonus amount permitted by law today is $20,000, few bonuses of this size are offered.[90] The Army uses them very selectively—for individuals in military intelligence with a particular language skill, for example. Today, the average Army enlistment bonus is about $8,000, while the Navy, Marine Corps, and Air Force pay, on average, about $4,000, $4,000-$5,000, and $8,000, respectively. These amounts vary somewhat during the course of the year in response to supply and demand conditions.

Targeted enlistment bonuses have had a significant effect on the ability of the Services to attract high-quality recruits in particular career fields. They have also proven to be more cost-effective than across-the-board pay increases since recruiters can target bonuses toward individuals who would not otherwise sign enlistment contracts.[91] Empirical studies support

[89] These percentages differ from those in Table 3-1. Table 3-1 reflects the percent of the total force receiving enlistment bonuses; Table 3-3 reports the percent of non-prior service enlistees only.

[90] The statutory enlistment bonus maximum was increased from $12,000 to $20,000 in 1999.

[91] John T. Warner, Curtis J. Simon, and Deborah M. Payne, *Enlistment Supply in the 1990s: A Study of the Navy College Fund and Other Enlistment Incentive Programs,*

the efficacy of bonuses for several other reasons. First, bonuses are useful in channeling recruits into hard-to-fill skills. Second, they can be targeted to longer terms of enlistment. By attracting recruits for longer terms, they reduce future recruiting requirements and future training costs. Thus, the Services have substantially increased their use of bonuses in recent years in response to the more difficult recruiting environment.

Selective Reenlistment Bonuses

Selective reenlistment bonuses (SRBs) are paid over a broad range of years-of-service, and the use of these bonuses varies widely among the Services as well. As shown in Table 3-3, about 20 percent of Army, 29 percent of Navy, 31 percent of Air Force, and 21 percent of the Marine Corps re-enlistees received an initial SRB payment in 1999.[92] The Air Force and Navy each rely on a relatively more senior enlisted career force to support their technical skill requirements; the greater use of SRBs in the Air Force and Navy reflect those requirements. The average amounts of the initial payment for selective reenlistment bonuses in 1999 were: Navy, $9,321; Marine Corps, $5,341; Air Force, $5,038; and Army, $4,670. SRBs tend to be used most in the early and mid-career—during 4 to 12 years of service—when the majority of career decisions are made.

Since the early days of the All-Volunteer Force, the SRB program has been an effective management tool for shaping both the size and skill composition of the mid-career force. SRBs have positive effects on reenlistment rates and, like enlistment bonuses, have been found to be more cost-effective than across-the-board pay raises. Studies have shown that a one-level change in an SRB increases the reenlistment rate by 2 to 3 percentage points.[93,94] An additional advantage is that the payment

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Report No. 2000-15 (Arlington, VA: Defense Manpower Data Center), April 2001. See also Warner and Asch (1995), Table 4, p. 359.

92 These data indicate the percentage of *reenlistments* receiving SRBs; the numbers in Table 3-1 differ in that they reflect the percentage of the *total enlisted force* receiving SRBs.

93 See Matthew S. Goldberg, *A Survey of Enlisted Retention: Models and Findings*, CRM D0004085.A2 (Alexandria, VA: Center for Naval Analyses), November 2001, pp. 57-65.

94 The Services set reenlistment bonuses for each skill over three periods (Zone A= 2-6 years of service; Zone B=7-10 years of service; Zone C=11-14 years of service) by assigning each skill-zone combination an SRB multiple. Multiples (or levels) range from 0 to 15, in increments of one half, and the bonus calculation equals the SRB multiple times years of reenlistment (3 to 6 years) times current monthly basic pay. SRBs vary from about $2,250 (SRB multiple .5 for a 3-year reenlistment, for an E-4 with 4 years of service) to about $54,000 (for an SRB multiple of 6 and a 6-year reenlistment). Current policy limits any one SRB to no more than $60,000.

structure of SRBs encourages longer terms of reenlistment thereby increasing the supply of personnel.

Table 3-4 illustrates the marginal cost of a reenlistment in each reenlistment zone. Costs were calculated using the average monthly basic pay in each zone, in FY 2000. The base retention rates in the three zones are representative of average retention rates in the Services given 2 to 6, 7 to 10, and 11 to 14 years of service, respectively. In this example, the marginal SRB cost of a reenlistment at the first term is $87,000, while marginal costs at the second and third term points (Zones B and C) are $150,000 and $233,000, respectively. Marginal SRB costs rise with zone because service members are more likely to reenlist the longer they have served and would do so regardless of whether a bonus is offered. The calculations suggest that bonuses should be concentrated in Zone A; and in fact they are.

Table 3-4. Marginal Reenlistment Costs, FY 2000

Zone	Base Reenlistment Rate (%)	Reenlistment Rate with SRB (%)	Marginal SRB Cost ($)
A	40	43	87,000
B	60	63	150,000
C	80	83	233,000

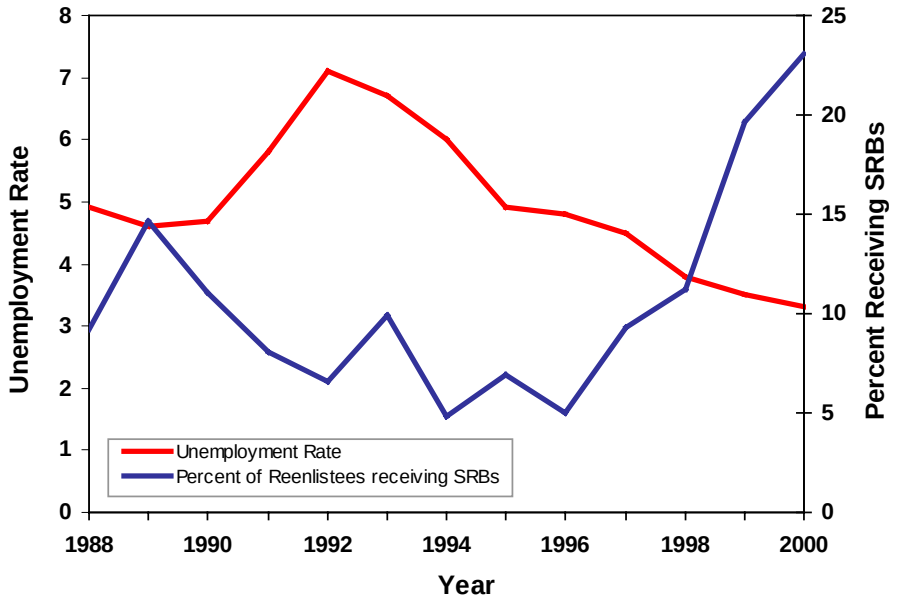
When other factors are considered, the marginal cost of a reenlistment is lower than these calculations suggest. By reducing personnel turnover with longer terms of reenlistment, higher reenlistment bonuses reduce recruiting and training costs. Furthermore, reenlistees are proficient in their positions while new personnel often require a substantial period of time on the job before their productivity approaches that of a more experienced reenlistee. Given the high cost of training and long periods required to gain proficiency in some military specialties—such as for aviation maintenance personnel and nuclear power technicians—there are many situations in which the positive SRB cost of a reenlistment is more than offset by reductions in recruiting and training costs and in lost readiness.[95] SRBs and other incentives targeted toward such skills are much more cost-effective than overall pay increases.

Each year, the Services attempt to set SRB levels to ensure that reenlistments meet Service requirements in both number and skill. Bonus levels may change in response to both internal and external factors

[95] Carol S. Moore, Heidi L. W. Golding, and Henry S. Griffis, *Manpower and Personnel IWAR 2000: Aging the Force*, D0003079.A2 (Alexandria, VA: Center for Naval Analyses), January 2001.

affecting manpower supply to the military. For example, during the recent force drawdown, the Army reduced the level of SRBs. In turn, the percentage of reenlistees receiving SRB payments fell from about 15 percent of all reenlistments in 1988 to less than 5 percent in the 1994-1996 timeframe, as shown in Figure 3-5. At the same time, other incentives—such as the Voluntary Separation Incentive and Selected Separation Benefit—were also used to help downsize the force.

Figure 3-5. Percent of Army Reenlistees Receiving SRBs Compared to Unemployment Rate, 1988-2000



Note: Unemployment rate is for males 20 years and over.

However, beginning in 1997, the Army increased the level of SRB payments to encourage more reenlistments from the relatively small accession cohorts of the early 1990s. The number of payments increased to about 23 percent of all reenlistments in 2000, also reflecting the shortage of skilled personnel in the civilian job market in the late 1990s. Rising SRB payments, which were used to combat falling unemployment in a tight labor market, illustrate how the bonus program can be used as a counter-cyclical policy tool.

The increased use of selective reenlistment bonuses over the past three years, in terms of amount of bonus paid and the number of specialties

offered a bonus, has been the key factor in meeting Service retention objectives. For example:

- In FY 2001, the Army expanded its SRB program to entice soldiers to move to locations that were critically undermanned. Soldiers in certain skills were offered a bonus if they agreed to move to a location with shortages in that skill. The Army was able, therefore, to more effectively target their SRB program to achieve specific manning objectives by location.
- In FY 2001, more than one in three reenlistments in the Navy were associated with a bonus offering. The Navy's budget for initial reenlistment bonuses has increased from $69 million in FY 1998 to $165 million in FY 2001.
- During 1997, the Marine Corps offered reenlistment bonuses to 134 skills. Today that number has risen to 176 skills, with the greatest percentage increase targeted at retaining their more experienced personnel.
- The Air Force made aggressive use of bonuses as retention trends turned downward in the late 1990s. Both the budget for bonuses and the skills eligible to receive bonuses have increased exponentially. The budget for initial bonuses increased from $25 million in FY 1998 to $126 million in FY 2001. The number of skills receiving a bonus increased from 107 to 154 in the same period.

While bonuses are a very important compensation tool, *their use is intended for specific purposes and for relatively short periods of time*. They are not designed to create a *permanent* change in a member's earnings over a military career. As a result, they are not carried over as a post-service benefit, since they are not included in determining the level of retired pay.

The use of bonuses today reflects a departure from most of the 1990s. It may reflect a growing discrepancy between military and civilian pay for the mid-career enlisted force. This implication is particularly evident in the increased use of bonuses for personnel with 10 to 14 years of service. Bonuses are not the appropriate tool for resolving differentials between military and civilian pay when they are evident across an entire segment of the force, as opposed to particular skill categories. Instead, widespread pay differentials should be remedied through pay table restructuring, as was discussed in the previous chapter.

MILITARY AND CIVILIAN PAY DIFFERENTIALS: THE ROLE OF SPECIAL PAYS

Special pays and bonuses can be effective in meeting military requirements for personnel with particular skills in high demand and/or those who are very highly compensated in the civilian sector. For example, officers in medical, aviation, and nuclear fields receive S&I pays and bonuses that raise their average compensation well above that of other officers. That said, over the past decade the private sector has become a competitive alternative for many career service members.

COMPARISON TO CIVILIAN PAY

The dispersion of earnings in the private-sector economy has grown since the early 1980s, and differences in skill, education, and ability help explain that trend. Given the importance of private-sector earnings opportunities in a military member's retention decision, it is of interest to understand the degree of variation in military earnings, as well as the importance of skill and other factors in explaining that variance.

Figures 3-6 and 3-7 show the total pay of military members in the 30th and 90th percentiles of the pay distribution for enlisted personnel and officers, respectively, as compared with their civilian peers. Differences in military pay between the 30th and 90th percentiles vary by years of service. For enlisted personnel, the difference is about $6,700 at five years of service and $8,500 at 10 years of service. In contrast, the variance in civilian pay is significantly larger. At five years of experience, the difference between the 30th and 90th percentile is about $20,000 for those with some college education; at 10 years of experience, the difference is about $28,000. The differential continues to widen with years of experience.

For officers, the difference in pay between the 30th and 90th percentiles is about $6,900 at five years of service and peaks at over $23,000 at 11 years of service. As in the enlisted force comparison, the variation is due to a number of factors including differences in pay grade, marital status, and non-RMC pays. The difference is largest in mid-career, although it changes little beyond 10 to 12 years of service. For civilians with a college or graduate education, the differential at five years is about $38,000, at 11 years about $45,000, and increases at 20 years of experience to about $58,000—a significantly larger variation than for officers with similar levels of experience and education.

Figure 3-6. Comparison of Enlisted Total Pay to Earnings of Civilians with Some College Education (1999 dollars)

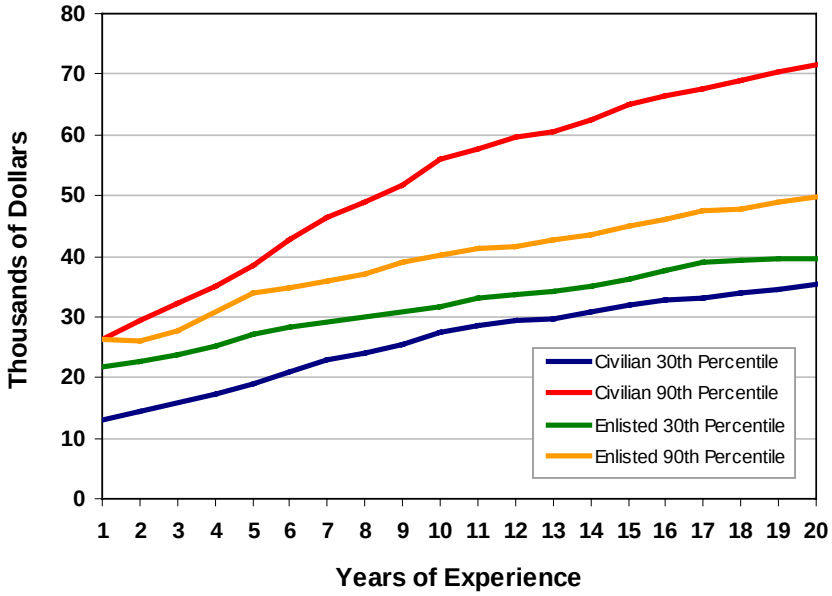
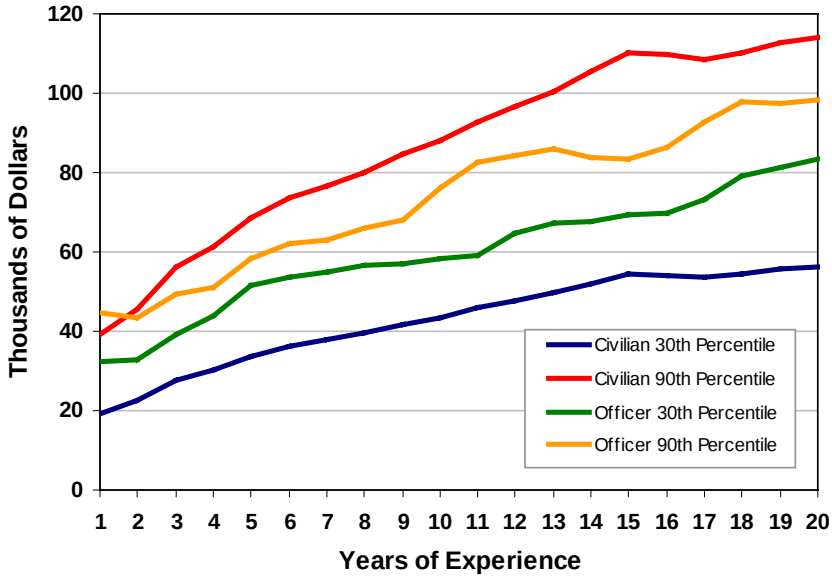


Figure 3-7. Comparison of Officer Total Pay to Civilian Earnings for Managers and Professionals with Baccalaureate or Advanced Degrees (1999 dollars)



Source: Special tabulations prepared by the RAND Corporation for the 9th QRMC.

The civilian earnings figures are averaged over many firms with different hiring requirements, occupational mixes, and industry and location conditions—perhaps representing a more diverse work force than that of the military. Consequently, it is not surprising that the variance in civilian earnings would be greater. Nonetheless, the range of variation between military and civilian compensation is larger than would be expected due to those factors alone.

In the previous chapter, we showed how today's force is more highly educated than in decades past and recommended increases in basic pay to better reflect the education levels of the workforce. Should the Services find, as the labor market changes, that larger pay differentials are needed in particular skills, occupations, and assignments, then bonuses and special pays are effective tools and can be used to a greater extent.

THE NEED FOR MORE PAY VARIANCE: A NAVY CASE STUDY

A recent study illustrates the effectiveness of pay differentials—in this case created by selective reenlistment bonuses—on retention.[96] The study was motivated, in part, by concern that gaps between civilian and military earnings were having a negative impact on enlisted retention in the Navy, particularly in grades E-4 through E-6 in highly technical occupations (or ratings).

The study found substantial variation in civilian earnings opportunities across ratings. Consistent with expectations, highly technical occupations such as aircraft engine mechanics, aviation electronics technicians, electronics technicians, and gas turbine systems electricians, commanded the highest civilian salaries, and those occupations currently pose the most severe manning problems. Those in the Navy with the most technical skills and the most training can simply earn the highest salaries in the civilian economy.

Although such specialists command the highest civilian earnings, they also have the highest levels of military compensation, due primarily to high SRB payments. Despite relatively high military compensation, many of these occupations still have manning problems. This fact does *not* imply that military compensation is an ineffective tool in attracting and retaining personnel, however. On the contrary, the Navy study found that continued manning problems in these specialties are an indication that

[96] Michael L. Hansen, *Compensation and Enlisted Manning Shortfalls*, CRM D0001998.A2 (Alexandria, VA: Center for Naval Analyses), September, 2000.

compensation (and SRB) levels, although relatively high, *are not high enough*. In these technical specialties, military pay differentials still fall short of those in the civilian sector, and the magnitude of these differences is directly correlated with manning shortfalls in these occupations. In fact, for some technical ratings, the *maximum observed differentials* in military compensation did not even match the *median differentials* in the civilian sector. *In these situations, greater flexibility in military compensation is needed to alleviate manning shortfalls.*

As in previous studies, this analysis found that increases in military compensation have a significant effect on reenlistment behavior. Higher SRBs in these highly technical specialties will help to alleviate manpower shortages. The current array of S&I pays and bonuses, including the new critical skills retention bonus (discussed at the end of this chapter), offer the type of flexibility needed—if used.

SPECIAL PAYS AND ALLOWANCES FOR THE RESERVE COMPONENT

Many special and incentive pays, bonuses, and allowances are used to augment basic pay for the Reserve as well as active component. Over the past few decades, the Total Force policy has motivated a greater integration of the active and Reserve forces, which has led to changes in the role of the Reserve components. They are no longer a "force in reserve" but in fact are essential players in most military missions. This fact led the QRMC to review two elements of pay for the Reserves: the application of special and incentive pays and the validity of the 140-day threshold for the payment of the basic allowance for housing.

SPECIAL & INCENTIVE PAYS

In 1942, special pays were extended to Reserve and Guard members performing certain duties during Inactive Duty for Training (IDT). In 1948, the "1/30th rule" became the standard pay rule for all Reserve component members engaged in IDT. Under the 1/30th rule, a Reserve component member receives 1/30th of the monthly active-duty pay amount for each drill completed. The 1/30th rule authorized special pays to Reserve pilots, radar technicians, and some medical personnel for IDT periods under standards specified by the Service Secretaries. In the

intervening years, these special pays have been enhanced for some personnel and eliminated for others. Hazardous duty incentive pays were extended to IDT reservists in 1949.

The Department of Defense last reviewed the issue of special and incentive pays for Reserve component members of the armed forces in 1986.[97] The 6th QRMC concluded that the 1/30th rule was appropriate for Reserve S&I pays:

> *Reservists on ADT [active duty for training] or IDT performing in certain specialties receive 1/30th of the basic pay rate for active duty members for each period of duty performed. The 6th QRMC believes this rate of pay is both appropriate and consistent with the manner in which members of the reserve components are compensated.*

The 9th QRMC revisited this issue because of the observed changes in both the scope of S&I pays and in the role of the Reserve forces. Renewed interest in this topic arises from three sources:

- First, DoD's Total Force policy requires a greater integration of the active and reserve forces. Barriers to that integration, including differences in pay and compensation policy, should be limited to those that can be justified on readiness or efficiency grounds.
- Second, the role of the Reserves has changed dramatically since the end of the Cold War, during which Reserve component members were a form of pre-trained manpower to be used in the event of full mobilization. They were rarely called to active duty to support any conflict. Now, members of the Reserves are integrated more fully into missions that require less than full mobilization and are therefore subject to more frequent call-ups. Because the civilian careers of these members may be subject to greater disruption than in the past, it is prudent to review whether changing the manner in which S&I pays are provided to Reserve and Guard components may mitigate any retention or recruiting problems that might emerge.
- Third, there have been a number of significant changes in special and incentive pays, including the types of pays for

[97] U.S. Department of Defense, *Report of the Sixth Quadrennial Review of Military Compensation, Volume I*, Office of the Assistant Secretary of Defense (Force Management and Personnel), Washington, DC, August 1988, pp. 5-7.

which personnel are eligible and how they are paid relative to active-duty personnel.

Application of S&I Pays for Reserves: Arguments for Change

For purposes of discussion, S&I pays for the Reserve component are grouped, in Table 3-5, in three categories that reflect the primary purpose of each pay, as identified by the Services: hazard or hardship duty pays, critical and skill incentive pays with hazardous duty, and critical and skill incentive pays without hazardous duty. There are 28 special and incentive pays for which a Reserve component member is eligible. Payment methods vary across these categories. Most pays are paid proportionately ($1/30^{th}$ of the monthly rate per day) to Reserve component members performing Active Duty for Training (ADT). Not all of the pays, however, are paid to reservists when performing IDT.[98]

Table 3-5. Reserve Special and Incentive Pay Categories

Hazardous or Hardship Duty Pays	Career or Skill Retention with Hazardous Duty
Hostile fire/imminent danger	ACIP/CEIP
Demolition	Nuclear qualified
Flight pay crew	Submarine duty incentive
Flight pay non-crew	Operational submarine duty
Parachute duty	**Career or Skill Retention without Hazardous Duty**
Toxic fuels/chemical munitions	Dentist
Diving duty	Veterinarian
Career sea pay	Optometrists
Experimental stress	Psychologists/non-physician
Personal exposure (toxic/dangerous)	Nurse anesthetists/ registered nurses
High or low pressure chamber	Reserve health care officers
Human accel/decel subject	Special duty assignment pay
Responsibility pay	Foreign language proficiency pay

Source: Hogan, et al. (2001).

[98] Details of how each of these pay are earned by members of the Reserve component are discussed in general in the section to follow. For details on the individual pays, see Paul F. Hogan, Patrick C. Mackin, Captain Louis M. Farrell, and Captain George T. Elliott, *Special and Incentive Pays for the Reserve Component*, paper prepared for the Ninth Quadrennial Review of Military Compensation, December 2001.

Hazardous Duty and Hardship Duty Pays

These pays are designed primarily to encourage participation in specific onerous or dangerous activities, or to reward a member who encounters danger as a result of performing assigned duty. Members must perform the duty to a specified performance standard. In most cases, the pays to active-duty members are based on a "threshold"—if the member is exposed to the risk or performs the duty a minimum number of times, he or she is entitled to the full monthly pay.

Reservists are entitled to these pays for both ADT and IDT. Regardless of the threshold for a particular pay, Reservists are paid at the 1/30th rate, with the exception of Hostile Fire/Imminent Danger Pay.[99] In some cases, the entitlement threshold for active and Reserve component members is the same—such as for Parachute Duty Pay, which is one jump per quarter—but the pay is not. It is conceivable that Reserve component members could exceed the active-duty thresholds, yet, because of the 1/30th rule, Reservists would receive less pay than those serving on active duty.

Because active-duty personnel receive the full monthly amount of these pays provided they meet a minimum exposure or duty threshold, one can argue that there may be cases where Reservists who meet (or exceed) that same threshold should receive more than the 1/30th payment currently allowed. A counter-argument may be that, on average, active-duty personnel have greater exposure to the hazards, regardless of threshold levels. However, even those active-duty personnel who just meet the standards receive the same amount of pay as others who exceed the thresholds.

Career and Skill Pays with Hazardous Duty

Career and skill pays provide an incentive for members to acquire particular skills or encourage retention in careers such as aviation (Aviation Career Incentive Pay [ACIP] and Career Enlisted Flyer Incentive Pay [CEIP]) and submarine service (Submarine Duty Incentive Pay for continuous and operational duties). In addition, applications of these skills will typically be associated with hazards, risks, or hardships. Hence, while the primary purpose is to encourage a career in a particular skill, the pay is partial compensation for the hazardous duty.

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[99] For Hostile Fire/Imminent Danger Pay, members (both active and reserve) receive the full monthly payment if they spend even one day in the specified zone during the month, regardless of their duty status. This pay is not applicable to IDT.

Entitlement to these pays may depend on meeting various career "gates." For example, to receive ACIP when a member has up to 18 years of aviation service, he or she must fly 8 out of 12 years of service. The same requirement applies to Reserve component members on IDT or ADT. Members must perform the duty at specified levels during their career in order to continue receiving the pay. Reserve component members are eligible to receive these pays at the 1/30th rate.

These pays are historically used to encourage full-time, active-duty careers. However, as the role of the Reserve component evolves, their use may need to be expanded to encourage reserve careers and as partial compensation for hazardous reserve duty. To advance this argument, it will be necessary to provide evidence of reserve retention and recruiting difficulties. Are there problem areas in particular skills (such as reserve aviation) that could benefit from improved incentives to remain as a drilling Reservist? Paying 1/30th of the active-duty rate may not be enough to ensure a sufficient supply of reserve personnel. Providing the Services with the flexibility to increase the payment amount to Reservists, as needed to maintain staffing levels, may be prudent policy. The QRMC believes that more detailed study is needed to determine whether the manner of payment for all or some of these pays should change for Reserve component members.

Career or Skill Retention without Hazardous Duty

The third category of pays consists of those designed to attract and retain members in particular skills or types of duty. However, unlike the pays discussed above, there is not an explicit hazard associated with the skill or duty assignment. Few of these pays are paid to Reservists on IDT, but a larger number are paid to Reservists when performing ADT. None of the health-related occupation pays are paid to Reservists for IDT, but physicians and dentists receive a lower, pro-rated amount—lower than what the 1/30th rule would give—when on ADT. Additionally, reserve health-care officers recalled to active duty for more than thirty days, but fewer than 365 days, receive Reserve Health Care Officers' pay.

Because these are retention pays, entitlement and payment ought to be governed by supply and demand considerations. Pay levels for Reservists should be based on the Services' needs to attract and retain the "Total Force." The effects of these pays for Reservists must also be balanced against their effects on active component retention. While the pay levels required for Reservists may indeed be lower than those required for ensuring sufficient active component retention, the 1/30th rule does not

necessarily ensure the proper level of pay. This area is another in which the QRMC believes further study is needed.

Foreign Language Proficiency Pay

Of particular interest, among the skill retention pays without hazardous duty, is Foreign Language Proficiency Pay (FLPP). It is somewhat different than the other pays in this category in that it can be paid for the acquisition and maintenance of a language skill, even though the member may not be in an assignment that requires use of the language. FLPP currently has two purposes, at least in its application to the active component. First, FLPP is paid to retain members with critical skills who are in jobs that require them to use those skills, such as interpreters. Reserve component members receive this form of FLPP at the 1/30th rate if they use language skills in their reserve jobs for at least two hours during IDT drills.

Second, some active component members receive a lower FLPP payment to *maintain proficiency* in a critical language. These members are not using the foreign languages in their military jobs, but are merely available should they be needed in the future. In this case, FLPP functions as a skill pay, ensuring a sufficient pool of qualified personnel. Payment of FLPP to maintain language proficiency is available only to active component members. There is no corresponding authority to provide the same incentive pay for Reserve component members who meet the same language skill requirements.

If the Services can meet their language skill requirements using only active-duty members (who may be more readily available for rapid deployment), they may not need to offer the second type of FLPP to Reservists. However, providing the *authority* to pay Reserve component members for language proficiency would increase manning flexibility. Because this version of FLPP is paid only for maintaining proficiency, it would make sense to pay Reservists at the same rate ($100/month) if the Services decide to offer them the pay.

Future Directions

The QRMC was not able to obtain sufficiently detailed pay and retention data for Reserve components because so little has been collected in the past. As a result, it was not deemed appropriate to conclude whether the method of paying certain S&I pays to the Reserve component should be changed. However, the QRMC believes there are some areas where a more consistent application of S&I pays for Reserve component and active component members might be considered. Thus, its primary

recommendation is for further study of these issues. Two themes are fundamental in such a study: the changing role of the Reserves and whether changes in S&I pays would have a positive impact on Reserve component recruiting and retention.

PAYMENT OF THE BASIC ALLOWANCE FOR HOUSING

With a few exceptions, military officers have always been provided some form of housing, either government quarters or a cash allowance when government quarters are not available. Prior to 1980, Reserve component members, like their active component counterparts, received the Basic Allowance for Quarters (BAQ) while on active duty, regardless of the tour length. In 1980, Congress established a Variable Housing Allowance (VHA) to provide an additional housing benefit to those members living in areas with high housing costs. Initially, Reservists were authorized to receive VHA for any length of active duty. However, in 1983, Congress established 140 days of consecutive active duty as the threshold above which a Reservist was entitled to receive VHA. For tours of duty of 139 days or less, the Reservist received only BAQ.

This threshold for Reservists was motivated by three factors:

- The cost of providing VHA to Reserve and active components was higher than projected, especially in the Army.
- For short periods of duty (defined as 139 days or less), the Reserve component member was not expected to incur significant financial losses related to housing costs, since employers were expected to continue to pay their Reserve component employees while they were on short-term active duty.
- Most Reserve component members on short-term active duty were expected to perform the duty within commuting distance of their permanent civilian homes.

The 6th QRMC reviewed the validity of the 140-day threshold in 1986 and concluded that no change to the threshold was warranted, but the issue has not been considered by a QRMC since that time.[100] When Congress combined BAQ and VHA into the Basic Allowance for Housing in 1998, the 140-day threshold for Reserve component members was left intact. At

[100] U.S. Department of Defense, *Report of the Sixth Quadrennial Review of Military Compensation, Volume I* (1988), pp. 6-8.

that time, the Secretary of Defense established BAH-II for Reservists on active duty of less than 140 days, and this policy remains in place today. BAH-II is essentially equal to the old BAQ and, in most cases, is less than BAH—significantly so in areas with high housing costs.

In 2000, the Secretary of Defense's *Report to Congress on the Parity of Pay and Benefits for Active Duty Service and Reserve Service* concluded that:

> *most Reservists [on ADT] must rely on their military salary to pay their housing expenses. This creates a disparity between Active and Reserve component members who live in the same area and experience the same housing costs for that area, yet receive different housing allowances simply based on the duration of the Reservist's orders.*[101]

In November, 2001, the Department of Defense BAH Committee reviewed this issue and recommended a reduction of the threshold from 140 days to 30 days. In establishing the 30-day threshold, the Committee recognized the significant costs of reducing the threshold below 30 days and determined that a member does not incur any significant financial losses for periods of active duty less than 30 days.

The 9th QRMC believes there should be no difference between the housing allowance for the active force (BAH) and the Reserve component (BAH II), in theory, and also believes that the assumptions used for establishing the 140-day threshold are no longer appropriate for today's Total Force. *Given cost considerations, however, the 9th QRMC recommends that the Secretary of Defense reduce from 140 days to 30 days the threshold at which a Reserve component member is entitled to receive BAH.*

SPECIAL PAYS FOR OVERSEAS DUTY

In the armed forces, some assignment locations are considered more onerous or less desirable than others. Overseas assignments and sea duty, for example, have generally been considered less desirable by the typical

[101] U.S. Department of Defense, *Report to Congress on the Parity of Pay and Benefits for Active Duty Service and Reserve Service*, Office of the Assistant Secretary of Defense (Reserve Affairs) and Office of the Assistant Secretary of Defense (Force Management Policy), March 26, 2001, p. 5.

military member. The impact that more frequent deployments will have on retention has been a growing concern in recent years. Lifestyle expectations and family interests are making many overseas duty assignments—whether permanent change of station or temporary deployment—even less desirable. This trend has remained true even though there are a large and growing number of programs designed to compensate members who are so assigned.

If the trend toward more frequent deployments continues, particularly peacetime operations that do not involve hazardous duty, the Services may find a need for additional compensation tools. This section addresses special pays and other incentives for overseas duty. The employment of a voluntary assignment system as well as creation of an S&I pay for deployment are also discussed.

OVERSEAS DUTY ASSIGNMENTS

In the National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), Congress expressed concern "that the military services are having difficulty filling overseas duty positions with volunteers. … While overseas duty is often desirable for younger unaccompanied service members, senior service members are frequently reluctant to go overseas because of family concerns."

In response, an internal Departmental working group issued the *Military Assignment Policy Review*.[102] Through focus groups, interviews, and survey data, this working group validated the overseas assignment problem in certain locations, reviewed existing incentives, and identified a strategy to increase volunteerism for overseas assignments.

Current Incentives for Overseas Service

The Department of Defense manages overseas assignments for about 275,000 personnel serving in over 130 countries. While the Services must place top priority on maintaining readiness, they must balance this priority with individual preferences and considerations of quality of life for service members and their families.

Whenever possible, the military services seek volunteers to fill overseas assignments; but they do not have an exclusively voluntary system. Personnel are assigned based on qualifications such as military specialty and rank, as well as other conditions such as time-on-station.

[102] *Military Assignment Policy Review*, Office of the Under Secretary of Defense (Personnel and Readiness), October 2001.

Qualified volunteers, however, are assigned ahead of others. While each Service is meeting the challenges of assigning personnel to overseas locations, all Services report some areas of difficulty. Identifying additional measures that will enhance the quality of life overseas and providing compensatory relief for military members and their families in overseas assignments is a high priority. Improved incentives will help encourage volunteerism, particularly in hard-to-fill assignments.

Three of the Services can identify several overseas assignment locations that are particularly difficult to fill. For the Army, Korea is difficult. The Navy reports difficulty in filling assignments in Japan, Italy, and Hawaii. The Air Force is not experiencing serious problems but believes that Korea and Turkey are the least desirable locations in their overseas inventory. The greatest challenge for the Air Force is filling assignment vacancies in dependent-restricted and short-tour locations that require personnel with mission-critical skills in small career fields—so called "high demand/low density" personnel.

Often the decision to serve an overseas tour—with or without the family—is determined by the benefits offered to the member, in addition to conditions at the overseas location such as housing and community services. The Services offer benefits to alleviate family burdens, reduce hardship, and provide financial recognition of difficult environmental challenges. For example, the Services offer certain special and incentive pays such as Hardship Duty Pay-Location ($50 to $150 per month) in designated locations; Imminent Danger Pay ($150 per month) for members serving in designated dangerous locations overseas; and tax-relief benefits for certain overseas locations approved as Combat Zone or Qualified Hazardous Duty Areas. The Services also use incentives such as free trips home, paid family moves, extended leave benefits, and rest and recuperation leave.

Improving Assignment Incentives

The vast majority of service members who have served in overseas assignments (84 percent) would recommend a similar assignment to a friend.[103] They feel that these assignments offer great cultural and great operational job experiences. But in many cases, the perception of some overseas assignments is that they are less desirable than in fact may be the case, based on the recent experience of members assigned to those positions. This discrepancy is a result of poor "public relations." Thus, in addition to improving assignment incentives, the Services need to ensure

[103] *Military Assignment Policy Review* (2001), p. 13.

that current information about these assignments is provided to their members. Up-to-date information and assignment previews are keys to a reliable and realistic assessment of overseas locations.

As reported by the *Military Assignment Policy Review*, the main objection to serving in *accompanied* overseas locations was family separation from parents and other relatives. The high cost of living was the second most common objection, followed by the difficulty of adjusting to cultural differences in overseas areas. Survey participants suggested many incentives that could be adopted to address concerns associated with volunteering for overseas assignments. The most frequent suggestion was the adoption of more and better bonuses, allowances, or incentive pays. However, providing members with better local area information, reconsidering current assignment policies concerning time-on-station, and making improvements in areas such as housing and schools would help to address many concerns. For those in *unaccompanied* overseas locations, family separation was the main objection to serving overseas. As a result, the top recommendations included allowing dependents to accompany or visit members at remote installations and providing free round-trip tickets for members to travel home or for their families to visit.

The review offered 15 recommendations for improving incentives for military members to volunteer for overseas assignments. The QRMC highlights several of these recommendations that, in particular, offer the type of flexibility that the Department needs to incorporate into its policies.

- ***Waive time-on-station requirements*** to allow qualified members in CONUS to volunteer for overseas duty.[104] This waiver would help to increase the number of volunteers by permitting them to compete for overseas duty regardless of the amount of time currently served in their present assignment.
- ***Offer members additional compensation*** for difficult-to-fill billets in specific overseas locations, providing the Services more flexibility in offering incentives for specific overseas assignments.
- ***Expand use of the family separation allowance*** to apply to all members who elect unaccompanied tours, regardless of dependency status. This allowance can help to alleviate

[104] Service members typically serve in a given assignment for a period of 36 months; this period is referred to as time-on-station.

additional expenses of separate households while a member serves overseas.

- ***Offer tour extension benefits to officers***. This proposal encourages officers to extend tours when needed to increase stability and continuity for leadership positions in overseas locations.

Other recommendations made by the working group addressed expanded leave opportunities, a range of benefits that reduce out-of-pocket expenses incurred by members during change of station to overseas locations, expanded spousal employment opportunities, and benefits to reduce the cost of communicating with family and friends while serving overseas. To implement these recommendations will involve both policy and legislative changes, some of which are already being addressed.

The QRMC supports the recommendations contained in the *Military Assignment Policy Review*. They offer a combination of pay and quality-of-life incentives that should help to increase volunteers for overseas assignments as well as increase retention of service members in assignments overseas.

A VOLUNTARY ASSIGNMENT SYSTEM

Each Service attempts to fill career assignments voluntarily by matching members' preferences against the available assignments for which they are qualified. Although members may submit a list of assignment preferences, there is no guarantee of a member receiving his or her first, or even second, choice. Ultimately, to ensure readiness, if there are no qualified volunteers for an overseas assignment, it is assigned to an individual.[105]

A service member's satisfaction with his or her assignment can have a significant impact on retention. In 1998, the Air Force conducted a survey of 633 departing personnel to determine their reasons for separating.[106] Survey participants were asked if there was a single change the Air Force could make to keep them in the service. Of the 35 percent of enlisted personnel and 48 percent of officers who responded in the affirmative, the most frequently cited change was more choice in assignments.

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[105] For a more complete discussion, see Paul F. Hogan, Timothy M. Dall, Michael H. Cardwell, Patrick C. Mackin, and Shahriar Hasan, *Review of the Department of Defense Cost-of-Living Allowance* (Falls Church, VA: The Lewin Group and SAG Corporation), July 2000, Chapter 6.

[106] See *Military Retirement: Proposed Changes Warrant Careful Analysis* (Washington, DC: General Accounting Office), February 1999.

Satisfaction with assignments is related to individual tastes and preferences, which are diverse. Some military members find certain "onerous" assignments less onerous than others—perhaps even enjoyable. There are a variety of reasons why members prefer some assignments to others. These factors include:

- Differences in the cost of living.
- Environmental conditions, such as climate.
- Type of duty.
- Family separation.
- Spouse employment opportunities.[107]
- Dependent needs (education, medical, social).
- Cultural and other amenities.

The overseas cost-of-living allowance, discussed in the following chapter, is designed to address the first factor—cost of living. A voluntary assignment system attempts to address the other factors, providing a way to allocate overseas assignments to those qualified members who *prefer* them.

Description of a Voluntary Assignment System

The primary purpose of a voluntary assignment system is to better match the overseas staffing needs of the uniformed services and the preferences of their career force members. Five principles underlie the concept of a voluntary assignment system:

- The Services make a commitment to staff as many assignments as possible with volunteers.
- The volunteers must be qualified for the positions.
- Members are provided with full information on living and working conditions associated with assignments.
- Within the limitations of an affordable budget, monetary incentives are used to encourage qualified volunteers to staff hard-to-fill assignments.

[107] This factor is of increasing importance since about 65 percent of military households are dual income. In a 1994 survey of private-sector employees conducted by the National Foreign Trade Council, more than half the respondents considered the careers of their spouses as a major factor for turning down an overseas assignment, and 81 percent felt family considerations to be a primary reason candidates turn down overseas assignments.

- When necessary, traditional (non-voluntary) assignment practices are used to preserve readiness.

The voluntary system allows members to sort themselves across location by preferences and circumstances. Ideally, the set of qualified employees available within a time period exactly matches the set of available assignments. In practice, of course, the match will be imperfect. Some jobs will have a surplus of applications; others will have no volunteers.

Attempts to establish compensating differentials for onerous assignments on an "administrative" basis tend to correspond to the "average" preference. These differentials will necessarily result in over-compensating members who do not find the assignment particularly onerous and under-compensating those who do. Moreover, compensation for some disamenities—such as the cost of living—may neglect offsetting amenities in other areas, such as an attractive climate or a rich cultural environment.

The key to a voluntary assignment system is to increase the use of monetary incentives in difficult-to-fill locations until those positions are filled by sufficient numbers of volunteers. These location-specific incentives are intended to compensate for the aspects of living overseas that are not associated with the cost of living—such as educational opportunities for dependents, the desirability of the location, as well as the arduous nature of the duty—and could vary with changes in supply and demand. Pay rates could be increased for locations and assignments that are not being filled and either lowered or eliminated for assignments with a surplus of applicants. Thus, a voluntary assignment system employing a combination of cost-of-living allowances and incentive pays could have a positive effect on retention and recruiting.

Given the diversity of preferences among military members and the difficult problem of measuring the overall "onerous" nature of a particular assignment location, a voluntary assignment system is likely to come closest to achieving an efficient assignment solution. Differentials are not determined merely by differences in costs of living or by an administrative estimate of the average member's monetary valuation of an assignment. In such a system, compensating differentials are set to "clear the market" for a particular assignment—in other words, to staff the assignment with volunteers.

In implementing a voluntary assignment system, it is important to recognize the ongoing readiness needs of the military and the special needs during war or emergency. Thus, the system would have limitations in its use. A voluntary assignment system would not apply to

deployments within an assignment. That is, if the unit to which members are assigned is deployed, those deployed would not be restricted to volunteers. The system would be suspended in time of war or national emergency. Also, the system would not apply to the first duty assignment of enlisted personnel or officers; it would apply most to those members facing a permanent change-of-station move after their first term of service.

Benefits of a Voluntary Assignment System

A voluntary assignment system could be an effective means to improve retention and readiness, as described. But such a system can result in other benefits as well. Service members who volunteer for an assignment are more likely to complete the assignment and, if relevant, volunteer for an extension. Therefore, permanent change-of-station costs could be lower, and the transient account could enjoy a significant reduction.[108] Further, reduced turnover and longer tenure at an assignment is likely to improve the performance and productivity of members. Less productive times at the beginning and end of a member's tour would be reduced. Also, if assignment-specific factors affect productivity, increased time on assignment will provide a longer period of productivity improvement through the "learning curve" effect.

Finally, under a voluntary assignment system, the cost of particularly difficult-to-fill assignments will be more apparent to the Services. In implementing such a system, incentives to staff difficult-to-fill positions will need to be established, within overall budget constraints, based on supply and demand. How high these incentives ultimately have to be set will make the cost of such positions more explicit to the Services.[109]

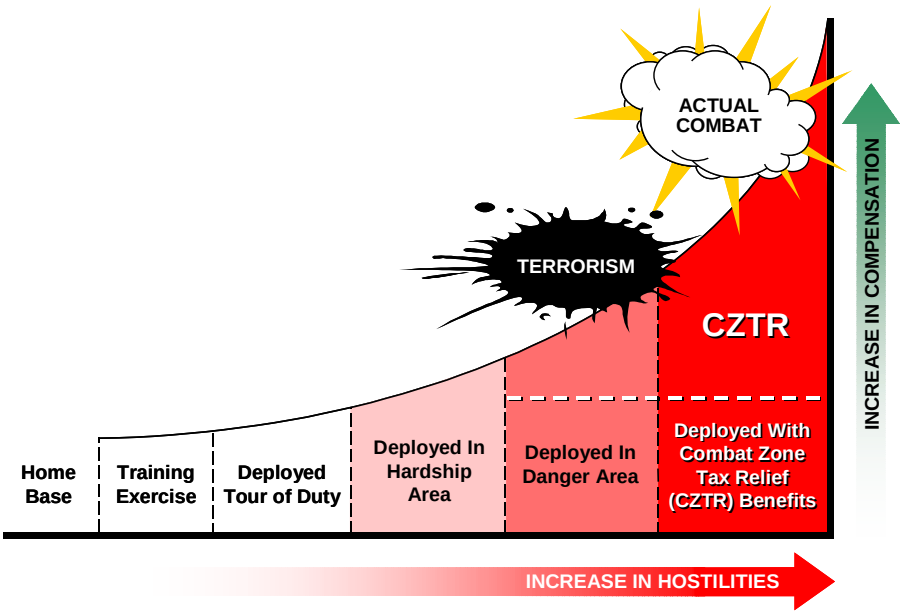
[108] When military members execute permanent change-of-station (PCS) move orders, they are between assignments for a period of about a month. They are contributing directly to readiness neither at the previous assignment nor their new assignment during this time and are placed in a DoD account called "transient." Management policies that reduce the size of the transient account, other things being equal, will generate greater military readiness from the total active-duty strength. Hence, reducing the frequency of PCS moves will, other things being equal, reduce the transient account and increase readiness.

[109] Understanding these costs is an important point. If certain assignments or billets are extremely costly to fill, the Services in some cases might seek more innovative ways of accomplishing a missions without such costly positions.

DEPLOYMENT PAY

The time away from home often associated with military service can be burdensome to personnel and their families. The military has used a variety of pays to compensate, either explicitly or implicitly, for the hardships associated with these assignments. Career Sea Pay and the Career Sea Pay Premium, Submarine Duty Pay, Family Separation Allowances, Overseas Tour Extension Incentive Pay, Hardship Duty Pay, and Hostile Fire/Imminent Danger Pay, as well as Combat Zone Tax Relief, are examples of the pays and benefits historically used to achieve this objective. Typically, the philosophy has been to offer larger amounts of compensation as the dangerous or onerous nature of the mission or deployment increases, as Figure 3-8 shows.

Figure 3-8. Conditions of Deployment



To date, however, the military offers no explicit "deployment pay," although the increased rate of overseas operations associated with peacekeeping, peacemaking, and even combat missions has brought the issue of deployment pay to the fore. The 9th QRMC explored the issues associated with creating a deployment pay and how it relates to existing pays that target time away from home.

As new international peacekeeping and peacemaking roles evolve, deployment patterns and risks and hardships to service members are changing as well. Some Services are maintaining traditional deployment patterns, but others have increased personnel tempo, either through longer deployments or through more frequent, shorter deployments. Although empirical evidence suggests that deployments have a modest, positive effect on retention, deployments for extended periods of time, an especially large number of deployments, or frequent hostile deployments may reduce retention.[110] Thus, the focus of this examination is whether current pay options offer sufficient flexibility to alleviate current and future recruiting, manning, and retention challenges that may be associated with these changing deployment patterns.

What is Deployment Pay?

Before considering options for a new deployment pay, it is important to understand the key concepts related to structuring such a pay. They include: 1) identifying the goal for a new pay and the hardships for which people should be compensated, 2) defining deployments and time away, and 3) developing a deployment pay structure.[111]

Goals

The goal of any deployment pay would be to complement existing pays by recognizing the unique demands that deployments now place on service members. To achieve this goal, the Services must agree on and identify the hardships for which they want to compensate. For example, is the operational deployment itself a hardship, or are the real hardships those associated with family separation, overseas duty, the incidence or duration of deployments, the unanticipated nature of deployments, or the unpleasant or dangerous nature of work done while on deployments? These considerations will affect both the definition of deployment selected and the measures developed to account for time deployed.

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[110] See James Hosek and Mark Totten, *Does Perstempo Hurt Reenlistment? The Effect of Long or Hostile Perstempo on Reenlistment*, MR-990-OSD (Santa Monica, CA: RAND Corporation), 1998; Paul F. Hogan, Paul J. Sticha, et al., *Analysis and Models of Perstempo* (Alexandria, VA: Human Resources Research Organization), August 1999; Ronald D. Fricker, Jr., *The Effects of Perstempo on Officer Retention in the United States Military*, MR-1556-OSD (Santa Monica, CA: RAND Corporation), March 2002; and LTC Casey Wardynski, *The Effects of Hostile Duty on First Term Retention* (West Point, NY: United States Military Academy), 2001.

[111] For more detailed discussion of the current deployment-related pays, see Koopman and Hattiangadi (2001).

Defining Deployments

Today deployment refers loosely to time spent away from home. According to the *DoD Dictionary of Military Terms*, deployment encompasses all activities from origin or home station through destination, specifically including intracontinental United States, intertheater, and intratheater movement legs, staging, and holding areas.[112] In addition to this official definition, the Services historically have included a time dimension in their interpretation of deployment and have established policies or conventions determining acceptable deployment lengths.

For example, a Navy deployment does not begin until a unit is away from its homeport for 56 days; deployments are limited to six months, with at least twice as much time spent back in homeport before the ship's next deployment. Marine Corps deployments are usually thought to be when an entire unit embarks on a six-month unaccompanied tour, either at an overseas location or on a ship. While neither the Army nor the Air Force has official policy limiting deployments, the Army tries to avoid single deployments of over six months and the Air Force tries to avoid assigning airmen away from home for more than three months annually.

These traditional interpretations of deployment were reexamined when the FY 2000 National Defense Authorization Act mandated that the Services track and report how many days each service member spends deployed. The law defined *personnel tempo* as:

> *the amount of time members of the armed forces are engaged in their official duties, including official duties at a location or under circumstances that make it infeasible for a member to spend off-duty time in the housing in which the member resides when on garrison duty at the member's PDS [permanent duty station].*[113]

The law specifically outlines deployment and nondeployment events and requires the services to pay for excessive deployment—a pay referred to as High Deployment Per Diem. The FY 2001 National Defense Authorization Act set this pay at $100 per day for deployment days in excess of 400 out of 730 days (a change from the initial time dimensions set in the FY 2000 Act).[114] What is important in this context is the recent and high-level focus on deployment—what it is, what it isn't, and how much is too much—all critical elements in defining a deployment pay for the Department.

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[112] The specific definition of deployment can be found at http://www.dtic.mil/doctrine/jel/doddict/.

[113] This includes personnel assigned to ships who are away from homeport.

[114] As a result of the current U.S. involvement in Afghanistan, this pay has been temporarily suspended.

Structuring Deployment Pay

Several structural elements warrant examination. For example, when does hardship become onerous enough to require extra compensation? Should a deployment pay include stepwise increases as time away lengthens? If graduated pay increases were allowed, but not mandated by law, the Services could change them as needs and service member preferences evolve. Should accumulated deployed days trigger pay, or should a deployment pay reward frequent deployments and lengthy deployments differently? Alternatively, a proxy could be used—such as a sea-duty billet in the Navy—rather than days deployed. Should the pay reward unexpected deployment? How should dependent status be incorporated? The Family Separation Allowance, for example, is available only to service members with dependents. But single members on deployments also experience hardships. All of these issues must be considered in structuring a deployment pay.

Use of Current Deployment-Related Pays

A variety of existing pays, as shown in Table 3-6, have been used to compensate for hardships associated with deployments. One of the oldest, and perhaps most similar in nature to a deployment pay, is Career Sea Pay. Others, such as Hardship Duty Pay-Location and the Combat Zone Tax Exclusion, are well known in association with certain operational deployments. The Overseas Tour Extension Incentive Pay is specifically designed to improve personnel retention in overseas assignments, enhance readiness, and increase the stabilization and turnaround time between assignments outside the continental United States (OCONUS). It is used as a distribution tool for short-term or hard-to-fill OCONUS assignments. Despite the array of pays shown, none is used specifically as compensation for being deployed.

Special pays that relate to deployment time constitute just under 1 percent of the FY 2001 enlisted personnel budgets for all the Services combined. When looking at how the individual Services spend deployment-related pays, the Army, Air Force, and Marine Corps are the most similar, overall. The Navy, however, offers considerably more deployment-related pay due to the extensive use of sea pay, and to a lesser extent, submarine pay. Figure 3-9 illustrates the significant difference between the use of deployment-related pays in the Navy and in the other Services. As the figure shows, the average amount of away pays for an E-4 in the Navy is over three times higher than the average for any of the other Services; for an E-6 it is almost eight times higher.

Table 3-6. Summary of Existing Away Pays

Pay	Paid For	Amount	Varies With	Other Restrictions	FY 2001 Budget ($M)[1]
Career Sea Pay[2]	Assignment to ship	$50-$520 per month, average $200 for E-6	Pay grade and cumulative sea duty	Pay grade E-4 and above	216 combined
Career Sea Pay Premium[3]	Over 36 continuous months assigned to sea	$100/month	Fixed	Paid to E-4s and officers; E-5s to E-9 up to the 5th year of sea duty	
Submarine Duty Pay	Operational sub duty for lower pay grades, sub qualification for higher pay grades	$75-$355 per month, average $230 for E-6	Pay grade and years of submarine service		46
Family Separation Allowance	Enforced family separations	$100/month prorated daily	Fixed	Must have spouse and/or dependents and be away > 30 days	84
Hostile Fire/Imminent Danger Pay	Subjected to hostile fire, hostile mine, or threat thereof	$150/month	Fixed	IDP	28
Hardship Duty Pay-Mission	Designated hardship mission, e.g., prisoner of war remains recovery	$150/month	Fixed		26 combined
Hardship Duty Pay-Location	Living conditions far below those in the United States	$50-$150/ month	Severity of hardships	OCONUS locations TAD or PCS in excess of 30 days[4]	
Overseas Tour Extension Incentive Pay	Extending OCONUS tour at least 1 year	$80/month or extra leave[5]	Fixed	Paid to specific occupational specialties	5
Combat Zone Tax Exclusion	Serving in designated combat zone	Taxes on basic and some special pays	Income level	Officer income exclusions have upper limits	N/A
High Deployment Per Diem	Days deployed in excess of 400/730	$100/day	Fixed		0 for 2001

Source: Koopman and Hattiangadi (2001).

Notes: 1. The amounts are in millions of dollars and are enlisted military personnel appropriations only.

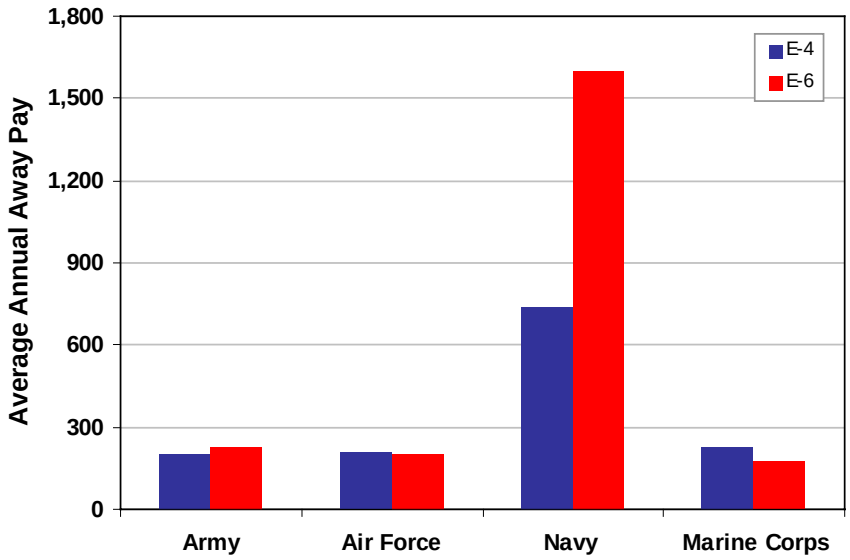
2. These amounts and restrictions were in effect before 1 October 2001.

3. These amounts and restrictions were in effect before 1 October 2001.

4. Permanent duty assignments collect pay from first day. Temporary Additional Duty (TAD)/Tour of Duty must be there at least 30 days; then they get pay retroactively.

5. Some locations and operational specialties qualify for $2,000 lump sum payments.

Figure 3-9. Average Away Pays for Selected Grades (E-4 and E-6) by Service, FY 1999



Source: Koopman and Hattiangadi (2001).

Options for a Deployment Pay

Although some existing special and incentive pays compensate for unique dangers and arduous conditions associated with some military jobs and locations, only a few pays—notably sea pay and the family separation allowance—recognize the time spent away from home which is characteristic of most military careers. As Table 3-7 shows, all pays currently used to compensate for time away from home also have other purposes.

Sea pay, for example, is flexible enough to apply to much of the time that sailors and Marines spend deployed, but not all who are deployed receive sea pay and the other Services do not have an equivalent pay. Hardship Duty Pay-Location (HDP-L) is paid only for locations with multiple hardships. The Family Separation Allowance is paid only to people with dependents. High Deployment Per Diem covers only extremely long periods of time and is structured more as a penalty for the Services for not controlling deployment time for the individual than as a compensatory pay for the member. No existing pays compensate for frequent, shorter deployments or for unanticipated deployments. Thus, current incentive pays do not fully address the needs of people who are

deployed but are not on a ship or submarine, or who are not subjected to other hardships.

Table 3-7. Features of Existing Away Pays

Pay	Pay Intended to Compensate for		
	Deployment/ Away From Home	Danger	Other Hardships
Career Sea Pay	Yes		Rigors of sea duty
Career Sea Pay Premium	Yes		Long sea tours
Submarine Duty Pay	Yes		Rigors of submarine duty
Family Separation Allowance	Yes		
Hostile Fire/Imminent Danger Pay		Yes	
Hardship Duty Pay-Mission			Designated hardship mission
Hardship Duty Pay-Location	Yes	Yes (Unless location is designated for IDP)	Yes (Designated quality of living conditions)
Overseas Tour Extension Incentive Pay	Yes		
Combat Zone Tax Exclusion		Yes	
High Deployment Per Diem	Yes		Excessive time away

Source: Koopman and Hattiangadi (2001).

Several recent or current policy initiatives are aimed at improving incentives to make duty that requires substantial time deployed more attractive. If the Department determines a need for additional deployment compensation, several specific policy options are available. These range from a pay modeled on the Navy's sea pay to a third type of hardship duty pay for tempo of operations.

- ***Sea pay is a logical model*** for a deployment pay for the other Services. It has helped the Navy in meeting manning and retention goals and was designed to recognize the arduous nature of deploying for long periods of time away from home.[115] An advantage of sea pay is that there is no need for an exact count of deployed days. Instead, being on a sea tour is used as a proxy for an assignment that requires significant time deployed. To the extent that the other Services have units with more deployed time—such as has been the case recently with civil affairs units, for example—they could adopt a sea-pay equivalent for these units.

[115] Golding and McCarver (2001).

- ***Replace the Family Separation Allowance*** with an allowance that is paid regardless of dependency status. Differential rates could be set for members with and without dependents, as is currently done for the Basic Allowance for Housing. The Family Separation Allowance is currently a fixed amount regardless of rank or the amount of time away, so the Services would have to reach consensus regarding these issues. Furthermore, because the Family Separation Allowance does not apply until someone is away from home for 30 or more days, it will have to be modified if used to cover frequent, short periods of time away.
- ***Hardship Duty Pay-Tempo (HDP-T)*** was considered by the Services when developing Hardship Duty Pay-Mission (HDP-M) and HDP-L, recognizing that existing pays do not always cover the risk and hardships associated with new patterns of operations. Problems with inconsistent application of existing pays could be addressed by integrating a tempo pay into the HDP structure. This pay option was tabled because of its estimated cost, disagreements among the Services regarding where to set thresholds, and the need to implement the new High Deployment Per Diem. An HDP-T pay would likely be most useful if the laws creating such a pay established guidelines and boundaries as general as possible, as is the case with HDP-M and HDP-L.
- ***Tax Relief Proposals*** have recently been suggested to apply foreign-earned income exclusion tax laws to overseas service members. Non-governmental personnel working overseas can exclude up to $80,000 of foreign-earned income from U.S. federal income taxes if they are away for the entire year. Legislation could be proposed to change the tax code, extending this exclusion to service members stationed overseas. Proponents of tax relief measures argue that they send a clear signal of the uniqueness of military service. A major disadvantage of tax relief proposals, however, is that they are less valuable to people in lower tax brackets. Another shortcoming of tax policies is that they do not allow the Services the flexibility to *target* incentives to meet their needs.[116]

[116] One way to address this would be to exempt from taxation any bonus received by a member who holds a critical skill and who is serving or who agrees to serve at a command that is experiencing manning difficulties. Anecdotal evidence suggests that

Next Steps for the Department

The QRMC has identified a variety of options for structuring a deployment pay but believes it is premature to recommend a particular solution. Setting a policy to compensate service members for deployment time should begin with a clear vision of the problem, whether compensation is a viable policy tool, and if so, what the pay is trying to accomplish. An efficient deployment pay should be applied to deployments that exceed a "normal" duration or to deployment frequencies that exceed a "normal" or average threshold. Because of the complexity of developing a deployment pay, as is evident in the preceding discussion, the QRMC recommends the Department undertake a detailed study of the deployment pay issue before choosing an approach. Such a study should investigate in depth the conceptual issues described briefly at the outset of this section: the goal of a new deployment pay, how to define deployment and time away, and what deployment pay structure best suits the individual needs of the Services and the needs of the Department as a whole.

Should the Department determine a need for a new deployment pay, the QRMC believes that the best approach is one that is as flexible as possible so that policy makers can respond to changing conditions as warranted. Given the inherent differences between the operations and goals of the individual Services, it is likely that a deployment pay will be implemented differently across the Services. By allowing some structural flexibility, it can be possible to institute a pay that both meets the Services' needs and adequately recognizes the unique hardship associated with deployment.

ALTERNATIVE TOOLS FOR SHAPING PAY

Overall, the special pay system has been effective in recruiting and retaining a force to meet current and past missions of the Department. However, if it becomes increasingly difficult to fill positions in technical occupations and other critical skill areas, the Services may have to make even greater use of special and incentive pays or offer even higher bonus amounts to maintain sufficient personnel levels. In the long run, however,

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reenlistment rates are higher in combat zones or qualified hazardous duty areas because the bonus is tax exempt. The exclusion applies to both current and future installments.

increasing the use of existing pays may not be enough. New missions and changing operational patterns may place new demands on personnel and in turn on the military compensation system. Ultimately, the manning challenges of the past decade may not reflect the manning challenges of the future. Thus, the Department may find a need for new compensation tools, such as the voluntary assignment system or deployment pay previously discussed.

The remainder of this chapter describes four other compensation tools that would add greater flexibility to the Department's current system of S&I pays and bonuses: a critical skills retention bonus, a contributory thrift savings plan, skill and capability pay, and an aviation career savings fund. The first two have been authorized, and plans for implementation are being developed. The second two are new concepts, not among the current set of tools available. The QRMC believes that these concepts can be useful to the Department and offers an overview of each alternative as a way of setting the stage for future debate.

CRITICAL SKILLS RETENTION BONUS

In the FY 2001 National Defense Authorization Act, the Department of Defense was granted authority to implement a new bonus program, the Critical Skills Retention Bonus (CSRB).[117] The purpose of the CSRB is to provide a financial incentive to increase retention of officer and enlisted personnel in critical specialties with documented manning shortages. A "designated critical specialty" is defined as being essential to a military mission, having personnel shortages that affect successful accomplishment of the mission, and having high training investment or replacement costs.

Under this program, an officer or enlisted member, on active duty and qualified in a designated critical specialty, may be paid a CSRB if the individual executes a written agreement to remain on active duty for at least one year, with no maximum service length defined.

The total CSRB award may not exceed $200,000 to an individual member over a career or exceed $30,000 per year. Within this cap, the Services can set annual awards within certain guidelines. The Services are given the flexibility to grant a CSRB while a member is serving under another active-duty service obligation, and the CSRB can be paid in

[117] See *Critical Skills Retention Bonus,* Memorandum from the Assistant Secretary of Defense (Force Management Policy) to Service Assistant Secretaries, October 25, 2001.

addition to all other pays and allowances to which the member is entitled. The CSRB is designed to be used in specialties where no other bonus authority exists or to augment existing bonus authorities. It can be paid in a lump sum or annual installments, at the discretion of the Service. The CSRB offers the Services a great deal of flexibility in responding to critical skill shortages.

Naval Intelligence Officers: A Case for Effectiveness

A recent study examined the potential effectiveness of the CSRB on officer retention—in particular, for officers in the naval intelligence community.[118] Currently, the Navy faces a critical manning shortage in this specialty, as a large proportion of officers leave at or shortly after completing their minimum service requirements. As a result, the Navy is unable to meet its requirements for intelligence officers at the Lieutenant Commander (O-4) rank.

The study estimated the effect of a $55,000 CSRB offered in FY 2003. In this assessment, the CSRB required a five-year service commitment and would obligate most officers through at least the tenth year of service. Even under conservative estimates of pay effects, it was demonstrated that instituting a CSRB would have a substantial impact on officer retention, with continuation rates increasing by as much as 4 percent in the fourth through sixth years of service. With higher continuation rates, the Navy would have to access fewer officers into the community, saving initial training costs estimated at $10,300 per student.

Overall, annual savings from lower billet and training costs are estimated in the $10-12 million range, more than offsetting the annual CSRB costs of about $3.4 million which would be required to maintain a goal of 74 officers in the specialty. Even assuming lower retention effects, the savings of implementing a CSRB for commissioned officers in the naval intelligence community would be substantial—exceeding $4.7 million. Savings from the CSRB are realized because with higher retention, fewer officers need be accessed every year and retained as junior officers. Retention effects can be adjusted by changes in the total bonus award as well as the timing of the payments.

One of the key benefits of using the CSRB for officers is that it provides a degree of flexibility analogous to the selective reenlistment bonus program for the enlisted force. The Air Force is the first of the

[118] Patrick Mackin and Mark Dye, *Cost-Benefit Analysis of Proposed Critical Skills Retention Bonus for Commissioned Naval Intelligence Officers* (Arlington, VA: SAG Corporation), October 2001.

Services to provide implementation plans for a CSRB, and the QRMC believes it could be a highly effective compensation tool.

THRIFT SAVINGS PLAN

The uniformed services retirement system vests members after 20 years of service. Service members leaving before completing 20 years receive no retirement benefits. The system compensates, then, only a small fraction of personnel who stay in active or Reserve service long enough to qualify for benefits. In fact, only 18 percent of active-duty members today are expected to reach the 20-year mark and qualify for retirement benefits. This includes 46 percent of new officers and 16 percent of new enlistees who will attain 20 years of active-duty service.[119] Some believe this system is unfair to the vast majority of the force who earn no retirement benefits, in some cases after many years of service.[120]

The 20-year retirement benefit was designed as an incentive for retention, encouraging members—especially those with 14 or 15 years of service—to stay in the military. But in recent years, economic growth has created attractive private-sector opportunities in some fields, fueling strong competition with the 20-year retirement system. Most large employers offer a tax-deferred retirement plan that vests much earlier than the military retirement system. Moreover, as manpower needs change in the future, the military may find it increasingly desirable to consider alternative career lengths for particular skill or occupational specialties. In this context, some flexibility in retirement options, in addition to the 20-year retirement, will be needed. Allowing military personnel to participate in the Federal Thrift Savings Plan (TSP) is an important first step toward providing a flexible retirement benefit that makes military service more attractive to both recruits and members currently in service.

TSP Participation for Service Members

The FY 2000 National Defense Authorization Act provided authority for members of the uniformed services to participate in the Federal Thrift Savings Plan.[121] The structure of this plan for service members is similar to that of the Civil Service Retirement System (CSRS), in which civil

[119] *Valuation of the Military Retirement System, 2000*, U.S. Department of Defense, Office of the Actuary, September 30, 2000, page 12.
[120] Asch and Warner, *A Policy Analysis of Alternative Military Retirement Systems* (1994), p. 4.
[121] National Defense Authorization Act for Fiscal Year 2000, Conference Report, P.L. 106-65, October 5, 1999, Section 661, pp. 163-67.

service personnel participate. For CSRS and military participants in the federal TSP, members may contribute up to 7 percent of their basic pay.[122] Neither plan provides for a government contribution.[123]

However, the military plan differs in three ways from the CSRS plan. First, military members can contribute special or incentive pays and bonuses to the fund up to a total annual contribution limit of $11,000 for FY 2001.[124] Second, there is a provision that permits the Service Secretaries to designate critical specialties for *matching contributions*. Members in these specialties who agree to serve on active duty for six years would be eligible for matching contributions according to the formula applicable to civilian employees under the Federal Employees' Retirement System. Third, members may contribute amounts to the TSP that have been excluded from income due to combat zone service.[125]

In 1999, the *Congressional Commission on Servicemembers and Veterans Transition Assistance* recommended that active-duty service members be allowed to participate in the Federal Thrift Savings Plan.[126] Early in its deliberations, the 9th QRMC endorsed that recommendation, but further recommended that coverage be expanded to include the Reserve component (Ready Reserve). The Federal Retirement Thrift Investment Board (TSB), the agency that administers the Thrift Savings Plan for federal employees, initially rejected extending participation to reserve members because of the estimated high costs of administering what it projected to be a large number of small accounts. However, based partly on QRMC projections that reserve participation would be

[122] The 7 percent cap on basic pay contributions applies to contributions made in 2002. This contribution limit will increase by one percentage point each year through 2005, after which participants' contributions will be limited only by the Internal Revenue Code's (IRC) annual limits.

[123] Most civil service employees and all new hires today are covered by the Federal Employees' Retirement System, which permits employees to contribute up to 12 percent of basic pay to their TSP. The federal government will match contributions dollar-for-dollar for the first 3 percent and 50 cents on the dollar for the next 2 percent.

[124] Section 402(g) of the IRC limits the dollar amount that an individual may contribute on a tax-deferred basis to retirement savings plans. This limited is called the elective deferral limit. It will increase $1,000 each year until 2006, when it will be $15,000. It may be increased in later years by cost-of-living adjustments.

[125] Tax-exempt contributions (i.e., from combat zone pay) do not count against the IRC §402(g) limit. They do count toward the higher, IRC §415 limit. Section 415 of the IRC limits the amount of a member's contributions and any matching contributions to the TSP to the lesser of 100 percent of compensation or a dollar amount that is subject to cost-of-living adjustments ($40,000 in 2002).

[126] *Report of the Congressional Commission on Servicemembers and Veterans Transition Assistance*, submitted to the United States Congress, January 14, 1999, p. 137.

considerably lower than TSB projections and average account balances higher, the TSB agreed to offer membership in the Thrift Savings Plan to members of the Reserve component.[127]

TSP Benefits

The QRMC recognizes that a tax-deferred voluntary payroll savings plan, such as the federal TSP, would provide service members with an increased opportunity to accumulate savings and would also enable the military to become a more competitive employer.[128] The federal TSP has certain advantages for service members. First, it is easily understood and simple to enroll in, with virtually no minimum amount for both initial investment and subsequent contributions. Second, it is convenient, since participants contribute through automatic payroll deductions. Third, it is portable—members can leave their funds in the plan or roll them into a new retirement plan when they leave. This point is particularly important since over 80 percent of armed forces personnel leave military service before becoming eligible for military retirement benefits. Fourth, it has tax advantages since employees contribute from pre-tax earnings.[129] Finally, the strength of a TSP is the compounding of earnings over time.

Of course, Individual Retirement Accounts (IRAs) have been available to military members since they were first introduced in the early 1980s and are another potential source of flexibility. IRAs are also independent of place of employment. However, employees who participate in thrift savings plans have different characteristics than those who contribute to IRAs. In general, participation is broader in the former. One reason is the convenience of participating in a TSP at work and with contributions from pre-tax earnings. But perhaps more important, IRAs can require relatively large initial investments, and data show that individuals with earnings similar to military personnel—those who are younger and less affluent—are less likely to enroll in IRAs.

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[127] Beth J. Asch and John T. Warner, *The Thrift Savings Plan: Will Reservists Participate?* DB-306-OSD (Santa Monica, CA: RAND Corporation), 2000. Asch and Warner estimate that about 55,000 Reservists would participate in the TSP, accounting for only 2.5 percent of the total number of TSP accounts managed by the Thrift Savings Board.

[128] *The Defense Science Board Task Force on Human Resources Strategy* (2000), pp. 72-78, also recommended a contributory TSP-like plan that vests members earlier than 20 years. A similar concept is discussed in Asch, Johnson, and Warner (1998).

[129] Because contributions are from pre-tax earnings, employees are restricted from early withdrawal of their contributions without tax penalties.

In 1992, only 5 percent of those eligible for tax-deferred IRA contributions actually made them.[130] Thus, IRAs have not been overly popular among military members, particularly within the enlisted force.[131] The Roth IRA, however, offers some advantages to low- and moderate-income personnel. A comparative study of 401(k) plans and the Roth IRA shows that the latter is more beneficial for lower income workers over their lifetimes, due primarily to tax implications. By participating in a 401(k) or similar tax-deferred savings plan, low-income workers pay more taxes in old age than they save when young, resulting in higher lifetime tax payments compared to the Roth IRA.[132]

How Likely is Participation?

The Federal Thrift Savings Plan, however, provides flexibility to the current military pension plan—particularly if matching contributions are offered. The current military retirement system is a *defined benefit* plan in which the member receives a pre-specified retirement benefit based on some combination of the employee's salary and years of service. The majority of medium and large establishments, on the other hand, offer *defined contribution* plans in which employees contribute to a fund that is then invested in some financial instrument. Examples of these plans include the thrift savings plan, 401(k) plans, and stock ownership plans. In a defined contribution plan, the retirement income that a participant receives depends on how much the participant (and the participant's Service, if the Service offers matching contributions) has contributed to his or her account and the earnings on those contributions. A primary benefit of most of these plans is that the employer matches some or all of the employees' contributions. Despite the fact that both *defined benefit*

[130] *Databook on Employee Benefits*, Employee Benefit Research Institute, April 1995, Table 15.1.

[131] For more detail on the effect of thrift savings plans on military members, see Thomas A. Husted and Michael L. Hansen, *Thrift Savings Plans: Effect on Savings and Tax Revenues*, CRM D0002891.A2 (Alexandria, VA: Center for Naval Analyses), December 2001, p. 15.

[132] Jagadeesh Gokhale and Laurence J. Kotiloff, *Who Gets Paid to Save*? Working Paper 01-14 (New York: National Bureau of Economic Research), September 2001. The difference between a TSP and Roth IRA is that contributions to the former are from pre-tax dollars but the distributions (which can begin at age 59 ½) are taxed as ordinary income. Contributions to the latter are from after-tax dollars and distributions are tax-free. The question is whether, over a long-run horizon, the features of tax-free withdrawals from the Roth IRA are able to overcome the benefit of tax-free contributions for the TSP. A study of military personnel found that they did. Among some members the Roth IRA had a higher lifetime return on investment. See Paul W. Mayberry, *Supplemental Retirement Investment Options: Roth IRA vs. TSP*, White Paper, Department of the Navy, 6 October 1998.

and *defined contribution* plans feature benefits that are taxed only upon realization, contributions to defined contribution plans are taken from pre-tax earnings—a distinct advantage as noted above.

Over the last 20 years, the private sector has made a significant shift away from defined benefit plans toward defined contribution plans, as shown in Figure 3-10. Since 1980, the share of medium and large companies with defined benefit plans has fallen steadily to where they account for only 58 percent of all plans. Today, nearly all medium and large firms offer defined contribution plans.[133] Much of this shift reflects the preferences of employees, particularly during the economic expansion of the 1990s. Still, the upward trend has continued over the last two decades. Even with the uncertainty in today's financial markets, which brings more risk to defined contribution plans, employees appear to prefer the flexibility of choice and the potential for substantial growth in retirement benefits to a safer defined benefit. This trend in private-sector pension plans has called into question whether more flexibility is needed in the military defined retirement benefit.[134]

Between 80 and 90 percent of participants in thrift savings plans or 401(k) savings plans nationwide have employers that match all or part of the employee's contribution. Most employers match at about 6 percent of employee pay.[135] There is also strong evidence that employer matching positively affects both employee participation and contribution rates. Data from the 1999 Survey of Active Duty Personnel provide evidence of the same relationship between the generosity of employer contributions and TSP participation among military members. Service members were asked the likelihood on a 5-point scale of their TSP participation under three scenarios: no government matching (the current situation under the FY 2000 Defense Authorization Act), the government matching up to 5 percent of the member's pay, and the ability to invest reenlistment or continuation bonuses in the TSP.

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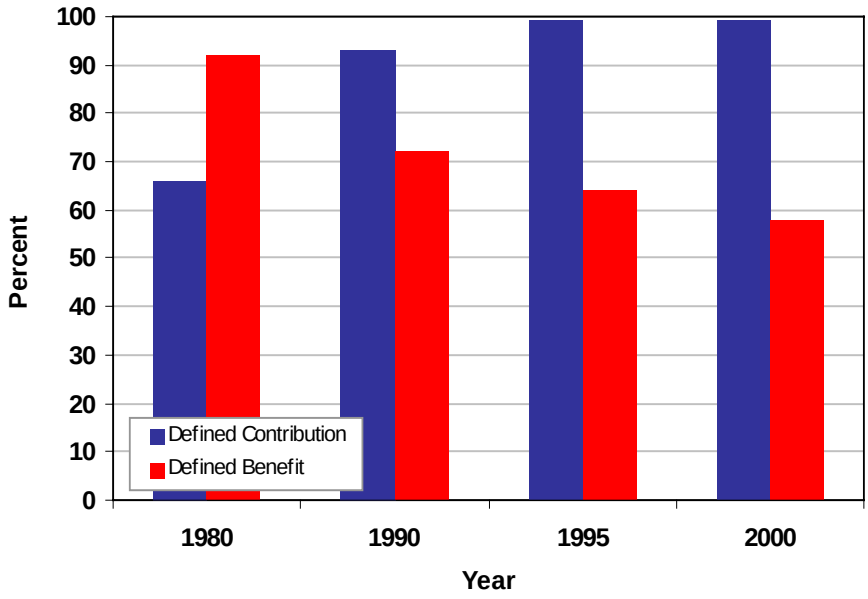
[133] See Bureau of Labor Statistics, *Employee Benefits in Medium and Large Private Establishments, 1997*, United States Department of Labor, Bulletin 2517, September 1999; and Anita U. Hattiangadi, *Private-Sector Benefit Offerings in the Competition for High-Skill Recruits*, CRM D0003563.A2 (Alexandria, VA: Center for Naval Analyses), December 2001, pp. 51-56. Many firms offer both defined benefit and defined contribution plans (accounting for why the percentages add to more than 100 percent) and some firms are offering a hybrid, but the trend is clearly toward defined contribution plans.

[134] Husted and Hansen (December 2001), p. 6. See also Asch and Warner, *A Policy Analysis of Alternative Military Retirement Systems* (1994); and Asch, Johnson, and Warner (1998).

[135] Husted and Hansen (December 2001), p. 10-12; and Hattiangadi (2001), p. 52.

Figure 3-10. Trends in Retirement Benefit Plans



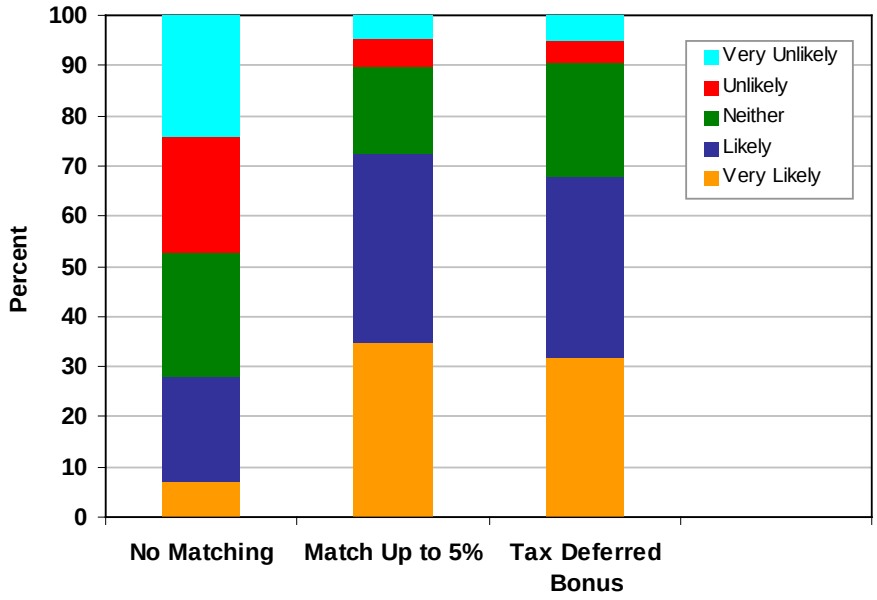
Source: Hattiangadi (2001).

Data in Figure 3-11 show that with no government matching, the proportion of members "very likely" to participate is about 7 percent. Adding those "likely" to participate without government matching increases the total to 28 percent—somewhat higher than the 20 percent TSP participation rate among CSRS federal employees. When service members were asked about participation in a TSP where the government matches the service member's contribution, the "very likely" proportion rises to 35 percent; those either "very likely" or "likely" to participate in a matching TSP is about 73 percent. If service members are allowed to invest their bonuses in a TSP, the "very likely" and "likely" groups rise to proportions similar to those who would participate with matching contributions. The proportions are virtually the same across the four Services and the Coast Guard.

The survey demonstrates that military personnel would increase TSP participation if the government made matching contributions. Thus, using the Service Secretary authorities to offer matching funds in selected specialties could be an effective means of encouraging retention in needed skills or occupations. Because participation is correlated with the performance of financial markets, however, the participation rates cited above

may overstate to some extent those rates today. Nevertheless, the value of the TSP as an alternative compensation tool is not likely to be diminished.

Figure 3-11. Likelihood of Participation in Thrift Savings Plans



Source: Husted and Hansen (December 2001).

Actual Participation Rates

The uniformed services concluded a highly successful first open season in the Thrift Savings Plan on January 31, 2002. Over 212,000 active, Reserve, and Guard members of the military services enrolled. Based upon initial participation rates of federal civilian employees covered by the Civil Service Retirement System, DoD had estimated that its first year participation rate would equal approximately 10 percent of the total force.[136] More than 8 percent enrolled in the first open season, and members will have two more opportunities to enroll this year. It appears likely that more than 10 percent will ultimately enroll in this first year. For a new program, this response rate has been exceptional.

[136] *Assessment of the Costs and Benefits of a Uniformed Services Payroll Savings Plan (USPSP)*, Draft Department of Defense Report to Congress, June, 3, 1988.

Summary

The thrift savings plan provides an attractive addition to the military compensation package. It provides more flexibility, offers a benefit that is enjoyed by the vast majority of comparable private-sector employees, and provides service members with another way to save for retirement. The program represents a major initiative to improve the quality of life of service members and their families.

Using the existing authority for a contributory TSP as a financial incentive to improve retention in critical skill areas is an option for the Services. Should this option be implemented, which the QRMC supports, the Department should also disseminate information on the Federal Thrift Savings Plan and the alternative investment options available, given the greater risk associated with defined contribution plans in general.

SKILL AND CAPABILITY PAY

As discussed in the opening of this report, the military services faced significant recruiting and retention challenges in the late 1990s, as evidenced by a decline in recruit quality, a decline in first- and second-term reenlistment rates, and declining junior officer continuation rates. These difficulties were the result of a variety of factors including the strong civilian economy with attractive private-sector job opportunities; the long-term upward trend in college enrollment; the faster pace of wage growth for persons with four or more years of college; the wage trends in certain segments of the civilian labor market, particularly in the high-technology sector; and an increase in peacetime operations overall and hostile duty deployments in particular.

Although recruiting has improved in the past year, skill shortages may continue to plague the Services in particular areas. The Air Force, for example, has had the most serious retention challenges because it has the largest relative concentration of personnel in occupations that are in high demand in the civilian economy—aviation, information technology, and other knowledge-based occupations. Special and incentive pays and bonuses are the tools most used by the Services to create pay differentials to attract and retain military personnel in hard-to-fill positions. Two pays—skill pay and capability pay—could play a role in creating new pay

differentials, particularly in areas where they are needed on a more permanent basis.[137]

Skill Pay

Skill pay would be designed to create a more *permanent* pay differential than that provided by bonuses. Bonuses are intended to relieve personnel shortages in selected specialties that are more *temporary* in nature. The personnel in those specialties might have varying levels of skill. Compared with bonuses, skill pay has the advantage of being a more stable component of pay that would continue during the service career or portion of a career.

Skill pay is intended to provide higher pay for certain skills, though not necessarily certain occupations. Personnel with designated skills would receive skill pay regardless of their duty assignment and regardless of whether they were using the skills in their current assignment. Skill pay would help assure a stock of designated skills that are valuable to the military and that might be costly and time-consuming to replace.

Skill pay would enable the Services to give explicit recognition to the different external market opportunities available to personnel in various skill areas. Because skill pay could vary across specialties or skill areas, it could create a means of varying career pay profiles, which could result in different retention profiles and career lengths. Special pays for aviators and physicians exemplify skill pay: the skill communities are well defined, have obvious civilian counterparts, and are costly to replace when shortages occur.

To implement skill pay, it is necessary to define "skills" and to establish a program to maintain and certify skills. Information relevant to a given skill—such as requirements for the skill, short- and long-run costs of replacing the skill, the time required to acquire the skill, and private-sector employment and earnings opportunities—needs to be maintained. Most likely, each occupational specialty or skill area would need to be handled on a case-by-case basis, with overarching criteria established for designating skills that qualify for skill pay.

The Department will also need to determine how skill pay will be set and when it will be paid. Skill pay might be a flat monthly amount or a percentage of basic pay, with the percentage rising with rank, year of service, and perhaps time-in-grade. A separate skill pay table might

[137] James R. Hosek and Beth J. Asch, *Changing Air Force Compensation: A Consideration of Some Options*, MR-1566-AF (Santa Monica, CA: RAND Corporation), 2002.

designate a start point and an end point for pay, such as a certain year of service. Once established, the skill pay table should remain relatively stable as compared with the year-to-year uncertainty typically associated with bonuses. However, the flexibility to make adjustments will be necessary.[138]

Capability Pay

Capability pay is intended to provide compensation and incentives for superior individual capability, especially for current and prospective leadership potential—such as for a flag officer position or for heading a community such as acquisition, logistics, or intelligence. Capability pay is based on the notion that personnel differ in their leadership ability—which depends on skills, knowledge and experience, opportunities, incentives, effort, and aptitude.

Today the basic pay table and special and incentive pays are not designed to provide higher pay to more capable personnel in a given rank and year of service. Capability pay could do so by making military pay rise more quickly for a select group of individuals. It would help retain the most capable personnel and provide an incentive for those personnel to exert effort in order to qualify for and reach higher levels of pay. As a result, capability pay could help support a larger pool of highly capable candidates for the highest-ranking positions, as compared with the current pay system. It would also provide personnel managers with more flexibility because they would have other ways to reward capability than through promotion.

A capability pay system requires an accurate method of assessing performance. The system must be perceived as fair; members should believe the system gives everyone an equal chance of being awarded capability pay, regardless of their assignment or occupational area. If the system is perceived as fair, the pay can be given to selected, high-performing members rather than to all members. Capability pay might be implemented as a smaller increment in pay over the remaining years of service, or as a larger increment over a shorter period. The level of pay could rise with rank, year of service, the level of capability pay already attained, or some combination. Increasing pay based on the level of capability pay already attained serves to multiply the rewards for high performance, thereby providing a strong incentive at the beginning of a career to excel.

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[138] For a discussion of how to structure a skill-based pay, see Martha E. Koopman and Heidi L. W. Golding, *Optimal Manning and Technological Change*, CRM 9959 (Alexandria, VA: Center for Naval Analyses), July 1999.

Skill pay and capability pay are not the most appropriate tools for responding to supply problems caused by the business cycle. They would, however, be helpful for dealing with persistent, large differences between military and private-sector pay and for encouraging higher performers to stay in service. Implementing skill or capability pay will require further analysis in a number of areas: the design of the pay with regard to eligibility, amount, and duration and both the effectiveness and cost-effectiveness of implementing such a system. Moreover, these members would presumably receive higher basic pay than others, and as a result, accrue higher retirement benefits within the current 20-year system. Different implementation strategies would need to be assessed in terms of the dollar benefits and costs; the effects on recruiting and retention, on pay levels relative to civilian pay, and on morale; as well as their likely effects on existing incentives and on capability in different skill areas.

AVIATION CAREER SAVINGS FUND

Many special and incentive pays and all bonuses are designed to provide pay differentials to meet staffing shortfalls that vary over time. They are designed primarily for *temporary* conditions or circumstances and, by their nature, are subject to change from year to year. The continued use of special and incentive pays to compensate for factors associated with a skill on a *permanent* rather than a *temporary* basis suggests that alternative tools might be more appropriate to meet force manning requirements.

One alternative, as discussed in the previous section, would be to design a "skill-based" pay to provide appropriate long-term career incentives, while at the same time meeting near-term retention exigencies, as does a typical special or incentive pay. Pilots are an example of an occupational community for which a skill-based pay may be appropriate—but there are other communities for which such an approach could be useful as well, such as health care and information technology.

In the case of pilots, for example, a skill-based pay could change the shape of their career profile by encouraging higher retention during the period from 10 to 15 years of service. Military pilots of fixed-wing aircraft can generally leave active service at this point in their careers for a position with the civilian airlines and, within a few years, earn substantially more than their active-duty pay. In recognition of this alternative, two types of S&I pays are offered to aviators:

- Aviation Career Incentive Pay (ACIP) is offered to almost all aviators over the course of a career, and in practice, has

become a permanent component of aviator pay. The amount of ACIP varies based on years of service, ranging from $125 per month for those with less than two years of aviation service, to over $800 per month for those with between 14 and 22 years of aviation service.

- Aviators may also receive Aviation Continuation Pay (ACP), a bonus to improve retention beyond the active-duty commitment incurred for flight training. ACP is intended to be a *temporary pay* designed to alleviate acute shortages. But because of the continuing shortage of pilots, ACP is not likely to be eliminated in the foreseeable future.

ACIP and ACP together make up from 10 to just over 20 percent of total pay for aviators, depending on branch of service, grade, and longevity. While the combination of these pays helps to improve aviator retention, there are weaknesses in using this approach to solve chronic pilot shortages. ACIP, for example, varies with longevity only, not pay grade. Hence, like other longevity pays, it may weaken the financial incentive for early promotion. Further, a significant portion of the ACP budget is paid to aviators who are still serving their initial obligation for flight training. This use of funds is inefficient if the goal is to improve retention beyond the initial obligation. ACP, as a bonus, is subject to some uncertainty in application. Thus, as long-term incentives, these measures can be improved upon.

A New Approach

One such improvement might be an Aviation Career Savings Fund (ACSF), which could be used to shape aviator career paths in the future as well as improve retention in the near term.[139] The ACSF would work as follows. For each pilot, the Service would contribute a specified percentage of a pilot's basic pay to a fund for each year of aviation service. Contribution to the fund would begin when a pilot received his or her wings. The fund would grow with government contributions and interest payments. Contributions into the fund would continue until some specified year of service was reached or until separation or retirement.

The service member would become partially vested in the fund at the beginning of a designated year of service, with full vesting occurring a

[139] Paul F. Hogan and Brian Simonson, *Aviation Career Savings Fund: A Skill-Based Pay for Pilots* (Falls Church, VA: The Lewin Group), 2001. The Air Force recently increased the service obligation for flight training from eight to ten years. The ten-year service obligation will improve pilot retention to some degree, but may not be sufficient to meet service manning requirements.

number of years later, according to a specified schedule. If the member were to leave, only the vested portion of the fund would be paid; the remaining amount would be forfeited. The fund could be paid out at retirement or separation, or possibly the vested portion could be withdrawn while on active duty. Upon separation or retirement, the member would have the option to roll unused entitled funds to some other plan (such as a 401(k) or IRA) to protect its tax-deferred status. The ACSF could be used with the current military retirement system.

The ACSF has several advantages. First, it is a long-term, permanent incentive upon which pilots can rely. It would encourage a career path, depending on the vesting structure, which would attract more pilots to the fifteen-year point; it would compensate those who are not promoted to O-6 and therefore separate to start a civilian aviation career. Second, depending on the vesting structure, it would encourage pilots to stay beyond their active-duty service obligation and implicitly penalize those who do not. Third, it would offer significant additional compensation for those who choose to stay for twenty years of service.

Figure 3-12 shows the projected impact of the ACSF on Air Force pilot inventories in 2010, 2015, and 2020, respectively.[140] The results shown assume that the ACSF would be implemented in 2002, at which point the ten-year service obligation would be phased in. All other compensation elements, including continued payment of ACP and ACIP, remain the same.[141] The analysis assumes that 25 percent of basic pay is contributed to the fund beginning at the first year of aviation service and continuing each year until the member's twentieth year. Pilots are 50-percent vested in the fund at the fifteenth year of service, with full vesting at 20 years. Different vesting schedules, the amount of the contributions, as well as the period for which contributions are made can influence the effect of the ACSF.

As the figure indicates, the ACSF would help retain personnel after the ten-year service obligation and maintain this higher retention past the twentieth year of service. The incentive would have its most dramatic effect in increasing retention from the active-duty service obligation to the first, partial vesting point at year 15.

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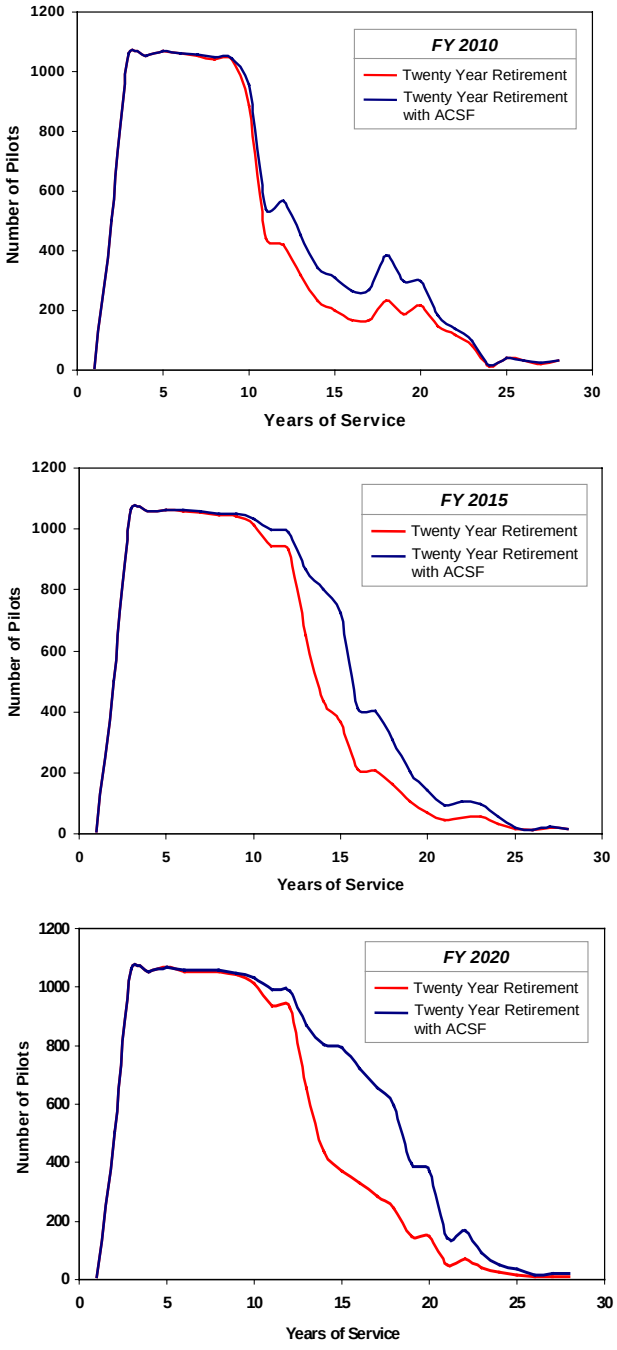
[140] For more detailed analysis of the ACSF, see Hogan and Simonson (2001). The 9th QRMC is grateful to the Air Force for providing data for these simulations. These data were provided for illustrative purposes only, and the Air Force does not necessarily subscribe to this or any similar plan.

[141] This analysis also assumes a pay elasticity of 0.5. This means, for example, that a one percentage point increase in pay would result in a 0.5 percentage point increase in retention.

Figure 3-12. Predicted Pilot Inventories



Source: Hogan and Simonson (2001).

This effect is intuitive since most pilots would remain in service for three additional years to become 50 percent vested in a fund that has been accumulating since 2002. Retention would remain strong after fifteen years of service because of the incentive to become fully vested in the fund at 20 years, coupled with the traditional pull of the current 20-year retirement system.

The effect of the fund would become greater in 2015 and 2020 because the initial period of "transition" will have passed. In the early years after implementation, the program will not have been in effect long enough for those coming to the vesting points to have enjoyed a full career of contributions to the fund. The longer the fund has been in place, the more money will have been contributed and the greater the incentive effects.

The 9th QRMC believes the concept of an Aviation Career Savings Fund could be very effective in shaping career paths in aviation or other occupational communities. Implementing such a concept would require additional analysis in several areas. First, how the concept of "pay for skill" ultimately fits into the military culture must be considered. This type of pay incentive could possibly create morale problems among members with lower-pay skills, perhaps even creating a shortage of personnel in those low-skill occupations. In addition, the specifics of which jobs would qualify for benefits must be examined. Furthermore, the relationship between the ACSF and other pays, such as ACP and ACIP, needs to be fully resolved, and an analysis needs to be undertaken to determine the cost of the ACSF.

IN SUMMARY

The QRMC has described two features of the military compensation system that combine for effective force management: balance and flexibility. Appropriate ***balance*** between *regular military compensation* and *special* and *incentive pays* is required to maintain a basic wage structure throughout the military career and to create special incentives to deal with differences in supply across military occupations. The different S&I pays also offer ***flexibility*** in the compensation system when they are used to alleviate shortages due to competition from civilian labor markets and/or the varying conditions of service across skills.

Does the current compensation system contain the proper balance and flexibility to meet the force requirements of today, as well as of the future? The primary recommendation of Chapter II—increasing enlisted, officer,

and warrant officer RMC above the average earnings of their comparably educated civilian peers—will improve the balance between RMC and S&I pays by ensuring that S&I pays and bonuses are not compensating for shortfalls in average basic pay. Although some adjustments to the levels of S&I pays undoubtedly will occur in response to the RMC changes, the current array of S&I pays seems adequate for dealing with the problems typically faced by each Service today. The evidence supporting this conclusion is that, for the most part, the current system of special pays and bonuses has been successful in adapting the skill and experience mix to changing requirements over a wide range of force levels for almost three decades. In addition, there are new pay authorities that now exist to provide additional flexibility, of which the Services could take more advantage.

As for the future, changes will be necessary if either military personnel requirements or the personnel management system are transformed in significant ways. Requirements can change if either threats or defense budgets are altered significantly. The recent emphasis on homeland security is a good example. As the Department's responsibilities for homeland security are clarified, new requirements may emerge.

Another avenue for change—that would almost certainly have an impact on the compensation system—would be changes to the personnel management system, such as altering the traditional "up-or-out" promotion system or adopting alternative career lengths. Requirements for experience-levels may change in selected occupations, for example, if the Department encouraged variable career lengths—making some careers shorter and some longer than the traditional 20-year career. In the case of many fixed-wing pilots, for example, a career length of 14 or 15 years may be optimal; shorter careers may also be optimal in many combat arms occupations where "youth and vigor" are still critical requirements. Conversely, the Services lose many personnel at the 20-year point who are in technical and specialized occupations—such as health-care professions—and could continue to make valuable contributions over a longer career.

If more fundamental changes to requirements or to personnel policies occur, traditional S&I pays and bonuses may not provide the proper level or, when combined with regular military compensation, the proper composition of pays to achieve future manpower goals. In those cases, new tools such as those described in this chapter may be necessary to ensure that the military can compete successfully in the civilian job market.

CHAPTER IV

OTHER MEASURES OF FINANCIAL WELL-BEING

When considering the financial well-being of the force, reference is often made to regular military compensation of a typical service member. But this measure can mask the financial condition of particular segments of the force or particular groups of individuals, all of special interest to the Department. The uniformed services care about their members in all phases of their careers—early in service, in overseas assignments, and when they separate, for example. This chapter examines issues that involve five segments of the force: three involving members who are still in service and two that involve post-service experiences.

- ***The standard of living of junior enlisted families*** is often the focus of much attention. While the earnings of junior enlisted members fall above the 70th percentile of their civilian counterparts, a few of these families face financial stress. It is important to the Department that pay be sufficient to meet the needs of its personnel, so understanding the cause of these financial hardships is essential.
- ***Earnings of military spouses*** are an important retention issue. Given that retention is a family decision, the employment and earnings situation of spouses plays a role in this decision. The analyses presented in this chapter offer a quantitative assessment of the situation.
- ***Members assigned to a permanent change-of-station overseas*** are compensated for cost-of-living differences between the United States and their assigned overseas location. Although the budgeted amount of the allowance is a small proportion of the defense budget, monthly payments to families can represent a sizeable portion of their spendable earnings. Ensuring that the cost-of-living allowance reflects current realities in overseas locations requires periodic review.
- ***Post-service educational benefits*** are one of the most popular incentives for young men and women entering military service. If the military is to be competitive in the market for high-quality personnel, it must offer meaningful educational benefits and encourage members to further their education both during and after military service.
- ***Military retiree earnings*** are another area of interest. The Department cares about the economic well-being of retirees and also wants to ensure that members feel their military service was a wise career choice. Most members begin a second career after leaving military service; and second career

earnings can have a significant impact on a member's overall satisfaction with his or her military career.

THE STANDARD OF LIVING OF JUNIOR ENLISTED FAMILIES

An important goal for military compensation policy is that pay be sufficient to meet the basic needs of all personnel. The analyses in Chapter II have shown that RMC for most junior enlisted personnel (E-1 to E-4) appears to be adequate compared to civilian earnings of workers with either a high school diploma or some college education. However, this conclusion ignores the differences in dependent status and family size among junior members. Data show, for example, that enlisted personnel tend to marry and start families at an earlier age than do their civilian counterparts.

Concern is often expressed over reports about military families participating in the U.S. Department of Agriculture Food Stamp program or living in inadequate off-base housing. That some military members qualify for federal welfare programs is sometimes viewed as evidence that military compensation is not sufficient to meet basic needs. Although the military compensation system does recognize some family differences in the basic allowance for housing (in providing different levels for single vs. married members) it does not distinguish between large and small families. It is important, therefore, to examine the overall standard of living of junior members with families.

The QRMC examined the question of how well military compensation provides for an adequate standard of living from three perspectives. First, RMC is compared to poverty levels as defined in other government programs. Second, participation in the food stamp program among military families is examined since family size is a key factor in determining food stamp eligibility. Third, the potential "near-poverty" military population—those families assigned to above-average cost-of-living areas with relatively low RMC—is analyzed to determine both the number of service members living in such circumstances and the length of time spent there.

Regular Military Compensation and Poverty Levels

In the United States, poverty is determined by comparing individual or family income to a threshold income level, or poverty line.[142] Threshold income is defined as the income level required to fulfill basic needs. Poverty thresholds vary by family size and are adjusted annually for changes in purchasing power.

Using official poverty thresholds to characterize the standard of living of service members is complicated because measuring the full resources available to them is difficult. Comparing the poverty level to basic pay is the easiest approach, but it leaves out many elements of total military compensation. Regular military compensation is a more appropriate measure of income because it includes the Basic Allowances for Housing and Subsistence as well as the federal tax advantage for these allowances.[143] The official poverty thresholds and enlisted RMC are shown in Table 4-1.

Table 4-1. Poverty Thresholds and Regular Military Compensation, 1999

Poverty Thresholds			Military Pay	
Number of Children	Single Adult ($)	Two Adults ($)	Grade	RMC ($)
0	8,677	11,156	E-1	21,565
1	11,483	13,410	E-2	22,623
2	13,423	16,895	E-3	24,514
3	16,954	18,882	E-4	27,622
4	19,578	22,261	E-5	32,517
5	21,845	24,934	E-6	36,915
6	23,953	27,412	E-7	42,885
7	27,180	33,499		
8+	32,208	32,208		

Source: Husted and Hansen (March 2001).

[142] For a complete discussion of military pay and poverty level measurement in the United States see, Husted and Hansen (March 2001).

[143] Using RMC alone, however, may actually underestimate resources available to the families of enlisted personnel. Most members receive free medical insurance and subsidized recreation and commissary/exchange benefits, and some receive enlistment bonuses and special pays as well as the benefits of subsidized child care.

Data for FY 1999 indicate that regular military compensation for enlisted personnel is above the official poverty threshold in nearly all cases. Less than one-tenth of one percent (0.04 percent), or 509 service members with families, receives RMC below poverty income thresholds. In these cases, the family size tends to be large. At grades E-3 or below, only families with 5 or more children have earnings that fall below the poverty threshold; at grades E-4 and E-5 only families with 7 or more children have earnings that fall below the threshold. Single enlisted members with no dependents never fall below poverty levels.

Eligibility For Government Assistance Among Military Families

A relatively small number of military families have always been eligible to participate in government assistance programs based on need. These programs include the U.S. Department of Agriculture's Food Stamp Program, the School Lunch and School Breakfast Programs, and the Special Supplemental Nutrition Program for Women, Infants, and Children.[144]

Nevertheless, accurate information on how many military families are eligible to participate in these programs is difficult to obtain. The U.S. Department of Agriculture administers the food stamp program through its various state offices. Neither the Department of Agriculture nor the state offices collect information on whether food stamp recipients are military members. The Department of Defense has no involvement with the food stamp program and does not directly collect information on food stamp usage.

Further, a widely accepted view is that more military families receive food stamps than should qualify because it is difficult for the Agriculture Department to determine the full value of military compensation. Families who live on base are most likely to qualify because although the value of their housing is imputed in RMC, it generally is not figured into food stamp eligibility. Other income "sources" such as tax-exempt allowances, some special pays and bonuses, benefits in kind, and price subsidies are also not reflected in documents used to verify eligibility.

[144] The Women, Infants, and Children program is designed to provide supplemental food to low-income pregnant women, new mothers, and infants. States determine eligibility, but the federal government requires that income limits be no greater than 185 percent and no less than 100 percent of the U.S. Department of Health and Human Services poverty guidelines.

The most recent DoD study on the use of food stamps among military members was requested in the FY 1999 Defense Appropriations Act.[145] Food stamp eligibility is based upon household size, household gross and net income, and financial resources.[146] For military members to be eligible for food stamps, their cash pay must be less than the gross income eligibility limit for food stamps. For this study, data were collected over an 8-month period in 1998 from ten states with a military population of 649,170.

To estimate the number of service members eligible for food stamps, the study calculated cash pay per grade as the sum of basic pay (assuming the average years of service per grade), Basic Allowance for Housing at the "with-dependent" rate, and Basic Allowance for Subsistence for that grade. Members who live on base receive housing in lieu of housing allowances and, consequently, their cash pay will be correspondingly lower. Members living in areas with higher housing costs would receive

[145] The DoD's first attempt to count the number of military members receiving food stamps was reported in a study conducted in 1991. The methodology used in this study matched the social security numbers of all active-duty personnel in four states with individual state food stamp records. These four states contained one quarter of the total military population. Extrapolating from the four-state sample to the military population, DoD estimated that 19,740 members (less than one percent of the force) were receiving food stamps in 1991.

Because of the reduction in force size that occurred from 1991 to 1993, this estimate of the food stamp population was reduced to 17,000. The estimate was further reduced in 1994 to 16,000 to account for additional downsizing and the likely impact of recent pay raises on military incomes compared with the impact of inflation on food stamp income eligibility limits.

The FY 1995 Defense Appropriations Act required DoD to conduct a second study of the number of military receiving food stamp benefits. This report, submitted in January, 1996, used the same methodology as the 1991 study and found that the number of food stamp recipients had decreased to 11,900.

[146] To receive food stamps, households must meet certain tests, including resources and income tests. With respect to resources, households may have up to $2,000 ($3,000 if a member is age 60 or older) in countable resources, such as a bank account. Certain resources are not counted, such as a home or income from Supplemental Security Income or Aid to Families with Dependent Children. There are a number of rules that determine how motor vehicles are treated for the purpose of determining resources. Basically, the fair market value of the vehicle over $4,650 or the equity value, whichever is more, is counted as a resource unless the vehicle is necessary for long distance travel for work, used as a home, or helps produce income.

Households also have to meet income tests. Most households must meet both the gross and net income tests, but a household with an elderly or disabled member (as defined for food stamp purposes) only has to meet the net income test.

substantially greater BAH (and possibly cost-of-living allowances provided in the continental United States [CONUS]) and therefore have higher cash pay. One could argue that the tax advantage accruing from the allowances should also have been included in these calculations, but they were not.

The military population considered in the FY 1999 study was approximately 47 percent of the total active-duty force. Of the number surveyed, 2,946 members received food stamps. Adjusting this number to the total military population, DoD estimated that approximately 6,300 members, or less than one-half of 1 percent, were eligible to receive food stamp benefits out of an active-duty force of 1.4 million. These recipients were divided into two groups: 60 percent (or 3,780 members) living on base and 40 percent (or 2,520 members) living off base.

Data for the FY 1999 study came from actual food stamp usage in 1998. Between 1998 and 2001, military pay increased by a cumulative total of 15 percent (with some pay grades having even higher increases). Cumulative increases in BAH amounted to 24 percent over the same period. The gross income limit for food stamp eligibility for a given year increases with changes in the Consumer Price Increase (CPI). From 1998 to 2001, the CPI increased by only 8.2 percent. When adjustments using these relative gains in military income were made to the FY 1998 food stamp population, the number of members estimated to be eligible for food stamps fell to about 4,200 in FY 2001.

FAMILY SUBSISTENCE SUPPLEMENTAL ALLOWANCE PROGRAM

Recently, Congress passed legislation in the National Defense Authorization Act for FY 2001 (Title 37, Section 402) designed to reduce the military food stamp eligible population to zero. The Family Subsistence Supplemental Allowance (FSSA) is now available to supplement the Basic Allowance for Subsistence in those cases where the combined effect of household income and household size make a service member eligible for food stamps.[147] Additional reductions in the number

[147] A member's basic pay plus allowances, together with any other household income, must fall within 130 percent of the poverty line as defined by the U.S. Department of Agriculture for a household of a given size. The amount of the FSSA is determined by subtracting total household income from the appropriate gross income limit for a particular household size. The difference is paid as additional BAS not to exceed $500 per month.

of personnel on food stamps between now and 2005 will occur as a result of pay raises and the reduction in out-of-pocket housing costs.

Off-base and on-base populations are considered separately in estimating how many personnel will be on food stamps by 2005. Table 4-2 shows that 1,121 members living off base are estimated to have received food stamps in 2001. The FSSA program allows up to $6,000 in increased annual income. Combined with the FY 2002 pay raise and continued increase in BAH, DoD estimates that the number of members living off base and eligible for food stamps will fall to about 100 families in FY 2002, assuming that all those eligible for food stamps apply for FSSA.

Table 4-2. Estimated Number of Enlisted Families in Off-Base Housing Eligible for Food Stamps, FY 2001

	Number of Dependents								
Grade	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
E-1		41	27	6					74
E-2		96	68	19	3	2	1		188
E-3		159	136	79	14	3	2	2	396
E-4			212	129	52	13	1	0	406
E-5					34	10	4	1	49
E-6							2	2	3
E-7								3	3
E-8									0
Total	**0**	**296**	**443**	**233**	**103**	**28**	**10**	**8**	**1,121**

Source: Saul Pleeter, Food Stamp Usage in the Military, Information Paper, Office of the Assistant Secretary of Defense (Force Management Policy), 2001.

For the population residing in base housing, the story is different. Because these members do not receive BAH, the increase in the housing allowance does not affect their food stamp eligibility. Also, their FSSA benefit will, for the most part, just equal their current food stamp benefit. This amount will not be sufficient to remove most of them from food stamp eligibility, because the annual dollar value of the benefit is less than the amount needed to remove them from food stamp rolls. The current estimate of the number of military members living on base who are on food stamps is shown in Table 4-3.

Table 4-3. Estimated Number of Enlisted Families in On-Base Housing Eligible for Food Stamps, FY 2001

	Number of Dependents								
Grade	3	4	5	6	7	8	9	10	Total
E-1	406	61	41	9					517
E-2	297	145	102	28	4	3	1		580
E-3	125	238	205	119	22	5	3	3	719
E-4		211	317	193	78	19	1	0	820
E-5		47	91	115	51	15	6	1	328
E-6			13	35	15	10	3	3	78
E-7					6	2	1	5	14
E-8								1	1
E-9									0
Total	**828**	**702**	**769**	**499**	**176**	**53**	**15**	**13**	**3,056**

Source: Pleeter (2001).

FSSA and the pay raise will reduce the on-base food stamp population by 1,084 members to a projected new total of 1,972 members on base in FY 2002. Thus, the total estimate of the number of personnel on food stamps by the end of FY 2002 is approximately 2,072.

Pay raises programmed through 2005 (projected to be only 3.7 percent each year) will exceed the increasing food stamp eligibility limits (raised each year by the CPI, which is estimated to grow by about 3 percent annually) by only 0.7 percent each year. Consequently, DoD projects that pay raises alone will only remove a few additional families (households with only one member) over the limit—perhaps another 90 to 100. Therefore, the estimated number of military members on food stamps will fall to just less than 2,000 by FY 2005. Virtually all of these service members will have family sizes of five or more members and be in grades E-2 to E-4.

CONDITIONS OF FINANCIAL "STRESS" IN MILITARY FAMILIES

It is important to note that poverty status is transitory for enlisted personnel. Service members typically reach E-3 by the end of their first year of service. On average, E-3s have about two years of active-duty service and E-4s have about four years. Earning less than the poverty threshold is a *temporary* phenomenon in the military. In fact, the only way junior personnel can remain in poverty is to have their family size grow

faster than the rate at which they are promoted. This situation is in sharp contrast to that of civilians in poverty, who are significantly more likely to remain poor for extended periods of time.

The fact that very few military personnel remain impoverished for very long is reassuring, but there may still be many families just beyond, but on the brink of, the poverty line. For average size families, however, it turns out that RMC is well above the poverty threshold. In particular, for a family with two adults and two children, typical RMC exceeds the poverty line by 28 percent for E-1s and by 64 percent for E-4s. And when extra pays, health benefits, and spousal earnings are added, most military families move well above the poverty line.

However, some evidence suggests that substantial numbers of military members feel they exist in a state of "near-poverty." Responses to surveys about financial conditions can be used to create a subjective measure of standard of living. One such measure is the person's evaluation of his or her family's ability to "make ends meet" financially. The 1999 DoD Survey of Active Duty Personnel shows that some service members in each grade are troubled by their financial condition.[148] As one might expect, however, the proportion with financial difficulties declines by grade. In particular, 47 percent of E-1 to E-3s report having substantial financial difficulties; this proportion declines to 39 percent of E-4 to E-6s and 23 percent of E-7 to E-9s. Similarly, only 25 percent of E-1 to E-6s, but 47 percent of E-7 to E-9s, feel that they are financially stable.

Excess debt could explain perceptions of financial instability. According to survey responses, those who indicated they faced substantial financial difficulties were more likely to have significant levels of debt, whereas those who were financially stable were most likely to have little or no debt. Although financial difficulty can reflect low-income levels, people who consistently live beyond their means, regardless of income level, also experience it.[149]

Because so many members reported feeling financially stressed, the QRMC also examined one group likely to be at risk—young enlisted families living off base assigned to above-average cost-of-living locations. Even if military facilities (health care, commissary and exchange, or recreation) are available on base, these "low-income" families may encounter higher costs simply because of the difficulty in obtaining access

[148] See Tabulations of Responses from the 1999 Survey of Active Duty Personnel in *Assignments, Careers and Military Life*, *Volume I,* DMDC Report No. 2000-006 (Arlington, VA: Defense Manpower Data Center), September 2000.

[149] Tiemeyer, Wardynski, and Buddin (1999).

to these services. Table 4-4 shows the number of these families in May, 1999, and the number remaining after 10 and 22 months, respectively.

Table 4-4: Low-Income Military Families Residing Off Base In High Cost-of-Living Areas, 1999-2001

	Number of Military Families				
Month/Year	Army	Navy	Marine Corps	Air Force	Total
May 1999	4,200	6,613	7,899	2,428	21,301
September 2000	1,041	1,762	2,801	367	5,972
September 2001	1,108	1,108	1,762	239	3,685

Note: Families include members (grades E-4 and below) living off base in geographic areas with cost-of-living indices greater than the median of all U.S. areas. Approximately 10 percent of these families were eligible to receive CONUS cost-of-living allowances in each year.

These data suggest that enlisted families facing the greatest financial challenges do not remain in those circumstances very long. Of the initial cohort (May, 1999), 28 percent and 17 percent of the families remained in the same locations (in pay grades E-4 and below) after 10 months and 22 months, respectively. Over the 22-month period, 30 percent of the members separated from the military and 53 percent were promoted to E-5, moved into on-base housing, or moved to a lower cost-of-living area.

The data in Table 4-4 also indicate that young enlisted families facing the most challenging financial conditions are concentrated in the Navy and Marine Corps. Over two-thirds of the initial cohorts are in these two services compared to their proportion in the total active-duty force of only 40 percent. Moreover, 80 percent of these Navy and Marine Corps families are assigned to military installations in California. Therefore, the population of young enlisted families that may face the most financial stress is highly concentrated in a few geographic areas.

IMPLICATIONS

Research indicates that most enlisted personnel and their families receive an income that should provide an adequate standard of living. Using the commonly accepted definitions of poverty:

- Only about 500 Service members earn a level of regular military compensation below the official U.S. poverty thresholds. This number represents less than one-tenth of one percent (0.04 percent) of the total active-duty force of about 1.4 million.

- Families have to be large to fall below the poverty line. Even at the lowest end of the pay table, families must have at least five children for the poverty threshold to rise above RMC. There are a few families just barely above the poverty line. For a family with two adults and two children, RMC for an E-1 is 28 percent above the poverty threshold; RMC for an E-4 is about 64 percent.
- For the few military families who are poor, being poor is a temporary phenomenon experienced by people in junior grades where the advancement rate is rapid.
- Low-income families most likely to face financial hardship—those assigned to above-average cost locations and living off base—do not remain in those circumstances for very long (generally less than one year) before being promoted, reassigned to a lower-cost location, or leaving the military. These families are primarily in the Navy and Marine Corps and in California locations.
- Recent DoD initiatives—the special pay raise in FY 2002, the increase in the basic allowance for housing, and the new FSSA for large families—will increase RMC substantially for families close to the poverty line. Although food stamp usage will fall, it will not be eliminated unless the methods by which the food stamp program calculates military incomes are changed for members residing on base.
- The QRMC found no compelling evidence that enlisted personnel are paid inadequate wages. For those enlisted personnel who report substantial financial difficulties, the analysis indicates that this is more strongly related to levels of debt or family size than levels of compensation.

EARNINGS OF MILITARY SPOUSES

The adage that the military "recruits individuals but retains families" is truer today than ever before. Only about one in seven active-duty members enter the military married, but by the eighth year of service, approximately three-quarters are married. Many have children. And the number of dual-income military families has increased steadily over the

last thirty years. In 1999, 65 out of every 100 military wives worked at full- or part-time jobs outside the home.[150]

During the draft era, and even in the early years of the All-Volunteer Force, the focus of military personnel policy was the individual service member. During this era, a greater proportion of members were single than is the case today, and the majority of spouses were homemakers. The changing demographics of the force have dictated that the Services pay even more attention to the family.

The Services have recognized the importance of quality-of-life issues for both single and married members and are concerned about their impact on military retention and readiness. But the emergence of the family as a dominant feature of the All-Volunteer Force has made even more critical the need for adequate housing, health care, dependent schools, childcare, and other family support programs. The employment and earnings opportunities for military spouses is an important family concern—a subject of increasing attention in the military because of its potential impact on a member's decision to stay in or leave the military. The QRMC brings attention to this issue with an analysis of how military life affects the earnings of spouses—in particular, how the employment and earnings opportunities for military spouses can be influenced by the assignments and schedules of military members.

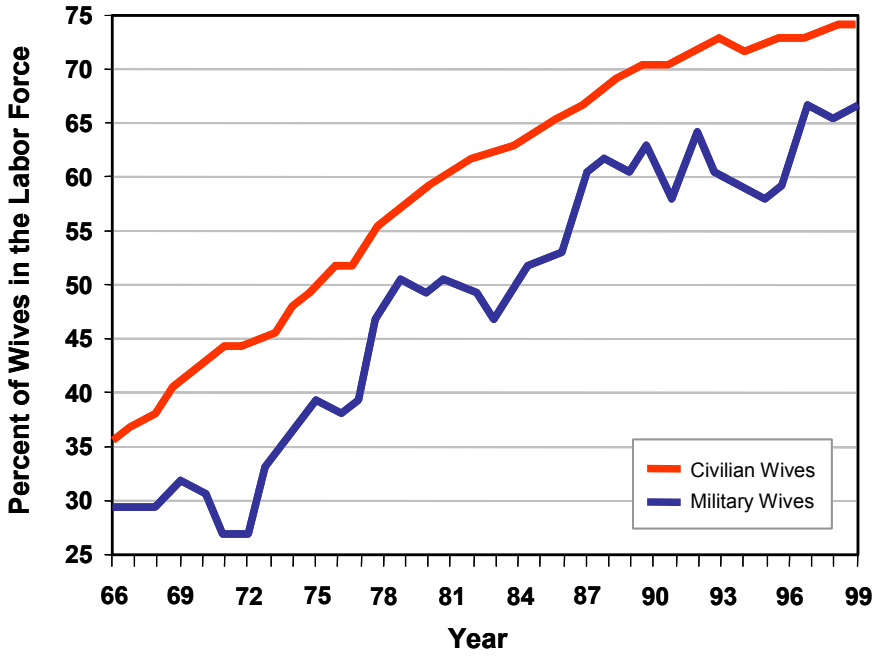
EMPLOYMENT AND EARNINGS OF MARRIED WOMEN

One of the most significant social phenomena over the last 40 years has been the dramatic and steady increase in the percentage of married women who have entered the labor force. As shown in Figure 4-1, this percentage has doubled since the early 1960s. Today, about 75 percent of wives in civilian households work or are looking for work outside the home; similarly over 65 percent of military wives are in the labor force.[151]

[150] The focus in this analysis is on the "wives" of military members since military spouses are overwhelmingly (93 percent) female.

[151] This rate is referred to as the labor force participation rate, which is the labor force (those 16 years of age and over who are either employed or looking for work) divided by the civilian population. Comparisons of these rates for military and civilian wives using raw data can be misleading, however, because there are significant differences in the demographic characteristics of the two population groups—civilian wives on average being much older, having fewer young children at home, and having more education, for example. Because these differences can affect employment and earnings status, they should be taken into account (controlled for) when making comparisons between military and civilian wives.

Figure 4-1. Labor Force Participation of Married Women, 1966-1999



Source: Wardynski (2001).
Note: Data set is limited to married women with husbands age 20 through 49.

Despite the similarities in labor force participation between military and civilian wives, the employment situation of military wives is quite different from that of their civilian peers, as one recent study found.[152] As shown Table 4-5, on average, about 74 percent of military wives worked at any time during the year, compared with 82 percent of civilian wives—an 8 percentage-point differential. Among working wives, military spouses were 11 percentage points less likely to work full time (48 percent

[152] James Hosek, Beth Asch, C. Christine Fair, Craig Martin, and Michael Mattock, *Married to the Military: The Employment and Earnings of Military Wives Compared to Civilian Wives,* MR-1565-OSD (Santa Monica, CA: RAND Corporation), 2002. To compare the employment situation of military and civilian wives, Hosek et al. examined the employment rate (the proportion of wives who have worked at any time during a year), the proportion of those working who work full time (35 or more hours per week for 35 or more weeks in a year), and the number of weeks worked per year. In these comparisons, data are adjusted for differences in demographic characteristics between military and civilian wives. Results reported here are based on analyses covering the 1987-1999 period.

compared to 59 percent).[153] They also worked three fewer weeks per year and earned $40 (or 13 percent) less per week than women married to civilian husbands.

Table 4-5. Employment and Earnings of Military and Civilian Wives

	Civilian Wives	Military Wives	Difference
Probability of Working (%)	82	74	-8
Probability of Working Full Time (%)	59	48	-11
Weeks Worked	41	38	-3
Weekly Earnings	$308	$268	-$40

Source: Hosek et al. (2002).

Arguably, the best indicator of a family's material well-being is income, since it is the key factor in family spending and saving decisions. With more married women working outside the home, wives contribute a large share of income in many, if not most, families. Military wives working both full time and part time earn less than civilian wives in annual earnings, but they account for about 25 percent of total family income.

Figures 4-2 and 4-3 compare annual earnings of military and civilian wives and show that military wives working full time earn, on average, about $4,000 less than their civilian counterparts. The difference in earnings increases with education from just under $3,000 for those with a high school diploma or some college to about $8,000 for those who are college graduates. A similar pattern emerges when comparing military and civilian wives working part time.

[153] Wardynski finds similar patterns and reports that military wives are about 4 times as likely as civilian wives to be unemployed looking for full-time work. LTC Eugene Wardynski, *Military Compensation in the Age of Two-Income Households: Adding Spouses' Earnings to the Compensation Policy Mix*, (West Point, NY: United States Military Academy), 2001.

Figure 4-2. Annual Earnings of Military and Civilian Wives Working Full Time (1999 dollars)

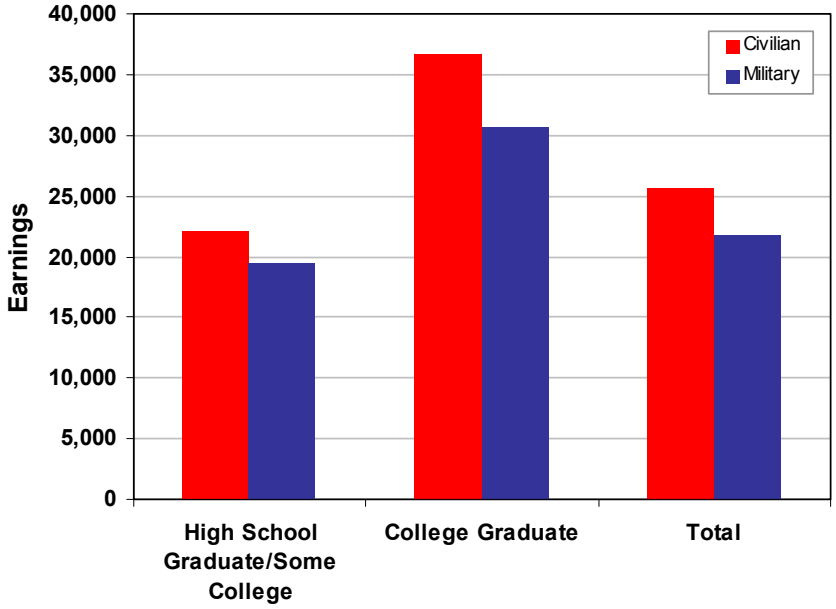
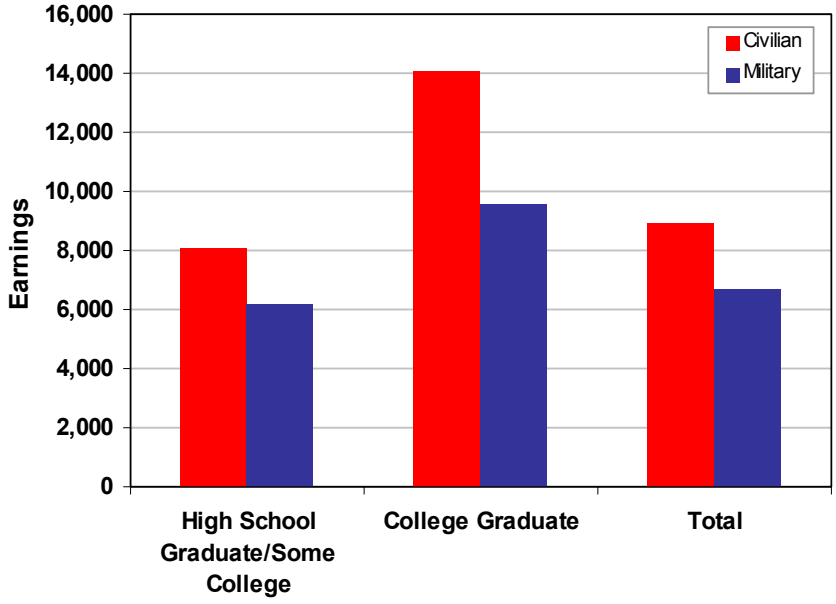


Figure 4-3. Annual Earnings of Military and Civilian Wives Working Part Time (1999 dollars)



Source: Hosek et al. (2002).

Note: Data are an average of the 1987-1999 period. Percentages for total include a small number of wives who have not graduated high school.

An earlier study found similar differences between military and civilian wives in terms of employment and earnings.[154] Specifically, the probability of a wife working full time was reduced by about 20 percent if she were married to a military member rather than a civilian. The study also found average annual earnings to be about 28 to 35 percent less (and weekly earnings to average 18 to 25 percent less) than earnings of civilians with the same race, age, and education level. The study corroborated other findings that earnings differences for military wives are largest at the highest education levels.[155] This is a significant issue if the average education level of the force is rising over time.

Factors Influencing the Employment and Earnings of Military Wives

There are several possible reasons why fewer military wives are employed outside the home and why their earnings are lower than those of their civilian peers. These reasons include the frequency and distance of moves, location of military installations, demands of the military lifestyle, and personal taste.

Frequency and Distance of Moves

First, the frequency and distance of moves is associated with lower earnings for military wives. Permanent change-of-station (PCS) moves require that military members relocate every few years—about one third of military families move every year. For military wives, these frequent moves interrupt work and can hinder their ability to accumulate education and both general and job-specific experience. Employers may choose either not to hire military wives or not to invest in as much education and training for them, as they are perceived to be more transient.[156]

Further, unlike civilian wives who may move to improve their employment opportunities, military wives more often move in conjunction with their husband's primary job. This may cause military wives to spend less time searching for employment, and as a result, they may accept jobs

[154] See Deborah M. Payne, John T. Warner, and Roger D. Little, "Tied Migration and Military Wives' Returns to Human Capital," *Social Science Quarterly,* 73 (2), June 1992, 324-39.

[155] Wardynski (2001) reports similar results: military wives earn about 30 percent less than comparable civilian wives across all educational levels.

[156] There is also evidence of employer prejudice against hiring military wives. See Margaret C. Harrell, *Invisible Women*: *Junior Enlisted Army Wives*, MR-1223 (Santa Monica, CA: RAND Corporation), 2000, p. 108.

beneath their level of education, skills, or abilities. Given their expected tenure on the job, this decision is not surprising.

A recent and interesting finding associated with moves is that military wives do not suffer a larger earnings loss from moving than civilian wives for a given type of move. The issue is that military wives are more likely to make long-distance moves, and the earnings loss associated with these moves is greater than for shorter moves for both military and civilian wives. Thus, the problem in terms of earnings loss is not frequency of moves *per se*, but the frequency of long moves, which is more typical among military families.[157]

Location of Military Installations

The location of military installations can also have an impact on employment opportunities. Military posts are often located in areas where wages are relatively low, increasing the likelihood that military wives will accept positions that provide lower earnings. The earnings difference between military and civilian wives ranged from 12 percent in the Navy to about 25 percent in the Army; this earnings difference is due both to the permanent change of station move and to locality, with the latter accounting for between 50 percent (in the Navy) and 70 percent (in the Army) of the difference.[158]

Demands of the Military Lifestyle

The demands of the military as an employer can adversely affect the employment and earnings opportunities of military wives, especially those with children.[159] Military members typically experience irregular duty hours, and deployments that have become more frequent and longer over the last decade, requiring the spouse to be particularly involved in child care. During deployments, the spouse generally has to take full responsibility for family and household matters. There is also the expectation by the military that military spouses do volunteer work and

[157] Hosek et al. (2002).

[158] Wardynski (2001), p. 337. Wardynski estimated that cutting PCS moves in half would reduce the earnings difference by about 5 to 6 percentage points—equivalent to lengthening the PCS interval from 3 to 6 years. Payne, Warner, and Little (1992) examined earnings changes after PCS moves. They estimated that two 3-year tours in different locations resulted in about a 40-percent earnings loss relative to what the wife would have earned if the military family had spent all 6 years in the same location.

[159] See, for example, Mady Wechsler Segal, "The Military and the Family as Greedy Institutions," in Charles C. Moskos and Frank R. Wood, eds. *The Military: More Than Just a Job* (Washington, DC: Pergamon-Brassey's), 1988, 79-97.

other community support, which can further frustrate wives' desire to work outside the home.

Personal Taste

Finally, an important point often overlooked when making military-civilian earnings comparisons is that many wives have a preference for military life. This fact does not dismiss the employment and earnings disadvantages they may face in the job market, but recognizes that some wives prefer travel, living in different cultures and climates, and a more regimented lifestyle.

IMPACT ON RETENTION

The QRMC sought to better understand and offer evidence of the differences in employment and earnings experience of military and civilian spouses. Military wives earn less annually than civilian wives because they work fewer weeks, on average, during the course of a year. Their wage rate is also lower, partly because they often make more frequent job changes, lack seniority, and face fewer job opportunities commensurate with their skills and abilities.

Given that retention is a "family" decision, the employment and earnings opportunities for spouses certainly plays some role in that decision. While the analyses show that military wives are in certain ways disadvantaged in the job market, it should not be taken to mean that military families are necessarily less well off. Being a member of the military is a source of satisfaction and pride to members and their families. If members are satisfied with and proud of their careers and have the support of their families as well, then they are more likely to remain in the military. However, if members or their spouses believe they can have a better life outside the military, they may choose to leave. The fact that military spouses must condition their job selection on the rigidities and uncertainties of a military member's career will be a factor in that decision.

Overall, military retention is higher among married personnel than among single personnel. This fact is most likely attributed to the many policies that have been devised to compensate for the challenges married personnel face—policies such as the recent, family-oriented changes to TRICARE and improvements in military housing. The Services have also begun to address the employment difficulties that military spouses face. The Navy and Marine Corps, for example, have launched a pilot program with Adecco SA, a Zurich Switzerland staffing business with 5,500 offices

worldwide, which will provide career counseling, training, and temporary jobs for military spouses. As employees of Adecco, spouses are eligible for benefits, which they keep as they transfer among jobs.[160]

Other initiatives aim to find "portable" jobs. The Navy is investigating opportunities with several large companies for customer-service jobs that can be performed in remote locations. The Army has a pilot program to provide training for administrative work-at-home skills. Also, the Air Force has begun an online job bank, with more than 700 jobs with large employers to assist Air Force spouses in finding employment.[161]

The QRMC supports these initiatives.

MEMBERS ASSIGNED OVERSEAS: THE OVERSEAS COST-OF-LIVING ALLOWANCE

The overseas cost-of-living allowance (COLA) is a bi-weekly payment provided to approximately 275,000 military members stationed at one of 600 locations outside the continental United States (OCONUS). The allowance represents the difference in the cost of purchasing a "typical" market basket of goods and services at the overseas location compared to the cost of purchasing that same market basket in the continental United States (CONUS). The purpose of the OCONUS COLA is to compensate members for differences in the cost of living between CONUS and their assigned overseas location, so they are not penalized financially for assignment overseas.[162]

The amount of the allowance varies across service members both by geographic location and by grade and dependency status. The cost-of-living index, which measures the cost of living at the OCONUS location relative to the CONUS cost, is the same for all members at a particular location. But the amount of the allowance varies because the "spendable income"—the amount of a member's pay that is subject to adjustment—varies according to pay grade and number of dependents.

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[160] "Military Works to Ease Work Woes of Spouses," *Wall Street Journal*, January 16, 2002.

[161] Ibid.

[162] For a comprehensive review of the overseas cost-of-living allowance, see Hogan, et al. (2000).

The Per Diem, Travel and Transportation Allowance Committee (PDTATAC) in the Office of the Secretary of Defense is responsible for administering the OCONUS COLA program, which currently costs approximately $1 billion annually. At locations where the OCONUS COLA is paid, the average monthly payment per member is $297. However, the monthly COLA varies substantially by location—from $36 per month in La Paz, Bolivia to $1,758 in Kure, Japan, for example.

Determining the Overseas Cost-of-Living Allowance

To calculate the income adjustment needed to help service members stationed overseas maintain the same purchasing power they have in the continental United States, the PDTATAC:

- Constructs a market basket of goods and services that reflects the spending patterns of service members.
- Collects price information on the items in that market basket in both CONUS and OCONUS locations.
- Creates a cost-of-living index based on these prices.
- Applies the cost-of-living index to estimated spendable income.
- Updates the index for currency exchange fluctuations.

Table 4-6 outlines the process used to calculate the OCONUS COLA.

While the purpose of the OCONUS COLA program is to assist members financially for the higher cost of goods and services abroad, this allowance does not necessarily allow members to maintain the same standard of living they would have in CONUS. Two factors contribute to this condition.

First, some products and services are simply not available at an overseas location. The market basket used to calculate the cost-of-living indices at various overseas locations is determined by spending patterns in CONUS. But there can be significant differences in expenditure patterns between CONUS and OCONUS locations due to the different availability of goods.

Table 4-6. Overview of Overseas Cost-of-Living Allowance Determination Process

Determine Market Basket Items and Weights
▪ The market basket consists of 120 items in 11 categories representative of the types of goods and services purchased by households in the continental United States. ▪ Market basket item and category weights (i.e., spending proportions) are determined using Consumer Expenditure Survey data, collected by the Bureau of Labor Statistics, on military members in the continental United States. ▪ Item and category weights are updated approximately annually.
Determine Spending Patterns
▪ A Living Pattern Survey (LPS) is administered to members stationed overseas to identify the proportion of spending that takes place at the commissaries and exchanges, at stores in the local economy, through the mail, and from CONUS. ▪ The LPS is used to identify at which stores in the local economy members purchase items. ▪ The LPS is administered every three years, or more often at the request of the overseas command.
Determine Prices
▪ At OCONUS locations, selected members are assigned to price items in the market basket at the commissary and exchange and at stores in the local economy identified through the LPS. ▪ In CONUS, commissary and exchange price data come from the commissary and exchange services. ▪ In CONUS, price data for stores in the local economy also come from the commissary and exchange services. ▪ OCONUS prices are collected annually from price surveys and compared to CONUS prices for the most recent quarter.
Calculate Indices
▪ Locality indices are calculated based on the ratio of OCONUS to CONUS prices; these ratios are weighted by the proportion of purchases at commissaries and exchanges, local outlets, mail order, and CONUS, using item and category weights.
Compute the Cost-of-Living Allowance
▪ Locality indices are applied to spendable income of members. ▪ The component of the index that reflects spending in the local economy is adjusted for exchange-rate fluctuations. ▪ Location-unique expenditures covered under the COLA are then added to determine the total allowance.

Source: Hogan, et al. (2000).

Second, spending patterns may change in response to differences in price. Service members overseas will adjust their shopping between the commissary and stores in the local economy in response to changes in relative prices. Members will purchase goods in the local economy that are relatively less expensive than commissary purchases, even if they would typically have purchased the same goods or services at the commissary in CONUS.

Adjustments to the COLA, however, are based on changes in OCONUS prices *relative* to CONUS prices—not simply changes in OCONUS prices. This means that if prices increase at an overseas location, the OCONUS COLA will be adjusted *only if those prices rise more* than CONUS prices for the same goods and services. Conversely, if prices in CONUS *rise faster* than prices at an overseas location, the OCONUS COLA may *decline* whether or not prices decline in the overseas location.

This artifact of the OCONUS COLA calculation has been a source of much confusion. It is the primary reason why some members perceive recent overseas COLA adjustments in Alaska and Hawaii as unfair. Recently, members in Alaska and Hawaii experienced a reduction in the OCONUS COLA when there was no noticeable decline in prices in the OCONUS localities. The cause was a *relative increase in CONUS prices*. Members find this logic counter-intuitive. Moreover, if members overseas have entered into long-term financial commitments based on the continued receipt of the OCONUS COLA at a certain level, a decrease in the COLA may cause the member and his or her family to face hardships that could be considered unfair.

While simple in purpose, determination of the OCONUS COLA is a complex series of steps, as described above. Nonetheless, the critical issue is whether the current system for determining the overseas cost-of-living allowance successfully compensates members financially for the higher costs of goods and services overseas. *The QRMC believes that, conceptually, the CONUS market basket approach to determining "cost-of-living" adjustments is sound and is similar to the approach used by many private-sector multi-national firms. However, the system can be improved in a number of ways—both technically and administratively—to ensure it is perceived by members to be equitable.*

The QRMC believes the Department should integrate the following recommendations into the current system.

- Creation of a limited "safety net" that keeps the allowance payment from declining for members on their current tour when a *decline in the OCONUS COLA payment* would occur

due to an *increase in CONUS prices* or as a result of a significant change in exchange rates.

- Adjustments to the technical factors associated with calculating the cost-of-living index to ensure that members are not penalized for changes in shopping patterns due to overseas assignment.
- Improvements in data collection to ensure that the OCONUS COLA is calculated based on more timely and relevant information.
- More frequent updates to the spendable income tables to ensure that the COLA is not artificially high or low as a result of out-of-date information, the likelihood of which increases during periods of significant change in household income.
- Administrative improvements to further refine the process for determining the OCONUS COLA, particularly with regard to location-unique expenditures.

Each recommendation is discussed below in more detail.

OCONUS COLA Safety Net

A decline in the overseas COLA payment that occurs during a member's tour of duty can be disruptive for service members and their families. As described above, this can be true particularly in cases where members have entered into long-term contracts in the local economy. Establishing a safety net could ameliorate this concern.

An OCONUS COLA payment may decline for one of three reasons. First, prices in the local economy may fall. In this case, the member's cost of living will have declined, both relative to CONUS and in the local economy. Under these circumstances, there would be little reason to interrupt the decline in OCONUS COLA payment except in the case where a member has entered into fixed-price contracts in the local currency.

Second, prices in CONUS may rise at a faster rate than prices in the local economy. Here, the member's cost of living has declined relative to CONUS, but has not declined relative to the local economy. In this instance, a case can be made that a reduction in the OCONUS COLA will be a hardship for the member, even though such a reduction is consistent with a system that compensates members for the cost-of-living differences between CONUS and OCONUS locations.

Third, exchange rate fluctuations may cause the dollar to appreciate relative to the local currency, which decreases the cost of living in the local economy. A reduction in the dollar amount of the OCONUS COLA is consistent with maintaining the same cost of living relative to both CONUS and the local economy.

The QRMC believes that changes in the OCONUS COLA should not disadvantage service members assigned to overseas locations. Thus, it believes the PDTATAC should establish a safety net that keeps the OCONUS COLA payment from declining when the decline would result from an increase in CONUS prices. Because the current pay system may not be able to precisely track the timing of tours, the safety net should apply to all members at a location for the duration of their tour.[163]

Exchange Rate Changes

Under the current system, exchange rates are assessed bi-weekly to determine whether the market exchange rate is sufficiently different from the exchange rate actually used to determine the current COLA to warrant an adjustment. If the cumulative difference between the daily market exchange rate and the exchange rate being used to calculate the current OCONUS COLA exceeds 5 percent, then a COLA adjustment is made. Previously, a 10 percent threshold was used.

In most countries, exchange rates are fairly stable and COLA adjustments are infrequent. At times, though, economic conditions can cause rapid and significant changes in a country's exchange rate, which necessitate a mechanism for rapid and accurate COLA adjustments. During periods where the dollar is appreciating rapidly, compared to the local currency, the OCONUS COLA payment will decline rapidly to reflect the lower cost of living in the local economy. However, if local prices are significantly increasing at the same time, these price increases can offset, either completely or in part, any decline in the cost of living implied by appreciation of the dollar. Because local prices are sampled only once a year while exchange rates are adjusted more frequently, the member may be significantly underpaid in the interim period.

[163] A countervailing view is that a safety net—or rate protection—creates an inequity between OCONUS and CONUS members whereby OCONUS members could have more buying power than their stateside counterparts. Because of this inequity, a safety net should not be pursued. While a legitimate argument, the QRMC believes this temporary inequity is justified to ensure service members in overseas assignments are not at a financial disadvantage.

The QRMC believes that a moratorium should be placed on reductions in overseas COLA payments when the dollar appreciates by more than 30 percent since the last scheduled local price survey. This safety net will stop the allowance from further declining until the scheduled annual price survey validates the decline in the cost of living. Along with such a moratorium, the overseas Command may request an out-of-cycle price survey. If the survey reveals an increase in local prices—countering the decline in the COLA due to the exchange rate changes—the COLA payment will be adjusted to the level implied by the price survey.

The exchange rate adjustment system can also lead to over- or under-payment of the allowance to members who rotate into and out of assignments between COLA adjustments. Under the current system, OCONUS COLA adjustments are made only after exchange rates exceed a threshold (cumulative) percentage change of 5 percent. This recent reduction in the threshold from 10 to 5 percent increases the frequency of COLA adjustments for exchange rates and reduces the potential for a member to be under-compensated due to the timing of a member's rotation. The QRMC supports the new exchange rate threshold of 5 percent. This policy is a reasonable compromise between the frequency of exchange rate adjustment and the potential cost to the member. However, the PDTATAC should continue to explore the advantages of continuous adjustments for exchange rate changes, as are often employed in private-sector firms.

COST-OF-LIVING INDEX

The cost-of-living index, as constructed, is sound and should be retained. But one element of the calculation should be reconsidered. Today, the actual value of the index depends largely on the proportion of shopping that the member does in the commissary and exchange as compared to the local economy. This proportion is currently based on actual expenditures and often has perverse effects.

Local Economy Expenditure Share

Members at most overseas locations have ready access to a commissary and exchange. Because prices are generally lower at these facilities than in the local economy, it is typically the case that the COLA index and COLA payments decline when service members make a higher proportion of their expenditures at the commissary and exchange. Members' actual expenditures as recorded in the Living Pattern Survey

(conducted every three years) determine the expenditure shares between the commissaries and the local economy.

There are two problems with the current procedure. First, estimating expenditure shares from a survey places a burden on the integrity of the system by potentially pitting members' narrow economic interests (the size of the COLA payment) against an honest response. Most members try to respond to the survey to the best of their recollection and ability; nonetheless, it is a poor design feature of the system.

Second, the use of actual expenditures to determine shares—which on the surface seems reasonable—may have perverse results. A situation analogous to a "death spiral" may occur in which high prices in the local economy drive members to shop more in the commissary which, in turn, reduces their COLA payment and income, resulting in further increases in the share of shopping at the commissary, and so on. Members, then, are doubly burdened—once by the effect of price increases that adversely affect their shopping patterns and again by the effect of changing shopping patterns based on the OCONUS COLA amount. In the short run, the increase in prices in the local economy will be reflected in lower COLA payments. In the long run, as prices rise in the local economy, the COLA payment declines even further because members do more shopping in the commissary and exchange.

An alternative to the current methodology—and one that would eliminate the "death spiral" effect—is to base the commissary and exchange expenditure shares either on CONUS shopping patterns or on an explicit policy. For the latter—which the QRMC believes is preferable—it would be assumed, as a matter of policy, that a fixed percent of expenditures would be at the commissary or exchange, and the OCONUS COLA would be computed appropriately. Basing expenditure proportions on policy, rather than on actual expenditures, is similar to practices used by the State Department and the World Bank to determine the proportion of spending that employees will make in-country (overseas locations) versus out-of-country.

Living Pattern Survey

If the local economy expenditure share is based on policy, as suggested above, the frequency of administering the Living Pattern Survey can be scaled back, which the QRMC supports. The survey is controversial, and the overseas Commands often consider it an imposition. If expenditure shares are set by policy, the actual survey results could then be used only as one piece of information to be considered in setting expenditure shares.

Regardless of the frequency with which the Living Pattern Survey is conducted, significant revisions to that survey must be made. PDTATAC should produce scientifically based sample selection and administration guidelines, increasing the sample sizes for most locations to meet requirements for more precise estimates.

DATA COLLECTION

The collection of price data and information on service members' spending patterns is also very important for constructing an accurate index for overseas COLA payments. It is an activity that is both labor-intensive and difficult, for which PDTATAC should be commended. However, improved data quality is both desirable and achievable. Several areas should be addressed: using price indices and other official data sources to update the overseas cost-of-living indices, outsourcing data collection, pricing "miscellaneous" items, and adjusting for price seasonality.

Using Inflation Indices To Update Cost-of-Living Indices

Under the current system for determining the OCONUS COLA, prices are updated annually for each location, and occasionally at more frequent intervals, if the local Command requests an out-of-cycle survey. While the price survey system results in accurate prices for the COLA market basket, it requires a significant investment in time and effort. Another potential problem is the difficulty in responding quickly to sudden price shifts at OCONUS locations under the current system.

The PDTATAC should explore the possibility of using local price indices and information to update the OCONUS COLA on an interim basis, especially in countries with historically high rates of inflation. A consumer price index for OCONUS locations could be a useful addition to the standard price collection scheme because it would allow the COLA to be quickly supplemented, without a costly price survey, at times of rapid price increases in local economies. With a consumer price index that is measured frequently, on a monthly or quarterly basis for example, the negative effects of rapid consumer price inflation may be alleviated.

It may also be possible to use a consumer price index to reduce the frequency of OCONUS location price surveys and their related costs. One alternative may be to survey prices less frequently at each location, and instead make interim changes based on local indicators of consumer prices.

CONUS Prices and Price Indices

Prices collected to represent the cost of living in the continental United States are, arguably, the single most important set of price data collected, as they affect the amount of the COLA at every OCONUS location. Currently, CONUS price data are collected from a variety of sources, including the Bureau of Labor Statistics. However, the single largest source of price data for the private U.S. economy is data reported by the commissary and exchange services—the Defense Commissary Agency (DeCA) and the Army and Air Force Exchange Service (AAFES).

DeCA and AAFES report prices for the U.S. economy based on price sampling they undertake to determine the price savings that their goods and services provide to military members in the continental United States. But the price data collected by DeCA and AAFES may be subject to bias, due to a potential conflict of interest. The commissary and exchange services have an interest in showing that prices at which they supply goods and services to the member result in significant savings relative to prices prevailing in the economy. Hence, they are not likely to underestimate private-sector prices.

To ensure that the cost-of-living data reflect no bias, PDTATAC should regularly validate CONUS prices through independent sampling, objective external price indices, and other forms of quality assurance.

Outsourcing Data Collection

It is often suggested that DoD outsource for overseas cost-of-living data, as is a common practice of most international private companies. One rationale for outsourcing the data collection effort is to reduce the burden placed on in-house staff overseas. Another is that data collected by a third party may be seen as more objective.

The QRMC believes that the uniformed services should continue to collect data themselves, in cooperation with the Department of State. Data collection is not overly expensive, since much of the collection is done as collateral duty by members or civilian employees or obtained through reciprocal agreement with the State Department. Most private-sector firms obtain cost-of-living data by contracting with specialized firms, but these sources currently obtain data in only half of the locations where the uniformed services currently collect price information. That said, PDTATAC should continue to explore the issue of outsourcing some or all of the data collection, as data sources change over time.

Pricing "Miscellaneous" Items

The "miscellaneous" category in the market basket contains a mixture of items that do not logically fit into one of the 13 other categories. This category accounts for almost 10 percent of the total cost-of-living index weight. The prices for this entire category are set equal to CONUS prices for all locations, which biases the index toward "no difference" in cost of living. One major item in this category is the cost of owning an automobile—which varies considerably by OCONUS location and is generally higher in overseas locations than CONUS.

Ideally, actual prices should be collected for the "miscellaneous" category in the market basket. The PDTATAC should study the implications of including actual prices for this miscellaneous category prior to making a final decision to implement this recommendation.

Seasonal Prices

In general, OCONUS price levels are sampled once a year. That set of prices is used to adjust the COLA index used over the ensuing 12 months; as such it reflects the "average" annual difference in the prices of market basket items. However, the prices of many goods and services vary throughout the year. Systematic seasonal variation in price levels may bias the OCONUS COLA price indices depending on the season when the price data are collected.

The PDTATAC should develop methods that would ensure that prices do not suffer from error rates due to seasonality. Several alternatives are possible. One is to gather data for annual average prices at each OCONUS location, which would eliminate the possibility of overstating or understating an index due to the time of survey. A second possibility is to use statistically derived seasonality indices to adjust for fluctuations. A final alternative is to use seasonally adjusted CONUS prices. Each of these alternatives has advantages and disadvantages, which need further study before implementation can be considered.

SPENDABLE INCOME

An important component of the overseas COLA process is the determination of "spendable income." This is the portion of a member's income that is used to purchase items in the COLA market basket. It excludes items not considered living expenses for purposes of the COLA, such as housing (partially covered by a separate housing allowance), savings, taxes, life insurance, and tuition expenses.

The Department of State generates the spendable income table from a simple model using data from the Consumer Expenditure Survey conducted by the Bureau of Labor Statistics. Civilian households are included in the calculations since the table is used to estimate spendable income for all federal government employees assigned to OCONUS locations. Because the number of military respondents to the survey is small, it is not possible to generate a spendable income table for military members alone.

There are several potential problems with the current method of calculating spendable income. First, spendable income based largely on a non-military population may not accurately reflect the spending patterns of military members. Moreover, the current method of estimating spendable income uses aggregate data and few explanatory variables. This approach does not make efficient use of the data available and can result in inaccurate estimates.

A more sophisticated modeling approach needs to be developed that both improves the accuracy of estimates and helps mitigate the adverse effects of using a largely civilian sample to estimate spendable income for military members. More specifically, an alternative method for calculating spendable income that uses data at the individual household level with an expanded set of independent variables would improve the current estimation process.

Another problem with the current system involves the frequency with which the spendable income table is updated. Infrequent updates of the spendable income table may bias the OCONUS COLA amounts downward. Individuals at higher income levels tend to devote a larger proportion of their incomes to items that are not considered part of spendable income (such as savings), and the spendable income table reflects this difference. Although a new table using data from the 1997-1998 timeframe has recently been introduced, the last update to this table took place in 1989. Since that time, a member's nominal income has grown substantially due to inflation. The increase in nominal compensation levels leads to "bracket creep"—and therefore the table underestimates spendable income. In one typical case (an E-5 with nine years of service and two dependents), the table's estimate of the spendable income percentage fell by 15 percent over this period, even if real military income did not change much. As a result, the overseas COLA has been significantly below what it otherwise would have been had the spendable income table been updated more frequently.

The QRMC recommends that the spendable income table be updated more frequently and indexed for inflation in years in which it is not updated.

ADMINISTRATIVE ISSUES

Administration of the OCONUS COLA program can be improved in a number of areas: handling location-unique expenditures, using lump sum COLA payments, and determining program jurisdiction.

Location-Unique Expenditures

At some overseas locations, members incur expenses that are not incurred by members in CONUS. The cost-of-living index does not typically capture these location-unique (or "COLA-unique") expenses because the items are not part of the market basket or, if they are included in the basket, are not considered in the appropriate quantities. One example is the safety kits that members in Alaska are required to carry in their automobiles. Members also incur large expenses to winterize their cars, some of which are not currently covered. Automobile safety and winterization costs should be included under the COLA as location-unique items.

Under the current system, DoD increases COLA amounts in some locations to cover these additional expenses incurred by members. But currently no systematic way of making such determination exists. The QRMC recommends that the PDTATAC establish a set of criteria or principles for determining items to be included in a location's COLA payment.

Lump-Sum COLA Payments

The current allowance treats expenditures as if they occurred on a per-day basis and is paid bi-weekly as if the expenses were incurred continuously over a year. If these expenditures actually come early in a member's tour, financing them can be a hardship, particularly for junior enlisted personnel. The PDTATAC should consider recommending legislation to permit lump-sum COLA payments for certain items that are legally required or mandated or for which a large lump-sum payment is required by the member. The automobile tax in Singapore and the high cost of television connection in Great Britain are two examples. These single payments would be made annually or per tour.

Program Jurisdiction

The Commands and other military organizations frequently raise issues for consideration regarding members' expenses not covered under the OCONUS COLA or other programs. PDTATAC often serves as the *de facto* organization for consideration of these issues. Often, however, the issue is more appropriately addressed under other programs. Today, there is no organization that has formal responsibility for ensuring that the appropriate program office addresses the issues. The QRMC recommends that the Director of Compensation, Office of the Secretary of Defense (Force Management Policy), be the focal point for new issues raised and, in consultation with the Service compensation chiefs and the Chairman, PDTATAC, ensure that the appropriate program office formally addresses the issues.

IMPROVING THE OCONUS COLA SYSTEM

The current system for determining the overseas cost-of-living allowance is a complex but important program to ensure that service members do not suffer adverse financial consequences when sent to overseas assignments. The basic concept of the system is sound, as administered by PDTATAC. However, improvements in technical and administrative aspects of the program are needed. The QRMC believes that the recommendations put forward would help to improve the perception among service members that the program is equitable. They would help to resolve aspects in the current program that do not fully take into account differences among overseas assignment locations that can have a significant impact on the COLA amount. Finally, these recommendations would improve the timeliness and relevance of the data that underlie the OCONUS COLA calculations.

POST-SERVICE EDUCATIONAL BENEFITS: THE MONTGOMERY GI BILL

The original GI Bill of Rights enacted at the end of World War II was a far-reaching policy initiative that provided returning service members with a comprehensive package of benefits. The purpose of these benefits was to compensate service members for their military service and to

provide assistance for readjustment to civilian life. A keystone of these benefits was financial assistance for higher education. GI Bill programs continued through both the Korean and Vietnam Wars. The Vietnam-era GI Bill expired in 1976 and was replaced with an assortment of less attractive veterans' educational assistance programs. In 1984, the Montgomery GI Bill (MGIB) was passed as part of the All-Volunteer Force Educational Assistance Program, and it is still in place today.

While the original GI Bill was designed to ease the transition for service members from a *conscripted* force to civilian life, the MGIB lists as one of its purposes:

> *to promote and assist the All-Volunteer Force program and the Total Force Concept of the Armed Forces by establishing a new program of educational assistance based upon service on active duty or a combination of service on active duty and in the Selected Reserve to aid in the recruitment and retention of highly qualified personnel for both the active and reserve components of the Armed Forces.*[164]

Under the current provisions of the MGIB, recruits are automatically enrolled in the program and $100 per month is withdrawn from their basic pay for the first 12 months of service, for a total contribution of $1,200.[165] This contribution entitles service members to receive education benefits upon separation from military service. Today about 56 percent of those eligible for benefits are actively using them.[166] To remain eligible for post-service benefits from the Department of Veteran's Affairs, the member must serve a specified number of months, receive an honorable discharge, and have a high school diploma or equivalent.

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[164] U.S. Code Section 3001, Chapter 30, Title 38.

[165] About 97 percent of service members are enrolled in the program. Once enrolled, members cannot withdraw from the program and the money deducted is non-refundable. New recruits who decline enrollment must do so formally within the first two weeks of active duty. Members who declined enrollment in the MGIB as originally enacted could not enter the program at a later date, but subsequent legislation has authorized exceptions to this prohibition. For more detail on the program, see U.S. Department of Defense, *Biennial Report to Congress on the Montgomery GI Bill Education Benefits Program,* Office of the Assistant Secretary of Defense (Force Management Policy), May 2001.

[166] The 56 percent who use their benefits use about one-half the benefit, on average.

MGIB ENROLLMENTS AND USAGE

The MGIB is a very popular incentive for young men and women enlisting in the military. In the 1999 Youth Attitude Tracking Study, 33 percent of 16 to 21 year-old males and 39 percent of females chose "pay for education" as the single most important reason for considering enlistment in the armed forces. Of those who actually joined, the Army reports that half (49 percent) of junior enlisted personnel gave *educational benefits* as their most important reason for joining.[167] Almost half (47 percent) of male and three-fifths (58 percent) of female junior enlisted members service wide reported educational benefits as most important. This statistic has remained virtually unchanged since 1996.

The Army has made substantial use of an enhanced educational benefit by offering the Army College Fund to college-bound high-aptitude youth who would be interested in a shorter (two-year) enlistment tour. The individuals targeted would not otherwise choose to serve, but are encouraged by money for college. By targeting such an incentive to this new segment of the youth population, the Army was able to expand its recruiting market considerably.[168]

This successful program demonstrates how important college education is to potential recruits as the data in Figure 2-1 showed—particularly among young people who are more likely to move directly from high school to college without taking time out for military service. This trend poses a potential problem for recruiting since the military's traditional target group—individuals not planning to go to college right after high school—is growing more slowly than the group that goes to college right away.

Further, many college-bound youth and their parents see a tour of military service as a detour from their college plans, not as a way to achieve that goal.[169] Parents and students are well aware that the earnings premium attached to college education has been rising over time (see Figure 2-2). These trends suggest that for military service to remain a viable option for high school graduates, the MGIB must provide a benefit that would convince individuals to delay their college plans in favor of active-duty military service. The Department must make sure that young men and women who choose to enlist have the opportunity to pursue further education.

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[167] *Findings from the Spring 1999 Sample Survey of Military Personnel* (October 2001).
[168] Gilroy, Phillips, and Blair (1990).
[169] *Report of the Congressional Commission on Servicemembers and Veterans Transition Assistance* (1999), p. 23.

The MGIB has become increasingly popular in part because members believe they will have more success in the private sector after leaving the military if they obtain additional education. Indeed, a recent study finds that individuals who use the MGIB benefit experience more success in the labor market than non-users; they have lower unemployment rates, and the unemployment they experience is more likely to be shorter in duration.[170] In addition, earnings of MGIB users are higher. This study also finds that educational and occupational goals of program participants are raised by both the MGIB and military experience. Over half of MGIB users said they would not have completed the same amount of schooling without the benefit. Many more MGIB benefit users pursue post-secondary education or training than non-users; they also pursue different types of education—attending formal four- and two-year college programs.

Educational benefits, then, have proven to be an effective enlistment incentive for the Services. Research has shown that increases in the benefit level result in statistically significant increases in enlistments. Although estimates vary, studies suggest that, in general, a 10-percent increase in educational benefits would result in a 2-percent increase in high-quality accessions.[171] Moreover, the Services can use the college fund programs to channel high-quality recruits into hard-to-fill skills.

THE PROBLEM

While MGIB benefits have been sufficient in the past, the Department is concerned about their adequacy in the future. Interest in college has been growing, but the cost of college in real terms has been rising as well. The value of MGIB benefits has declined in recent years in relation to the total costs (tuition, fees, and lodging) of an average four-year college education. MGIB benefits have grown in nominal terms, but only slightly more than inflation through the year 2000. According to the *Commission on Servicemembers and Veterans Transition Assistance*, "… in comparison with other financial aid … the amount available under the

[170] U.S. Department of Veterans Affairs, *Program Evaluation of the Montgomery GI Bill: 38 U.S.C., Chapter 30* (Washington, DC: Klemm Analysis Group), April 17, 2000. Non-users are those veterans who have paid into the program and are eligible to use their benefits but have not yet done so.

[171] See Warner, Payne, and Simon (2000); Michael P. Murray and Laurie L. McDonald, *Recent Trends and Their Implications for Models of Labor Supply*, MR-847-OSD/A (Santa Monica, CA: RAND Corporation), 1999; and Cyril E. Kearl, David K. Horne, and Curtis L. Gilroy, "Army Recruiting in a Changing Environment," *Contemporary Policy Issues*, VIII(4), October 1990, 68-78.

MGIB is not enough to compensate youth for the time spent and risk involved in military service."[172]

A recent evaluation of the MGIB program concluded that the size of the benefit does not make education affordable to all and compromises educational choices.[173] This problem is felt particularly keenly by MGIB users with low incomes who have a high probability of dropping out of school. Forty-one percent of MGIB users said they would have enrolled in a different program if the amount of the benefit were larger. Few MGIB users (12 percent) attended private college, due to higher costs; proportionately more of the general public (22 percent) attended private institutions.

Between 1985 and 2000, average total costs—including tuition, room, and board—at a four-year public college grew by 60 percent. In contrast, the maximum value of the MGIB benefit, over the same period of time, has increased by 55 percent.[174] The erosion in real benefits has become a concern among policymakers, both in terms of the adequacy of the benefit for veterans and its value as a viable recruiting incentive.

Growing interest in Congress and the Administration in enhancing the MGIB resulted in increases in the basic benefit in FY 2001. With this increase, the MGIB covered 68 percent of the average total costs of a four-year public college—a substantial increase over the 1997-1998 school year when the MGIB offset only 52 percent of college costs. But there remained concern that these increases in the basic benefit were not enough.

ENHANCEMENTS TO THE MONTGOMERY GI BILL

Any recommendation to enhance the current MGIB should be subject to two criteria. First, an appropriate balance must be maintained between the positive recruiting effects on the one hand, and the negative retention effects on the other. The MGIB program is in some ways a double-edged sword: the Department offers an attractive incentive for individuals to enlist; but to use that benefit fully, the individual must leave military service. The basic benefit needs to be large enough to attract potential

[172] *Report of the Congressional Commission on Servicemembers and Veterans Transition Assistance* (1999), p. 23.
[173] U.S. Department of Veterans Affairs, *Program Evaluation of the Montgomery GI Bill: 38 U.S.C., Chapter 30* (2000).
[174] Cost comparisons in 2000 dollars.

recruits, but not so large as to cause most members to leave as soon as they are eligible to receive benefits.

Second, the Services must have the ability to offer meaningfully sized college funds, or "kickers," to channel high-quality recruits into hard-to-fill and critical occupational specialties. If the basic benefit is increased too much, the relative value of the kickers (currently limited to $950 per month) is reduced and they become less effective as a "compensating differential" in inducing recruits to choose certain occupations.

On the other hand, eliminating the Service College Funds and significantly increasing the basic benefit, as some recent legislative proposals have recommended, could potentially hurt recruiting and force the Services to find alternative ways to channel recruits. The expanded use of enlistment bonuses is an obvious choice, but this alternative (as well as other strategies such as increased advertising and more recruiters) is far more costly per recruit.[175] For example, "… on a per-enlistment basis, the marginal cost of a high-quality recruit is only $6,900 in educational benefits compared with $18,700 in bonus expenditures."[176]

With these two criteria in mind, the QRMC endorses the statement of the *Commission on Servicemembers and Veterans Transition Assistance* that "[A] more financially attractive MGIB would enable the Nation to fully capitalize on the unique national resource of veterans' skills, training, experience, and character." The MGIB is losing its effectiveness as an incentive for high-quality youth to join the military, and veterans are becoming scarce in the leadership ranks of American institutions. "If America's leaders are to include veterans … it will be necessary for more veterans to have the means to attend the schools from which the leadership of America's institutions is drawn."[177]

In accord with this position, the QRMC makes the following recommendations:

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[175] For a discussion of these issues, see Beth J. Asch, C. Christine Fair, and M. Rebecca Kilburn, *An Assessment of Recent Proposals to Improve the Montgomery G.I. Bill*, DB-301-OSD/FMP (Santa Monica, CA: RAND Corporation), 2000; and Beth J. Asch and Bruce R. Orvis, *Recent Recruiting Trends and Their Implications: Preliminary Analysis and Recommendations,* MR-549-OSD (Santa Monica, CA: RAND Corporation), 1994.

[176] Beth J. Asch and James N. Dertouzos, *Educational Benefits Versus Enlistment Bonuses: A Comparison of Recruiting Options*, MR-302-OSD (Santa Monica, CA: RAND Corporation), 1994, page 38.

[177] *Report of the Congressional Commission on Servicemembers and Veterans Transition Assistance* (1999), p. 27.

- Increase the monthly MGIB stipend to cover the average cost (tuition, fees, and lodging) of a public four-year institution. Raising the monthly stipend to approximately $1,000 per month would increase high-quality accessions with only a modest negative impact on reenlistments.
- Index the monthly stipend to the average cost of a public four-year institution, not the consumer price index, as is currently the case.
- Allow in-service benefit payments after the first reenlistment at the same rate as post-service benefit payments. Currently, in-service benefits are limited to the lesser of the cost of tuition and fees or the standard monthly rate. Offering full MGIB benefits to those on active duty would reduce the incentive to leave the military to use the benefits.
- Disallow MGIB stipends from being counted as income by the Department of Education in the determination of eligibility for federal educational grants and loans.

The QRMC estimates that the enhancement to the basic benefit would have the effect of increasing high-quality enlistments for each of the Services by between 5.4 and 8.0 percent, as shown in Table 4-7. The negative effects on the career force that result from lower reenlistments as eligible members leave to use their benefits are likely to be modest and readily offset as necessary through the use of selective reenlistment bonuses. The estimated decline in the career force, after eight years at the enhanced benefit level, would be between 1.4 and 3.8 percent. Such effects, in the aggregate, can be offset by an increase in the selective reenlistment bonus budget of about $150 million across all Services.

Table 4-7. Change in High-Quality Recruits and Career Force

Percentage Increase in High-Quality Recruits			
Army	Navy	Marine Corps	Air Force
5.4	6.5	6.6	8.0
Percentage Decline In Career Force (After Eight Years)			
Army	Navy	Marine Corps	Air Force
1.4	2.3	3.8	1.4

Based in part on this analysis, Congress passed Public Law 107-103 in FY 2002, which increased the basic MGIB benefit. For service members enlisting for 3 years or longer, the benefit increased to $800 per month (payable for up to 36 months) for a potential total benefit of $28,800. The

benefit will increase to $900 in 2003 and $985 in 2004. These amounts represent substantial increases from the levels of just one year ago, when the basic benefit was only $650 per month. They are projected to cover 80 percent of average college costs in the 2001-2002 school year, 87 percent in 2002-2003, and 92 percent in 2003-2004.

Moreover, Congress will now permit MGIB participants to contribute an additional $600 above their basic contribution of $1,200 at any time while on active duty. This additional contribution would entitle the member to an additional benefit of $5,400, making the total current MGIB benefit $34,200 ($28,800 plus $5,400).

In addition to these basic benefits, the Army, Navy, and Marine Corps offer a supplemental benefit known as Service College Funds, which provides educational assistance for members who qualify for and enlist in certain critical or hard-to-fill occupations. The Service College Funds can increase the total MGIB benefit to over $50,000, although the typical benefit in FY 2002 is about $40,000 for the Army. The MGIB benefit levels are subject to annual adjustments in accord with yearly percentage increases in the consumer price index.

TRANSFERABILITY OF MGIB BENEFITS

Until this year, MGIB benefits accrued to the service member alone. The *Commission on Servicemembers and Veterans Transition Assistance*, and some members of Congress, recommended that the Services be granted discretionary authority to fund the transfer of this education benefit from the service member who earned it to a member of his or her immediate family (spouse or child). The FY 2002 National Defense Authorization Act (Public Law 107-107) now permits such transferability.

The basic rules set forth in law allow the Secretaries of the Military Departments to fund transferability to attract service members into critical military skills. The service member must have at least six years of service, and agree to serve another four years or more. The member can only transfer up to 18 months of MGIB benefits to his or her spouse and/or child. The spouse can use the benefits immediately, while children have to wait until the member completes 10 years of service. Children must be between 18 and 26 years old and have a high school diploma or equivalency certificate.

Transferability may increase the attractiveness of educational benefits in the recruiting market only marginally. However, the primary purpose of transferability is to reduce the negative effect of educational benefits on reenlistments. Service members do not need to leave active duty to allow

family members to use the benefits. Additionally, the Services strengthen the retention effect to some degree by tying transferability to an additional service commitment by the eligible member.

While transferability could improve retention, analysis suggests that the selective reenlistment bonus program provides a more flexible and efficient means of reducing adverse retention effects.[178] The negative impact of educational benefits on retention will be at the first-term reenlistment point. At that point, enlisted members have no college-age children and, in fact, college tuition payments for children will typically be 15 or more years in the future. Reenlistment bonuses, on the other hand, are in the form of cash, which all members value and can be precisely targeted to the term of service and skill where they are needed to improve retention.

Although the Department has no actual experience with transferability, the QRMC estimates that between one and one-half to four dollars in MGIB benefits will be required to produce the same effect on retention as a one dollar increase in the selective reenlistment bonus. For these reasons, the QRMC is reluctant to endorse the use of a "transferability" feature as a force management tool at this time. However, the QRMC does support a pilot program to determine the efficacy of transferability.

MILITARY RETIREE EARNINGS

More than 20,000 individuals retire from the U.S. military each year and are eligible to receive a pension amounting to half or more of their basic military pay.[179] Separating from the military at an average age of 43,

[178] See Paul Hogan, Michael Cardwell, Patrick Mackin, and Shahriar Hassan, *Recruiting and Retention Implications of Enhancements to the Montgomery GI Bill,* Paper prepared for the Office of the Assistant Secretary of Defense (Force Management Policy), October 22, 1999, pp. 20-22.

[179] There are three military retirement systems now in effect. (1) Entrants prior to 1980 receive a lifetime, inflation-protected annuity of .025 x years of service x final basic pay. (2) Entrants from October 1, 1980, to July 30, 1986, receive .025 x years of service x high 3-years' average basic pay. (3) Entrants since August 1986 have a choice of remaining under the second system or receiving a bonus of $30,000 at the 15th year of service, if they commit to staying in service until year 20. If they choose the bonus, they will receive only 40 percent of high 3-years' basic pay on completion of 20 years of service (as opposed to 50 percent under the first and second systems), but their annuity grows by 3.5 percent for each year after year 20, as opposed to only 2.5 percent. Benefits under this third system are not fully indexed for inflation. For a

the overwhelming majority of military retirees begin second careers in the civilian sector. Military retirees often enter the civilian labor force earning less from these jobs, on average, than civilians with comparable experience and education. A primary reason is that some military training does not transfer perfectly to civilian occupations.[180] Therefore, retirees often experience a "training" period when entering the civilian labor market before their earnings catch up with those of their civilian peers. Another reason is that some members have less seniority when first entering a civilian organization.

Examining retiree earnings is important because career retention decisions are based in part on the extent to which additional years of military service affect civilian earnings potential. More specifically, if longer military service itself reduces future civilian earnings, the military will be less successful in retaining high-quality personnel. While the QRMC cannot definitively answer how military service affects the civilian earnings of military retirees, the analysis which follows provides a more complete picture of the experience of military retirees during their civilian careers than was previously available.

FINDINGS

The QRMC's findings grew out of an examination of three questions:

- How do civilian earnings and total income (including pensions) of military retirees compare with those of comparably experienced and educated civilians?
- Do military retirees enjoy higher relative earnings growth during their second careers than do their civilian peers?
- Is the transition to civilian employment a difficult process for military retirees and how satisfied are they with their post-service careers and earnings?

more detailed discussion of these systems and proposals for reform since the end of World War II, see Asch and Warner, *A Policy Analysis of Alternative Military Retirement Systems* (1994).

[180] See for example, Warner and Asch (1995); Matthew Goldberg and John Warner, "Military Experience, Civilian Experience, and The Earnings of Veterans," *Journal of Human Resources*, 22(1), 1987, 62-81; and Robert Phillips, Paul Andrisani, Thomas Daymont, and Curtis Gilroy, "The Economic Returns to Military Service: Race-Ethnic Differences," *Social Science Quarterly*, 73(2), June 1992, 340-59.

Comparison of Military Retiree and Civilian Earnings

Analysis based on data from the 1996 Survey of Retired Military Personnel and the Current Population Survey offers insight into how military retirees' earnings compare to those of their civilian counterparts.[181] The QRMC found that retirees' earnings in their first job after separation from the military are, on average, both lower than the earnings in their last military job and lower than the earnings of civilians with similar experience and education. For military enlisted personnel and officers who retired between 1985 and 1989, civilian earnings were 22 percent and 5 percent lower, respectively, in their first full-time job as compared to their civilian counterparts. By 1995, the earnings of enlisted retirees improved somewhat (17 percent lower) while those of retired officers worsened (13 percent lower). Earnings for the next cohort of retirees—those retiring between 1990 and 1994—showed even larger gaps in earnings: 37 percent for enlisted personnel and 30 percent for officers.[182] However, these numbers provide only part of the picture, as earnings from a civilian job are only one component of retirees' total income.

When military pensions are added to retiree civilian earnings, total retiree income increases substantially, to between the average and the 70th percentile of comparable civilian earnings.[183] For example, an enlisted retiree—an E-7 with 22 years of service—has a total monthly income of

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[181] The analysis presented is based on restricted data from both surveys. Samples from both data sets were limited to non-disabled males age 38 to 64 with a high school diploma or more, working full time and not self-employed. For a complete discussion of the study methodology see David Loughran, *Wage Growth in the Civilian Careers of Military Retirees*, MR-1363-OSD (Santa Monica, CA: RAND Corporation), 2002.

The Survey of Retired Military Personnel (SRMP) was conducted by the Defense Manpower Data Center and asks respondents a wide range of questions concerning their separation from the military. For a more detailed description of the SRMP survey instrument and sampling design see R. Reimer and D. Lamoreaux, *The 1996 Survey of Retired Military Personnel: Statistical Methodology Report*, Unpublished manuscript, (Arlington, VA: Defense Manpower Data Center), 1997. The Current Population Survey, a nationally represented survey of approximately 60,000 households conducted on a monthly basis, was the source for civilian earnings data. See http://www.bls.census.gov/cps for more on the Current Population Survey sampling design.

[182] The magnitude of these results may reflect the influence of higher civilian unemployment in 1990 to 1994 compared to the earlier period. But the overall finding holds true over several decades of experience. Moreover, the results are similar if the earnings of both retirees and veterans who separate with less than 20 years of service are compared to comparable civilian earnings.

[183] For these comparisons, the two most recent cohorts of the SRMP, 1986 to 1990 and 1991 to 1994, were combined to create average retiree earnings estimates. All earnings are in 1995 dollars.

$3,607, which includes $1,458 from the military pension and $2,149 from civilian earnings. This total income is above the average earnings ($3,307) but less than the 70th percentile ($4,151) for civilians with some college education and 22 years of work experience, as shown in Figure 4-4. Nearly 70 percent of the enlisted force retires with total income substantially above the average of their civilian counterparts.

For officers, the estimated total monthly income for a retired O-5 with 23 years of service is $6,952. This income is also well above the average ($6,390) but slightly below the 70th percentile ($7,035) of earnings for civilians with advanced degrees and 23 years of work experience, shown in Figure 4-5. Three-quarters of all officers retire with a total income at or above the 70th percentile of comparable civilian earnings. Not surprisingly, total income increases for service members who retire at a higher rank—both because higher-ranking retirees earn larger pensions and they fare better in the civilian job market.

Growth in Civilian Earnings of Military Retirees

The earnings of military retirees relative to their civilian counterparts tend to be roughly constant during their second career, implying little or no convergence in the earnings of military retirees and comparable civilians, which previous research had suggested.[184] For example, a 50-year old retiree earned 16 percent less than a comparable civilian in 1995. The same individual earned 15 percent less than a comparable civilian when first entering full-time civilian employment after retiring from the military some years earlier. This consistency implies about the same level of wage growth for military retirees as their civilian peers.[185]

[184] Note again, that the wage growth discussed here includes only the civilian earnings of military retirees and does not include their military pensions as well.

[185] This conclusion contrasts with the findings of earlier research. See George J. Borjas and Finis Welch, "The Postservice Earnings of Military Retirees," in Curtis L. Gilroy, ed. *Army Manpower Economics* (Boulder, CO: Westview Press), 1986, pp. 295-313. This difference is attributed to the failure of earlier research to control for cohort effects (that is, groups of individuals born in the same period of time), which can bias cross-sectional estimates of relative wage growth.

Figure 4-4. Enlisted Retiree Income Compared with Earnings of Civilians with Similar Education and Experience (1995 dollars)

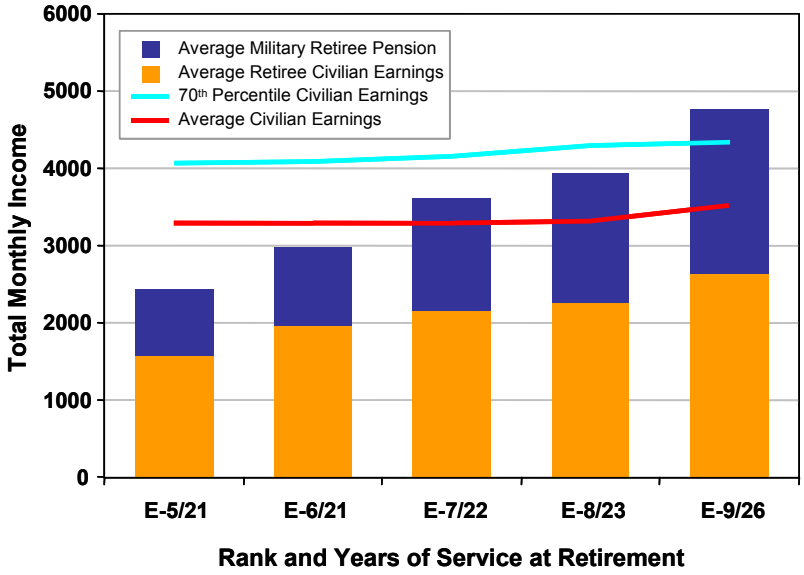
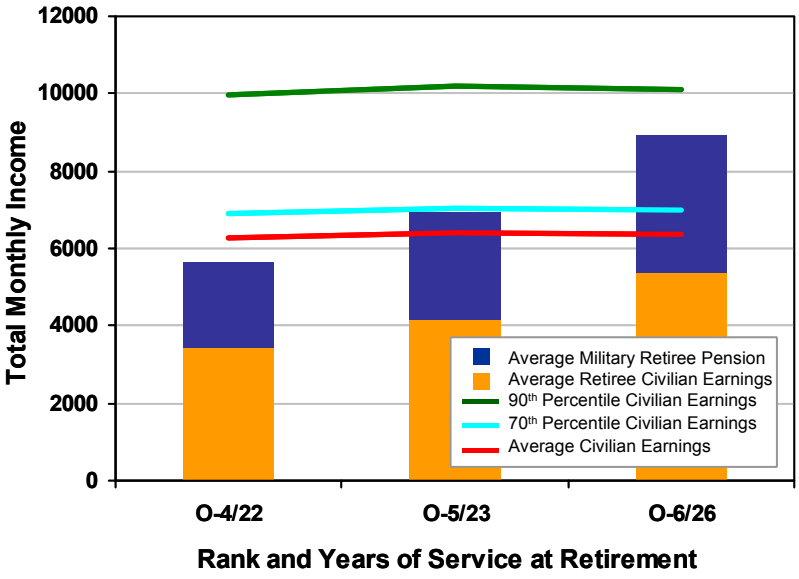


Figure 4-5. Officer Retiree Income Compared with Earnings of Civilians with Similar Education and Experience (1995 dollars)



Note: Enlisted income is compared to earnings of civilians with some college education. Officer income is compared to earnings of civilians with baccalaureate or advanced degrees.

Transition to Civilian Employment

The overwhelming majority of retirees, however, have been satisfied with their military careers (91 percent) and their civilian life (97 percent) as indicated in Table 4-8. When retirees examine earnings from their civilian job together with the "deferred" income from their retirement pension, 75 percent believe their standard of living is better now than when they were in the military and 69 percent feel they are doing as well or better than their civilian peers. When retirees were specifically asked "Overall, how much has being a military retiree helped or hindered your chances of getting a wage or salary comparable to civilian peers?" only between 17 and 30 percent felt that being a military retiree hindered their chances of earning a comparable wage. Given that retirees report high levels of satisfaction with their civilian life and military career, it is doubtful that they believe that their total income (including their military pension) lags behind that of their civilian peers.[186]

Table 4-8. Subjective Assessments of Well-Being Among Retiree Cohorts in 1996 (percentage of respondents)

	Retiree Cohort				
	1990 to 1994	1985 to 1989	1980 to 1984	1975 to 1979	1971 to 1974
Military career hindered chance of earning comparable civilian wages	30	25	25	22	17
Satisfied with civilian life	86	91	93	95	97
Satisfied with military career	89	91	89	90	91
Standard of living better now than when in military	75	85	90	92	95
Doing as well as or better than civilian peers	69	76	80	83	89
Proportion with 1995 wages below median civilian wages[1]	70	58	51	49	48

Source: 1996 Survey of Retired Military Personnel.

Note: 1. Proportion conditional on age and education.

[186] The fact that earlier (older) cohorts report higher levels of satisfaction in 1996 than later cohorts reflects the fact that earlier cohorts have been in the civilian labor market for longer and are more established in their post-service careers.

WHAT INFLUENCES RETIREE EARNINGS?

The availability of pension income could be one explanation for lower retiree earnings in their civilian jobs. Retirees may choose jobs based less on financial returns than on other characteristics such as job satisfaction or work schedule. Hence, pension income could affect not only the initial level of retiree earnings but also the relative growth in retiree earnings.

Another possibility for the relative decline of retiree civilian earnings is that recent retirees are more likely to make civilian employment decisions in concert with the employment choices of their spouses. The female labor force participation rate rose sharply between 1970 and 1994. The likelihood that a retiree's employment choices would be influenced by a spouse's career has no doubt risen as well. While retirees' military careers dictated family moves and spousal earnings opportunities when they were on active duty, now the spouses' careers may be the determining factor. The level of spousal earnings might also allow recent retirees to consume more leisure time or choose employment opportunities with less emphasis on financial returns.

Moreover, family income for military retirement-age individuals might include rising unearned income, such as interest, dividends, rental income, and inheritances. Finally, many military members retire to the south and southwest, often near military installations where health-care facilities exist. These locations tend to be characterized by civilian earnings levels somewhat below the national average.

RETIREE SATISFACTION

Total retiree *income*—civilian earnings plus military pensions—are comparable to prior military earnings and to those of their civilian peer group, despite the lack of convergence between military retiree *earnings* and civilian earnings. Retirees report being happy with their civilian life and few believe their military service hampered the development of a satisfying civilian career. This conclusion is important, because if military retirees do not do well in their second careers, high-quality potential recruits could forego military service in favor of full civilian careers, and those members contemplating reenlistment may not choose to make the military a career.[187] More study is needed to better understand the determinants of military retirees' employment choices and related civilian earnings, some of which were suggested above.

[187] Borjas and Welch (1986), p. 312.

CHAPTER V

FINAL THOUGHTS

At the outset of this report, the 9th QRMC identified two fundamental tenets of an effective military compensation system: ***balance*** and ***flexibility***. ***Balance*** must be achieved among all elements of the military compensation system and between compensation and personnel policies. The compensation system must also have sufficient ***flexibility*** to perform its traditional functions—attract, retain, motivate, and separate personnel—in an environment that is rapidly evolving. It is in reference to these tenets that the recommendations in this report were tested and are summarized here.

- The first priority is to "get basic pay right." Basic pay is the foundation of the compensation system. If basic pay is not set at an appropriate level, the system will become ***imbalanced***, requiring other compensation tools to fill the gap. Today, basic pay has fallen behind for some segments of the force, particularly mid-grade enlisted personnel and junior officers. This deficit is due primarily to the fact that the traditional basis for evaluating the adequacy of military pay is no longer valid. Today the Department pays its enlisted force as high school graduates and its officers as college graduates. In fact, the educational levels across the force are significantly higher.
- A new basis for comparing military and civilian pay is needed. For enlisted personnel, a composite profile of the earnings of high school graduates, those with some college, and college graduates serves as an appropriate comparison for different segments of the force. For officers, civilians with baccalaureate or advanced degrees working in professional and technical occupations are the appropriate comparison group. The earnings of warrant officers are appropriately compared to a composite profile of civilians with some college and college graduates. Getting basic pay right first is the basis for ***balance*** in the military compensation system.
- Once basic pay is set at an appropriate level, special and incentive pays and bonuses become useful in creating pay differentials to attract and retain the right numbers of personnel in particular career fields, assignments, and lengths of service. S&I pays and bonuses create ***flexibility*** in the compensation system, allowing the Services to adjust pay in response to changing demand for and supply of personnel in particular areas. While special pays and bonuses are largely effective, the difference between military and civilian pay in some career fields is growing, and the current level of some S&I pays is not sufficient to reduce the differential. As a

result, the Services may have to consider even greater use of these tools or set some pays or bonuses at even higher levels. In doing so, it is important to maintain the appropriate ***balance*** between basic pay and special pays.

- The special pay system is also being required to do more than was intended. Special pays and bonuses were designed primarily to respond to temporary manpower shortages in selected career specialties. However, in some cases—perhaps the aviation field is the best example—special pays and bonuses are being used to respond to permanent, long-term changes in supply and demand. While it is important to have raised the level of basic pay, it may be time for the Department to consider new tools that could add greater ***flexibility*** to the compensation system. The 9th QRMC reviewed several: a voluntary assignment system, deployment pay, skill and capability pay, an aviation career savings fund, a "contributory" thrift savings plan, and the new critical skills retention bonus.
- Other measures of financial well-being, such as those discussed in the previous chapter, are important to consider—in addition to the traditional components of compensation—since the overall well-being of service members and their families can be critical to decisions to stay in the force. Moreover, these measures can have an impact on traditional compensation tools and, in turn, on maintaining appropriate ***balance*** in the compensation system.

As the Department of Defense transforms for the 21st century, increasing demands on personnel may make new demands on the military compensation system. While the QRMC believes that the basic structure of the system is sound, innovative tools or new ways of implementing current tools may be required to add greater ***flexibility*** to the compensation system in the long run. As changes are considered, the impact of new tools and new approaches on the overall system must be evaluated to ensure the necessary ***balance*** is maintained.

IMPACT ON CURRENT POLICY

The 9th QRMC began its deliberations at a time when military pay for segments of the force had fallen behind comparable civilian earnings. A number of recent studies and high-level commissions had addressed the need for transforming the compensation system to meet greater demands on the Department and its people. The President had focused attention during his campaign on the need to increase military pay—promising to add $1 billion to the military compensation budget. Thus, the QRMC found itself in an unprecedented situation—its analysis became the basis for many policy decisions during the course of its deliberations. As a result, many of the recommendations set forth in the preceding chapters have become Departmental policy. They are summarized here.

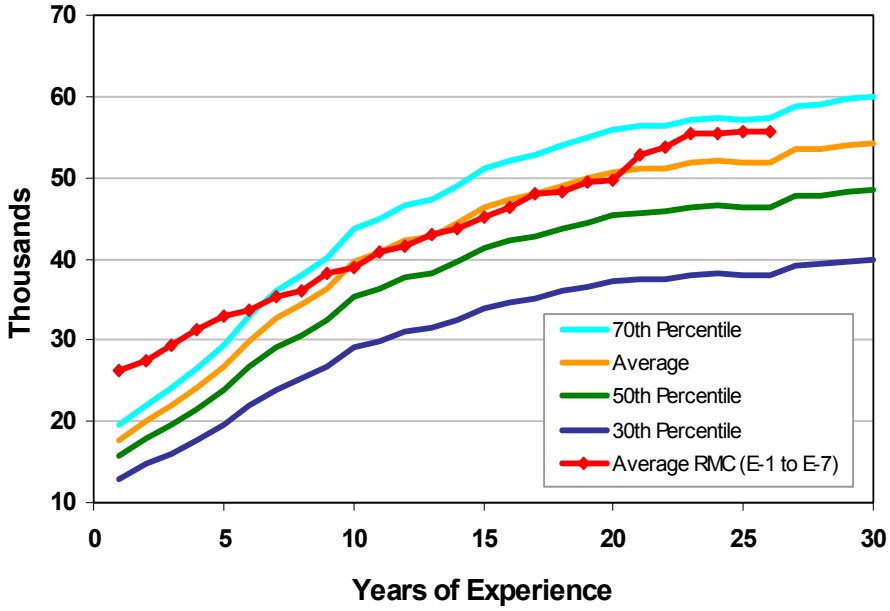
Targeted Pay Raises

Congress passed the largest military pay raise in two decades in the FY 2002 National Defense Authorization Act. The pay increase included a special one-time basic pay raise for military personnel, proposed by President George W. Bush, at a cost of one billion dollars. For FY 2003, the Department has approved an additional $300 million in targeted pay raises. Based on the findings reported in Chapter II of this report, these pay raises were targeted toward selected years-of-service and grades. The raises were larger for enlisted grades E-5 through E-9, for officers in grades O-3 and O-4, and for warrant officers in grades W-1 to W-3. The structure of these raises also rewards promotion over longevity.

The FY 2002 increase in basic pay, along with an increase in the basic allowance for housing, will reduce the difference between military pay and comparable civilian pay.[188] As shown in Figure 5-1, average RMC for enlisted personnel with 8 to 20 years of service now equals the average earnings for workers with some college—reducing the differential between RMC and the 70th percentile of civilian earnings by half. In 2000, enlisted RMC was only at the 50th percentile of comparable civilian pay (Figure 2-6). Additional targeted raises for grades E-5 through E-7 have been recommended by the Department for FY 2003, which would further narrow the differential to the 70th percentile of civilian earnings. Targeted raises are also recommended for grades E-8 and E-9 to preserve promotion incentives to these grades.

[188] As discussed in Chapter II, the basic allowance for housing will increase annually, so that by FY 2005 out-of-pocket expenses for service members will be eliminated.

Figure 5-1. Comparison of Enlisted RMC to the Earnings of Civilians with Some College Education (2002 dollars)

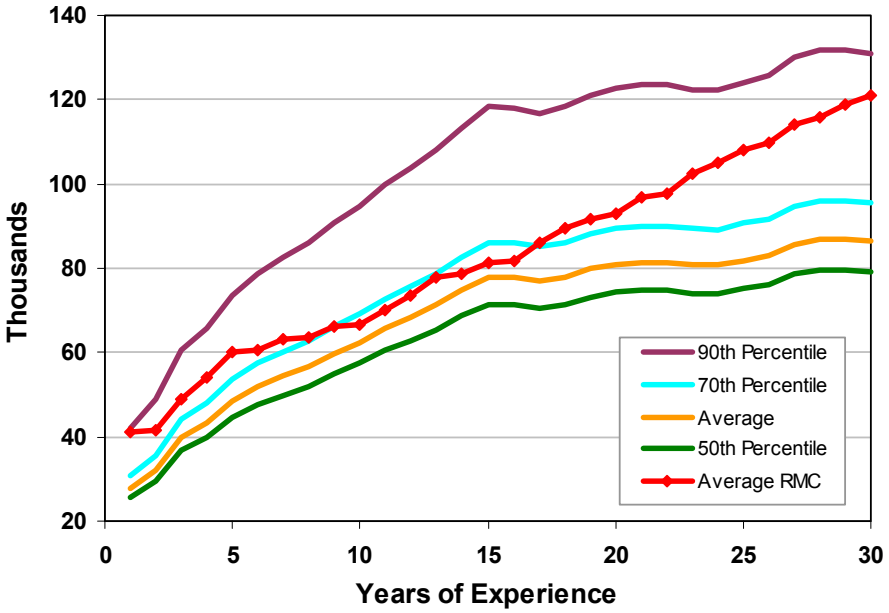


Note: Data reflect January 2002 enlisted pay (RMC) for E-1 to E-7 compared with predicted year 2002 earnings of males with some college.

In FY 2002, average RMC for mid-grade officers approaches the 70th percentile of earnings for civilian managers and professionals with college or advanced degrees, as Figure 5-2 depicts. In contrast, RMC for mid-grade officers was only equal to the average of comparable civilian earnings in 2000 (Figure 2-16). For FY 2003, the Department has recommended targeted raises for grades O-3 and O-4, which should raise RMC for mid-grade officers to the 70th percentile of comparable civilian earnings.

The FY 2003 pay proposal, together with the FY 2002 pay raise, targets warrant officers in grades W-1 through W-3. This is consistent with the recommendation to target enlisted grades E-5 to E-7 to maintain consistency between enlisted and warrant officer pay.

Figure 5-2. Comparison of Officer RMC to Civilian Earnings for Managers and Professionals with Baccalaureate or Advanced Degrees (2002 dollars)



Note: Data reflect January 2002 officer pay (RMC) compared with predicted year 2000 earnings of males in managerial and professional occupations with baccalaureate or advanced degrees.

A Critical Skills Retention Bonus

Authorization for a Critical Skills Retention Bonus was included in the FY 2001 National Defense Authorization Act. By permitting payment of as much as $200,000 over a member's career, the new authority provides more flexibility for the Services to increase retention of both officers and enlisted personnel in designated critical specialties.

The Air Force and Navy are expected to implement the Critical Skills Retention Bonus program this year. The Office of the Secretary of Defense has recently approved payment of a $10,000 annual bonus to five technical officer specialties in the Air Force. The Navy plans to designate Surface Warfare Officers as a critical skill area.

An Increase in Educational Assistance

The FY 2002 National Defense Authorization Act and the Veterans Education and Benefits Expansion Act of 2001 enhanced the educational

benefits package for military members. Among the recommendations included in this package are:

- An increase in the Montgomery GI Bill monthly stipend to approximately $1,000, which covers the average cost of a public four-year university (including tuition, fees, and lodging). The basic benefit for an enlistment term of three or more years was increased to $800 per month in 2002, $900 in 2003, and $985 for 2004.
- More flexibility in benefit payment options (lump-sum, up-front payment schedule) and for special courses that are high cost, short-term, and high tech.
- Permitting members who participated in earlier, less attractive educational assistance programs the opportunity to enroll in the Montgomery GI Bill.

Improvements in the Overseas Cost-of-Living Allowance

To ensure that members are more fairly compensated while on overseas assignments, the Per Diem, Travel and Transportation Allowance Committee has recently revised policies governing the overseas cost-of-living allowances. Of the several recommendations accepted are:

- Safety nets to protect members when exchange rates fluctuate significantly or when U.S. prices rise relative to local prices.
- Many technical improvements associated with collecting data and calculating the allowance.

FURTHER RESEARCH

No study such as this can provide a comprehensive review of the military compensation system in depth. In fact, the 9th QRMC focused its effort on only a few of the components of military compensation, principally basic pay and special and incentive pays and bonuses. Even the other topics discussed in the previous chapters could not be exhaustively addressed in the time allowed. Thus, a number of areas emerged as promising subjects for future research.

Evaluation of Total Military Compensation

Typical comparisons of military and civilian compensation tend to focus on regular military compensation, as the 9th QRMC analyses in Chapter II presented. The next step would be to include both cash and in-kind benefits in such comparisons. Housing, health care, exchange and commissary benefits, and military retirement, for example, should be examined to provide a more comprehensive comparison of military and civilian total compensation.

Alternative Career Lengths

Although not strictly a compensation issue, the shortening or lengthening of the 20-year career is an important issue for the Department as the competition for scarce manpower resources intensifies. Regardless of whether this variation is accomplished by changing the current up-or-out policies or by offering additional financial incentives for shorter careers for some occupations (as exemplified by the analysis of pilot retention) or longer careers for others, the set of compensation tools will almost certainly need to be expanded. The QRMC's work in this area should be continued to include analysis of occupations other than aviation and to reexamine the need for a standard career length for all occupations and Services.

Deployment Pay

Changes in missions and operations resulting from the end of the Cold War appear to have created the need for a new deployment pay system, one that recognizes explicitly both the "away-from-home" and "danger" dimensions of many military jobs. Past policies that focus on equity in assignment and rotation—combined with an array of pays designed to recognize hazardous duty—have sufficed, but the future may require more flexibility in paying members for their sacrifices. Further research on this issue is clearly warranted, including investigation of inter-Service differences in deployment time and the budgetary implications of introducing new pays or modifying existing ones.

Compensation Policies for the Reserves

With the dramatically changing role of the Reserve component, there is a need for a comprehensive review of Reserve compensation to include the retirement benefit. This review must first collect detailed time-series data documenting the recruiting and retention experience in the Reserves, and then estimate the effects of alternative compensation policies on

Reserve recruiting and retention. The extent to which more flexibility is needed in Reserve compensation policies and the relationship between active and Reserve component policies can be determined only by empirical evidence. The tenets of ***balance*** and ***flexibility*** used in the 9th QRMC should guide the analysis of Reserve compensation.

Other Related Compensation Policies

The QRMC believes that other manpower and related compensation policies are in need of in-depth study. Changes to the retirement system and the use of more lateral entry are two possible strategies for improving the effectiveness of the Department's human resources strategy.

- Changes to the retirement system that allow earlier vesting and portability of benefits within a more defined contribution plan may help to improve retention of service members in the mid-career grades, a continual problem for today's manpower planners.
- Increasing the number of lateral entry personnel in certain skills (perhaps through greater use of prior-service members) would allow the Department to reduce its training costs and realize a greater return on its investment in human resources.

The research conducted under Quadrennial Reviews of Military Compensation supports military compensation policies in two ways. First, it can have a direct impact on current policy, as the initiatives described above suggest. Analyses conducted by QRMCs can support the development of policy initiatives needed to resolve critical near-term issues facing the uniformed services. While direct impacts have occurred in the past, perhaps no other QRMC has been so successful in influencing current policy as the current review.

Equally important, however, are the analyses of issues that *may* lead to adjustments in military compensation at some future date. Even when recommendations are not adopted in the short run, the analysis is useful in framing the debate and identifying policy options. Much of what appears in Chapters III and IV serves this function. Issues requiring a longer time frame for evaluation often pose philosophical challenges or have significant budgetary implications. Thus, highlighting these issues within the context of a QRMC provides a forum for ideas to be debated and consensus to build. At least part of this debate should focus on how new initiatives can provide additional ***flexibility*** in the compensation system and to do so while maintaining ***balance*** among existing policies.

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

9th QRMC	Ninth Quadrennial Review of Military Compensation
AAFES	Army and Air Force Exchange Service
ACIP	Aviation Career Incentive Pay
ACP	Aviation Continuation Pay
ACSF	Aviation Career Savings Fund
ADT	Active Duty for Training
AFQT	Armed Forces Qualification Test
ASVAB	Armed Services Vocational Aptitude Battery
BAH	Basic Allowance for Housing
BAQ	Basic Allowance for Quarters
BAS	Basic Allowance for Subsistence
CEIP	Career Enlisted Flyer Incentive Pay
COLA	Cost-of-Living Allowance
CONUS	Continental United States
CPI	Consumer Price Index
CSRB	Critical Skills Retention Bonus
CSRS	Civil Service Retirement System
DeCA	Defense Commissary Agency
DSB	Defense Science Board
FLPP	Foreign Language Proficiency Pay
FSSA	Family Subsistence Supplemental Allowance
FY	Fiscal Year
GED	General Educational Development
HDP-L	Hardship Duty Pay-Location
HDP-M	Hardship Duty Pay-Mission
HDP-T	Hardship Duty Pay-Tempo

IDT	Inactive Duty for Training
IRA	Individual Retirement Account
IRC	Internal Revenue Code
LPS	Living Pattern Survey
MGIB	Montgomery GI Bill
NCO	Noncommissioned Officer
NOAA	National Oceanic and Atmospheric Administration
OCONUS	Outside the Continental United States
PCS	Permanent Change-of-Station
PDS	Permanent Duty Station
PDTATAC	Per Diem, Travel and Transportation Allowance Committee
QRMC	Quadrennial Review of Military Compensation
RMC	Regular Military Compensation
ROTC	Reserve Officer Training Corps
S&I	Special and Incentive
SRB	Selective Reenlistment Bonus
SRMP	Survey of Retired Military Personnel
TAD	Temporary Additional Duty
TSB	The Federal Retirement Thrift Investment Board
TSP	Thrift Savings Plan
USPHS	United States Public Health Service
VHA	Variable Housing Allowance

The Report of the Ninth Quadrennial Review of Military Compensation

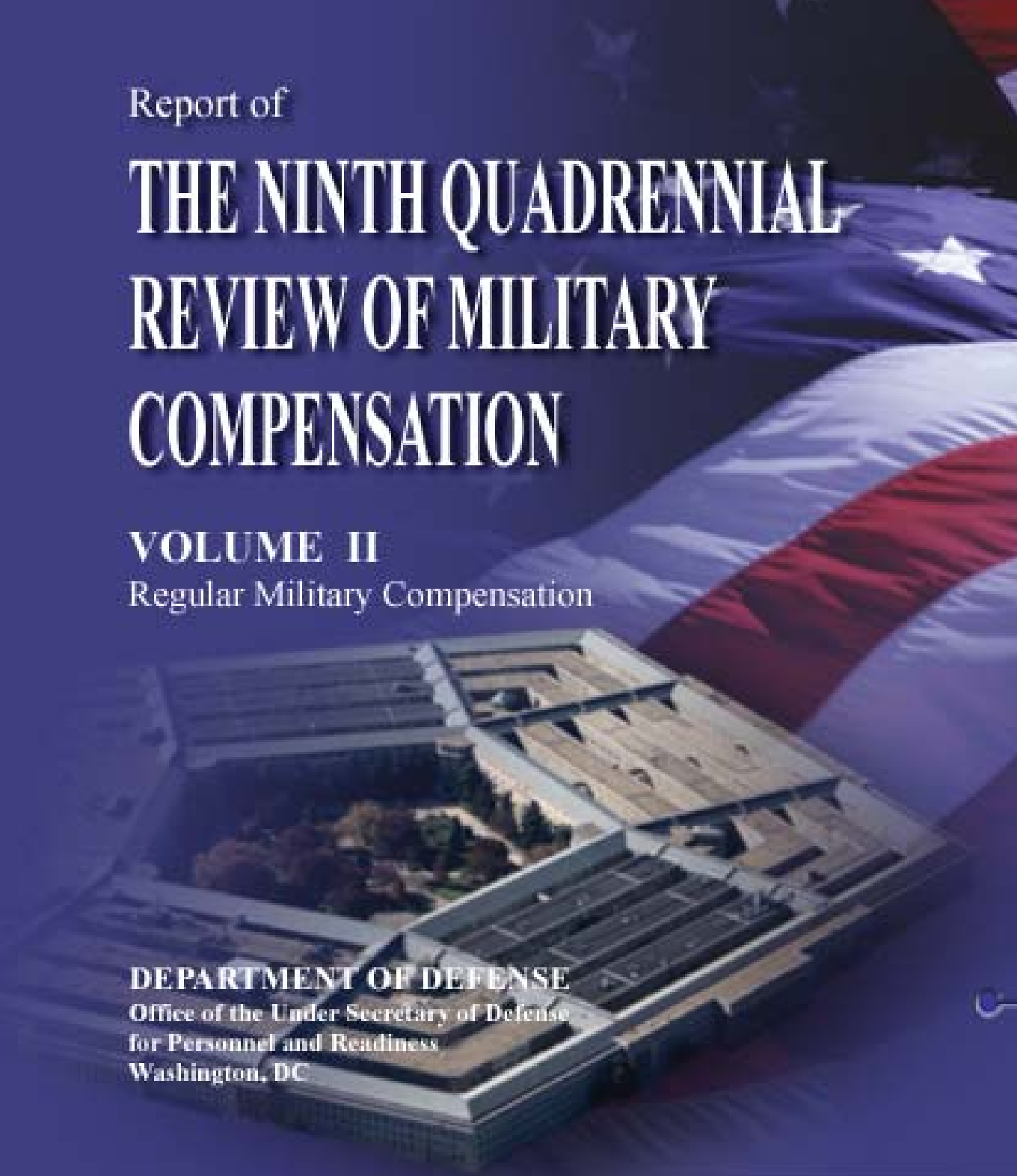
Office of the Under Secretary of Defense for Personnel and Readiness
4000 Defense Pentagon
Washington, DC 20301-4000

Report of

THE NINTH QUADRENNIAL REVIEW OF MILITARY COMPENSATION

VOLUME II

Regular Military Compensation



DEPARTMENT OF DEFENSE
Office of the Under Secretary of Defense
for Personnel and Readiness
Washington, DC

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PREFACE

The Ninth Quadrennial Review of Military Compensation (9th QRMC) assesses the effectiveness of current military compensation policies in recruiting and retaining a high-quality force. The review takes place at a time of increasing pressure on military recruiting and retention—the result of both external and internal pressures on the Department of Defense. A sustained strong economy and changing private-sector compensation practices along with changing missions and operational requirements create a complex environment for sustaining the All-Volunteer Force.

To compete for quality personnel, DoD must reexamine all of its recruiting and retention tools, the foundation of which is regular military compensation. Regular military compensation is the basis for evaluating comparability between military and civilian pay and is the topic of the research papers in this document—the second of five volumes of the 9th QRMC report.

New data and innovative analyses suggest that military pay—particularly for mid-grade enlisted members and junior officers—has not kept pace with compensation levels in the private sector. Because the current pay table does not include a high enough premium to sustain a more educated force, adjustments to both the level and structure of basic pay are recommended for the enlisted force, commissioned officers, and the warrant officer corps.

Because of today's dynamic labor market, which reflects the rapid pace of change fueled by the information revolution, keeping pay competitive means regularly evaluating pay comparability between military members and their appropriate civilian counterparts. The structure and level of basic pay is a critical element in keeping the All-Volunteer Force viable.

The research papers included in this volume were written in support of the 9th Quadrennial Review of Military Compensation. The views expressed in these papers represent those of the authors and are not necessarily those of the Department of Defense.

CHAPTER I

AN ANALYSIS OF PAY FOR ENLISTED PERSONNEL

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

SUMMARY

A major purpose of the 9th Quadrennial Review of Military Compensation is to determine whether the structure and level of military compensation remains adequate to meet the manning requirements of the military. Changes in civilian labor market opportunities may call the adequacy of military compensation into question. To address these issues, this briefing examines the compensation of active duty enlisted personnel in relation to that of their civilian opportunities.

During the past 20 years, enrollment in college within the 12 months following graduation from high school has risen substantially. In 1980, the enrollment rate was 48 percent; by 1997, it had risen to 67 percent. The increase in enrollment has fundamentally changed the market for new recruits. Although the high school graduate market remains important, its role as a source of high-aptitude youth for the military has declined because those in the graduate market who score high on the Armed Forces Qualification Test (AFQT) are increasingly likely to enroll in college. This loss from the traditional recruiting market is potentially troubling because high-scoring youth perform better in military training and mission-essential tasks. Further, the growth in college enrollment has been accompanied by—and probably responded to—the increases in returns to a college education. Since the early 1980s, the wages of those with some college education have risen relative to the wages of high school graduates, and the wages of those with four or more years of college have risen even faster. Thus, the traditional recruiting market has declined in size, college enrollment has increased and attracted high-aptitude youth, and the rising returns derived from a college education, especially four or more years of college, make college an attractive career investment. These changes imply that the opportunity cost of entering the military has been rising. Furthermore, from the perspective of the military, a decline in the quality of recruits leads to a risk of decreased subsequent military capability.

The education levels of the enlisted force have also been changing. Increasingly, enlisted personnel take educational courses while in service. The coursework may facilitate promotion to higher ranks, and it may reflect an understanding of the value of education in expanding one's civilian opportunities after military service. In 1985, just over 20 percent of junior enlistees with one to four years of service had at least one year of college. By 1999, more than 50 percent had some college. Nearly all of

this change reflects education obtained during military service rather than an increase in the percentage of recruits having some college. Education levels have been rising in higher ranks as well. In 1999, more than 80 percent of enlisted personnel with 20 or more years of service had a year or more of college, and more than 20 percent of E-8s had a college degree. These changes imply that military service and education have become increasingly compatible for many personnel.

Despite the increase in education levels among enlisted personnel, there is reason to believe that the military is becoming less able to compete with civilian opportunities. Not only have college enrollment rates been rising, but the quality of recruits has been declining since 1992. In 1992, recruit quality reached an all-time high: 74 percent of non-prior-service recruits were high school graduates who scored in the upper half of the AFQT test score distribution. In 2000, 57 percent of recruits met these criteria. It should be emphasized that the quality of these recruits is no different from that of the 1987 recruit cohort, and 57 percent is certainly well above the 1979–1981 level of 30 to 35 percent. The concern is that recruit quality might continue to decline.

The structural changes in the recruiting market and the growing importance of higher education as a prerequisite to many civilian career paths may mean that the current structure of military compensation should be revised. This raises three questions: How well does military compensation compare with the civilian compensation of those with some college? How has this comparison changed over time, i.e., has military compensation fallen relative to civilian pay of those with some college? Will the military pay legislation of Fiscal Year 2000 (FY 00), already being implemented, address the concerns about the adequacy of military pay?

To compare military and civilian pay, military pay was measured as the sum of basic pay, basic allowance for housing, basic allowance for subsistence, and the tax advantage due to the allowances not being taxable. The total of these elements is called regular military compensation (RMC). RMC accounts for the bulk of current monetary compensation of military personnel. We compared RMC to civilian earnings by placing it on the civilian earnings distribution, not simply by looking at average civilian wages. RMC probably exaggerates the value of military pay for junior personnel because many of them live in barracks or in ship bunks and cannot take advantage of the housing allowance.

In FY 00, military pay appeared to compare fairly well with the civilian pay of high school graduates but not as well for those with some college. Over much of a typical military career, RMC approximately

equaled the 70th percentile civilian wage of high school graduates. That is, at any given age (or level of experience), about 30 civilians out of 100 had a higher wage, and about 70 had a lower wage. By comparison, RMC was only slightly above the 50th percentile civilian wage of those with some college, for most ages. However, among junior personnel RMC stood at respectively higher percentiles.

There are two major reasons for the fact that the military pay for high school graduates is above the 50th percentile (median wage) and above the average wage, which approximately equals the 60th percentile. (The average is greater than the median because the wage distribution has a long right tail.) First, the military is selective and prefers youth with higher aptitudes, excellent health, and no criminal records. Second, military duty requires the subordination of personal freedom to regimentation, military personnel are constantly on call, and military duty entails heightened risk of illness, injury, and death. Both the selectivity and the rigors of military service call for above-average pay, and pay at around the 70th percentile or above has historically been necessary to enable the military to recruit and retain the quantity and quality of personnel it requires. But RMC is nearer the 50th percentile of civilian pay for those with some college, and thus military compensation—and a military career—is relatively less attractive for this group. Therefore, as more and more high school graduates choose to enroll in college, the military compensation structure seems increasingly out of tune with the youth population it prefers to enlist. Moreover, given the rising levels of education within the military, the civilian opportunities of enlisted personnel must increasingly be judged against the career and earnings paths of those with some college, not just those with a high school education.

The military/civilian pay comparisons for FY 00, along with the rising importance of higher education both outside and within the military, suggest that the military compensation needs realignment. However, the situation is more complex. The FY 00 comparisons, made at a point in time, do not reveal how the value of a military career has been changing relative to that of civilian careers over time. Although one might expect that the value of a military career has been declining relative to that of a civilian career for individuals with some college, that is in fact not the case. We compared earning streams over a military career with civilian earnings streams for different education levels and occupation groups. Again, military pay was measured in terms of basic pay, housing allowance, subsistence allowance, and the tax advantage of the allowances. Civilian pay consisted of wage and salary income, including overtime pay.

The present value of civilian career earnings of high school graduates who enter the production/craft occupational area—the most common occupational area for male high school graduates—has been declining. The present value was slightly lower for the 1998 cohort than for the 1983 cohort, and it is projected to be still lower for the 2006 cohort. The present value of a production/craft career for a male with some college has been roughly constant over time and is higher than the present value for male high school graduates. The present value of a professional/technical career for a male with some college is still higher and has been rising over time. The relative decline in the value of high school careers is consistent with the rise in college enrollment. Nevertheless, the value of an enlisted career is higher and has risen faster than the value of the production/craft and professional/technical careers for persons with some college. By this measure, then, the military has been gaining ground. Yet, the military is finding it hard to maintain recruit quality and to retain personnel in many technical skill areas.

This leads to several hypotheses regarding the military's apparent loss of competitiveness:

Stepping-stone hypothesis: Obtaining some college is a stepping stone toward four or more years of college. Earnings have grown more rapidly for those with four or more years of college than for those with less college, and persons considering a two-year college may factor this into their decision to enroll. In addition, enrolled students who initially had no intention of getting more than a year or two of college may revise their education goals as they see what four-year graduates can earn. As evidence of this hypothesis, the percentage of persons working toward a four-year degree after completing a year or two of college has been rising.

Value of civilian experience hypothesis: In an era of relatively fast technical change in certain occupations, such as those using information technology, the value of on-the-job experience may have risen relative to the value of military skills and experience. Civilian job experience may increasingly be seen by youth as a gateway to higher-quality career opportunities, although not necessarily to higher-paying jobs. By this hypothesis, the military may need to review, and perhaps restructure, its career paths to make them comparable to civilian opportunities. If career restructuring is infeasible or detracts from military readiness, then higher military compensation may be needed.

Cyclical factors hypothesis: The economic boom of the 1990s may have caused today's recruiting and retention difficulties as civilian pay rose relative to military pay and unemployment hit a 30-year low. The decline in military pay relative to civilian pay, the decrease in the

unemployment rate, and the increase in college enrollment actually can account for most of the decline in recruit quality between 1992 and 1999.

Will the FY 00 pay legislation improve recruiting and retention and thereby address questions of military pay inadequacy? The FY 00 pay legislation mandated increases in basic pay half a percentage point higher than the growth in the Employment Cost Index for years 2000 to 2006. It also mandated modest structural changes in the enlisted and officer basic pay tables that took effect July 1, 2000. In addition, it increased authorizations for bonuses, created (but did not fund) a thrift savings program, and redressed an inequity in the retirement benefit structure affecting personnel entering service since August 1986.

The FY 00 pay legislation was a major step forward in restoring military pay to competitive levels. However, because it is being implemented over six years, its effects will take time to materialize. Depending on the scenario chosen, the ECI + 0.5 percent pay increases can be expected to improve recruit quality to the levels prevailing in the early 1990s by the time they are fully implemented in 2006. But in the intervening years, recruit quality may be at the levels seen in recent years. If so, the string of comparatively low-quality cohorts will be extended and could result in a force with less capability than would be the case if recruiting improvements were achieved sooner.

Improvements in retention are also expected. In the absence of the FY 00 pay legislation, the Air Force and Navy would experience marked declines in continuation rates among members in their mid-careers, necessitating an increase in accession requirements. As the FY 00 pay actions are phased in over the next five years, they should improve overall retention in all services and offset the declines experienced since the early 1990s. However, shortages may persist in critical occupation areas.

The FY 00 legislation raised pay and addressed technical anomalies within the pay table. But it did not address the structural changes in the civilian labor market opportunities available to the type of individuals the military will continue to seek to recruit and retain in its enlisted force, namely high-aptitude high school graduates who seek or who have a college education.

The long-term changes in the civilian labor market and their implications for military capability argue for an additional pay action for military personnel. But what type of pay adjustment is needed? The usual type of pay increase for military personnel is an across-the-board raise that gives the same percentage increase to everyone in uniform. However, research suggests a number of advantages to a different pay raise approach, one that would target or graduate the pay raise to give larger

raises to those in higher grades. First, a graduated pay raise would target resources to areas where the educational and skill content of the enlisted force is greatest and where relative pay growth has been lagging. Second, a graduated pay raise would be more cost effective because this is generally a less costly approach to achieving retention targets than are across-the-board pay raises. Third, a graduated pay raise would build on the FY 00 pay legislation, enhance the rewards of promotion to higher grades, and increase the incentives in the pay system to work hard and effectively. Finally, such a raise would move military compensation in a direction that increases its effectiveness as a force management tool. A recent Defense Science Board report recommended several fundamental changes in the military compensation system to improve its effectiveness. Among them was a recommendation to restructure the military pay system to emphasize pay for performance. A graduated pay raise would be consistent with that recommendation.

Although the research summarized in this briefing focuses on enlisted pay, it is important to recognize that improving the competitiveness of enlisted careers will also entail other policy changes, particularly in recruiting and personnel management. In addition to pay increases, the military must also consider how to compete for high-aptitude college-bound recruits through the use of new and innovative recruiting policies as well as through revamping past policies. The military also needs to consider how to develop and use personnel who are seeking or who have postsecondary education. Such changes in personnel management and recruiting, together with a pay action, will help position the services better vis-à-vis the civilian labor market and will improve their ability to meet their current and future personnel requirements.

Congress Passed Major Pay Legislation for FY 2000

- Problems
  - Recruiting difficulties
  - Decline in retention
  - Shortages in some skills
  - Retirement benefit inequities
- Legislation
  - Raised pay across the board
  - Restructured pay table
  - Removed inequity in retirement benefits
  - Enhanced special and incentive pays

Is another pay action needed, and if so, what form should it take?

Two years ago, the nation started its most recent debate about military pay. The usual problems were present: poor recruiting and declining retention. These were not minor tremors. For the first time since 1979, the services were not able to recruit the number of personnel needed. The quality of recruits was eroding, and retention rates were declining. In addition, mid-career service members were aggravated by inequities in their expected retirement benefits.

In response to concern about this situation, Congress held hearings and formulated several military pay bills. This led to the passage of Fiscal Year 2000 (FY 00) pay legislation that was a major step forward. Military basic pay was increased by 4.8 percent on January 1, 2000. Members with various ranks and years of service received additional targeted increases on July 1, 2000. The July increases were targeted toward the middle ranks and middle years of service. Officers in the ranks O-3 and O-4 received increases of about 5 percent, but the increases for mid-ranking enlisted personnel were much smaller, 2 percent or less in most cases.

Our research addresses the question of whether this pay action was enough to restore the competitiveness of enlisted pay and careers in light of long-term trends in the civilian labor market that are extremely relevant to the military's desire to get and keep high-quality personnel. This briefing summarizes our research findings and begins to address what pay changes might be taken to improve the military's competitiveness. It also discusses what form such changes might take—an across-the-board increase or an increase targeted to give proportionally greater increases to the high ranks.

Briefing Outline

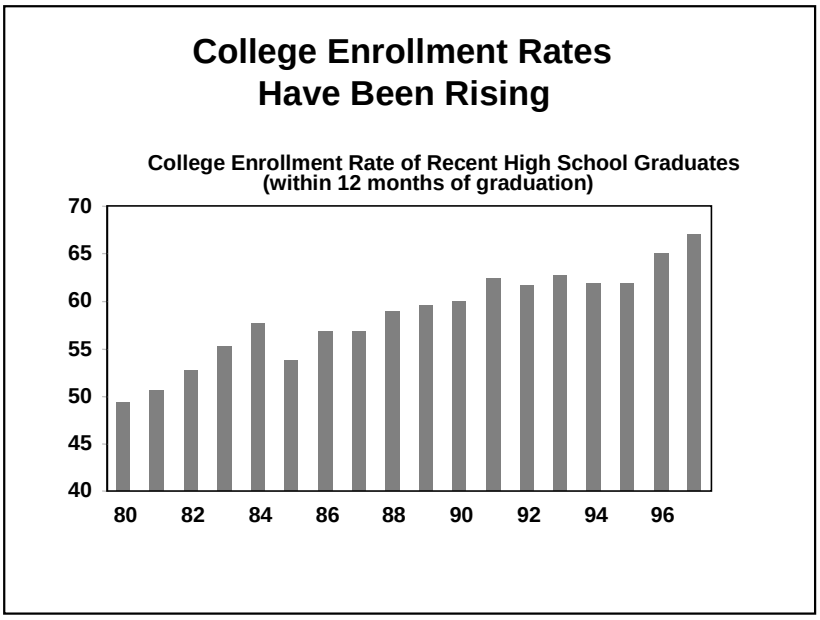
- Key trends
- How does the pay of enlistees compare to that of their civilian counterparts?
- How has the comparison changed over time?
- How will FY 00 pay actions affect the comparison?
- Are civilian pay increases temporary or permanent?
- What's happened to aggregate measures of enlisted recruiting and retention?
- What policy options might be considered?

We first look at key trends in the civilian labor market. We then examine how enlisted pay stacks up relative to the pay of two civilian comparison groups—those with a high school diploma and those with some college—and address the question of how the comparisons have changed over time.

Between FY 01 and FY 06, military pay is scheduled to increase by 0.5 percentage point per year more than the Employment Cost Index, a measure of civilian pay growth. Furthermore, Secretary of Defense William Cohen urged Congress to increase the basic allowance for housing (BAH) from 80 percent to 100 percent of local area housing costs. We study the effect of these pay reforms on relative military pay.

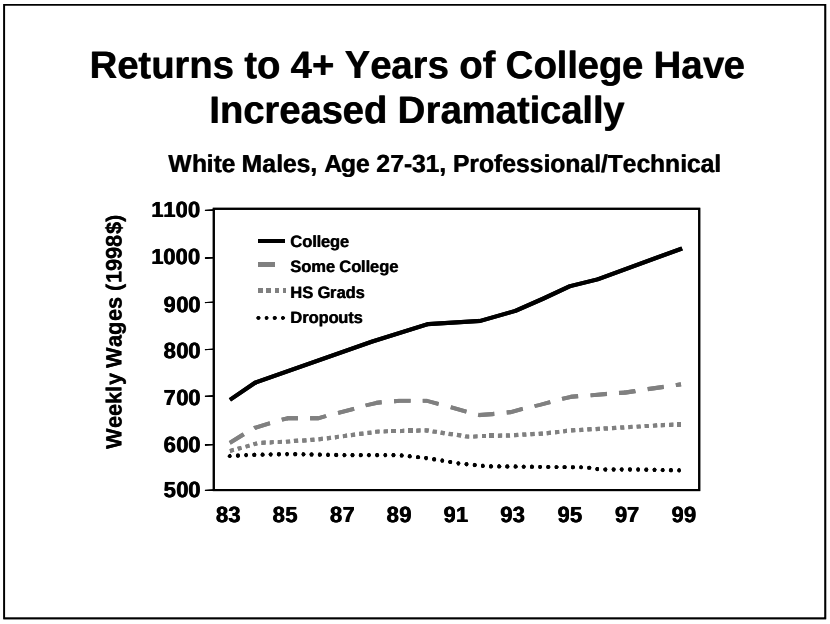
We then look at recent indicators of recruiting and retention. One question is that of how much the FY 00 pay actions are likely to improve the recruiting outlook, and we offer a preliminary assessment. We also consider the consequences for personnel force structure if recent, somewhat low retention rates should persist.

Finally, we consider policy options. Today's enlisted recruiting and retention challenges derive in part from the economic boom, which has pushed up wages and created jobs. Responding to these challenges might merely call for a higher level of compensation. But we believe that there are long-term, structural issues in compensation that cannot be solved by a simple increase in the enlisted pay table. The last part of the briefing raises these structural issues and puts the issue of restructuring enlisted basic pay in a broader context.



Trends in the civilian sector have a major influence on recruiting and retention. Recent recruiting challenges arise in part from the current state of the business cycle and in part from long-term trends. We begin with long-term trends.

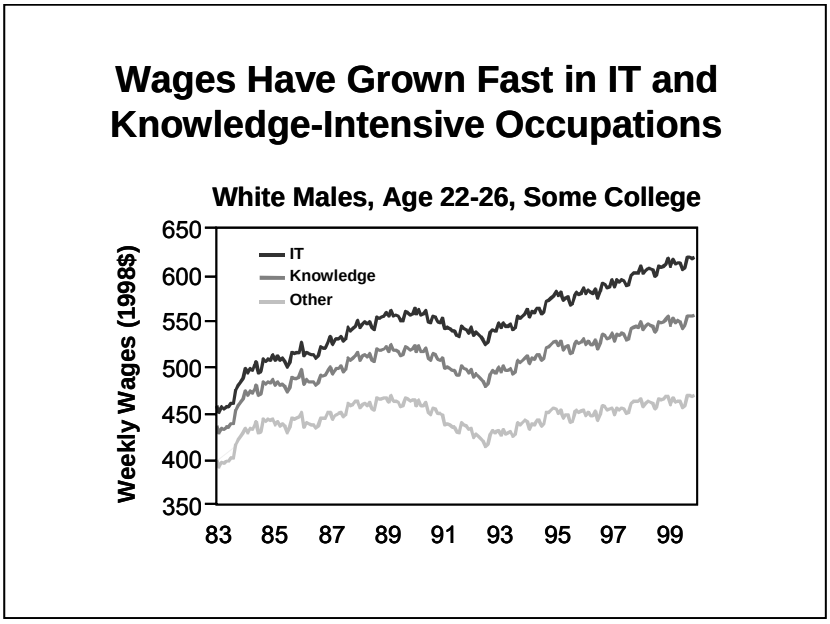
The first long-term trend is a dramatic rise in college attendance. In 1980, only about 48 percent of high school seniors enrolled in a college or university within 12 months of graduation. By 1990, that number had increased to about 60 percent. Today it stands at almost 70 percent. Unless the services can penetrate the market for college-bound youth, their recruiting pool is limited to about 3 of every 10 youth. In 1980, the services could recruit from 5 of every 10 youth without resorting to recruitment of college-bound youth.



Wages have been rising most for those with four or more years of college, somewhat less for those with some college, even less for high school graduates, and not at all for high school dropouts.

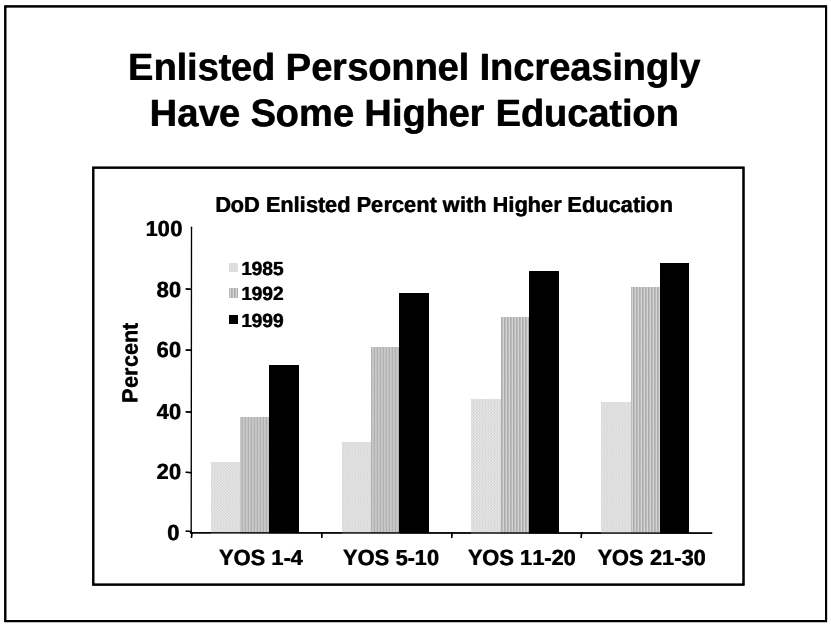
Why has college attendance risen so much? One reason is the rising incentive to acquire a college education. This slide shows the weekly wages of 27- to 31-year-old white males who work full time in professional and technical occupations. Wages are in 1998 dollars. Weekly wages of professional and technical workers with four or more years of college have risen significantly since 1983. Wages of professional/technical workers with some college have also risen, although the increase has not been as dramatic. Wages of high school graduates have increased a small amount, and those of high school dropouts have in fact declined. Earnings differentials have been rising in other occupational areas as well, although the wage gains for college graduates and those with some college have not been as large.

Real weekly earnings fell during the recession of the early 1990s. Part of the big increase in high-quality recruiting during that time owes to this fact. The current recruiting challenges owe partly to the strong growth in civilian pay since 1993.



As the military becomes more technologically oriented, it must increasingly compete with the private sector for skilled personnel. The wages of skilled workers have been rising more rapidly than those of less-skilled workers. This chart shows weekly earnings in three different occupation groups, information technology (IT), knowledge-based occupations (Knowledge), and all other occupations (Other), for 22- to 26-year-old white males with some college. IT includes programmers, systems administrators, network personnel, website personnel, and cablers. Knowledge workers are mainly in business management, accounting, engineering, architecture, law, medicine, science, and social science. In today's market, IT workers earn the most; knowledge workers earn less than IT workers but more than other workers. Absolute wage spreads between IT and knowledge workers versus other workers have been rising over time due to a rising demand for workers with computer-related, high-tech skills. All workers, regardless of occupational area, were hurt by the recession of the early 1990s.

After adjusting for inflation, other workers' weekly wages grew from $414 in 1992 to $466 by the end of 1999 (12.5 percent). Knowledge workers' wages rose from $464 to $528 (13.7 percent), and IT workers wages rose from $524 to $617 (17.7 percent). Thus, IT workers began the 1990s at higher wages and had the fastest wage growth during the decade.

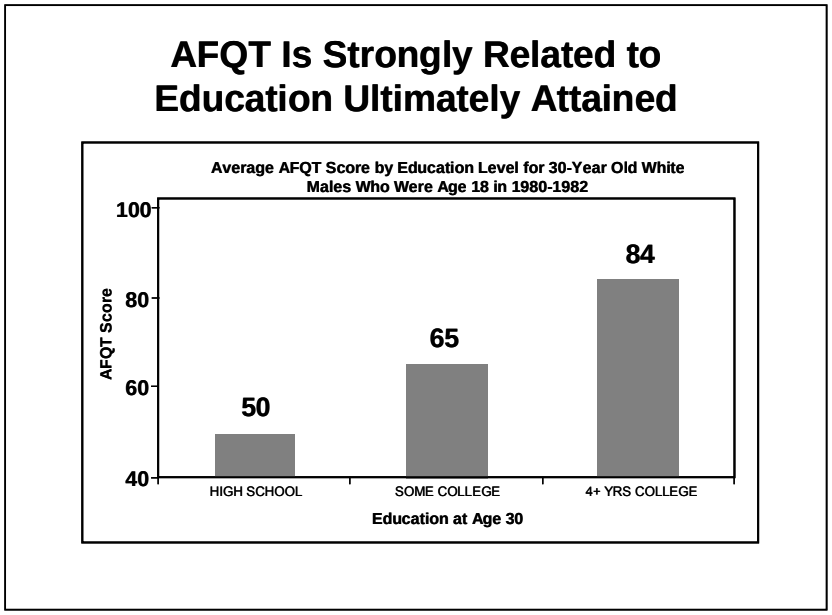


The traditional image of the enlisted force is one of high school graduates, but this depiction has become less and less accurate. According to data from the DoD Active Duty Personnel Surveys of 1985, 1992, and 1999, increasing proportions of enlisted personnel obtain at least some college education while in service. Today, more than half of the first-term enlisted force report at least one year of college, as do more than 80 percent of those with 20 or more years of service. In the 1999 survey, 21 percent of E-8s and 27 percent of E-9s reported having either a college degree or an advanced degree.

The increase in educational attainment is not due to an increasing percentage of recruits entering with higher education, i.e., some college or a college degree. The percentages of recruits with higher education were: 1986, 7 percent; 1990, 3 percent; 1994, 5 percent; 1998, 7 percent; 1999, 6 percent; 2000, 4 percent.

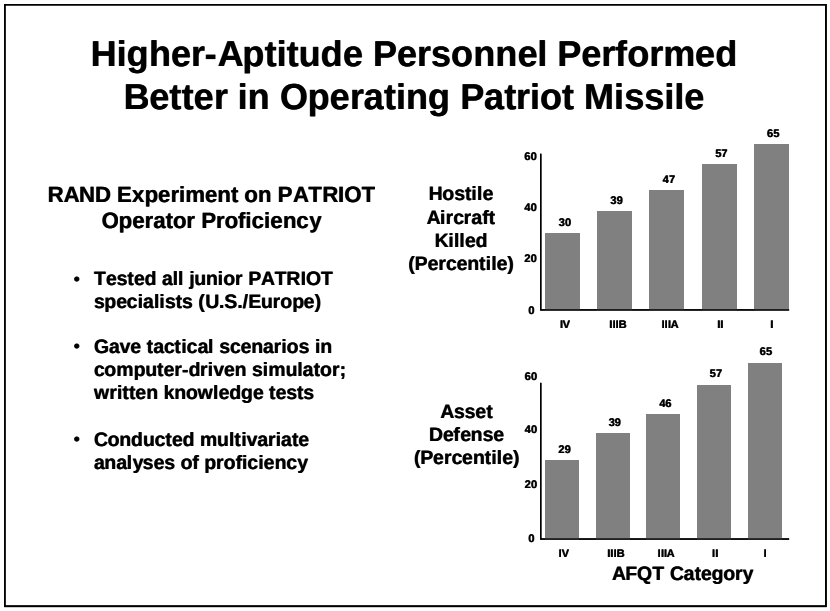
Several factors may have stimulated the rising educational attainment of the enlisted force: the better opportunities for education while in service today than in the past, the increasing returns to education in the private market, and the incentive to acquire more education that is imbedded in the services' promotion systems, which give some weight to educational attainment. However, it is also likely that the services now place greater emphasis on recording education provided in service. This may have changed perceptions about what should be counted when reporting one's higher education. Thus, some of the increase may represent more complete reporting by service members.

While it is hard to quantify, the increase in educational attainment of the enlisted force has no doubt contributed to the capability of the force.



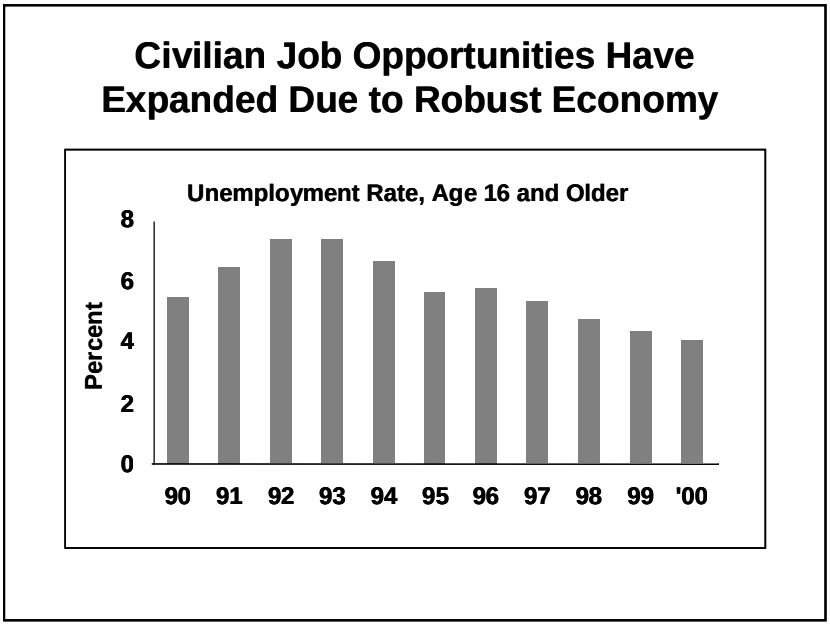
Educational attainment is strongly related to Armed Forces Qualification Test (AFQT) scores. We illustrate this point with data from the National Longitudinal Survey of Youth, a longitudinal, representative sample of youth who, as part of the survey design, took the Armed Services Vocational Aptitude Battery (ASVAB) in 1980. The AFQT score derives from certain verbal and quantitative components of the ASVAB. The slide focuses on white males who graduated from high school by age 20, grouped by their education attainment at age 30. Those who had not increased their education by age 30 had an average AFQT score of 50. Those with some college had an average score of 65, and those with a college degree had an average score of 84.

The relationship between verbal and quantitative scores and the likelihood of obtaining more education is quite strong. This relationship is of fundamental importance to the DoD. In order to recruit and retain more able personnel, the DoD must offer educational and training opportunities and pay commensurate with the increasingly attractive opportunities to be found in the civilian sector.



High-scoring personnel pay off in terms of higher performance, hence greater military capability. Studies indicate that the performance of service members depends on their education, experience, and aptitude. In one such study, RAND conducted a controlled trial of PATRIOT missile crews (Orvis et al., 1992). The trial included all junior (i.e., first-term) PATRIOT specialists in the United States and Europe, and their performance was assessed via written knowledge tests and tactical scenarios on a computer-driven simulator. Results of the analysis showed a clear positive relationship between a service member's AFQT test score category and performance. Personnel with higher AFQT scores were more effective in asset defense and killing hostile aircraft in accordance with tactics. Positive effects of higher AFQT scores have also been found for tank crews (Scribner et al., 1986), multichannel radio communications (Winkler et al., 1992), and ship readiness (Junor and Oi, 1996).

The military services have generally done well since the middle 1980s in recruiting from the top half of the AFQT distribution. For example, in 1997, 68 percent of non-prior-service recruits had an AFQT score of 50 or higher. This compares well to the AFQT scores in the overall youth population. In 1980, when the AFQT test was "renormed," 50 percent of all youth had a score of 50 or higher (*Population Representation in the Military Services 1997*, 1998). These numbers underscore the point that the military targets its recruiting on the high-scoring population. We argue later that it has become increasingly difficult to recruit from this population.



The DoD's current recruiting and retention challenges are due in part to the current state of the business cycle. The economic expansion has lasted more than seven years, massively expanding employment and reducing the unemployment rate from over 7 percent in 1992 to 4 percent in 2000—the lowest unemployment rate in a quarter century. Even without wage growth, the growth in civilian job opportunities can be a powerful lure for personnel to leave the military or not enter it. Low unemployment increases the odds of finding a job. As a result, a lower unemployment rate results in higher *expected* earnings in the civilian labor market.

Unemployment has a large cyclical component. When the cycle of expansion runs its course, the pressure on military recruiting and retention will ease somewhat. Cyclical changes highlight the value of recruiting incentives, such as enlistment bonuses and educational benefits, that can be turned on and off as needed. Large entry-level pay increases, in contrast, are not as flexible.

Military/Civilian Pay Comparisons Should Consider Pay over Career

- Comparisons of current pay ignore the future pay-outs associated with different career choices
- Theory of occupational choice: compare present value of
  - Work
  - Military service
  - Further education then work or military service
- Has pay over military career changed relative to other career paths?

Comparisons of military and civilian pay often focus on trends in current pay. We present a perspective of pay over a military career versus pay over a civilian career. These comparisons are made for different levels of education, especially for high school versus some college. This perspective is relevant because, as seen in the previous charts, wages for those with some college are rising, and that has created an incentive for college enrollments to rise. Young men and women are increasingly making career decisions that involve some education after high school, and presumably these decisions weigh the costs and returns of getting further education.

We depict profiles of enlisted career earnings compared first with civilian earnings of high school graduates and then with civilian earnings of those with some college. In addition, we compare the present value of an enlisted career with that of civilian careers for education levels of high school, some college, and four or more years of college. Career present values are computed for several different entry cohorts in order to see how the value of a military career has changed over time compared with the value of civilian careers.

We Use Two Approaches to Compare Earnings over Career

- Use "cross-section" approach and "life-cycle" approach
  - Cross-sectional analysis compares military and civilian pay at a point in time (e.g., July 2000)
  - Life-cycle analysis compares military and civilian pay over career for different entering cohorts
- Approaches make differing assumptions on how military personnel form expectations about future earnings
  - Cross-sectional approach assumes current-point-in-time civilian wage structure will remain constant
  - Life-cycle approach assumes career earnings will evolve according to wage trends by age, education, occupation
- Both approaches tell consistent message

We use two approaches in making these comparisons. The cross-section approach uses civilian wage data on individuals of different ages at a point in time, the year 2000, to portray experience-earnings profiles. Experience is defined as the number of years since completion of education. Also, civilian earnings profiles are shown for the 30th, 50th, 70th, and 90th percentiles of the earnings distribution. Military pay of July 2000 is overlaid onto the civilian profiles.

The life-cycle approach tracks a cohort's earnings over time from age 19. We estimate life-cycle earnings for three cohorts: 19-year-olds in 1983, 1998, and 2006, respectively. Actual earnings were used to 1999, and future earnings were predicted from models of wage trends. Life-cycle comparisons have been made for different education levels and occupation tracks.

The two approaches make different assumptions. The cross-section approach implicitly assumes that individuals forecast earnings at some future age by observing what individuals currently that age are earning. The approach also assumes that the age structure of earnings does not change much over time. This seems like a reasonable assumption in light of the modest wage trends for high school graduates and those with some college.

The life-cycle approach implicitly assumes that individuals are aware of earnings levels and trends and that they use this information in forecasting future earnings. Wage trends can differ by education level, occupational group, age (or experience), and the state of the economy.

Although the cross-section and life-cycle approaches are based on different assumptions, they tell a consistent story about how military career compensation compares with civilian compensation for workers with a high school education and for those with some college. The life-cycle approach, in presenting results for several different cohorts, further shows how the present value of military and civilian careers has changed over time, although the cross-section approach could also be used to do this.

Constructing Civilian Earnings Profiles with Cross-Section Approach

- Construct civilian experience-earnings profiles for ***Males*** by education level using Current Population Survey data from March 1994-1999 surveys (1993-1998 earnings)
  - mean earnings profile
  - profiles for 30th, 50th, 70th, and 90th percentiles of earnings
- Adjust the predicted profiles to account for wage growth between the CPS earnings year and year 2000
- Compare with July 2000 military pay and with FY 01 - FY 05 pay reforms

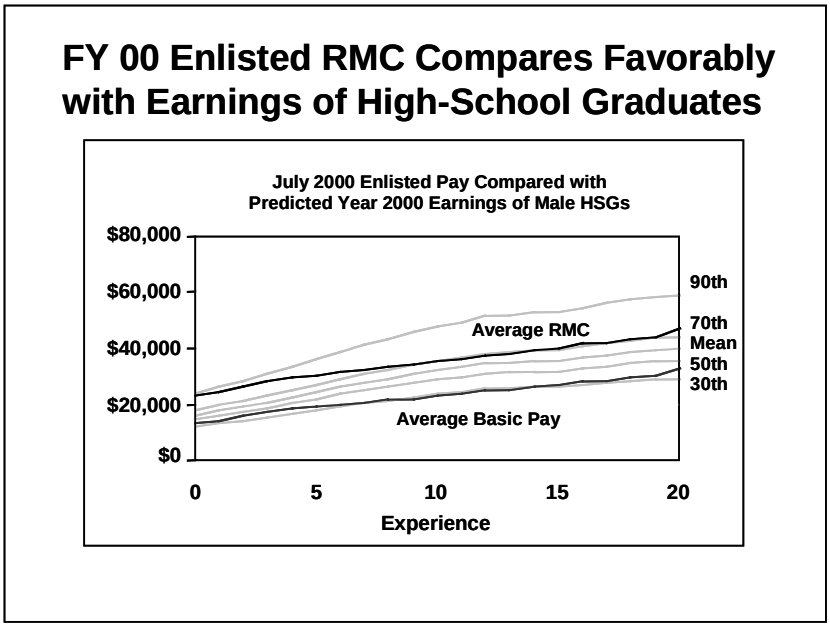
The next few charts compare military pay with the civilian pay of males. We use two measures of military pay, basic pay and regular military compensation (RMC). RMC equals basic pay plus the basic allowance for housing (BAH), the allowance for subsistence (BAS), and an adjustment for the nontaxability of the allowances. There are three pay comparisons: military pay in July 2000 vs. civilian pay of high school graduates; military pay in July 2000 vs. civilian pay of those with some college; and military pay in 2005 vs. civilian pay of those with some college.

We construct civilian earnings profiles from the 1994–1999 March Current Population Surveys (CPS). Since the March CPS of each year asks about earnings in the previous calendar year, earnings are actually for years 1993–1998. Full-year-round earnings were estimated by regression analysis, and the estimated regression models were used to predict earnings. The regressions controlled for experience, race, marital status, occupation, size of employer, and several other factors. Because the racial mix in the CPS varied with experience and was not fully representative of the racial mix of today's youth population, earnings were forecast by race and weighted to reflect the racial mix in today's 17- to 21-year-old population.

The following charts show the predicted earnings at the 30th, 50th, 70th, and 90th percentiles of earnings. At the 50th percentile (or median), half the workers earned more and half earned less, and similarly for the other percentiles (i.e., at the 90th percentile, 10 percent earned more and

90 percent earned less). In addition, a line for the mean, or average, wage is included. The mean happens to be close to the 60th percentile, so the latter has been omitted.

The wage profiles are based on a regression analysis of earnings in years 1993–1998. Annual average wage growth was estimated in the analysis and used to adjust the forecasts to year 2000 dollars. The Appendix explains the regression analysis and forecasts of earnings profiles in more detail.



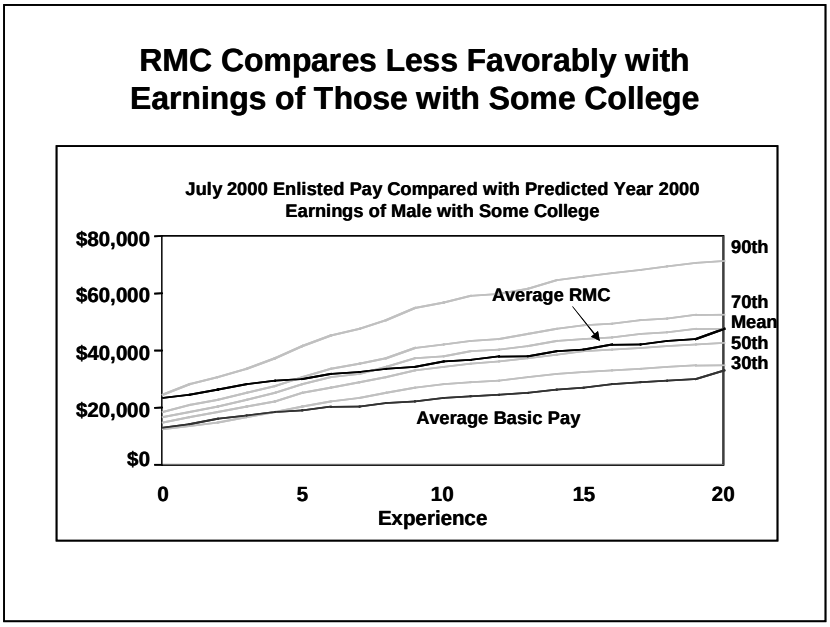
This slide compares July 2000 RMC and July 2000 basic pay by years of service with predicted earnings of male high school graduates.

Early on, RMC lies between the 80th and 90th percentiles, but this probably exaggerates the level of military compensation. The average BAH for a first-term enlisted person is over $500 per month ($6,000 per year), based on local area housing costs. But many junior personnel are single and live in government quarters; these personnel often do not have the option of taking the allowance, which many would do if given the choice. Single Navy personnel surely do not value a bunk on a ship at the current level of BAH. For junior personnel, effective RMC lies somewhere between the RMC and basic pay lines, probably closer to the latter.

Average RMC tracks the 70th percentile of civilian earnings from the 8th to the 20th year of service, while average basic pay tracks the 30th percentile. This difference occurs because nearly 40 percent of RMC comes from the allowances for food and housing and their tax advantage.

Although not shown, average RMC rises rapidly beyond the 20th year of service because of the changing composition of personnel. Mid-ranking enlisted personnel tend to retire around the 20th year, while higher-ranking personnel tend to stay. After the 20th year of service (YOS 20), the enlisted force comprises mostly E-8s and E-9s, the top two enlisted grades; after YOS 26, it is almost exclusively E-9s. E-9 RMC approximately equals the 90th percentile of civilian high school graduate earnings. The 1 percent of recruits who successfully compete their way up

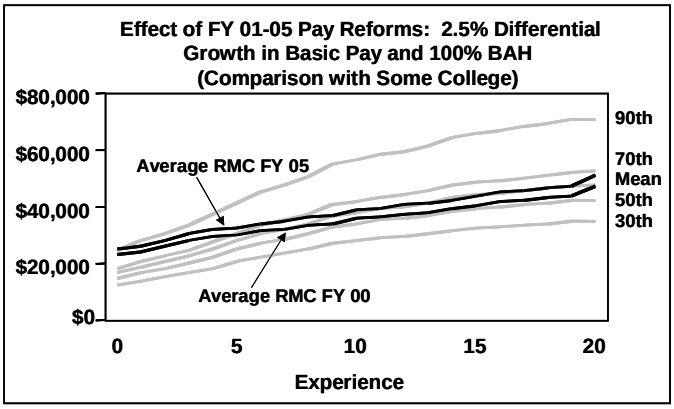
the ranks to E-9 earn about the same as the top 10 percent of high school graduates of similar age.



The pay comparison for males with some college is much less favorable than the comparison for high school graduates. Mid-career RMC tracks just above median earnings, well below the 70th percentile in the high school graduate case. E-9 RMC now equals only about the 80th percentile for those with some college, not the 90th percentile.

These comparisons cannot answer the question of whether enlisted pay is adequate. Pay adequacy depends on whether pay can attract and retain personnel with the skills and aptitudes required by the services, and later we discuss recent recruiting and retention outcomes. We recognize that cyclical factors—in particular, the economic boom—have made recruiting and retention harder for the services. But long-term trends in returns to college, college enrollments, and higher education among enlisted personnel should not be overlooked. The military is more than ever competing with higher education for high-quality youth. And as enlisted personnel increase their education while in service, their opportunity wage rises. Increasingly, the comparison group for enlisted personnel is shifting from high school graduates to those with some college. An RMC that compares with the 70th percentile of civilian earnings of high school graduates compares with the 50th percentile for those with some college.

Relative to Civilians with Some College, Enlisted Pay Growth Is Slower in Mid-Career Even with FY 01- FY 05 Reforms



The FY 00 pay package provides for basic pay increases 0.5 percentage point higher than the Employment Cost Index in the next few years. This chart shows RMC given 2.5 percent growth of basic pay relative to the ECI over the period FY 01–FY 05, and a 20 percent increase in the BAH from 80 percent to 100 percent of out-of-pocket housing costs. The chart assumes civilian earnings grow at the ECI (and CPI) rate over the 2001–2005 period. The percentage increases in RMC vary by year of service, but the average increase is around 7 percent. This lifts the average RMC line to about the average civilian wage for 10 to 20 years of experience. (The average wage approximately equals the 60th percentile of civilian wages.)

Constructing Civilian Earnings Profiles with Life-Cycle Approach

- Estimate model of wage trend by age, education, occupation, and unemployment rate for each sex/race ethnic group
- Construct earnings profiles from estimated models for cohorts aged 19 in 1983, 1998, and 2006
- Compare civilian and military career earnings
- Military pay based on:
  - Actual military pay to 2000, legislated pay increases to 2006, and ECI thereafter
  - Typical career progression using 1996-1999 promotion pace

The previous pay comparisons were snapshots at a point in time; we now shift to life-cycle comparisons. We make comparisons for several cohorts of youth: 19-year-olds in 1983, 1998, and 2006. If we looked only at a single cohort, we might find military/civilian pay differences, but we would not know whether those differences have widened or shrunk over time. The life-cycle comparisons confirm that the ratio of military to civilian pay over a career is lower for persons with some college than for high school graduates. Further, given some college, this disparity differs by occupational area: It is worse for professional/technical occupations than for production/craft occupations. Less expected, however, is the finding that the present value of earnings in an enlisted career has been *rising* relative to that of civilian careers of those with some college. If career earnings alone determined career choice and retention, recruiting and retention should be better today than they were in the past, contrary to actual recent outcomes.

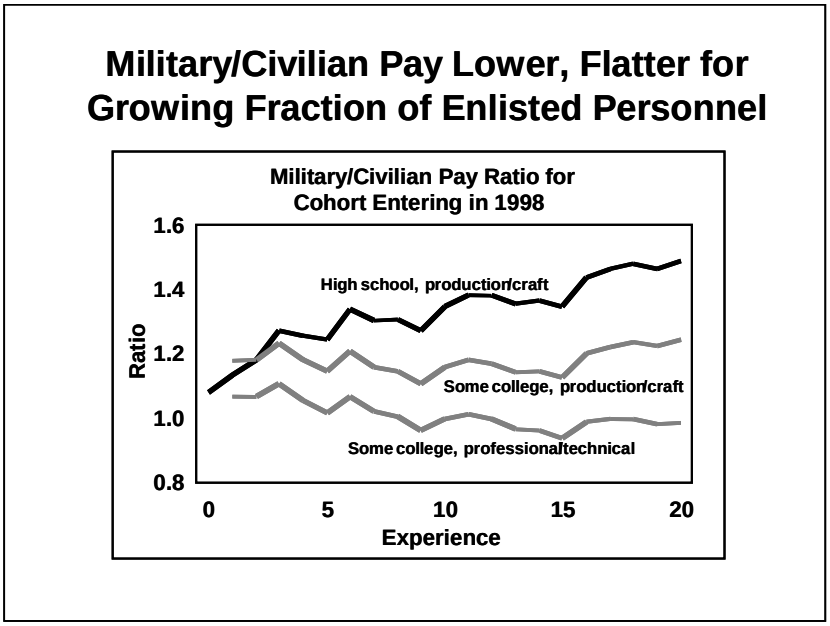
This leads us to consider the return to four or more years of college—not just the return to some college—as a factor in choosing a civilian education and career track over a military career. It also suggests the importance of military vs. civilian career content (skill development, experiences, opportunity for advancement) and transferability of skill as other possible factors in the military's competition for high-quality personnel.

The life-cycle analysis draws on a study by Hosek and Sharp (2001), who used the March Current Population Surveys to develop life-cycle civilian earnings profiles by cohort. Wage data for 1983–1998 were

grouped by age, education, occupation, race/ethnicity, and gender. The average wage for each group, deflated to 1998 dollars, was regressed on age/education/ occupation indicators, a time trend for each education/occupation group, and an unemployment effect differing by age and education. Separate models were estimated for each race/ethnicity-gender group. The data and models were then used to construct 20-year age-earnings profiles for three cohorts, persons age 19 in 1983, 1998, and 2006, respectively. This was done for each race/ethnicity-gender group, and within group by each combination of education level and occupation.

Earnings for the 1983 cohort were based on actual wages for 1983–1998 and predicted wages for 1999–2003, while earnings for the 1998 and 2006 cohorts were based on predicted wages. The wage predictions used the Congressional Budget Office forecast of unemployment rate for future years.

Military pay profiles assume a career having promotion rates equal to those in 1996–1998. The measures of military pay were taken from the Uniformed Services Almanac, which provides Basic Military Compensation (BMC) to 1997 and RMC for 1998 onward. BMC includes basic pay, basic allowance for subsistence, basic allowance for quarters, and an adjustment for the nontaxability of BAS and BAQ. RMC is the same except that BAQ is replaced by BAH, which restructures the housing allowance and includes amounts to adjust for location-specific differences in the cost of housing. Such adjustments had previously been in a separate allowance, the variable housing allowance. Military pay includes the 4.8 percent basic pay increase effective January 2000, the structural increases effective July 2000, and the ECI + 0.5 percent increases in years 2001–2006. ECI forecasts were generated by Data Resources, Inc., and provided to RAND by the Office of Compensation in the Office of the Secretary of Defense. Future military pay was converted to 1998 dollars by a deflator based on a Congressional Budget Office forecast of CPI growth. The analysis adjusted for the upward bias in the CPI by subtracting 1.1 percentage points per year, following the suggestion of the Boskin Commission. (The analysis alternatively used the Bureau of Labor Statistics CPI research series, which also adjusts for bias, and obtained basically the same results.) The CPI bias comes from substitution bias (as the price of a good rises, consumers respond by choosing substitute goods whose prices have not risen), outlet bias (CPI did not allow for the emergence of discount outlets offering the same goods at lower prices), and quality bias (a good of the same apparent description increases in quality).

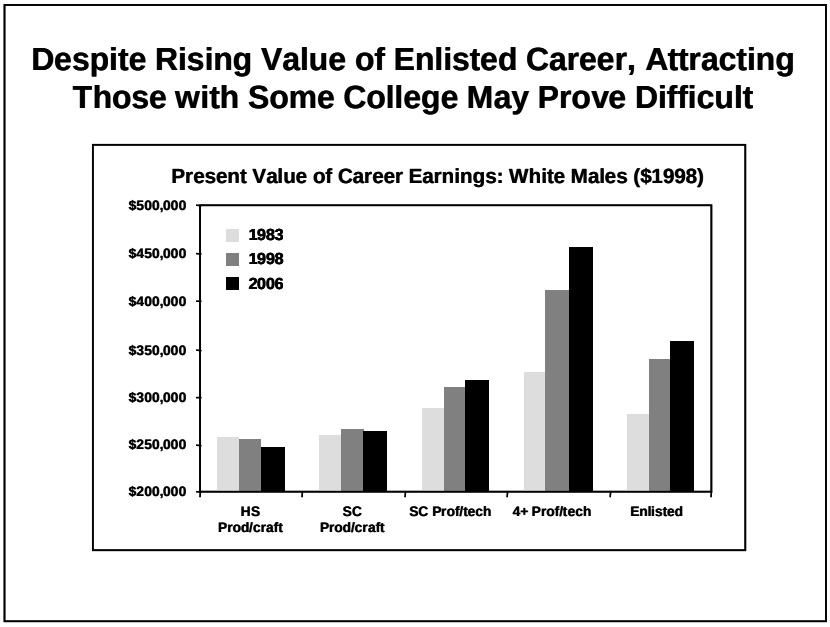


This chart displays the military/civilian pay ratio for the 1998 cohort by year of experience. In the top line, pay over a military career is compared with the average pay of a high school graduate working in a production/craft occupation. The military/civilian pay ratio begins at 1.1 and rises above 1.5 by 20 years of experience. This relative rise differs from the cross-section results, which showed RMC tracking the 70th percentile over years of service 8 to 20 and hence having a constant ratio over that range. The rise in the life-cycle comparison shown above occurs because real earnings of high school graduates in production/craft occupations are predicted to decline in the future, whereas real military earnings are expected to rise.

The middle and lower lines compare military pay with the average pay of workers with some college in a production/craft occupation or a professional/technical occupation, respectively. The production/craft pay ratio starts near 1.2, declines toward 1.1, then rises to over 1.2. The professional or technical pay ratio is lower overall because of the higher civilian wages in these occupations. The ratio starts below 1.1, declines toward 0.9, then rises to 1.0. The some-college career pay ratios are in effect similar to the cross-section comparison, which showed RMC tracking just above the 50th percentile over YOS 8 to 20. The pay ratios above are fairly flat, which implies that RMC and civilian pay will grow at about the same rate over these years of experience.

For an enlistee entering with a high school education, military pay compares well with civilian pay, and an enlisted career holds the promise

of significant growth in relative pay. But for an enlistee who acquires some college while in service, relative pay declines once the additional education is obtained (compare the top line with the middle or lower line), and then there is virtually no prospect of relative pay growth over the remainder of the career. Indeed, the drop in relative pay is greater for personnel in professional or technical occupations, and the prospects for relative pay growth over the career are worse. We therefore infer the same message we obtained from the cross-section results, though the life-cycle results indicate that the effect differs by occupational area.



The chart displays the present values of 20-year careers for different cohorts. The present value calculations use a 10 percent real personal discount rate. (Warner and Pleeter [2001] find evidence of even higher personal discount rates among military personnel, above 20 percent.) The perspective of the comparisons is that of a high school graduate interested in the payoffs to different education levels and career tracks.

The present value (PV) of an enlisted career has risen considerably from 1983 to 1998, and the full implementation of the FY 00 pay increases will increase it even further. In contrast, the PV of a high school production/craft career has fallen, reflecting the gradual erosion of real earnings of high school graduates. The military has always had to pay a premium to get and keep the people it requires, and in 1983, the PV of an enlisted career was greater than that of a high school career. Over time, the difference in values has widened. Nevertheless, in recent years, the military has had increasing difficulty recruiting high-quality personnel. We think this is the result not only of cyclical factors but also of the shift toward higher education.

The PV of a production/craft career for persons with some college is higher than that for high school graduates, but the difference is not large. Also, the value of this career has been about constant. The value of a professional/technical career for those with some college is higher than that of a production/craft career for high school graduates and has been rising. For the 2006 cohort, a professional/technical career for those with some college is predicted to be worth about $70,000 more than a

production/craft career for those with high school only ($317,000 vs. $247,000).

The value of careers based on four or more years of college has been rising fastest, especially in professional/technical fields. This rise encourages more people to start college and to continue toward a four-year degree after a year or two of college. That is, the returns to four years of college will be on the minds of some people who were initially oriented toward community college. Similarly, service members who have obtained some college while in service may be increasingly drawn to complete four years and cash in on a high-paying private-sector job. The military's educational benefits help to facilitate this behavior.

Indeed, college enrollment for persons in their mid- and late 20s has been rising, leading to an increase in the percentage of persons in their early 30s with four or more years of college. Thus, the PVs suggest that the military's competition with higher education comes in part through the rising returns to professional/technical occupations and the role of a year or two of college as a stepping stone to four or more years of college.

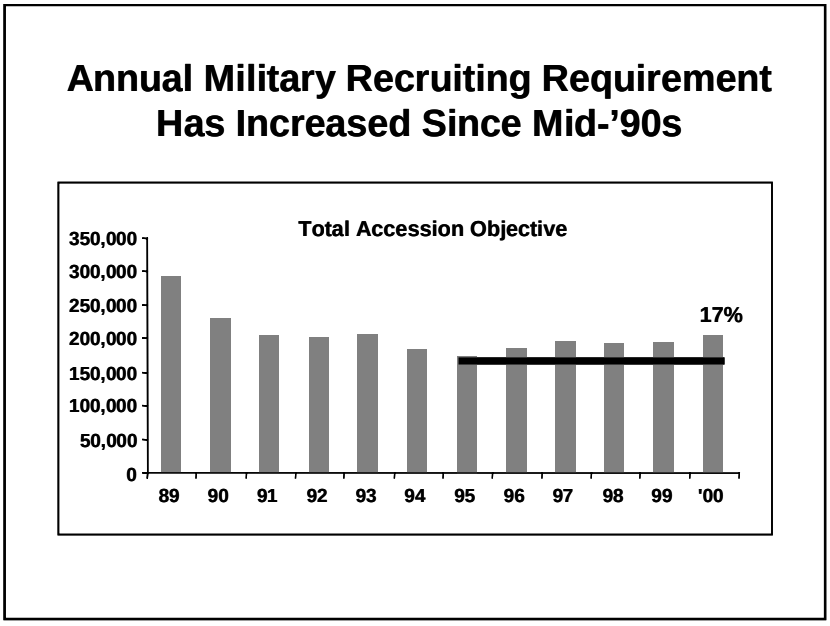
Still, many people interested in some college may not be interested in four or more years of it. They may be concerned with the value of civilian job experience vs. military experience, and it may be that civilian job experience has become relatively more valuable than it has been in the past.

Trends for College-Educated Workers Will Continue to Be Relevant for Military

- Rising return to college education is a long-term trend
- Studies indicate that skill-biased technological change (e.g., computers) explains a large part of recent wage growth for college group
- Recent technological changes are not a temporary phenomenon, though pace and impact on economy will change over time
- Military requirements for high-quality personnel and those with technical skills are not likely to abate in the future and are likely to increase

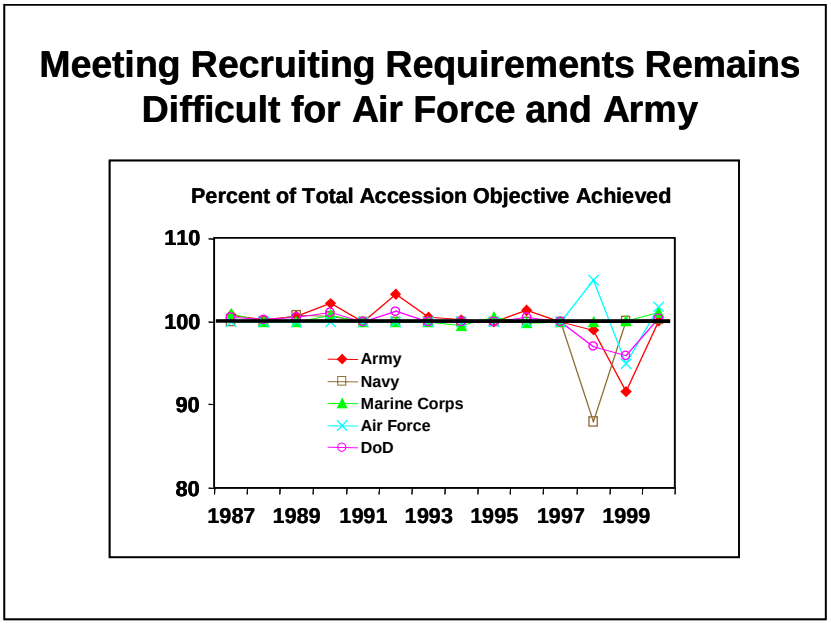
In seeking an explanation for the wage growth for those with a college degree, the economics literature points to technological change that is favoring the most skilled and educated workers. In other words, computers have made more-educated workers relatively more productive. This phenomenon is not likely to abate but will continue in some form as additional technological change occurs in the computer industry, which in turn has an impact on the rest of the economy.

Furthermore, the military will continue to demand skilled and educated personnel, and it will need to continue to draw from the civilian labor market to get these personnel and retain them. Therefore, these trends will continue to be relevant to the military, even without a booming economy.

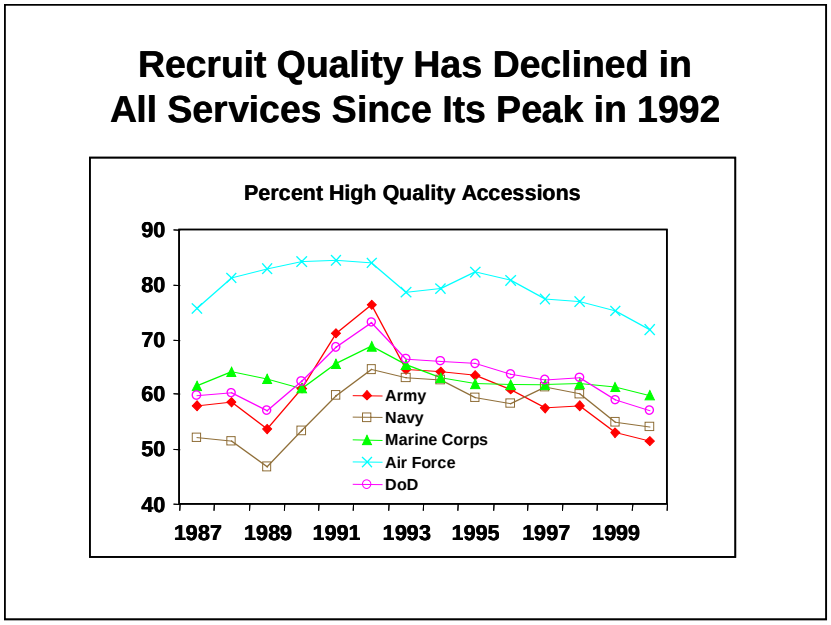


We next examine broad measures of active-duty recruiting and retention success. The measures provide an indication of how well the services have been able to meet their personnel needs in recent years. We present a preliminary assessment of what effect the FY 00 pay action might have on recruiting and retention, and we indicate the potential impact on the services of a continuation of recent retention rates in the future, in the absence of the FY 00 pay action.

In considering recent recruiting outcomes, it is useful to examine how the military's overall recruiting requirement has changed over time. Following a steep drop in the requirement during the defense drawdown of the early 1990s, the overall requirement has been rising since the mid-1990s. Specifically, since 1995, the overall accession mission has increased by 17 percent across the DoD.



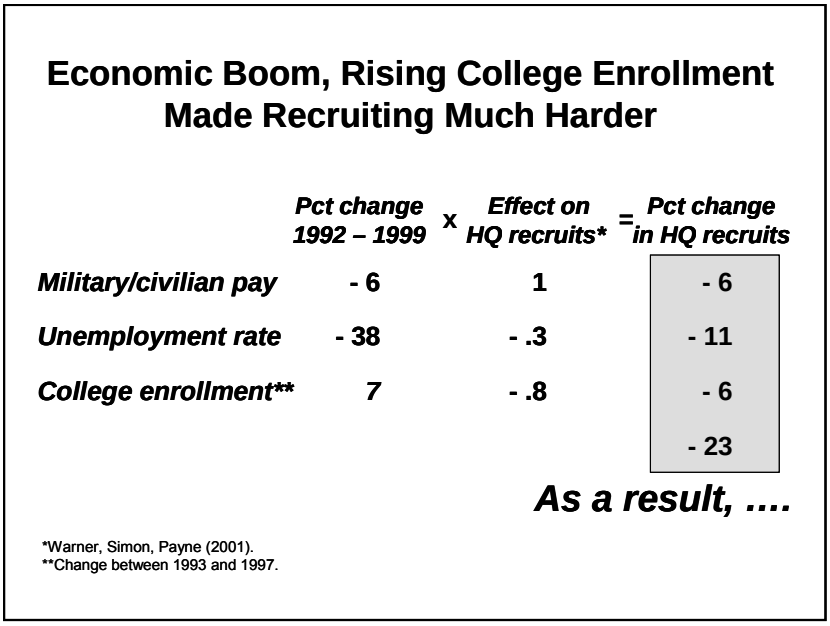
The services struggled to meet their accession targets in 1998 and 1999. In FY 00, all services met their goals.



A key indicator of recruiting success is the percentage of recruits who are of high quality. High-quality recruits are defined as those with a high school diploma who score in the upper half of the AFQT score distribution.

The percentage of recruits who are of high quality reached a peak in 1992, during the recession and the drawdown, and then fell steadily. At the end of the 1990s, quality stood at the level seen at the end of the 1980s. DoD-wide, 57 percent of the accessions were of high quality in FY 00. The figures by service were: Army, 51.5 percent; Navy, 54.2 percent; Marine Corps, 59.9 percent; and Air Force, 71.8 percent. Compared with the situation in the late 1970s and early 1980s, quality is high, but a continuation of the downward trend would be worrisome.

Since high-quality personnel perform better, and the quality of an entering cohort of recruits does not change much as it progresses in service, there is good reason not to allow quality to drop further. Further, it is possible that the demand for high-quality recruits relative to total recruits is rising. If that is the case, although the drawdown cut personnel strength and accession requirements by one-third, it is questionable whether the demand for high-quality recruits should have been cut by one-third, as recent recruiting performance suggests.



The economic boom and increased college enrollments were hard on recruiting in the 1990s. Between FY 92 and FY 99, the military/civilian pay ratio for 18- to 24-year-olds fell by 6 percent, and the national unemployment rate fell by 38 percent. We have used estimates from a recent recruiting study (Warner, Simon, and Payne, 2001) to estimate the change in the number of high-quality recruits due to pay, unemployment, and college enrollment. The estimates in the chart hold other factors constant, e.g., changes in recruiting resources such as recruiters and advertising. The changes between 1992 and 1999 in the military/civilian pay ratio, the unemployment rate, and college enrollment imply a 23 percent drop in high-quality recruits. Changes in recruiting resources, not shown, could counteract this drop.

Negative Impact on High-Quality Accessions Has Been Large

Actual outcomes	1992	1999
Accession	*203,000*	*195,000*
Actual accessions	*203,000*	*187,000*
Percent high-quality	*74.4%*	*59.1%*
Number high-quality	*151,000*	*111,000*

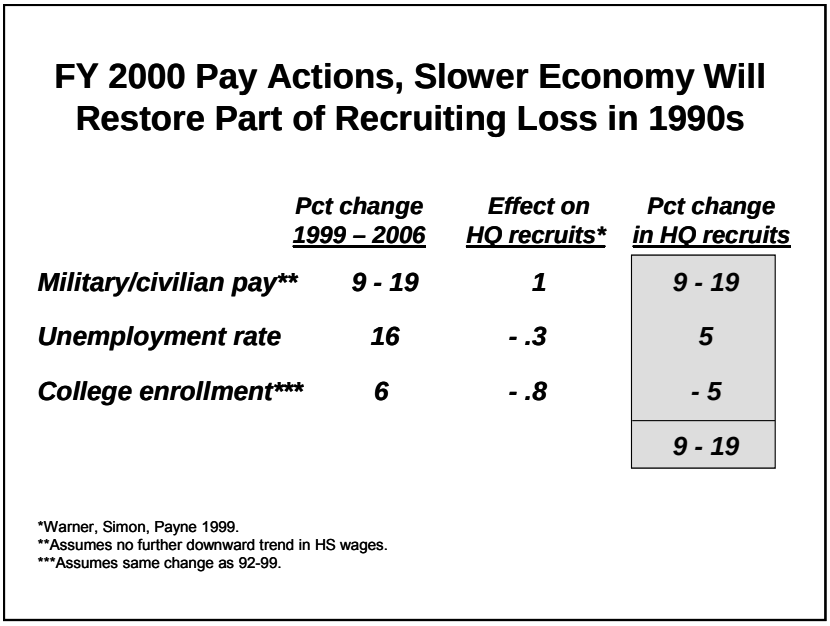
Estimated effect of pay, unemployment, college

A 23% decline high-quality accessions from 1992 equals .23 x 151,000 = 35,000.

To put the predicted 23 percent drop into perspective, we compared recruiting in FY 92 with that in FY 99. The DoD accession objective was 200,000 in FY 92 and 195,000 in FY 99. In FY 92, 203,000 were recruited, of whom 74.4 percent or 151,000, were high-quality recruits. A 23 percent decline against that base equals 35,000, hence a prediction of 151,000 – 35,000 = 116,000 high-quality recruits.

In FY 99, the DoD fell 8,000 short of its accession objective, recruiting 187,000. Of these, 59.1 percent, or 111,000, were of high quality.

The numbers indicate that declining pay, declining unemployment, and rising college enrollment played a large role in the decline in the number of high-quality recruits. The situation is more complex than the chart indicates, because the services took countermeasures against these changes and worked harder to achieve their recruiting targets. Despite these efforts, the net result of 111,000 high-quality recruits is close to the simple prediction of 116,000 based on pay, unemployment, and enrollment. Therefore, either the combined effect of pay, unemployment, and enrollment was worse than the predicted 23 percent drop, or other, unobserved factors were at play.



FY 2000 Pay Actions, Slower Economy Will Restore Part of Recruiting Loss in 1990s

	Pct change 1999 – 2006	Effect on HQ recruits*	Pct change in HQ recruits
Military/civilian pay**	9 - 19	1	9 - 19
Unemployment rate	16	- .3	5
College enrollment***	6	- .8	- 5
			9 - 19

*Warner, Simon, Payne 1999.
**Assumes no further downward trend in HS wages.
***Assumes same change as 92-99.

The improvement in military pay resulting from the FY 00 pay legislation and an anticipated softening of the economy should ease the recruiting situation. However, college enrollment will likely continue to increase.

We consider a range of possible changes in the military/civilian pay ratio itself. The range reflects alternative forecasts about how civilian pay will change in the future. The upper-bound forecast is based on a linear extrapolation of the trend in the earnings of 17- to 26-year-old males who have a high school diploma. The real earnings of this group have been declining or are at best nearly flat. This means their nominal earnings are not expected to grow as fast as the CPI. The FY 2000 pay legislation, however, will cause military pay to rise faster than the Employment Cost Index for six years, and based on the outlook, military pay will grow faster than inflation. As a result, the military/civilian pay ratio is expected to rise. Assuming the civilian pay trend continues, we forecast a 19 percent increase in military/civilian pay by 2006 relative to 1999.

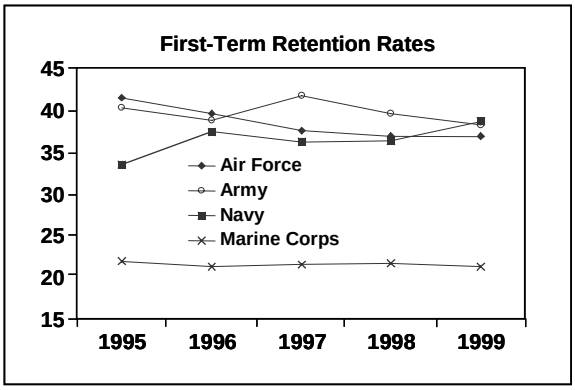
Frankly, this forecast seems high to us. Changes in the economy might cause earnings of high school graduates to rise rather than decline. For instance, low-skill labor markets have been fed by immigration and, more recently, by welfare reform, and perhaps these trends will abate. Further, the predicted increase in inflation might be too low; a higher inflation rate would mean slower growth in real military pay. To account for this possibility, we also consider a smaller increase, i.e., 9 percent in military/civilian pay between 2000 and 2006. (It is also possible that

high-quality youth may become less responsive to the military/civilian pay ratio for reasons having to do with the perceived value of civilian education and job experience.)

In FY 1999, 59 percent of recruits were of high quality. A 9 percent increase would raise the level to 64 percent in 2006, while a 19 percent increase would raise it to 70 percent. The quality percentages would be lower in intervening years. A level of 64 percent is above the range of recruit quality in the late 1980s, and 70 percent is in the range of the early 1990s.

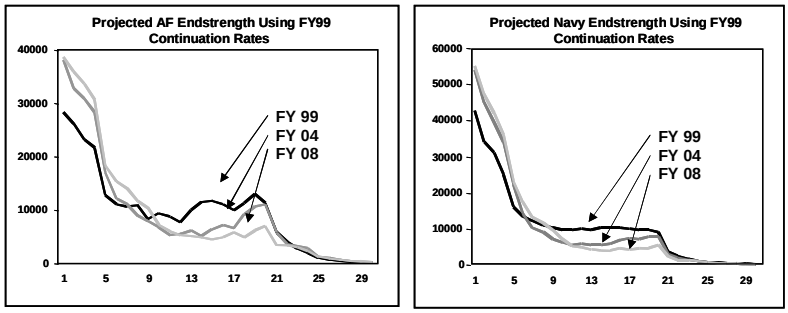
The gradual increase in military pay called for by the FY 2000 legislation means that the percentage of recruits who are of high quality could remain relatively low for several more years.

First-Term Reenlistment Rates Have Been Falling in the Army and Air Force



Turning to retention, the next few charts examine recent trends in retention and show projections of how retention and the experience mix of the services might change in the future. This chart shows the trend in the first-term retention rate, by service, defined as the percentage of personnel who, having reached the expiration date of a term of service, were still in service a year later (data provided by the Defense Manpower Data Center). Among the services, the Air Force experienced the largest retention-rate decline between 1995 and 1999, as retention fell by 5 percentage points, or 12 percent. The rate for the Marine Corps was relatively flat, but the Army's first-term retention rate fell by 2 percentage points, or 5 percent. The Navy rate actually increased, but the increase might reflect the Navy's rising first-term attrition rate, which cleared away personnel who would not have reenlisted.

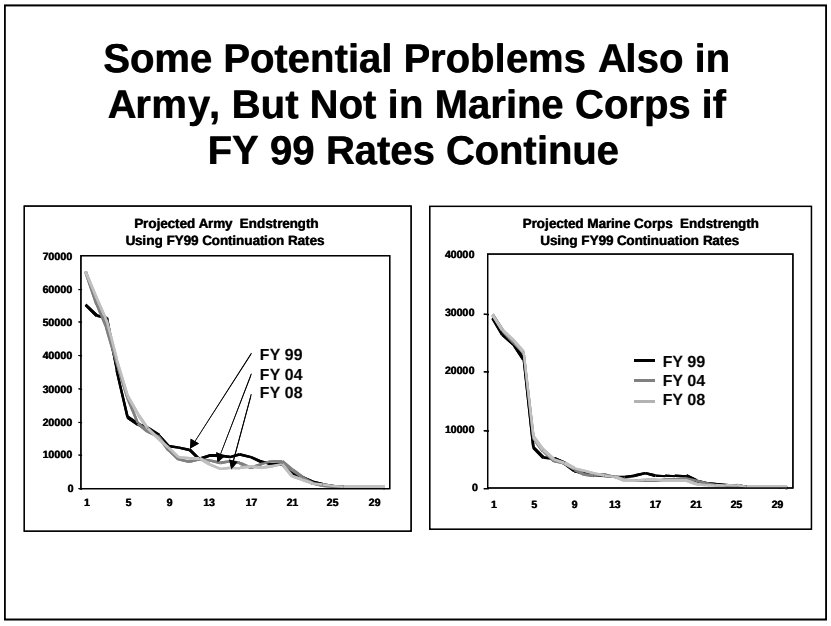
FY 99 Continuation Rates Would Cause Large Drops in Air Force, Navy Mid-Career Forces, Big Increases in Recruiting Requirements



The next two charts show the projected experience mix of each service under the relatively low continuation rates observed in FY 99, before the FY 00 pay action. The changes in the experience mix suggest what might happen if military vs. civilian pay and other factors remained at their FY 99 levels. To compute the experience profiles and project them into the future, specifically to FY 04 and FY 08, we began with the inventory of personnel by YOS and applied the FY 99 continuation rates by YOS. Total endstrength is maintained in each service by increasing accessions in YOS 1. When continuation rates are low relative to earlier years, the number of experienced personnel will fall, and the number of junior personnel will rise as accessions increase to make up the shortfall in endstrength.

This chart shows the results for the Air Force and the Navy. The FY 99 continuation rates are clearly low enough to cause mid-career forces to fall precipitously, especially in the Air Force, and the forces are projected to become far more junior as accessions rise.

The FY 99 rates, of course, do not reflect the effects on retention of the FY 00 pay action. An improvement in retention rates would avert the projected loss of seniority shown here for the Air Force and the Navy.



The projections for the Army show some loss of seniority in the mid-career range, although the effect is not large. We project no change in the seniority mix for the Marine Corps, which implies that the FY 99 continuation rates are at their steady-state level. Consequently, any improvement in retention due to the FY 00 pay action will cause the Marine Corps to become a more senior force, unless it takes steps to prevent this outcome, say, by using tighter reenlistment controls.

Available Information Suggests Mixed Aggregate Enlisted Retention Picture In FY 00

- Compared to FY 99, first-term FY 00 reenlistment rates were higher
- However, second term reenlistment rates were about the same or slightly lower; career reenlistment rates were significantly lower, except for the Marine Corps
- Furthermore, the services, particularly the Air Force, missed some of their FY 00 reenlistment targets

The previous charts rely on data from FY 99 and earlier. Information for FY 00 provided by the Office of Officer and Enlisted Personnel Management in the Office of the Secretary of Defense suggests that relative to FY 99, first-term reenlistment rates improved for all services.

However, the picture is more mixed when second-term and third-term reenlistment rates are considered. Second-term reenlistment rates stayed about the same (in the case of the Navy and the Marine Corps) or were somewhat lower (in the case of the Army and the Air Force). Third-term, or career, reenlistment rates were substantially lower in the Army, Navy, and Air Force but were higher in the Marine Corps.

The picture also appears mixed when it is recognized that in many cases, the services did not meet their reenlistment rate targets in FY 00, despite an increase in some of those rates relative to FY 99. The Air Force did not meet any of its aggregate reenlistment rate targets in FY 00, despite an increase in the first-term rate. The Air Force indicates that it has begun to meet its first-term reenlistment goal in FY 01, and second-term reenlistments have also improved as of the end of March 2001. Nonetheless, as Air Force Lieutenant General Peterson, Deputy Chief of Staff, Personnel, recently testified at a hearing of the Personnel Subcommittee of the Senate Armed Forces Committee (April 24, 2001), "While second-term reenlistments are slightly up from FY 2000, the continued shortfall in this area continues to be our most significant enlisted retention challenge."

Estimates Suggest FY 00 Pay Action Will Improve Future Retention

	Pct change	x	Effect on Retention*	=	Pct change in Retention
Period: 1992 - 1999					
Military/civilian pay	*- 6*		*.5 to 1.5*		*- 3 to -9*
Unemployment rate	*- 38*		*.15*		*– 6*
					- 9 to - 15
Period: 1999 - 2006					
Military/civilian pay	*9 to 19*		*.5 to 1.5*		*5 to 29*
Unemployment rate	*16*		*.15*		*2*
					+7 to 31

*Buddin et. Al (1992) and Arkes (2001)

The extent to which recent improvements in retention are due to the FY 00 pay action are unclear. Too little time has elapsed since July 2000 to judge the impact of the legislation on recruiting and retention.

As for the expected effect in the future, we used available estimates of the effects of changes in relative military and civilian pay and in the civilian unemployment rate to make predictions of the effect of the legislation on first-term reenlistment rates. These estimates are shown in this chart, and the discussion about them is the same as for the recruiting forecast chart.

Buddin et al. (1992) estimate that for each 1 percent increase in military vs. civilian pay, first-term retention increases by 1 to 1.5 percent. But to be conservative we also consider a lower range of responsiveness to pay.

Applying the range of pay-effect estimates to the range of forecasts, we find that the predicted retention effect of the FY 00 pay action, together with the effect of a change in the unemployment rate, will range from a 7 percent to a 31 percent increase in retention between 1999 and 2006.

Between 1992 and 1999, the available range of estimates implies a 9 percent to 15 percent drop in retention due to changes in the ratio of military to civilian pay and the unemployment rate. Therefore, depending on which estimates and forecasts one uses, future retention trends will either just offset the decline in the 1990s or more than compensate for

those declines. Either way, these estimates suggest that the FY 00 pay action will go a long way toward making up for the declines of the 1990s. Furthermore, these estimates do not account for increases in reenlistment bonuses that occurred in 2000 or other actions the services may take (such as relaxation of retention control points) in the future to improve retention. Still, the estimates and forecasts apply to retention across all occupations. Therefore, shortages and retention problems in specific occupational areas may continue to be concerns in the future despite the overall improvement in retention.

That the forecasts suggest that the FY 00 pay action will significantly improve retention does not mean that an additional pay action is not necessary. As discussed earlier, the FY 00 pay action did not address the fundamental changes in the educational composition of the enlisted force and in the youth population from which the military recruits or the changes in the civilian opportunities available to enlisted personnel.

Policy Options for Adjusting Enlisted Pay

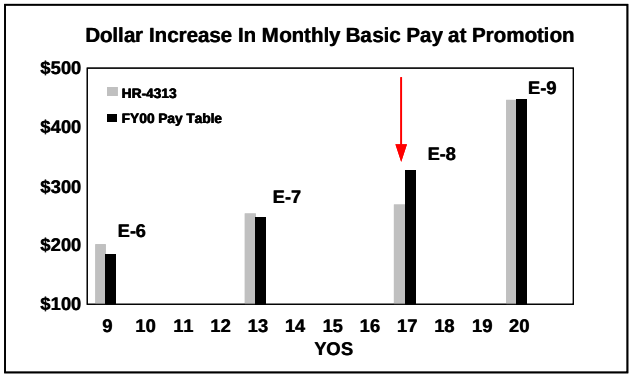
- Across-the-Board pay raise (e.g., same % increase for all enlisted personnel)
- Pay raise for mid-career enlisted personnel only
- Graduated pay raise (e.g., the % increase is higher for those in higher pay-grades)

Although our analysis was not intended to recommend specific policy initiatives, the next part of the briefing discusses the types of policies that might be considered to readjust enlisted pay to reflect the changing educational and skill composition of the enlisted force and to make an enlisted career more competitive with the civilian labor market. The discussion focuses on the broad policy issues associated with raising pay rather than on specific policy proposals and their costs and benefits.

One way to increase mid-career enlisted pay is to give an across-the-board pay raise to all enlisted personnel. An advantage of an across-the-board pay raise is that it would give the same percentage increase to everyone. This is appealing to many for reasons of equity and simplicity, including ease of communicating the pay increase to service members. However, the disadvantage of the across-the-board approach is that it would maintain the same structure of pay across grade and years of service. We showed earlier that relative to civilian pay, mid-career military wage growth is slower for personnel with some college than for those with only high school. Holding real civilian earnings constant, an across-the-board pay raise that increases pay at all experience levels by the same percentage would maintain that structure. While the level of mid-career military pay would be higher, the growth rate at that stage would be the same. Therefore, an across-the-board pay raise would not address the relatively flat structure of military pay, relative to civilian pay, for enlisted personnel.

Pay Raise Targeted Only to Mid-Career Would Create "Notches" in Pay Table

Example: House proposal to raise E-5 to E-7 basic pay reduces reward to E-8 promotion



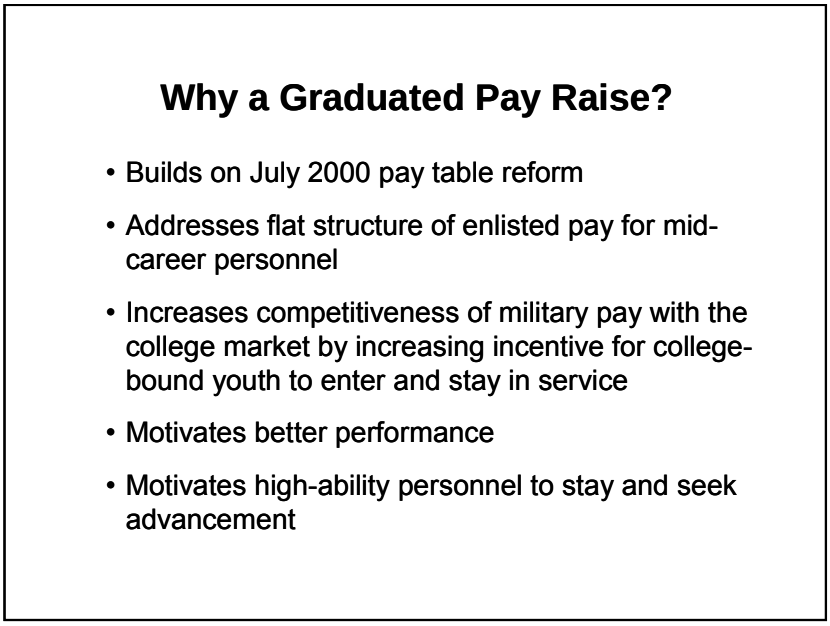
A second approach is to target the pay raise to those who are in mid-career. A third approach is to give a graduated pay raise to enlisted personnel. Under this approach, all enlisted personnel would get a raise, but the percentage increase would be successively higher for those in the higher pay grades, with those in the highest pay grade (E-9s) receiving the highest percentage increase.

A pay raise specifically targeted to enlisted personnel in mid-career also has advantages and disadvantages. One advantage of this approach over the across-the-board approach is that a mid-career pay raise bolsters incentives to continue in service after obtaining some college. As we saw, many first-term personnel now obtain some college, and further, the military/civilian pay ratio is lower in mid-career years for personnel with some college than for personnel with high school only. In addition, a mid-career pay raise will generally cost less because only a subset of personnel would receive more money. Finally, a mid-career raise would address inequities associated with the July FY 00 targeted pay raise, critics of which argued that enlisted non-commissioned officers in their mid-career received lower raises than junior commissioned officers, even though the duties for NCOs have entailed more responsibility in recent years.

Both the House of Representatives and the Senate proposed legislation in FY 00 that increased pay for NCOs only. The House Bill, HR-4313, proposed to increase the pay of NCOs (specifically E-5s, E-6s, and E-7s) by the same percentage amount as pay was increased for junior officers under the July FY 00 pay raise.

An important disadvantage of a pay raise targeted solely to mid-career personnel is that it creates undesirable notches in the pay table. That is, when pay is increased for E-7s but not for E-8s, the pay increase associated with a promotion from E-7 to E-8 is reduced. Consequently, a promotion to E-8 is worth relatively less, and the pay profile for those who achieve E-8 and E-9 is relatively flatter. This problem is illustrated in the chart, which shows the increase in monthly pay associated with enlisted promotions to E-6 through E-9 under the FY 00 pay table and under HR-4313, at specific years of service. As the chart illustrates, those promoted to E-8 receive a smaller increment in monthly pay under HR-4313 than under the current pay table.

By reducing the payoff to promotions to the senior grades, a raise targeted only to mid-career personnel reduces the relative incentive for high-quality personnel to stay in the military and seek advancement to E-8 and E-9; it also reduces the incentives for individuals in mid-career to work hard, perform effectively, and take the necessary actions that lead to a promotion to those grades. Given the military's hierarchical organizational structure, where the actions and productivity of the senior personnel affect the productivity of more-junior personnel, such adverse incentive effects could be large. Consequently, such a raise would be less effective, in terms of military productivity, than would a graduated pay raise, which is the third approach. On the other hand, because the dollar amounts under the House and Senate proposals are relatively small, the overall negative effects on incentives would be small as well.

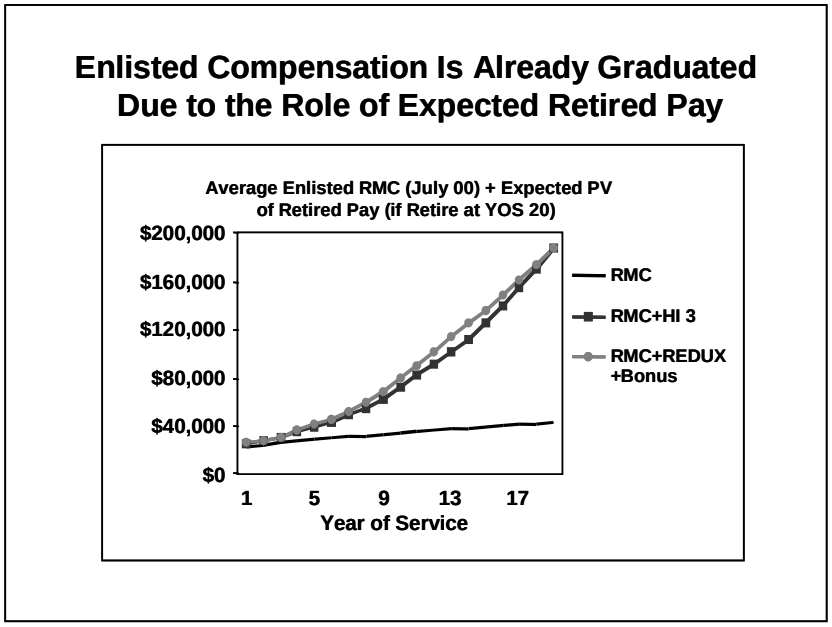


By giving increasingly higher raises to those in higher grades, a graduated pay raise would increase the wage growth for mid-career personnel relative to the civilian sector and would therefore target resources to the area where the educational and skill content of the enlisted force is the greatest and where relative pay growth has been lagging. A graduated pay raise has other advantages. Like the across-the-board pay raise, all enlisted personnel would receive a raise, although not the same percentage amount. Like a mid-career pay raise, the graduated pay raise would target resources to enlisted personnel who have the most education and whose pay growth has been lagging relative to that of males with some college in the civilian sector. Furthermore, earlier research has estimated that it is less costly to achieve a given level of retention when pay raises are graduated than it is when they are across the board (Asch and Warner, 1994b). Therefore, for a given level of retention, graduated pay raises are generally more cost effective than across-the-board raises. Furthermore, the cost savings of a graduated pay raise could be used to help defray the overall cost of the pay raise. Finally, unlike a mid-career pay raise, the graduated pay raise would give raises to those in the most senior ranks, thereby avoiding the creation of undesirable notches in the enlisted pay table.

Past research also highlights another advantage of a graduated pay raise (Asch and Warner, 1994b). For a given level of cost, such pay raises are estimated to have a larger impact on personnel productivity than across-the-board raises have. A system that graduates pay toward the

middle and senior grades increases the financial returns associated with promotion. If the promotion system successfully identifies the most-productive and best-performing personnel, a graduated system increases the incentives for members to work hard and effectively, and it motivates the performers who are the most likely to get promoted to remain in the organization. In other words, a graduated system improves productivity incentives.

The July FY 00 pay raise was targeted, although it was not graduated in the sense of providing successively higher raises to those in higher grades. Rather, it gave raises that were generally larger to those in mid-career. The July FY 00 pay raise addressed several anomalies in the basic pay table. As discussed in Asch and Hosek (1999), these anomalies included longevity pay increases that were greater than promotion pay increases for some personnel and larger pay raises for early promotions than for some later promotions. The July FY 00 targeted raise addressed many of these problems and helped create a pay table that is more graduated overall. Therefore, any additional graduated pay raise in the future would build on the July FY 00 basic pay raise.



It is useful to note that the structure of the military compensation system is already graduated because it provides disproportionately more expected compensation to those in the more senior grades. However, most of the graduation is in the form of expected retired pay, not basic pay. The role of expected retired pay in current military compensation is shown in this chart.

The graph shows the average enlisted RMC by YOS and the expected PV at each YOS of average retirement wealth for an individual retiring at YOS 20. Expected PV is computed by multiplying the PV at a year of service by an estimate of the probability that an individual will stay in service until YOS 20, where the probability is based on FY 99 continuation rates by YOS for all services. A 10 percent real discount rate is also assumed, and average retirement wealth is computed as follows. First, retired pay is computed for personnel in all grades at YOS 20. Then the PV of retired pay from retirement age until age 100 is computed, assuming enlisted personnel retire at age 40 and assuming a standard life table to compute survival rates from age 40 to each future age. To compute average retirement wealth, a weighted average of retirement wealth is calculated using the FY 99 grade distribution at YOS 20.

Regardless of whether personnel retire under REDUX[1] (with a $30,000 bonus paid at YOS 15 for those who retire at YOS 20) or under REDUX's predecessor, known as High-3, a large fraction of military compensation (assumed here as the sum of average enlisted RMC and expected PV of retired wealth) comes in the form of expected retired pay for those approaching retirement. The fraction increases with YOS because as individuals approach YOS 20, the PV of retirement wealth is discounted for fewer years, and the individuals have a higher probability of staying until YOS 20.

[1] REDUX is the name commonly given to the retirement benefit system that took effect on August 1, 1986. Among other changes, it reduced retirement benefits from 50 percent to 40 percent of the highest three years of basic pay for those retiring at YOS 20.

Past Studies Recommend Restructuring Military Compensation

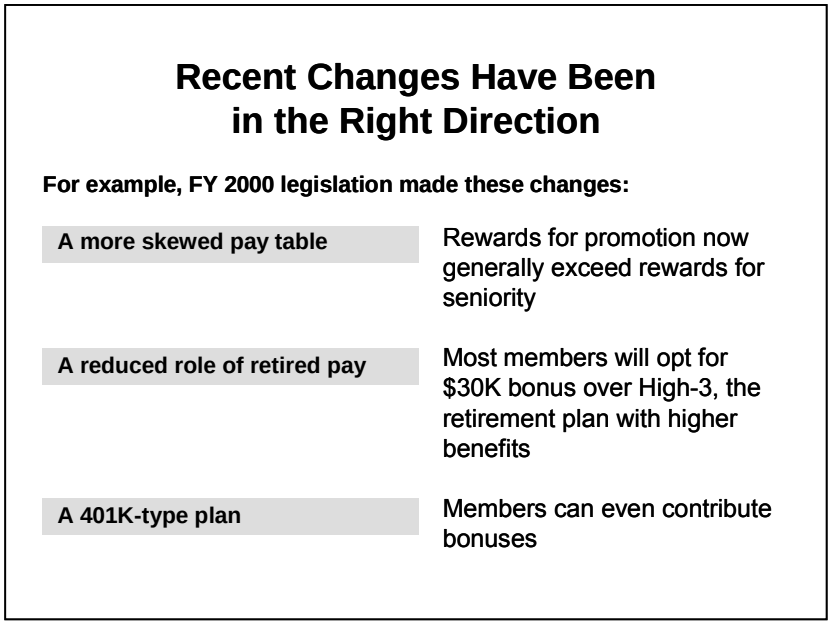
Recommendations by Defense Science Board report (1999) and RAND studies (1994, 1998) include:

- **Graduated pay raises by rank** (i.e., higher pay raises for mid-grade and senior personnel): to keep pay competitive and to provide performance incentives
- **Retirement system reform:** to vest personnel earlier in a 401K-type retirement plan that would provide an annuity for members' old age
- **Greater role of separation pay:** to improve force management flexibility and to facilitate the transition of personnel into "2nd career"

Several studies, including, most recently, the Defense Science Board (DSB) Task Force on Human Resource Strategy (2000), have recommended restructuring the military compensation system to reduce its cost while permitting more flexibility in personnel management and maintaining the advantages of its graduated structure. These studies have argued that the role of retired pay should be reduced and basic pay should be not only increased, but made more graduated by grade to maintain the overall graduated nature of the compensation system as a whole. Evidence on personal discount rates in the military suggests that enlisted personnel discount future benefits at a significantly higher rate than that at which the government discounts future costs (Warner and Pleeter, 2001). Therefore, benefits that are paid earlier in the member's career are valued more than those paid later. Consequently, the government can more cost effectively meet its recruiting and retention goals by increasing the role of basic pay and reducing the role of retired pay.

These studies have also argued for making the two policy goals of the military retirement system—helping individuals accumulate for retirement after age 62 and inducing separations at desired times prior to age 62—more transparent. The DSB recommended replacing the part of the retirement system that pays personnel after age 62 with a 401K-type retirement system that would vest personnel earlier (say, at year 10 rather than year 20) in a plan that would begin payment at age 62. It also recommended replacing the part of the system that pays personnel prior to age 62 with a system of separation pays that can be used to induce personnel to separate at desirable times in their careers and to permit more

variable career lengths across occupational areas. That is, separation pay can solve the flexibility problems created by a back-loaded or graduated compensation system.



Although no wholesale restructuring of the military's compensation system has been undertaken since World War II, there have been changes in the system in the past two decades that have tended to reduce the role of retired pay and to increase the role of basic pay while increasing the degree of graduation. Thus, these changes have been in the right direction. A good example is the FY 00 pay legislation. This legislation resulted in a somewhat more graduated military pay table, especially for officers. Regarding retired pay, although the legislation did not eliminate the 20-year system, and in fact offered a more generous retirement plan to those covered by REDUX, it also offered a $30,000 bonus to be paid at YOS 15 to those who did not opt for the more generous system. An analysis of the financial consequences of choosing the bonus over the more generous retirement system indicates that for most military personnel, the bonus will result in higher expected lifetime compensation (Asch and Hosek, 1999). In other words, most military personnel would have reason to choose the bonus over the more generous retirement system. Since basic pay was increased as part of the FY 00 legislation, and many personnel will choose the bonus over the more generous retirement system, and the bonus occurs relatively early in an individual's lifetime, the net result is that the role of retired pay in lifetime compensation will be reduced. Finally, the FY 00 legislation gives military members the option to participate in a 401K-type retirement plan. This provides a retirement vehicle for those who serve fewer than 20 years, and the government will contribute to it for those who reenlist in critical specialties.

So How Can DoD Become the Employer of Choice in the New Economy?

- Pay problem needs to be addressed
- Pay actions should:
  - Increase mid-career and senior enlisted pay
  - Increase with rank
- Military recruiting and personnel management needs to be reformed to better accommodate growing importance of education among current and future enlisted personnel

Future pay actions that address the long-term structural changes in the college market that have been discussed in this briefing should continue to move the overall structure of compensation in the right direction. Such actions should continue to focus on increasing the level of basic pay, bonuses, and other forms of pay that occur early in a military career, increasing the degree of graduation of these pays, and reducing the role of retired pay. To secure the competitiveness of enlisted pay in response to the rising levels of education among military personnel, the attractive opportunities they have in the civilian sector, and the need to recruit high-quality personnel in the future, a pay raise is warranted and it should be graduated, i.e., it should provide larger pay raises to those in the middle and senior grades.

Although the focus of this briefing has been on enlisted pay and compensation, it is worthwhile to recognize that improving the competitiveness of enlisted careers with civilian opportunities will also require changes in recruiting practices and in personnel management. The services have begun to make such changes. For example, they have introduced programs such as the Navy's "tech-prep" and "CASH" programs and have expanded existing educational programs such as the tuition assistance program. Nonetheless, the services must continue to examine how they can improve their effectiveness in recruiting the college market, how they can enhance military career opportunities for enlisted personnel with some college, and how they can help a better-educated enlisted force transition smoothly into the civilian labor market when they leave the military. Such changes, together with changes in pay, will help

position the services better in the civilian labor market and will improve their ability to meet their current and future personnel needs.

APPENDIX A

PREDICTING YEAR 2000 CIVILIAN EARNINGS FOR THE CROSS SECTIONAL APPROACH

Data from the March 1994–1999 Current Population Surveys were used to develop profiles of civilian earnings for comparison with military earnings profiles. To develop civilian profiles, data were extracted from these surveys on all males between the ages of 18 and 59 who worked at least 30 weeks in the preceding year and averaged more than 35 hours of work per week. Self-employed workers were deleted. The dataset contained observations on 111,141 individuals.

One way to develop experience-earnings profiles from such data is to simply array the observations for each education group by age or experience level (experience = age – years of education – 6) and compute the mean earnings at each experience level and the percentile limits of earnings (30th, 50th, etc.). Such a procedure would yield noisy profiles because even in a survey as large as the CPS there are small cell sizes in some education/experience cells. Average earnings and percentile limits in these small cells will exhibit more random variation than cells containing larger samples. Smoother experience-earnings profiles can be obtained by estimating regression models for earnings by education level and using the regression models to predict earnings. The regression approach also allows us to control for observable characteristics such as race and to predict earnings for specific groups.

Theory. Let earnings = Y = $\exp\{X\beta + u\}$, where X is the set of observable determinants of Y, and u is the random error and is distributed $N(0, \sigma^2)$. Our goal is to estimate β and use the estimated equation to predict earnings. The equation is easily estimated by taking the natural logarithm of Y and estimating the equation $\ln Y = X\beta + u$. Let b equal the estimate of β, s equal the estimate of σ (standard deviation of the unobservable determinants of Y), and e equal the estimate of the random error u ($e = Y - Xb$). Predicted mean earnings at experience level t are estimated as the average value of $\exp\{Xb + 0.5s^2\}$ for individuals at experience level t. To estimate percentile limits of earnings, we sorted the

estimated residuals in ascending order so that e_p equals the pth percentile residual. Then we predicted earnings at the pth percentile of earnings at experience level t as equal to the average value of $Y_p = \exp(Xb + e_p)$ for individuals with experience level t.

Empirical Model Specification. In the empirical model, lnY was the natural logarithm of annual wage and salary earnings in the year prior to the March CPS survey. Thus, for individuals surveyed in the March 1999 CPS, lnY is the natural logarithm of 1998 wage and salary earnings. Explanatory variables included experience, experience splines, variables for race (white, black, Hispanic), marital status, class of worker (private sector, federal employee), employer size, area type (urban, suburban), Census division, weeks of work, and calendar year.

Estimates. The estimated models are provided in Table A.1, along with associated T-statistics. A T-statistic larger than 1.96 (in absolute value) indicates that the estimate is statistically significant at the 5 percent level. Estimates may be interpreted as the proportionate change in earnings due to a given factor.

Earnings grow with experience but at a diminishing rate. Whites earn more than others. Married individuals earn more than single individuals. At all education levels, private sector workers earn more than state or local government workers; the difference is largest at the college graduate level. Federal government workers also earn more than state or local government workers.

It is important to note that earnings rise with organization size. Workers in the largest organizations (over 1,000 employees) are estimated to earn about 30 percent more than employees in the smallest organizations (less than 10 employees). When other factors are the same, workers in the largest organizations earn about 6 percent more than workers in the "average" organization.

Predicting 2000 Civilian Earnings. The regression models were used to predict the earnings of each individual in the CPS and the percentiles of earnings based on individual characteristics and experience level. The predictions thus take account of the distributions of individual characteristics in the civilian population (e.g., marital status, size of organization, area type, and Census division).

Three adjustments were made when we used the regression models to predict year 2000 earnings. First, the number of weeks of work was fixed at 52, which was the median weeks of work of the males in the CPS and represents a full work year. Second, it was assumed that earnings were

derived in 1998, the most recent year of March CPS data. Third, earnings were then increased by 7.1 percent to convert them to year 2000 earnings.

Table A.1 Earnings Regressions Used to Predict Year 2000 Civilian Earnings (dependent variable = natural logarithm of annual wage and salary earnings)

Variable	High School Graduates		Persons with Some College		College Graduates	
	Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
Intercept	7.622	157.85	7.511	134.55	7.503	87.83
Experience	0.056	5.02	0.058	4.71	0.087	5.26
Experience Splines:						
Exp ≥ 3 years	-0.014	-0.88	0.002	0.12	-0.029	-1.31
Exp ≥ 6 years	-0.005	-0.48	-0.011	-0.90	-0.017	-1.27
Exp ≥ 9 years	-0.009	-0.92	-0.030	-2.84	-0.017	-1.47
Exp ≥ 12 years	-0.025	-2.83	0.002	0.19	-0.004	-0.36
Exp ≥ 15 years	0.019	2.22	-0.008	-0.80	-0.014	-1.19
Exp ≥ 18 years	-0.013	-1.52	-0.003	-0.36	-0.002	-0.16
Exp ≥ 21 years	-0.005	-0.58	-0.007	-0.73	-0.003	-0.24
Exp ≥ 24 years	0.005	0.53	0.003	0.34	0.012	0.94
Exp ≥ 27 years	-0.010	-1.02	-0.001	-0.08	-0.025	-1.76
Exp ≥ 30 years	0.007	0.52	-0.014	-0.96	0.013	0.62
Exp ≥ 33 years	0.003	0.16	0.006	0.33	-0.005	-0.18
Exp ≥ 36 years	-0.013	-1.29	0.006	0.41	0.010	0.35
Race (omitted = other):						
White	0.122	9.42	0.113	8.26	0.144	9.44
Black	-0.036	-2.40	-0.001	-0.08	-0.011	-0.53
Hispanic	-0.040	-2.84	0.000	0.02	-0.012	-0.57
Marital status (omitted = single)						
Married	0.184	25.79	0.177	21.88	0.151	15.27
Divorced	0.088	8.71	0.072	6.33	0.045	2.76
Widowed or separated	0.059	1.66	0.001	0.01	0.068	1.03
Class of worker (omitted = state or local):						
Private	0.089	8.82	0.085	7.66	0.215	17.51
Federal	0.084	5.29	0.059	4.04	0.172	9.85
Number of employees in organization (omitted = < 10):						
10–24	0.084	8.63	0.096	7.81	0.087	4.90
25–99	0.148	16.54	0.157	14.45	0.172	11.10
100–499	0.193	21.41	0.202	18.69	0.227	15.03
500–499	0.234	20.39	0.220	16.43	0.271	15.00
1000+	0.293	35.76	0.270	27.81	0.302	22.08

Table A.1. Earnings Regressions Used to Predict Year 2000 Civilian Earnings (continued)

Variable	High School Graduates		Persons with Some College		College Graduates	
	Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
Area type (omitted = rural):						
Central city	0.032	4.73	0.065	8.75	0.088	9.13
Suburb	0.097	18.06	0.113	18.61	0.138	17.27
Census division (omitted = West):						
Northeast	-0.026	-2.33	-0.031	-2.50	-0.035	-2.32
Middle Atlantic	-0.018	-1.89	-0.024	-2.37	0.005	0.40
East North Central	-0.032	-3.39	-0.043	-4.43	-0.036	-2.84
West North Central	-0.118	-10.70	-0.128	-11.34	-0.163	-11.15
South Atlantic	-0.123	-12.69	-0.098	-10.00	-0.064	-5.10
East South Central	-0.154	-12.34	-0.148	-10.65	-0.113	-5.90
West South Central	-0.146	-13.84	-0.144	-13.13	-0.101	-6.98
Mountain	-0.093	-8.94	-0.118	-11.57	-0.121	-8.56
Weeks worked	0.027	40.97	0.030	36.22	0.029	23.38
Year (omitted = 1998):						
1993	-0.140	-17.96	-0.149	-17.07	-0.175	-15.62
1994	-0.113	-14.47	-0.118	-13.54	-0.161	-14.52
1995	-0.091	-11.33	-0.100	-11.16	-0.134	-11.74
1996	-0.062	-7.71	-0.067	-7.48	-0.129	-11.28
1997	-0.031	-3.86	-0.029	-3.23	-0.065	-5.76
Industry (omitted = agriculture):						
Mining	0.310	12.45	0.310	10.19	0.225	4.77
Construction	0.170	8.95	0.167	7.62	0.039	1.07
Manufacturing	0.107	5.81	0.135	6.47	0.028	0.83
Commerce	0.204	10.77	0.185	8.68	0.028	0.81
Trade	-0.004	-0.22	-0.015	-0.69	-0.124	-3.67
Finance	0.079	3.39	0.124	5.25	0.042	1.21
Service sector	-0.011	-0.56	-0.016	-0.74	-0.094	-2.83
Public admin.	0.270	12.14	0.270	11.69	0.049	1.40
Occupation (omitted = laborer)						
Manager	0.376	31.22	0.380	25.17	0.613	17.82
Professional	0.335	18.30	0.356	21.60	0.514	14.85
Technical	0.295	16.07	0.277	16.17	0.424	11.39

Table A.1. Earnings Regressions Used to Predict Year 2000 Civilian Earnings (continued)

Variable	High School Graduates		Persons with Some College		College Graduates	
	Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
Occupation (omitted = laborer) continued:						
Sales	0.288	23.99	0.303	19.39	0.542	15.51
Administrative	0.093	7.38	0.073	4.53	0.195	5.37
Service	-0.021	-1.81	0.076	4.63	0.297	7.85
Craft	0.213	22.44	0.223	15.54	0.250	6.88
Operative	0.104	9.58	0.088	5.21	0.056	1.32
Transport operative	0.141	13.12	0.097	5.75	0.088	2.04
Sample size	37857		31359		22264	
Standard error	0.441		0.451		0.486	
R-square	0.348		0.351		0.319	

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CHAPTER II

A RECENT HISTORY OF MILITARY COMPENSATION RELATIVE TO PRIVATE SECTOR COMPENSATION

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The views expressed in this paper represent those of the author and are not necessarily those of the Department of Defense.

SUMMARY

Military pay is compared with private sector pay in order to describe changes in relative pay over the past two decades. Military pay is measured by regular military compensation (RMC), a construct that includes basic pay, the allowances for subsistence and housing, and the tax advantage due to the allowances not being taxable. On average, RMC accounts for over 90 percent of the cash pay going to enlisted members and officers in the active duty force. Private sector pay consists of the pay of workers who worked at least 35 weeks per year and average at least 35 hours per week, inclusive of overtime pay. The source of private sector pay information is the Current Population Survey March Supplement. The CPS is a representative random sample, and the March Supplement contains information at the individual level about employment and earnings in the previous year. Pay comparisons consist of placing RMC on the private sector pay distribution for selected groups. For example, when RMC falls at the 70th percentile of private sector pay, RMC is higher than the pay of seven in ten workers and lower than the pay of three in ten workers.

For enlisted personnel, military pay rose relative to private sector pay during the 1980s and into the 1990s. However, during the middle 1990s, military pay fell moderately relative to private sector pay and probably contributed to recruiting and retention difficulties. In addition, during the 1980s and 1990s the level of education rose among enlisted personnel. This increase paralleled the increase in post-secondary enrollment rates among high school graduates. As a result of these changes, it is now relevant to compare enlisted pay not only to the private sector pay of high school graduates, but also to the pay of persons with some college. Further, private sector pay changed at different rates for workers with different experience levels. In the 1990s, private sector pay was not only higher for workers with some college than for workers with a high school education, but also higher for more-experienced workers with some college than for less-experienced workers with some college. The changes in education levels and private sector returns to experience imply that military pay growth has in effect become flatter in comparison to private sector pay growth.

Among officers, military pay fell rapidly during the 1980s. Private sector pay grew extraordinarily fast for workers with four or more years of college, although not for workers with less education. During the

recession in the early 1990s, military pay for O-3s rose relative to private sector pay. But from 1993 onward, the pay for O-3s tended to decline. This may have contributed to the O-3 retention concerns appearing at the end of the 1990s. The military pay for O-4s stayed around the same level (54th percentile) from 1988 to 1995 then rose in the latter half of the 1990s. Throughout the 1980s and 1990s O-4 pay stood at a lower percentile of private sector pay than did O-3 pay. This implied that private sector pay rose more rapidly with career experience than did military pay.

RECENT HISTORY OF MILITARY COMPENSATION RELATIVE TO PRIVATE SECTOR COMPENSATION

Military compensation consists of a wide variety of pays and allowances, yet for the vast majority of military personnel the foundational elements of compensation are basic pay, the allowances for subsistence and housing, and the implicit tax advantage arising from the non-taxability of those allowances. These elements are now termed regular military compensation (RMC) and previously were termed basic military compensation (BMC). In 1999, RMC accounted for over 90 percent of the average cash compensation for active duty personnel (Table 1). Because regular military compensation accounts for such a large part of military compensation on average, the broad trends in enlisted and officer compensation can be described in terms of RMC and BMC relative to private sector wages.

HISTORICAL OVERVIEW

The history of enlisted pay since 1982 may be divided into four phases. The first phase was the recovery from the acutely poor recruiting and retention climate of the late 1970s. At that time, the services were unable to meet their numerical recruiting goals, let alone their goals for high quality recruits. In addition, low retention rates among first-term and mid-career personnel led to concerns about manning shortages and the services struggled to maintain manning readiness. A key cause of the recruiting and retention crisis was the low level of military pay. During the latter 1970s, military pay had ebbed well below the level recommended by the Gates Commission as necessary to sustain an all-volunteer force. The crisis ended with the passage of large military pay

increases in 1980 and 1981, along with an expansion of bonus budgets, educational benefits, and recruiting resources. In particular, basic pay rose by 26 percent from 1979 to 1981. Although that was a period of high inflation—and private sector wages were rising rapidly—the increase in military pay outstripped the increase in private wages and returned military pay to the relative position it had held at the beginning of the volunteer force in 1973.

Table 1. Average Cash Compensation for Enlisted and Officers, 1999

Branch	Average Regular Military Compensation	Average Other Pays & Allowances	Average Total	RMC as Percent of Average Total
Enlisted				
Army	$30,509	$1,686	$32,195	95
Air Force	$31,398	$1,697	$33,095	95
Marine Corps	$28,241	$1,114	$29,355	96
Navy	$30,655	$3,088	$33,743	91
Officers				
Army	$61,689	$2,436	$64,125	96
Air Force	$61,599	$5,284	$66,883	92
Marine Corps	$58,707	$3,454	$62,161	94
Navy	$59,761	$6,179	$65,940	91

With military pay reset to competitive (or comparable) levels, recruiting and retention boomed in the years immediately after 1981. The services, especially the Army, succeeded in meeting their recruiting goals and substantially increasing the percentage of recruits who were high quality. In fact, first-term military pay continued to rise relative to the private sector pay of workers with a high school education. At the same time, retention rates rose. The rise in retention rates produced two effects: the average level of experience increased, and the number of accessions required to sustain the force fell. As a result, the services could be more selective in whom they retained and could increase their recruit quality goals.

The second phase was a period of consolidation of gains. This phase lasted from the middle 1980s to the early 1990s. Military pay held its approximate position relative to private sector pay from 1986 to 1990, and recruiting and retention remained strong. As a result, manpower readiness was high, and the services were in excellent condition for Operations Desert Shield and Desert Storm in 1990 and 1991. Still, the turn of the

decade marked a significant transition for national security strategy. The Cold War had ended, which led to plans for a one-third reduction in active duty personnel. In addition, the economy entered a recession in 1990-1991 and private sector wage growth flagged, causing a rise in military pay relative to private sector pay.

The third phase began around 1992. During 1992-1995 recruiting and retention targets were cut in accordance with downsizing. Also, operations other than war emerged as a trend, and military personnel were increasingly called away from home station to take part in military operations including peace making, peace keeping, humanitarian efforts, disaster relief, nation building, and border patrol. The private sector recovered from the recession, and by the late 1990s the nation had experienced its longest economic boom ever. During the expansion, the unemployment rate fell to 4 percent, its lowest rate in over 30 years. Private sector wages rose rapidly in professional/technical occupations and for college-educated workers, although not as fast as the remarkable increases for these groups in the 1980s. Private sector employment and earnings opportunities made recruiting and retention increasingly difficult.

In 1999, the Army, Navy, and Air Force missed their numerical recruiting targets for the first time since 1979. Moreover, the percentage of recruits who were high quality had fallen steadily since 1992. Recruit quality was still at a reasonably high level—in 2000, 57 percent of recruits were high quality, which compares with 57 percent in 1986—but the downward trend was deeply troubling. More puzzling, although entry-level military pay had fallen by about 6 percent from 1993 to 1997, it had regained that loss by 1999 and yet recruiting and retention were growing more difficult. One of the challenges faced by the 9th Quadrennial Review of Military Compensation was to understand the reasons for the growing divergence between recruiting and retention outcomes and the traditional measures of military pay relative to private sector pay.

The National Defense Authorization Act of FY 2000 sought to address the worsening military pay situation. This Act marked the beginning of the fourth phase. Provision was made to increase basic pay by half a percentage point per year more than what would have normally been expected over the period FY 2000-2006. In addition, authority was granted to pay higher bonuses, a thrift savings plan was created, and retirement benefits for personnel who entered service since August 1, 1986 were increased to be equitable with the retirement benefits of their predecessors. Nevertheless, concerns remained about the speed with which the pay increases would take effect. Although the services made their numerical goals in 2000, recruit quality was lower than in 1999. Further, retention of personnel with technical skills was problematic,

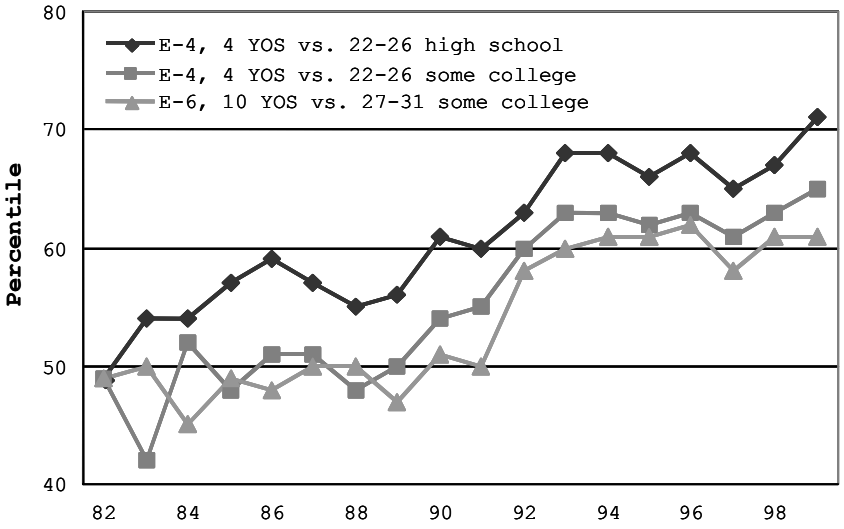
especially in the Air Force. Finally, the high pace of military operations other than war, in conjunction with the reduced force sizes of the post-Cold War era, continued to stress personnel and their families.

PAY TRENDS FOR ENLISTED PERSONNEL

Figure 1 depicts military pay for male enlisted personnel as a percentile of private sector pay for several age/education groups. Military pay is measured in terms of basic pay, subsistence and housing allowances, and a tax advantage due to the non-taxability of the allowances. The structure of each these pays has remained stable over time, except for a restructuring and multi-year phase-in of increases in the housing allowance beginning in 1998. The data source for private sector pay is the Current Population Survey March Supplement, which asks respondents about their employment and earnings in the previous year. Private sector pay is measured in terms of the earnings for persons who averaged at least 35 hours per week and worked at least 35 weeks per year. These are full-time, full-year workers. Private sector pay includes pay for overtime. The pay comparisons reflect basic military compensation as a percentile of the private sector wage distribution. For instance, if basic military compensation were at the 60th percentile, it would exceed the pay of 60 percent of the private sector workers and be less than that of 40 percent of the workers.

Figure 1 presents pay comparisons for an E-4 with high school, an E-4 with some college, and an E-6 with some college. An E-4 is a Corporal or Specialist in the Army, a Senior Airman in the Air Force, a Corporal in the Marine Corps, and a Petty Officer Third Class in the Navy. An E-6 is a Staff Sergeant in the Army and Marine Corps, Technical Sergeant in the Air Force, and Petty Officer First Class in the Navy. Military pay for an E-4 with high school rose from the 49th percentile to the 59th percentile between 1982 and 1986. Pay then ebbed into the mid-50s percentiles but rose rapidly as the recession took hold in 1990. It was at the 61st percentile by 1991, the 68th in 1993, and remained at or above the 65th percentile for the remainder of the decade. The pay line for an E-4 with some college follows approximately the same pattern. However, the line is lower because workers with some college earn more in the private sector than do workers with only high school.

Figure 1. Enlisted Pay as Percentile of Private Sector Pay, Males



The 9th QRMC has found that increasingly many enlisted personnel add to their education while in service. Today, nearly 50 percent of enlisted personnel have some college by their fifth year of service, about twice as many as in the mid-1980s. Paralleling this development, an increasing percentage of high school graduates are enrolling in a college or university within a year after their graduation. The shift toward higher education within and outside the military makes the some-college pay lines far more relevant today compared with then or twenty years ago. Further, for many enlisted personnel, the effective pay percentiles begin with high-school line but soon shift to the lower, some-college line, in effect flattening the pay growth profile.

The lowest line in Fig. 1 is that for an E-6 with some college. Although military pay is higher for an E-6 than for an E-4, private sector pay is still higher, so an E-6 with some college is at a lower percentile than an E-4 with some college. However, like the E-4, the E-6 received a "boost" in relative pay as a result of the recession in the early 1990s, which held down private sector pay growth.

The pay trends for women differ somewhat from those for men. The difference traces to differences in women's versus men's private sector wage growth. Women's wages were growing faster during the 1980s but were lower to begin with. The faster wage growth led to a decline in military pay relative to women's private sector pay in the 1980s, whereas relative military pay for men rose (for 22-26 year-old high school men) or

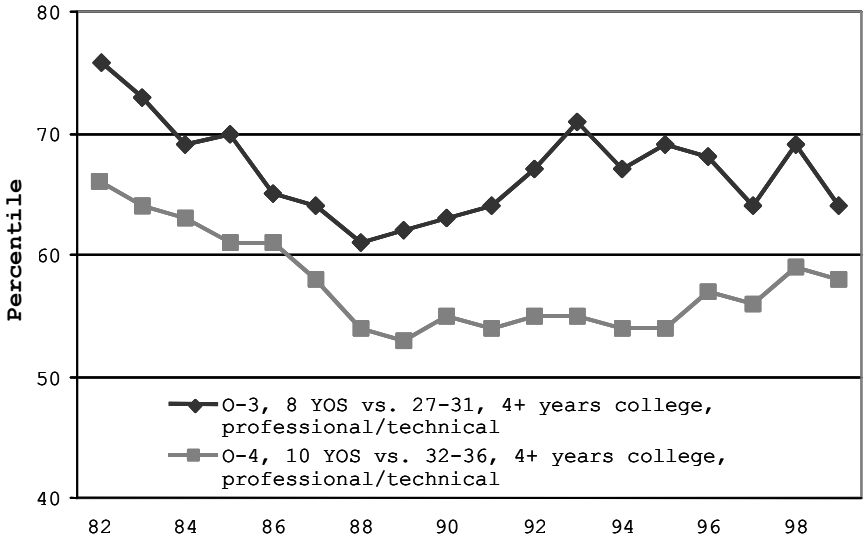
stayed about constant (for 22-26 and 27-31 year-old men with some college). The 1990-1991 recession slowed women's wage growth, and even during the later boom, military pay rose relative to women's private sector pay. Also, during the 1980s and into the 1990s, the number of military specialties open to women increased, expanding their military career possibilities. Appendix A contains pay percentiles for men and women.

Pay Trends for Officers

With rare exception, the year-to-year percentage adjustments in officers' pay have been the same as for enlisted pay. The trend in military pay is therefore the same for officers as enlisted. But private sector pay changes have been much different, and therefore the change in military pay relative to civilian pay has been different for officers than for enlisted. Virtually all officers are college graduates, and many have advanced degrees. During the 1980s, the private sector pay for workers with four or more years of college rose rapidly, far outpacing the private sector wage growth of workers with a high school diploma or some college. In the 1990s, the same pattern continued although pay for workers with four or more years of college did not rise as much faster than pay for workers with a high school education as it had in the 1980s. As a result of these private sector pay trends from 1982 to 2000, the story of enlisted pay compared with private sector pay was largely one of rapid increase in the 1980s, moderate decrease during the middle 1990s, and some increase at the end of the 1990s. In contrast, the story of officer pay was one of sharp initial decrease in the 1980s. In the 1990s, officer pay rose moderately for O-4s (mid-career officers at the rank of Major or, in the Navy, Lieutenant Commander), and fell moderately for O-3s (junior officers at the rank of Captain or, in the Navy, Lieutenant).

Figure 2 shows the pay percentiles for O-3's with 8 years of service compared with 27-31 year old workers with four or more years of college. It also show the percentiles for O-4's with 10 years of service compared with 32-36 year old workers with four or more years of college. Private sector wages are for workers in professional or technical occupations. As seen, military pay for O-3's and O-4's fell 12-15 percentiles from 1982 to the late 1980s. This was the period of fastest growth in the private sector wages of workers with four or more years of college. Their wage growth slowed during the 1990-1991 recession and did not regain its 1980s' pace afterwards. From 1993 onward, the relative pay of O-3's tended to fall, while that of O-4's tended to rise.

Figure 2. Officer Pay as Percentile of Private Sector Pay, Males



The fact that the O-4 pay percentile line lies below the O-3 line indicates that the structure of private sector pay was such that it rose more rapidly than military pay as workers gained job experience from ages 27-31 to 32-36. In the 1980s, relative pay for O-4's was about 5-8 percentiles below the relative pay for O-3's. This difference widened in the early 1990s but had narrowed by 1997-1999. Many officers who remain in the military at the O-4 promotion point around 10-12 years of service are likely to complete 20 or more years of service and qualify for military retirement benefits. The anticipated value of retirement benefits helps compensate for the flatter age-earnings profile in the military than in the private sector.

By the end of the 1990s, a time of burgeoning private sector employment and earnings, the services reported difficulty in retaining O-3s, officers in aviation, and officers in certain technical areas such as information technology. Also, like enlisted personnel, officers were increasingly called upon to participate in military operations other than war. These operations provided officers with valuable field experience but complicated the process of meeting their gates for promotion and created stress for their families.

APPENDIX A

MILITARY PAY PERCENTILES

Table A1. Basic Military Pay as Percentile of Private Sector Pay for Male Enlisted and Officer Personnel

Fiscal Year	E-4, 4 YOS vs. 22-26 Year Old, High School	E-4, 4 YOS vs. 22-26 Year Old, Some College	E-6, 10 YOS vs. 27-31 Year Old, Some College	O-3, 8 YOS vs. 27-31 Year Old, 4+ Years College, Prof/Tech	O-4, 10 YOS vs. 32-36 Year Old, 4+ Years College, Prof/Tech
82	49	49	49	76	66
83	54	42	50	73	64
84	54	52	45	69	63
85	57	48	49	70	61
86	59	51	48	65	61
87	57	51	50	64	58
88	55	48	50	61	54
89	56	50	47	62	53
90	61	54	51	63	55
91	60	55	50	64	54
92	63	60	58	67	55
93	68	63	60	71	55
94	68	63	61	67	54
95	66	62	61	69	54
96	68	63	62	68	57
97	65	61	58	64	56
98	67	63	61	69	59
99	71	65	61	64	58

Note: Military pay is measured as basic military compensation from 1982-1997 and regular military compensation from 1998-1999. BMC includes basic pay, basic allowance for subsistence, basic allowance for quarters, and the tax advantage arising from the non-taxability of the allowances. RMC is the same except the basic allowance for housing replaces the basic allowance for quarters. Private sector pay is from the March Supplement of the Current Population Survey. The sample is limited to the previous-year pay for workers who reported working at least 35 hours per week and at least 35 weeks in that year.

Table A2. Basic Military Pay as Percentile of Private Sector Pay for Female Enlisted and Officer Personnel

Fiscal Year	E-4, 4 YOS vs. 22-26 Year Old, High School	E-4, 4 YOS vs. 22-26 Year Old, Some College	E-6, 10 YOS vs. 27-31 Year Old, Some College	O-3, 8 YOS vs. 27-31 Year Old, 4+ Years College, Prof/Tech	O-4, 10 YOS vs. 32-36 Year Old, 4+ Years College, Prof/Tech
82	80	74	79	90+	90+
83	82	71	76	90+	90+
84	79	72	74	90+	90+
85	82	72	75	90+	90+
86	79	69	77	90+	86
87	81	71	75	90+	90+
88	77	70	72	87	85
89	76	63	73	82	80
90	77	66	74	81	82
91	80	70	74	82	79
92	84	73	75	90+	79
93	82	74	78	81	82
94	81	73	78	90+	73
95	98	77	80	85	78
96	87	75	83	82	75
97	83	77	86	81	79
98	84	78	92	84	83
99	85	81	89	82	76

Note: See note for Table A1.

CHAPTER III

SENIOR ENLISTED PERSONNEL: DO WE NEED ANOTHER GRADE?

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

INTRODUCTION[1]

Are the most senior enlisted service members adequately compensated? Given the varying levels of responsibility assigned to them, is the compensation sufficient to ensure that we retain the talent we require? Because these senior enlisted personnel are more apt to be retirement-eligible, are the best retiring too early? Are there sufficient incentives to induce the most competitive to remain in service?

Service members in grade E-9 usually fall into two categories:

- The technical or duty expert of a certain occupational field, or
- The senior enlisted advisor to the commanding officer of a given unit, usually a unit with its own organizational colors.

We'll start with a short history of non-commissioned officers, concentrating on the most senior grade. Then we'll present a current overview of the E-9s in each of the services[2] and describe what we see as the challenges facing the E-9 community today. We'll turn then to the current experience distribution of E-9s, promotion timing, and the pattern of retirements. Finally, we'll return to the question of incentives for E-9 retention and a proposal for an E-10 grade.

HISTORY

Before 1920, only six enlisted ranks existed—the top rank being E-1. War Department Circular 303 created a new rank of staff sergeant in 1920, but the system we know today did not come about until the Career Compensation Act of 1949 reversed the order of progression, making E-7 the top enlisted rank.[3]

In 1953, the Womble Commission studied the problem of enhancing the status and prestige of the non-commissioned officer (NCO), but the recommendations were not definitive and the Korean War precluded any action. As the Korean War ended, new problems arose, particularly in the

[1] The authors gratefully acknowledge the contributions of Michael L. Hansen for reviewing this paper and Robert A. Book for providing the appendix.

[2] We lack personnel data from the Coast Guard, so we don't include them in our empirical analyses; however, our discussion of senior enlisted pay includes the Coast Guard because its compensation and grade structure mirror those of the military services.

[3] This information and that which follows were largely taken from [1].

Army where several thousand commissioned officers were allowed to stay in the Army as E-7s. A thesis from the Industrial College of the Armed Forces notes that "cheerless commissioned rejects filled every room at the inn" [2].

In 1956, the Secretary of Defense appointed a Defense Advisory Committee on Professional and Technical Compensations with Ralph J. Cordiner as the chair. This committee is often called the Cordiner Commission. In its final report to the Secretary of Defense in May 1957, the commission made several important recommendations that were finalized by Congress in the Military Pay Bill of 1958 [3]. The commission report argued strongly that the current pay scales were based too much on longevity, a problem that was particularly serious at the highest NCO grades. It looked at pay compression among the enlisted ranks, comparing the 1908 pay table with that in effect in 1956. The report noted that the pay of E-1s increased almost 800 percent in that time period, while the E-7 pay increased only 300 percent.

The Military Pay Bill of 1958 addressed the problems identified by the Cordiner Commission report by establishing two new enlisted pay grades, E-8 and E-9. The text of the bill states:

> The purpose of establishing the two new enlisted pay grades E-8 and E-9 [was] to provide for a better delineation of responsibilities in the enlisted structure.… The result is that a situation exists wherein E-7s supervise E-7s who supervise other E-7s. The establishment of the pay grades of E-8 and E-9 will make it possible to distinguish properly between the different levels of responsibility and at the same time provide the necessary monetary recognition for the jobs being performed by those who hold the grades.[4]

The law restricted the percentage of E-9s in each service to 1 percent and the total percentage of E-8s and E-9s to 3 percent.[5] Few enlisted today are even aware that the grades of E-8 and E-9 were not introduced until 1958, and no one today can imagine managing the enlisted force without these grades. At the time of their introduction, however, the new grades were controversial, primarily because some felt that they somehow downgraded the importance of the previous top rank of E-7. Each service was able to implement the new ranks as they saw fit. The Army upgraded

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[4] This is cited on p. 307 of [1]. The citation is from PL 85-422, 85th Congress, H.R. 11470, May 20, 1958 (Senate Report No. 1472, April 25, 1958). See [4] for more information on the situation in 1958 and [5] for an excellent history of the enlisted personnel system.

[5] In other words, a service could choose to have 0.5 percent E-9s and 2.5 percent E-8s.

the rank structure in three phases and allowed the wearing of the older chevrons until 1968.

As we think about the situation today, with E-9s supervising E-9s who supervise other E-9s, we are reminded of what occurred in the 1950s.

CURRENT STATUS

According to FY 1999 data from the Defense Manpower Data Center (DMDC), the distribution of E-9s by service was as follows: 3,010 in the Navy (slightly under 1 percent), 3,205 in the Army (0.8 percent), 2,950 in the Air Force (slightly over 1 percent), and 1,231 in the Marine Corps (0.8 percent). In general, the services have had about 2 percent of their enlisted force in the grade of E-8 and 1 percent in the grade of E-9.

In each of the services, the E-9s who are technical or duty experts within their specific fields have the following titles:

- *Army:* Sergeant Major
- *Marine Corps:* Master Gunnery Sergeant
- *Navy:* Master Chief Petty Officer
- *Air Force:* Chief Master Sergeant
- *Coast Guard:* Master Chief Petty Officer

E-9s who serve as the principal enlisted to the commanders at all levels from battalions through headquarters are known as senior enlisted advisors (SEAs). Each service chief also has an SEA; this person, as the senior enlisted member in that service, receives a permanent increase in compensation. The titles of the senior enlisted member in each service and the titles of SEAs to other appropriate level commanding officers are as follows:

- *Army:* Sergeant Major of the Army
  - Command Sergeant Major
- *Marine Corps:* Sergeant Major of the Marine Corps
  - Sergeant Major
- *Navy:* Master Chief Petty Officer of the Navy
  - Command Master Chief Petty Officer
- *Air Force:* Chief Master Sergeant of the Air Force
  - Command Chief Master Sergeant

- *Coast Guard:* Master Chief Petty Officer of the Coast Guard
  - Command Master Chief Petty Officer.

The four military services and the Coast Guard manage their E-9 populations very differently. The management processes of the Army and Marine Corps have a few similarities, and the Navy and Coast Guard have many close similarities, but there are few similarities between the Air Force and the other services. In short, each service has determined a management process that addresses its needs.

CHALLENGES FACING THE E-9 COMMUNITY

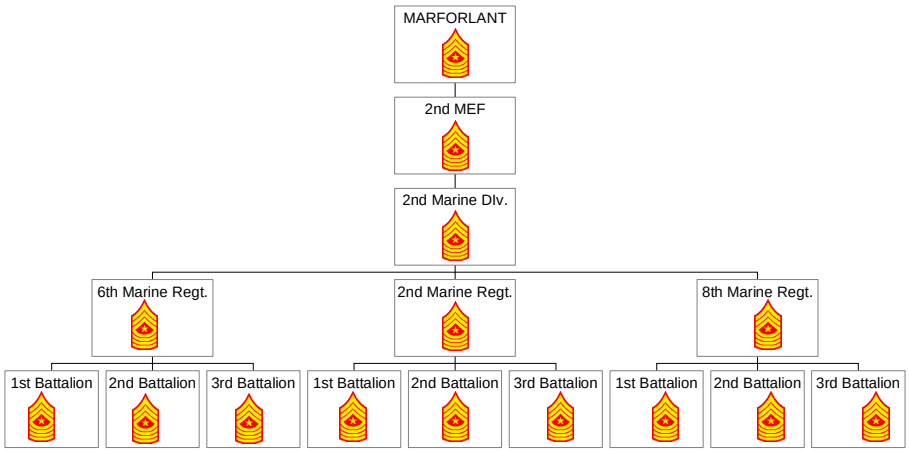
In this paper we examine four challenges that the services must address if we are to continue to retain the most competitive of our enlisted leaders. These challenges are:

- The E-9 grade cannot adequately distinguish among the varying levels of responsibility represented by E-9 billets. This phenomenon is similar to the one addressed in 1958 by the Cordiner Commission. Today we have E-9s supervising E-9s supervising other E-9s.
- E-9 compensation is based on overall years of service. E-9s who are promoted faster than average have fewer years of service when they reach the E-9 grade than do those with slower promotion rates. This creates a pay inversion, with the slower promotees earning more than the faster promotees.
- Years of service at retirement is smallest for those in each occupation who reach E-9 the fastest. While this empirical analysis is for the Navy only, we suspect that the same pattern may be found in the other services. Once the E-9 grade is reached, pay increases consist of only modest awards for longevity.
- Increasing competition from the civilian sector combined with longer overall work lives and higher educational attainment of E-9s suggest that the problems we have identified in retention of our most competitive E-9s can be expected to continue.

We'll address these points in more detail later. In this introduction, let's briefly address the first point: varying levels of supervision.

We'll use the Marine Corps to illustrate this point. Figure 1 shows Marine Forces Atlantic (MARFORLANT). The Lieutenant General who commands MARFORLANT (COMMARFORLANT) has a Force Sergeant Major, shown at the top of figure 1. The Sergeants Major below him report to him as the senior enlisted in MARFORLANT. The 2 MEF Sergeant Major, the SEA for the MEF Commander (a Major General) supervises 91 other Sergeants Major. Figure 1 shows only some of these SEAs—those in the infantry portion of the command.

Figure 1. Sergeants Major (Senior Enlisted Advisors): MARFORLANT (Infantry Portion)

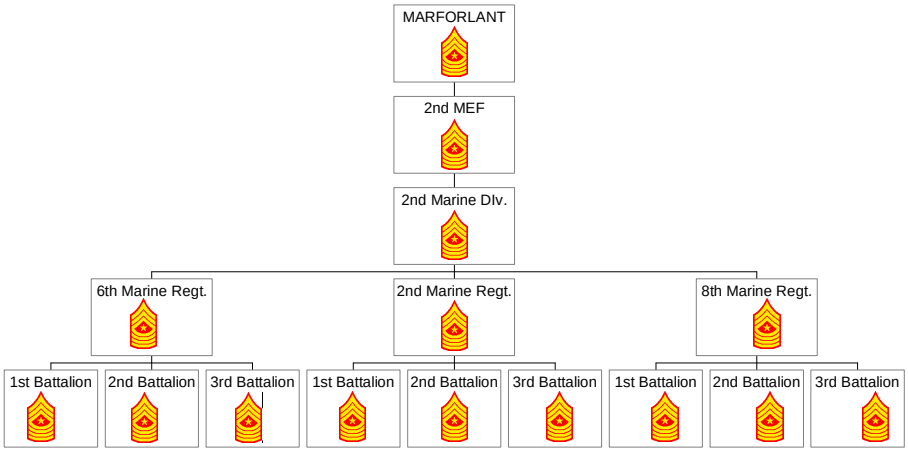


The 2nd Division Commander has an SEA; he directly supervises the Sergeants Major who are SEAs to the three Colonels who command regiments in the 2nd Division. Finally, each of the regiments has three Battalions, each of which is commanded by a Lieutenant Colonel. Each of these Battalions has a Sergeant Major who is the SEA to the Battalion commander. Thus, in MARFORLANT, there are five levels of command, each with an E-9 Sergeant Major serving as SEA to the commander.

The responsibilities of a commanding officer in pay grade O-9 are much greater than those of an O-5. The same case can be made for an SEA serving an O-8. O-8s are also compensated at a much greater level than are O-5s. There is no permanent mechanism, however, to ensure that an SEA serving an O-8 will be paid more than an SEA serving an O-5. In fact, an SEA serving a commanding officer in grade O-5 may draw higher pay than the SEA serving in a billet of greater responsibility because pay for E-9s depends on total years of service, not years of service as an E-9.

The situation is much the same for the technical portion of the E-9 rank, the Master Gunnery Sergeants. Figure 2 shows the five levels in the supervisory chain. Each level has a Master Gunnery Sergeant.

Figure 2. Master Gunnery Sergeants (Infantry Operations Chiefs): MARFORLANT (Infantry Portion)

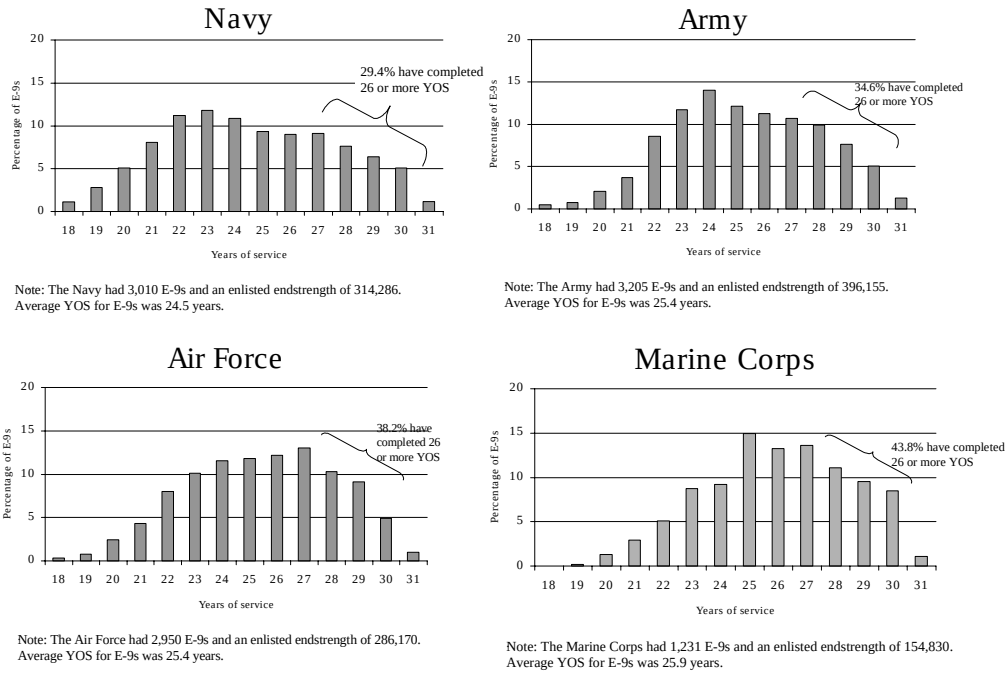


TODAY'S E-9s

EXPERIENCE DISTRIBUTIONS

In all our analyses, we show years of service as those serving in that particular year of service. Thus, the 30th year of service means that the person has completed 29 years and is in the 30th year. Figure 3 shows the E-9 experience distribution for each of the services.

Figure 3. Experience Distributions for E-9s in 1999[a]



Note: The Navy had 3,010 E-9s and an enlisted endstrength of 314,286. Average YOS for E-9s was 24.5 years.

Note: The Army had 3,205 E-9s and an enlisted endstrength of 396,155. Average YOS for E-9s was 25.4 years.

Note: The Air Force had 2,950 E-9s and an enlisted endstrength of 286,170. Average YOS for E-9s was 25.4 years.

Note: The Marine Corps had 1,231 E-9s and an enlisted endstrength of 154,830. Average YOS for E-9s was 25.9 years.

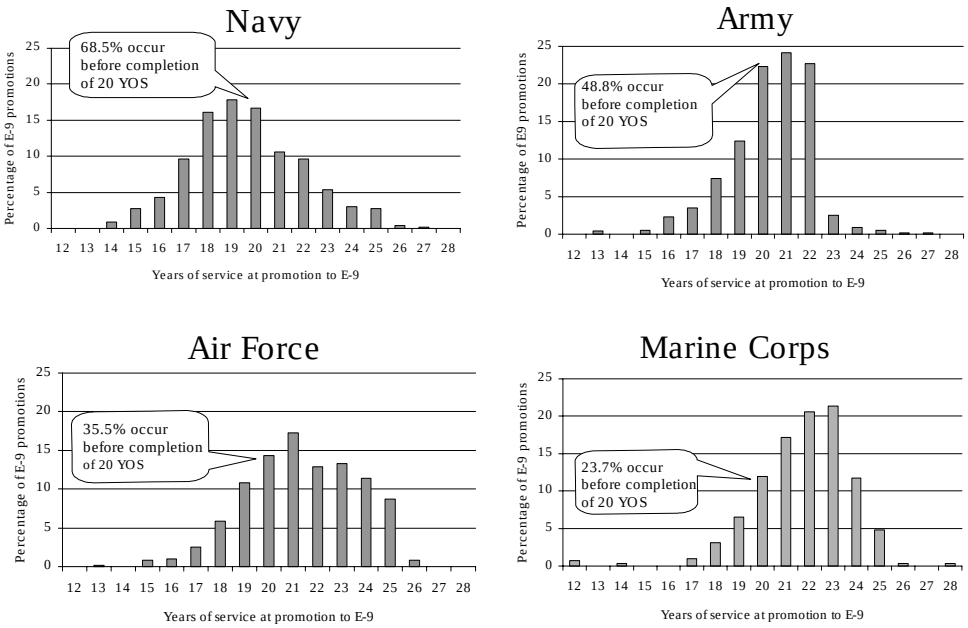
a. All data are from the FY 1999 MPP inventory report from the Defense Manpower Data Center (DMDC) Information Delivery System (IDS).

The Navy has the youngest experience distribution, with modal years of service at 22 to 24 years. Less than 30 percent of Navy Master Chiefs have 26 or more years of service, and just under 35 percent of the Army's Sergeants Major have 26 or more years of completed service. Though the Air Force's Chief Master Sergeants have a slightly higher proportion of the force with 26 or more years of service, the two distributions are quite different: we find modal years of service in the 24th and 27th years for the Army and the Air Force. The Marine Corps has the most experienced force of Sergeants Major; almost 44 percent have completed 26 or more years of service.

PROMOTIONS

As figure 4 demonstrates, promotion to E-9 occurred, on average, at 20.0 years of service in the Navy, 21.3 years in the Army, 22.3 years in the Air Force, and 22.6 years in the Marine Corps.[6]

Figure 4. Years of Service at Promotion to E-9 in 1999



a. All data are from the FY 1999 MPP inventory report from the Defense Manpower Data Center (DMDC) Information Delivery System (IDS).

Patterns

More revealing than the averages, however, is the entire pattern of the promotions. Promotions to E-9 occur earliest in the Navy and latest in the Air Force and the Marine Corps.

Comparisons with Commissioned Officers

As we've seen, the average years of service at promotion to E-9 are between 20 and 22.6 years. Officers with similar lengths of service at promotion are O-6s. However, those advanced to O-6 still have further

[6]All promotion data in this report are for selections to the grade.

advancement opportunities. By service, the average years of service at promotion[7] are as follows:

- *Navy:* 20.0 for promotion to E-9; 19.6 to O-6
- *Army:* 21.3 for promotion to E-9; 20.7 to O-6
- Air *Force:* 22.5 for promotion to E-9; 20.6 to O-6
- *Marine Corps:* 22.6 for promotion to E-9; 22.5 to O-6

In short, with the possible exception of the Air Force, the average military experience levels for promotions to E-9 in each service are virtually identical to those for promotion to O-6. We make the following points about this finding:

- First, the average enlisted person promoted to E-9 receives this last promotion at the same experience point at which officers potentially have four more promotion possibilities.
- Second, the average E-9 promotion occurs almost a decade before the time-in-service limit of 30 years. For the fast-track, early-promoted E-9s, there is more than a decade before service limits are reached—more than a decade without any promotion possibilities.
- Third, the average E-9 is about 4 years younger than the O-6, slightly under 40 at this point in their career. Outside observers might conclude that E-9s, particularly those who reached the grade early, have now found themselves in a dead-end job.

We later try to estimate how the lack of further advancement opportunities affects the retention of our most competitive E-9s, those who fast-tracked to E-7. This is a difficult subject to quantify because (a) quality is difficult to measure and (b) the analyses require extensive longitudinal personnel records. We would suggest, however, that the lack of advancement opportunities is not a retention-enhancer for our best and brightest E-9s.

WHEN DO E-9S RETIRE?

Figure 5 shows E-9 separations in FY 1999.[8] Just as the Navy had the earliest promotions to E-9, it also has the earliest retirements. The panels

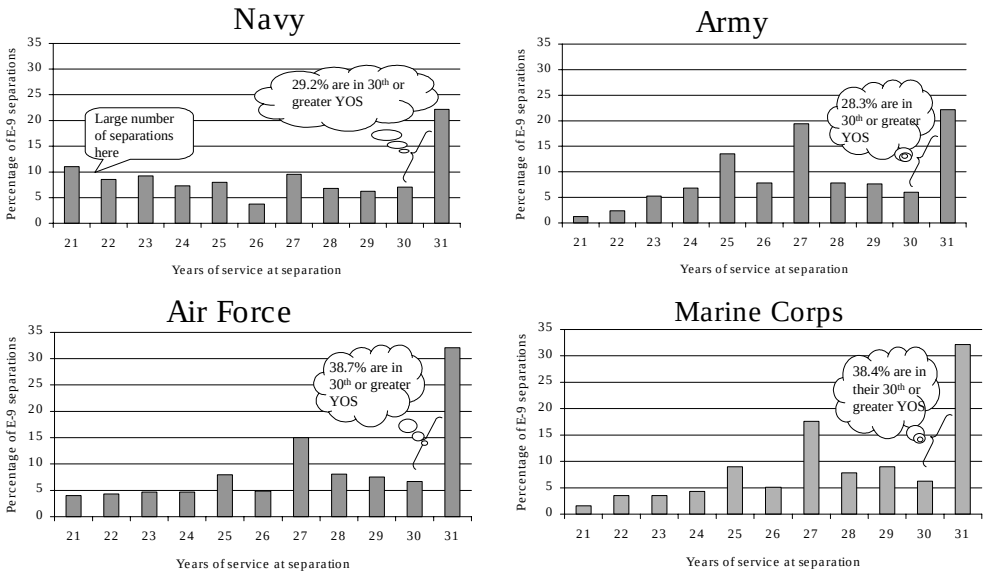
[7] These are DMDC data for 1999 selections to E-9 and O-6.

[8] The DMDC data from the IDS system that we used for these analyses did not show any E-9 separations before 20 years of service.

in the figure show the percentages retiring at the service limit, with 30 or more years of service. It's under 30 percent in the Navy and Army, and approaching 40 percent in the Air Force and the Marine Corps. In brief, *the large majority of E-9s retire before the service limit*.

The "bump" in retirement at the 27th year of service is clearly evident. These E-9s, who completed 26 years of service, have just received their last pay raise.[9]

Figure 5. E-9 Separations (Retirements) in FY 1999



a. All data are from the FY 1999 MPP inventory report from the Defense Manpower Data Center (DMDC) Information Delivery System (IDS).

Some Thoughts On Retirements

E-9s are constrained by law to be no more than 1 percent of enlisted strength. What percentage are they of those who retire from the military?

[9] The retirement system for military personnel who entered before 8 September 1980 based retired pay on the highest basic pay ever received. Service members would often wait to retire until they hit a longevity increase; these increases were after completing 22, 24, or 26 years of service. For those who entered between 8 September 1980 and 31 July 1986, however, retirement pay will be based on the highest 3-year average of basic pay. This is certain to change retirement behavior, and we should not expect to see a spike in retirement numbers at 23, 25, and 27 years of service as these members retire.

Even among those who complete a full military career of 20 or more years, they represent a very small percentage. In 1999, E-9 retirements made up less than 7 percent of all enlisted retirements.

For some E-5s and most E-6s, the service limits are 20 years. Given that retirement eligibility begins at 20 years, E-5s and E-6s uniformly retire at their retirement eligibility point (after 20 years of service). E-7s, E-8s, and E-9s also reach retirement eligibility at 20 years of service, but service limits allow more years of service. The year-of-service limits vary by service for E-7s and E-8s. In general, E-9s have a 30-year service limit. In 1999 in DMDC data for all the services, there are only 120 E-9s with 30 or more years of service.

It is clear that policy-makers set these service limits by grade as mandatory maximums. What is not clear, however, is what policy-makers wanted the retirement behavior by grade to be. In short, what is the "optimal" percentage to be retired at the service limit? One hundred percent of E-5s and most E-6s retire at the service limit. For DoD as a whole, 33 percent of E-9s retire at the service limit. Is this percentage too high, too low, or about right?

Moreover, there are fairly substantial percentages of E-9s who retire very early, in their 21st to 24th years of service. In FY99 these were:

- 36.0 percent in the Navy
- 15.7 percent in the Army
- 17.7 percent in the Air Force
- 12.9 percent in the Marine Corps.

Comparisons with Commissioned Officers: Average Years of Service at Retirement

Let's compare average years of service at retirement for E-9s and O-6s:

- *Navy:* 26.2 years for E-9s and for 27.2 for O-6s
- *Army:* 27.3 years for E-9s and for 28.2 for O-6s
- *Air Force:* 27.7 years for E-9s and for 27.8 for O-6s
- *Marine Corps:* 28.0 years for E-9s and for 28.2 for O-6s.

For the O-6s, opportunities for further advancement in rank help the services to retain the most able.[10] There is no such mechanism, however, that works to keep our very best E-9s in service. Enlisted E-9s have no

[10] The appendix summarizes the literature in economics that addresses this problem.

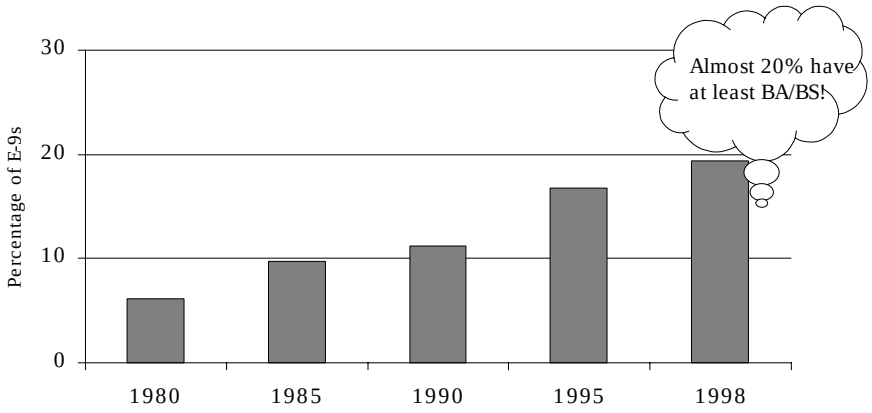
further promotion opportunities. They retire at about the same years of service as the O-6s who have not been selected for flag rank. The last longevity pay raise is after completion of the 26th year, but pay for years of service doesn't equate to pay for performance. There's no way to quantify that the E-9s who serve until they receive the 26th year "fogy" are the highest quality performers.

E-9s are Increasingly College Graduates

In addition to having ever-increasing layers of responsibility in the E-9 grade, E-9s who continue their service are increasingly college graduates. This makes them increasingly competitive in the civilian labor market. These changes in E-9 educational attainment cannot be expected to abate.

DMDC performed some special calculations for CNA with their historical personnel data for all services. Figure 6 shows the proportion of E-9s with Bachelor's degrees in various years from 1980 through 1998.

Figure 6. E-9s are Increasingly College Graduates[a]



a. Source: DMDC personnel data.

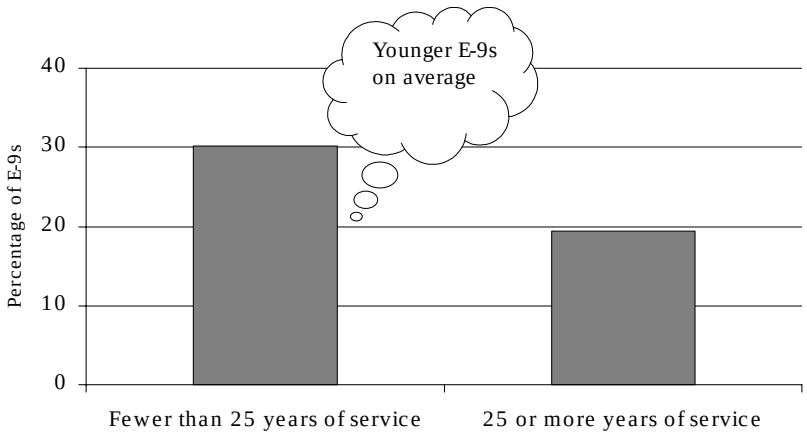
Even though DMDC personnel data suggest that about 20 percent of E-9s had college degrees in 1998, we believe that military personnel data in general probably understate educational attainment when the civilian education is earned after entry into the military.[11] Service members have little incentive to update their records for educational attainment. Thus, we

[11] The incentives to record additional educational attainment may differ by service.

also looked at the education attainment of E-9s using survey data, specifically the 1999 survey of active duty personnel. Here we separated younger E-9s (those with less than 25 years of service) from older E-9s (those with 25 or more years of service). Figure 7 shows the data.

Other research done for the QRMC has established the importance of educational attainment for civilian earnings. Earnings differences between those with a high school degree and those with a college degree, or even some college, are strikingly large. Moreover, increasing education levels qualify one for a wider variety of jobs. Given that in 1999 slightly over 30 percent of E-9s with fewer than 25 years of experience reported that they had at least a Bachelor's degree, we are in a very different market for our senior enlisted than we were 20 years ago.

Figure 7. E-9s with BA/BS or Higher Degrees[a]



a. Source:1999 DMDC survey of active-duty personnel. Overall, 25.6 percent of E-9s reported in the survey that they have at least a BA/BS degree.

In summary, E-9s have increasing educational attainment and better civilian opportunities than they had in the past. These trends can be expected to decrease E-9 retention, particularly for the most competitive. Before we address directly whether we have sufficient incentives for our best E-9s to serve full careers, let's again review the very selective process that makes an E-9.

IS OUR CURRENT COMPENSATION AND RANK STRUCTURE SUFFICIENT TO RETAIN OUR BEST E-9s?

THE PROMOTION PROCESS AND THE 1-PERCENT LIMIT: THE QUALITY CUT

The enlisted ranks form a pyramid, represented at the top by the pay grade E-9.[12] To make this pyramid work, the services over the years have devised a process of promotion whereby enlisted members compete for advancement to the next higher grade. When coupled with maximum service limits per grade, those who fail competitive selection must separate or retire. With the exception of promotion to E-2, all other promotions are merit based; also, the higher the grade for which one competes, the more difficult the challenge. To be promoted to E-9 means that all the challenges laid down by the service over many years have been met and overcome. We have considerable faith in these promotion processes developed over decades, believing that the promotion processes of each service ensure that only those of the highest quality advance. By the grade of E-9, each member has been through a series of boards and examinations and has been thoroughly vetted by the service.

REASONS TO CONTINUE IN SERVICE AFTER MAKING E-9

Very few service members ever make it to E-9. Although the services have different experience mixes—the Marine Corps the most junior and the Air Force the most senior overall—they do not differ in the probability that an E-1 will make it to the E-9 grade. For the 1 percent of the force that will be promoted to that rank, the E-9 promotion is based on superior, meritorious performance over a long period of time. In short, each grade cohort competes against itself with the most competitive winning promotion.

All the services offer their members some opportunity to advance through the ranks at accelerated speeds. Often called meritorious

[12] Keep in mind that the uniformed military do not represent the age distribution of America's full-time working population. Although both the enlisted ranks and the officer ranks form a pyramid (both by rank and by age), comparable ages in the civilian population are in the shape of a cylinder, with about the same numbers in each age group (see [6]).

promotion, such early advancements signal superior achievements. The rate of advance also depends on demonstrated performance and leadership abilities and, in some cases, on the uniqueness of the skill the member holds throughout his/her career. There's considerable anecdotal evidence to support the fact that many superior E-9s do not serve as long as the services would like or need. Because retiring from the service before mandatory service limits are reached is a voluntary act, one can assume that many of those who do so are not sufficiently satisfied with the current rewards to continue on as an E-9. One can further assume that many of those who are dissatisfied are among the very best and are those whom the services would want most to retain.

Each service promotes, retains, and loses its E-9s at different points in terms of years of service. What the optimums are is not clear; what stands out is that in each service the average difference between selection to E-9 and voluntary retirement is only 6 years, whereas the average difference between selection and mandatory retirement is considerably longer.

The services benefit from having their most qualified and meritorious E-9s continuing to serve until service limits of at least 30 years. Those who fill the most responsible and demanding billets will usually be selected/appointed from the most senior E-9s. Our hypothesis is that the services are losing many of their most capable performers prematurely. Why? We offer the following reasons why we believe E-9s do not have sufficient incentives to continue in service:

- There are no further advancement possibilities
- The only pay increases are small longevity increases at 20, 22, 24, and 26 years of service
- After 26 years of service, there are no further pay increases.[13]

SOME EMPIRICAL EVIDENCE FROM THE NAVY: "QUALITY" AND E-9 RETENTION

At various discussions with our QRMC sponsors, we were asked if we could quantify some of our arguments about E-9 retention. Specifically, could we say anything about "quality" and E-9 retention? Could we develop some kind of proxy for E-9 "quality"?

[13] The Army, Navy, and Coast Guard do pay a type of Special Duty Assignment Pay to SEAs in certain flag level and other special billets. This service-specific special pay doesn't carry over into increased retirement income and does not translate into any additional status or prestige.

As our earlier discussion has shown, we place considerable faith in the promotion process for selecting the most highly qualified. Could we proxy quality by the speed of promotion? We decided to try and chose the Navy, as we had detailed Navy personnel, longitudinal data since the late 1970s. Navy promotions are driven by vacancies in the next rank within the particular Navy occupation (rating). Each year there are different numbers of vacancies; thus, our analysis of promotion speed would have to be by rating and year of promotion.

We decided to use the E-7 promotion, and we built a file that sorted—for each fiscal year of promotion and rating—the personnel records by months of service at the promotion. We then defined the quickest third of promotions as "fast," the middle third of promotions as "average," and the bottom third of promotions as "slow." Thus, our proxy for quality is promotion speed, defined for each sailor by the rating and the year of promotion.[14]

After identifying each sailor as a fast, average, or slow promote by their promotion speed to E-7, we followed them, analyzing their behavior after the E-7 promotion. First, we asked, "What percentage of each group separated before reaching the rank of E-9?"[15] We show this in figure 8.

Figure 8 shows a clear pattern: well over 90 percent of sailors with slow E-7 promotions separate before reaching E-9. In contrast, a considerably smaller promotion of the fast-track sailors separate before reaching E-9. About 25 percent of this fast-track group stay and are promoted to E-9.[16]

Next, we looked at those sailors who were promoted to E-9, still keeping them in our three quality groups. We wanted to know how long it took each group to reach E-9, how long they stayed as E-9s, and what their total length of service was. We show this in figure 9 for those promoted to E-9 in 1985, 1989, and 1992.[17]

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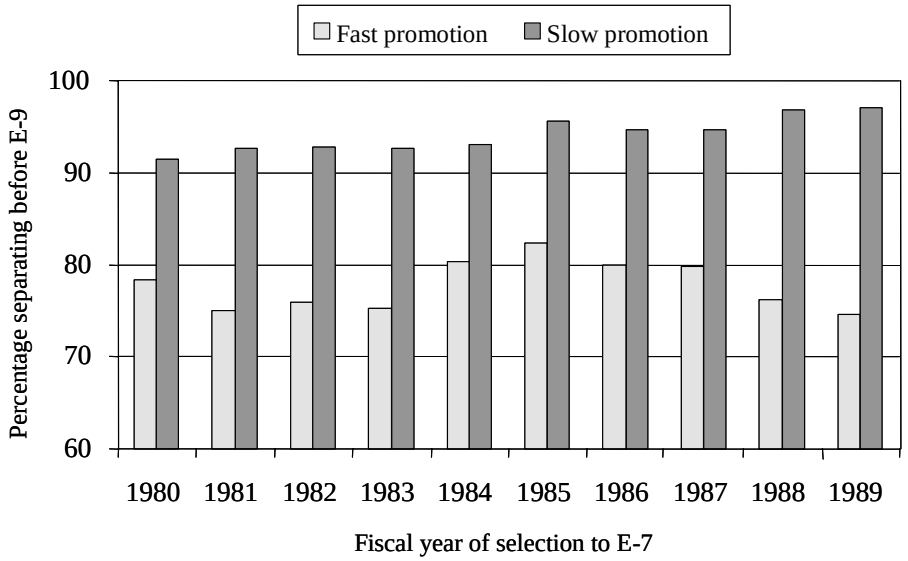
[14] If we had not done the analysis by rating, the fast-track group would have been dominated by the ratings with faster promotion rates. These are usually the high-tech ratings where the pull of civilian jobs creates many vacancies and the possibility of faster promotions. Because vacancies determine promotion rates, ratings with faster or slower than average promotion rates can also be caused by changes in personnel requirements.

[15] Some will separate because they no longer like the Navy or find the civilian sector more attractive. Some will be forced to separate as they reach high-year tenure. Others will separate at the grade of E-8, never reaching the grade of E-9, and so on.

[16] The average or middle group has separation rates between the fast and slow groups.

[17] Why did we stop with E-9 promotions in 1992? The short answer is that we needed to let sailors complete their E-9 service and retire from the service.Even with 1992 promotions, almost 100 sailors are still in the Navy. Thus, the years of service for the

Figure 8. Fast- and Slow-Track E-7 Sailors: How Many Separate Before Reaching E-9?



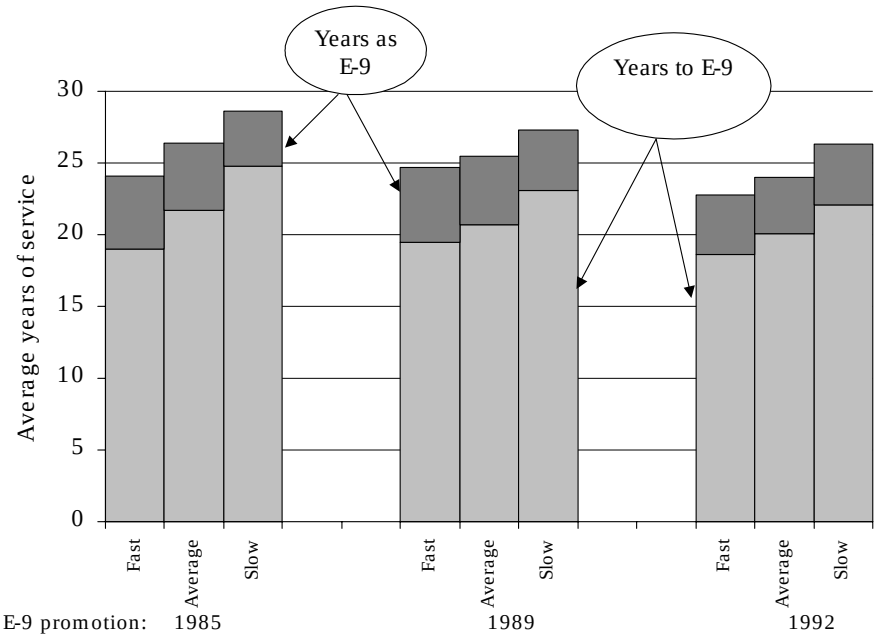
Note: Fast, average, and slow promoters were calculated separately withn Navy rating and year of E-7 promotion.

Figure 9 shows that the three quality groups seem to remain as E-9s for about the same period of time, although there has been some shortening of E-9 length of service for the highest quality group (from 58 months for FY85 E-9 promotions to 50 months for FY92 promotions). The big difference in this chart, however, is in the years of service before the E-9 promotion.[18] The Navy Master Chiefs who remain the longest in the Navy are those who are the slowest in their E-7 promotions. For those with fast promotions, the average total Navy service for Master Chief is under 25 years. Though some of our most competitive sailors serve more years than the average, most serve less. Overall, it does not appear that we have sufficient retention incentives for these sailors.

1992 E-9 promotion cohort group will increase somewhat, but not enough to be visible in the figure.

[18] Remember that we identified our quality categories at the E-7 promotion point.

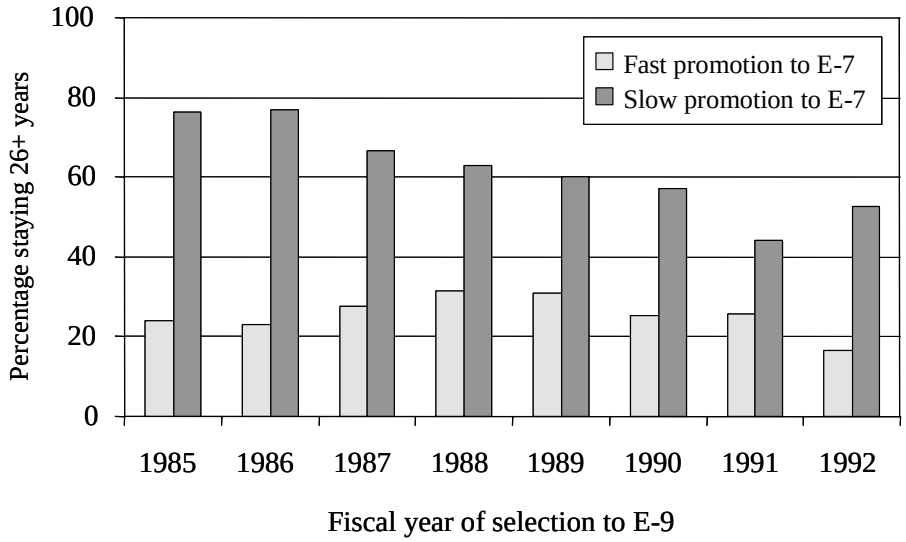
Figure 9. Completed Years of Service for E-9s: By Quality and Year Selected to E-9



Finally, we looked at the proportion of E-9s that stayed 26 years or longer (26 years is the last longevity increase for E-9s). We show this in figure 10. Only a very small proportion of fast-track E-9s stay 26 or more years; well over 50 percent of the slow promoters stay 26 or more years. (The percentages for those sailors with average promotion rates staying 26 or more years fall between the fast and slow promoters.)

We think this empirical evidence indicates quite strongly that we do not have sufficient incentives to retain our highest quality E-9s. Combining these findings with the fact that E9s are supervising E9s who are supervising E-9s leads us to propose consideration of an additional grade, E-10. Before going into this discussion in detail, however, let us make a few comments about recent changes in military retirement and the retention of E-9s.

Figure 10. Percentage of E-9s Staying 26 or More Years



Note: Fast, average, and slow promoters were calculated separately within Navy and year of E-7 promotion.

RECENT CHANGES IN MILITARY RETIREMENT

Other than seeking out more responsibility by moving to a more senior billet, there are no monetary incentives for an E-9 to serve past 26 years. Although retirement pay will increase by 2.5 percent for each additional year of service up to 30 years, the service member is usually better off financially by retiring at 26 years of service and combining a civilian job with retirement pay. This will be increasingly true for our more educated senior enlisted.

What's more, we believe that recent changes to the retirement system may induce E-9s to leave the service even earlier than they do today. Most enlisted personnel who retire do so as soon as they are eligible—at 20 years of service—but that is not true for E9s, as we have seen from our earlier discussion of E-9 retirement patterns by service. Until very recently, retirement pay was based on some percentage of the member's

highest base pay.[19] This induced E-9s to stay for the longevity "bumps" at 22, 24, and 26 months of service.

All service members who entered after 7 September 1980 will be under some form of "high 3" retirement. High-3 retirements will be little affected by these longevity increments. Under the prior system, a member only had to receive the higher pay for 1 month; under High-3, the member will need to receive the pay for 36 months to get the full benefit of the increase. One month's service at a higher longevity pay level will only represent 1/36th of the pay on which the member's retirement is based. In short, longevity increases cannot be expected to "hold" members under High-3 the way they could under the older system.

WHY WE NEED ANOTHER RANK: RECOMMENDATION FOR AN E-10 PAY GRADE

Promotion opportunities provide incentives both to work hard and to excel. They also provide a sorting function for large organizations, as the more able, talented, and energetic are pushed to the top.[20] Beth Asch and John Warner's excellent monograph, *A Theory of Military Compensation and Personnel Policy*, stresses the importance of pay rising with rank to provide incentives for retaining talent and ensuring maximum effort. In their conclusions [7, p. 117], they state:

> Those in higher ranks have fewer promotion opportunities left to them—they are already near the top. The grade differentials need to be higher to induce individuals to supply the efficient amount of effort. Higher pay in upper grades increases the likelihood of retaining the most able individuals.

No promotion opportunities exist after the E-9 promotion.[21] Longevity increases are not large: 3.9 percent at 22 years of service, 3.7 percent at 24

[19] If a member retired at 20 years of service, the retirement pay was 50 percent of the highest base pay. It increased by 2.5 percent of base pay for each additional year of service, peaking at 75 percent of base pay for 30 years of service.

[20] The appendix discusses this theory in more detail.

[21] The idea behind REDUX was to induce both officers and enlisted into longer careers, and those arguments made for longer careers still hold. Here we are making a more specific argument: namely, that there is no sorting mechanism to induce the most able E-9s to stay to the current service limits.

years, and 4.6 percent at 26 years. For our most talented, early selections to the E-9 rank, these paltry increases in compensation cannot be what is motivating them to stay in service. We are probably relying on patriotism and a love of service to retain these people. Can we count on that in the future? The Master Chief Petty Officer of the Navy (MCPON) recently expressed concern about the outflow of some of his most capable enlisted into the Warrant Officer or Commissioned Officer programs. Do we have enough of a "prize" in terms of compensation "rank-prestige" to ensure that we retain top people in the enlisted ranks for these critical senior positions?

We would argue that we do not. We will never have an exact measure of personnel quality that would allow us to unambiguously state that we are losing our best personnel too soon. We did, however, get some information from our detailed analysis of Navy data. We proxied quality by promotion speed, dividing all E-7 promotions into those that were promoted the fastest, the average, and the slowest for their promotion-year group and occupation. We then followed over 100,000 of these E-7s, looking at who left, who got promoted, and at their final lengths of service. Those we identified as fast track earlier in their careers will make up the largest proportion of the E-9 population later in their careers, but they also leave the Navy with the fewest years of service. In short, at least in the Navy, incentives are not sufficient to encourage the fast-track sailors to stay as long as others with slower promotion rates.

The 1999 Survey of Active Duty Personnel also reports that 34 percent of E-9s consider basic pay as the first or the second reason for "staying in" and that another 36 percent of E-9s consider basic pay as the first or second reason for "getting out." We suspect that fast-track individuals compose the largest group of those who think that pay is too low.

Large longevity increases for E-9s, or even another longevity increase at 28 years of service, will work more to make all E-9s stay longer. And there is a real concern that the tenure of all E-9s is too short, as we lose the experience gained over many years. Increasing overall E-9 longevity, however, slows promotions, so that situation will require careful monitoring.

A drawback of longevity increases is that, because they are not targeted, they do little to encourage the best E-9s to stay longer. Our primary concern in this paper is to propose a mechanism that will retain our most competitive E-9s.

THE E-10 GRADE

Current law restricts the E-8/E-9 grades to 3 percent of the enlisted force and the E-9 grade to no more than 1 percent of the enlisted force. We would propose changing the law to the following:

- Restrict the grades of E-8/E-9/E-10 to 3.2 percent of the enlisted force
- Restrict the grade of E-10 to no more than 0.2 percent of the enlisted force
  - This would imply that the maximum number of E-10s would be about 300 in the Marine Corps and about 600 in the Navy, Army, and Air Force

Just as in current practice, each service would need to determine (up to the 0.2-percent limit) the number of E-10 positions and the allocation of these positions among SEAs and technical personnel. Technical experts are now being appointed to management positions in the private sector. For example, the *New York Times* reports that Microsoft, Cisco Systems, IBM, Sun Microsystems, and Xerox are rewarding their top engineers and scientists with titles and financial rewards similar to those received by vice-presidents in managerial positions [8].

COST

An appropriate increase in base pay, perhaps 10 percent, would accompany the promotion to E-10. Because the number of E-10s would be small, perhaps slightly over 2,000 individuals, the cost would be small. The payoff would be large.

SUMMARY

In 1958 we added two grades, E-8 and E-9, to the enlisted grade structure. The primary reason was that the levels of responsibility were too varied in the E-7 grade. More than 40 years later, we face the same situation. We identified the following challenges for the E-9 grade:

- The E-9 grade cannot adequately distinguish among the varying levels of responsibility represented by E-9 billets. Today we have E-9s supervising E-9s supervising other E-9s.

- E-9 compensation is based on overall years of service. E-9s who are promoted faster than average have fewer years of service when they reach the E-9 grade than do those with slower promotion rates. This creates a pay inversion, with the slower promotees earning more than the faster promotees.
- Years of service at retirement is smallest for those E-9s who were fast-trackers at the E-7 grade. We identified fast-trackers within each Navy occupation. Thus, this analysis says that in all occupations our most competitive E-9s are retiring the earliest. While this empirical work is for the Navy only, we suspect that the same pattern may be found in the other services. Once the grade of E-9 is reached, pay increases consist of only modest awards for longevity. These small longevity increases provide little retention incentive for our most competitive E-9s.
- Increasing competition from the civilian sector combined with longer overall work lives and higher educational attainment of E-9s suggest that the problems we have identified in retention of our most competitive E-9s can be expected to continue.

We have proposed an E-10 paygrade, with a limit of 0.2 percent of the enlisted force. We believe that this new grade would induce additional years of service out of those senior enlisted who believe they are most competitive for the new grade of E-10. These are, quite simply, the most motivated and the best performers. We suspect that the very best of the enlisted E-9s would continue to serve, motivated by the tangible prospect of being selected for the new grade. The new grade would offer monetary compensation, recognition, and the opportunity for our strongest senior enlisted personnel to compete for one more level of increasing responsibility. The latter is probably the most important motivator for those who have served their country with a career in the armed forces. In short, on the assumption that the services would promote only their very best to E-10, the strength of the armed forces would be improved and the nation as a whole would benefit from this change. While the benefits of this additional grade would be large, the monetary cost would be very small.

APPENDIX

TOURNAMENT LITERATURE IN ECONOMICS[22]

In many civilian occupations, pay is determined primarily by some direct measure of input or productivity, such as hours worked (input) or units of production or dollars of sales (output). In other occupations, however, it is difficult to measure production directly because it may be a function of a combination of the worker's effort/capability and factors beyond the worker's control. In such occupations, particularly those in which only subjective measures of performance and productivity are available, firms reward employees with promotions—increases in both pay and status, awarded to a limited number of "top" employees. With respect to productivity measures and incentives, these occupations more closely resemble the military than those in which direct measures of output are appropriate. Therefore, the reward mechanisms in these occupations can be profitably compared to military.

This practice of using promotions that involve both pay and status has been modeled as a "tournament" in which the top N employees are "winners" (Lazear & Rosen, 1981; Lazear, 1999).[23] Examples of tournament pay in the private sector include promotion of associates to partner in law and accounting firms, "up or out" systems in consulting firms, and the academic tenure system in some universities (i.e., those that promote their own assistant professors rather than hire from other universities).

The military promotion system for any given rank can be modeled as a tournament. In fact, the whole system can be considered a multi-stage tournament like the model described in Rosen (1986).[24]

One advantage of tournaments over direct-measure compensation systems as a motivator of employees is that tournaments can be implemented when direct performance measures are imprecise but relative comparisons are not too difficult. With no obvious direct measures of

[22] This appendix was written by Robert A. Book.

[23] Edward P. Lazear and Sherwin Rosen, "Rank-Order Tournaments as Optimum Labor Contracts," *The Journal of Political Economy*, Vol. 89, Issue 5 (Oct. 1981): 841-864; Edward P. Lazear, *Personnel Economics: Past Lessons and Future Directions*, Feb. 1999 (National Bureau of Economic Research Working Paper 6957).

[24] Sherwin Rosen, "Prizes and Incentives in Elimination Tournaments," *The American Economic Review*, Vol. 76, Issue 4 (Sep. 1986): 701-715.

performance (such as "number of units manufactured" or "dollars of sales"), it may be extremely difficult to say, for example, "Employee A is performing at level X and therefore should receive a salary of $Y." Yet, it might be easy to rank employees and say, "Employee A is performing better than Employee B; therefore, we will promote Employee A." Tournaments also save the time of managers: with many promotion "slots" (but less than the number of eligible employees), it is often easy to determine the outcome for large numbers of cases because many employees are clearly either superior or inferior. Management then will need to expend significant effort in only a few "borderline" cases.

Employees may also prefer tournaments to direct compensation, particularly if output is partly determined by effects common to all employees in the organization (as opposed to effects related to individual effort). This will certainly be the case if employees are risk-averse and factors beyond the control of employees are significant. All of this applies to our military personnel system and the dominant importance of promotions in the compensation system.

One disadvantage of the tournament system is that the best employees likely have the best outside options, and they might leave the organization if they perceive that their rewards are capped at a lower level than their ability warrants. These problems become even more severe when all promotion opportunities have been exhausted. Once an individual reaches the highest level of an organization, only pride in a job well done motivates the employee, and this may not be sufficient in all cases. (In the civilian sector, this effect may help explain the very high financial rewards—and low tenure-in-job—of corporate CEOs.) At the top stage of a multistage tournament, such as the military promotion system, this problem is particularly severe because it is the very best employees, in the most important positions, who are the most likely to leave.

How many levels, then, should be in the tournament? How does one tell if another competition (another promotion) is needed? The literature does not contain exact answers, but it suggests that the military may not have sufficient levels in the tournament to retain the most talented.

At the time of an E-9 promotion, the fast-trackers in each service will have about 10 years before the 30-year service limit is reached. A decade with no prospect of promotion and only small, automatic longevity increases (which is to say, raises independent of performance), does not seem especially motivating for top performers. Furthermore, the most capable E-9s are not only those most likely to be disappointed by the lack of promotion opportunities, but also those with the best options for employment outside the military. This combination of factors suggests

that another tournament—competition for promotion to another grade (E-10)—might significantly improve the retention of the very best E-9s.

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The Report of the Ninth Quadrennial Review of Military Compensation

Office of the Under Secretary of Defense for Personnel and Readiness
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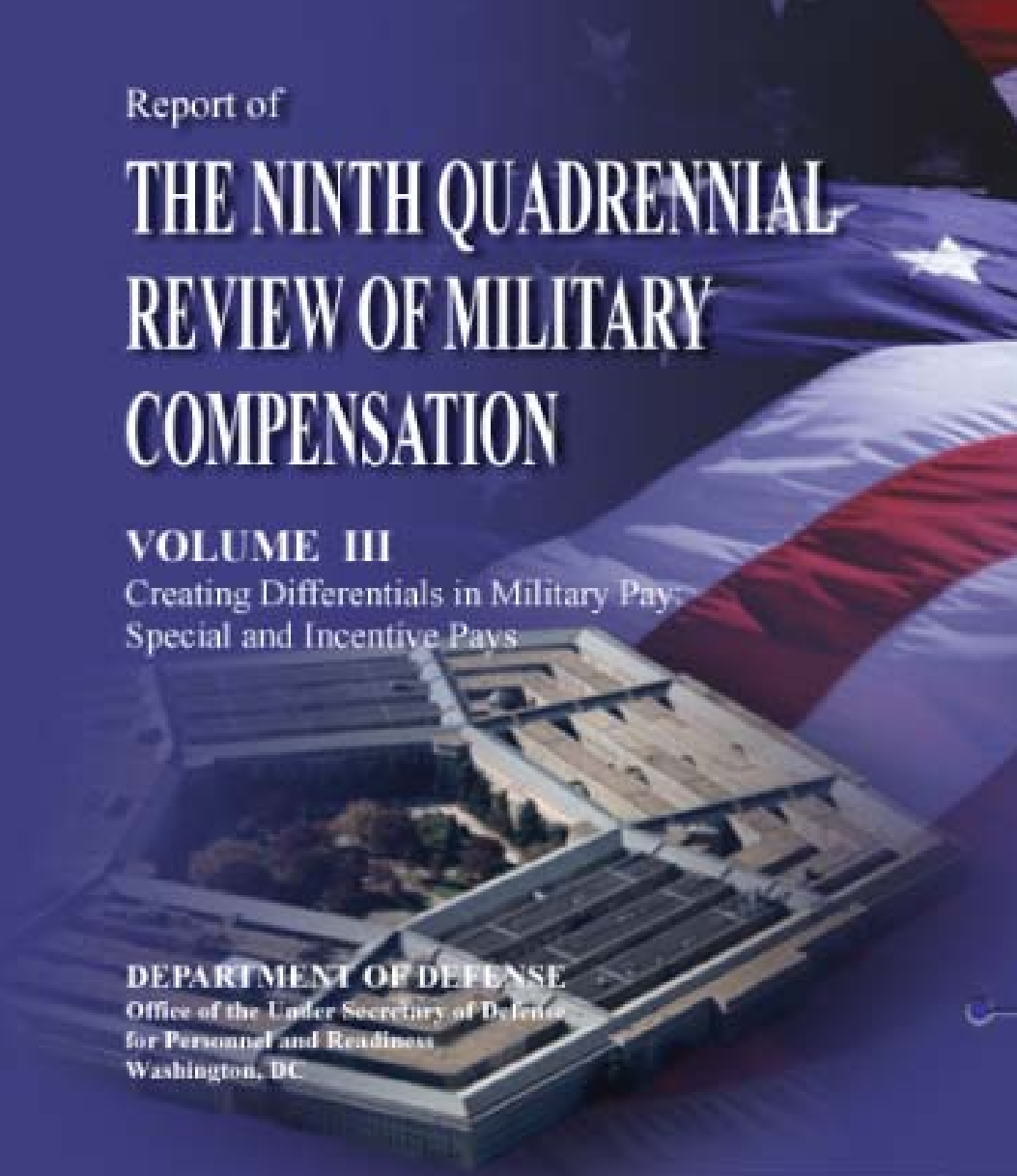
Report of

THE NINTH QUADRENNIAL REVIEW OF MILITARY COMPENSATION

VOLUME III

Creating Differentials in Military Pay:
Special and Incentive Pays



DEPARTMENT OF DEFENSE
Office of the Under Secretary of Defense
for Personnel and Readiness
Washington, DC

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PREFACE

The Ninth Quadrennial Review of Military Compensation (9th QRMC) assesses the effectiveness of current military compensation policies in recruiting and retaining a high-quality force. The review takes place at a time of increasing pressure on military recruiting and retention—the result of both external and internal pressures on the Department of Defense. A sustained strong economy and changing private-sector compensation practices along with changing missions and operational requirements create a complex environment for sustaining the All-Volunteer Force.

While the military compensation system is based on a common set of basic pay tables, it is necessary for the Department of Defense to be able to differentiate pay for particular members of the force. Special and incentive pays and bonuses provide some flexibility in the military compensation system. The research papers in this document—the third of five volumes of the 9th QRMC report—provide insight into the efficacy of these pays.

Although S&I pays and bonuses have been a relatively small proportion of total pay—historically about 4 percent—they have been effective policy tools in:

- Attracting and retaining individuals with critical skills.
- Encouraging retention in selected career fields, in certain locations, and in assignments involving arduous or unusual conditions.
- Recognizing members who perform hazardous duties.

The military services differ in their use of special pays and bonuses, which reflects differences in the occupational mix of each Service, in mission requirements, and in preferences for using certain pays and bonuses. As missions and requirements change over time, new pays and bonuses are sometimes developed in response. The concept of a deployment pay is one such example discussed in this report.

The research papers included in this volume were written in support of the 9th Quadrennial Review of Military Compensation. The views expressed in these papers represent those of the authors and are not necessarily those of the Department of Defense.

CHAPTER I

A LOOK AT CASH COMPENSATION FOR ACTIVE DUTY MILITARY PERSONNEL

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

SUMMARY

Every four years, the Quadrennial Review of Military Compensation (QRMC) examines the level and structure of military compensation to ensure that it continues to enable the armed services to meet its manpower requirements in a timely and cost-effective manner. An area of interest to the ninth QRMC is the degree to which military pay varies among personnel, and the extent to which special and incentive (S&I) pays contribute to total military pay. These pays are the key tool the services have to manage personnel flexibly and to vary pay in response to internal and external factors, such as the civilian economy, that affect their ability to attract and retain personnel.

Because military compensation consists of a large array of pays and allowances, it is unclear the degree to which total cash compensation differs among military personnel. All military personnel receive basic pay. Basic pay is based on a pay table common to all personnel, regardless of occupation and branch of service. The services also make extensive use of the various S&I pays. In addition to providing the services with the flexibility to vary pay among personnel, these pays also enable them to recognize unusual duties and hazards and to provide individuals an incentive to enlist or reenlist in hard-to-fill skill areas. The common pay table, and the relative importance of basic pay in total cash compensation, would argue for substantial similarity in pay among military personnel. But the diversity and differential use of S&I pays by the services would argue for substantial pay differences among servicemembers and a substantial role for S&I pays.

The purpose of this report is to investigate the role of the different components of military pay in total cash compensation, with attention paid to the role of S&I pays. We examine how large a portion of compensation consists of S&I pays and how much of the variance in compensation stems from S&I pays. We also consider how cash compensation varies among officer and enlisted personnel, by service, occupational group, and years of service. Since the competitiveness of military pay depends on how it compares to civilian pay opportunities, we also compare the variation in military cash compensation to the range in civilian earnings.

This report focuses on describing military compensation and not on the important behavioral outcomes that result from variations in military pay. Our analysis is related to another study conducted by Kilburn, Louie, and Goldman (2001) that also examine the role of different pay components in

determining the level and variance of enlisted military compensation. Our analysis builds on this study by considering officers, not just enlisted personnel, by examining differences among occupational groups, and by using more data for a more recent year, 1999, as described below.

DATA AND ANALYTICAL APPROACH

Our analysis considers average values of military cash compensation and the average values of different components of cash compensation for active-duty officer and enlisted personnel in a single year, 1999. As described above, we examine differences in the average values by service branch, by occupational groups, and by years of service. We also examine the variance in compensation by considering both the standard deviation in pay and the difference between the 90th and 10th percentile of military compensation by service branch and year of service.

The analysis relies on three sources of data. The first is the Joint Uniform Military Pay System (JUMPS) files for each of the 12 months of calendar year 1999, provided by the Defense Manpower Data Center (DMDC). These data indicate the incidence and actual dollar amounts of each pay component received by each servicemember in each month.

The second source, also provided by DMDC, is known as the Proxy Personnel Tempo (PERSTEMPO) data file, a data set that provides monthly information on the characteristics of active-duty personnel, including occupation, service, and date of entry into the military. PERSTEMPO records for nine months of 1999 were matched to the pay records for 1999. For characteristics in the PERSTEMPO data that vary with time, such as years of service, we used the value of the characteristic as of September 1999—i.e., the end of FY 1999. Because the inflow and outflow of personnel during a year can affect the computation of annual pay, we restricted the analysis to members who served all 12 months of 1999. A final data restriction is that our analysis of officers was limited to officers whose commissioning source was either a military academy or ROTC. We exclude those who were direct appointments or who were commissioned through Officer Candidate School or Officer Candidate Training because these individuals tend to have high pay grades for their years of service (in the case of direct appointments) or have low officer pay grades for their years of service (in the case of OCS). Including these individuals might result in misleading figures about how the average value of officer pay varied by years of service.

The third source is information provided by the Directorate of Compensation in the Office of the Secretary of Defense (OSD) on the average amount of BAH (basic allowance for housing), BAS (basic allowance for subsistence), and the federal tax advantage for 1999 by pay grade, year of service, and marital status. These averages were merged with the PERSTEMPO and JUMPS data. We used these averages rather than the actual values of these variables provided in the JUMPS data to place all personnel on an equal footing. Because members living in military housing receive zero benefits, using the actual dollar values would assign a zero value to their housing and, therefore, would bias our estimate of the housing benefit downward.

For the purposes of our analysis, we define total cash compensation to include BAS, BAH, S&I pays, bonuses, and the federal tax advantage that arises because some allowances are not subject to federal income tax. In short, cash compensation represents the pays that would appear in a member's monthly paycheck. While health benefits, future retirement benefits, and other forms of compensation are also important factors affecting manpower supply, they are not included in our definition of cash pay. The traditional definition of cash pay is Regular Military Compensation (RMC), which is the sum of basic pay, BAH, BAS, and the tax advantage. Our definition of total cash pay expands on the traditional definition because in addition to the components that constitute RMC, we also examine other miscellaneous allowances, S&I pays, and bonuses. Thus, we can analyze the role S&I pays play in total cash compensation.

RESULTS

The main result of our analysis is that considerable variation exists among the services in the incidence and average amounts of non-RMC pays and allowances. Nonetheless, these differences are overshadowed by the similarity in the average amount of RMC. The similar values of RMC at a given year of service and the fact that RMC accounts for 85 percent or more of average total cash compensation means that average cash compensation is quite similar across military personnel at a given year of service, regardless of branch of service or occupational group. Some exceptions can be found among certain officer communities, specifically doctors, aviators, and nuclear officers. Officers in these skill areas receive S&I pays that are quite large and that increase their pay well above the average pay in other skill areas.

As Table S.1 shows, average annual cash compensation in 1999 for officers varied from $62,161 in the Marine Corps to $66,883 in the Air Force. For enlisted personnel, it varied from $29,355 in the Marine Corps

to $33,744 in the Navy. By far, most of cash compensation is explained by the traditional measure of cash pay—namely RMC. In the case of officers, RMC varied from $58,707 for the Marine Corps to $61, 689 in the Army. Most of the variation across service branches in average annual cash pay and in RMC stems from differences in the years of service and pay grade distributions across the services. Because basic pay in the pay table varies by years of service and pay grade, differences in the distributions can result in variations in pay across services. Still, even when we conduct the analysis by year of service, we find remarkable similarity in average annual pay across the services at a given year of service.

The dollar amounts of S&I pays, bonuses, and miscellaneous allowances and Cost-of-Living Allowance (COLAs) shown in Table S.1 are unconditional averages—i.e., they are computed across everyone in a particular branch of service. As Table S.1 shows, the average amounts of S&I pays and, therefore, the portion of average annual pay attributable to these pays are quite small. This partly arises from the relatively low incidence of some pays and/or partly from the relative small dollar value of the pays among those who receive it.

Table S.1 Average Amounts of Cash Compensation, 1999

	Army	Air Force	Marine Corps	Navy
Officers				
RMC	$61,689	$61,599	$58,707	$59,761
S&I pays	$ 27	$2,810	$1,889	$3,134
Miscellaneous Allowances/COLAs	$837	$779	$810	$872
Bonuses	$673	$1,695	$756	$2,172
Annual Pay	$64,125	$66,883	$62,161	$65,940
Enlisted Personnel				
RMC	$30,509	$31,398	$28,241	$30,655
S&I pays	$482	$301	$317	$1,345
Miscellaneous Allowances/COLAs	$832	$1,015	$785	$967
Bonuses	$372	$381	$11	$777
Annual Pay	$32,195	$33,095	$29,355	$33,744

We examined the incidence of different pays and the average dollar amounts among those who receive them. The incidence of different S&I pays varies across the services and across the pay types. In most cases, even when the pay is relatively common throughout the enlisted or officer force, the average dollar amount among those who receive it tends to be

small. For example, among enlisted personnel, between 12 and 26 percent of personnel received hostile fire pay in 1999, depending on service. Still, the average dollar amount of hostile fire pay among those who received it was only between $433 and $633. An exception to this finding is officer Aviation Career Incentive Pay. This pay is relatively pervasive, particularly in the Air Force, Marine Corps, and Navy (between 33 and 42 percent for those three services) and the average dollar figure was relatively high, between $5,456 and $6,155.

In a few cases, the incidence of a pay is quite small, but the average dollar amount is high for those who receive the pay. For example, less than 1 percent of Army officers receive the medical officer retention bonus, but the average bonus is $36,260. Similarly, only 7.6 percent of Air Force officers receive the Aviation Officer Continuation Bonus, but the average dollar amount is $17,657. Not surprisingly, S&I pays are an important portion total cash compensation for individuals in these specific skill areas.

Among the enlisted force, one of the more important sources of pay is enlistment and reenlistment bonuses. The incidence of enlistment bonuses was the highest in the Army, and yet, in 1999, only 3 percent of Army enlisted members received enlistment bonuses. The incidence of reenlistment bonuses was the highest in the Navy, and about 15.5 percent received a reenlistment bonus in that service. These percentage figures include both initial payments of bonuses and anniversary payments.

The incidence of bonuses varies by years of service, as would be expected, given that bonuses are targeted to personnel making enlistment or reenlistment decisions in early and midcareer. For example, between YOS 5 and 11, upward of 40 percent of Navy enlisted personnel receive a reenlistment bonus, far higher than the 15.5 percent figure computed across individuals at all YOS. Nonetheless, as mentioned earlier, RMC represents such a large fraction of average total cash compensation, that even when we consider the role of bonuses in total compensation by year of service, we still find that bonuses play a relatively small overall role during YOS 5–11.

We also consider the size and determinants of the variation in military pay and how its variation compares to the variation in civilian earnings. We examine the range of cash compensation by considering the difference between the highest and lowest deciles (i.e., the 90th and 10th percentiles) of pay at each year of service. To examine the determinants of the variation, we compute the standard deviation of four increasingly inclusive measures of pay, RMC, RMC plus S&I pays, RMC plus S&I pays plus

bonuses, and RMC plus S&I pays plus bonuses plus miscellaneous allowances and COLAs.

The difference between the highest and lowest deciles varies somewhat by year of service. For enlisted personnel, the difference is about $8,000 at YOS 5, about $10,000 at YOS 10, about $12,000 at YOS 20, and about $11,000 at YOS 25. Thus, the largest difference is in the midcareer, although it does not change much after YOS 10. In part, the range of variation at each YOS reflects differences in pay grade. Bonuses and S&I pays add to the variation.

We compared the difference between the 90th and 10th percentile of military average cash pay by year of service with the difference between the 90th and 30th percentile of civilian average earnings, computed from the Current Population Survey by Professor John Warner at Clemson University. The computation was limited to males with some college education and was made for each year of experience to allow comparison with military pay. We used the 30th percentile as the lower bound because civilians who do not score well on the Armed Forces Qualification Test or who are not high school diploma graduates are unlikely to qualify for enlistment into the military but are likely to be found among those in the lowest percentiles of the civilian earnings distribution.

The key conclusion of our military and civilian comparison is that the variation in civilian pay as measured by the difference between the 90th and 30th percentile is far larger than the range in enlisted earnings. For example, at 10 years of experience, the difference in civilian earnings is about $23,000, far higher than the $10,000 difference found between the 90th and 10th percentile of military pay at YOS 10. At 20 years of experience, the civilian difference was about $30,000, again far higher than the $12,000 figure we found for enlisted personnel. It is important to note that the civilian earnings figures are averaged across many civilian firms that differ in hiring requirements, occupational mixes, industry conditions, and location-specific conditions. Although the military's workforce is diverse, it is far more homogeneous in terms of these factors than the civilian economy at large is. Nonetheless, the range of variation among civilian males with some college is far larger than the range for enlisted personnel, more than we might expect because of the heterogeneity of the civilian labor market.

To understand the extent to which the components of military pay contribute to variation in military cash pay, we examined the standard deviation of pay for the four, increasingly inclusive measures of pay given above. Because some of the pay components, notably BAH, BAS, and the

tax advantage, are averages from OSD, their contribution to the variance of total pay will be understated. The result is that the variance in RMC (which is the sum of basic pay, BAS, BAH, and the tax advantage) at a given year of service will reflect differences in pay grade and marital status of personnel at a given year of service.

The findings regarding the determinants of variance differ across the services. For the Air Force, the standard deviation of enlisted pay is in the $3,000 to $4,000 range over most years of service, with about half due to bonuses during YOS 4 to 11, after which variation in RMC accounts for most of the difference. The variation stemming from RMC reflects the diversity of pay grades in those years of service for the Air Force. Notably, S&I pay components (excluding bonuses) account for little of the variation in Air Force pay. For the Army, the standard deviation of enlisted pay lies within a fairly narrow band between $3,000 and $4,000 during YOS 6–25 and even less in YOS 1–5. Unlike the Air Force, pay variation stemming from RMC is more prominent in the early career (YOS 1–8) because of the greater diversity of pay grades in the Army in those years of service. The variation due to S&I pays are also greater than in the Air Force.

For the Marine Corps, the variation in enlisted pay rises steadily from about $1,500 at YOS 1 to $5,000 at YOS 24. The increase is due to variation in RMC and miscellaneous allowances and COLAs. The Marine Corps makes little use of bonuses. The Navy has the greatest variation in enlisted pay among the services. Between YOS 1 and 4, the standard deviation of pay rises from $2,000 to $5,000, with most of the increase arising from bonuses. Over the YOS 5 to 25 YOS period, the standard deviation is in the $5,000 to $6,000 range, with much of the variation coming from bonuses and much coming from S&I pays, especially sea pay. As in the Air Force, bonuses play a prominent role in the Navy in creating pay differentials during early and mid-career for enlisted personnel.

Among officers, the standard deviation of RMC for the Air Force, Army, and Navy is nearly $8,000 in the first few years of commissioned service, then declines to less than $4,000 in YOS 4–12. The Marine Corps figures are a bit higher. S&I pays add about $1,000 to the standard deviation, and bonuses add substantially to pay variance. However, it is important to recall that bonuses are generally received by only a small percentage of officers, although as noted earlier, some bonuses amounts are quite substantial, especially the amounts given to doctors, aviators, and those in the nuclear fields.

CONCLUSIONS

The main conclusion stemming from our analysis is the high degree of similarity in cash compensation among military personnel at each year of service, regardless of branch of service or occupational group. In other words, although pay grows over a military career, pay is remarkably similar among personnel at the same year of service. A few notable exceptions exist, such as officers in the medical, aviation, and nuclear fields who receive S&I pays and bonuses that substantially increase their average compensation. Apart from these exceptions, equity in compensation seems to prevail. Thus, despite the large number of S&I pays, they play a relatively small role in determining average total cash compensation.

The small role of non-RMC components of pay in determining average total cash compensation is explained in part by the relatively small fraction of personnel who receive the non-RMC components of pay—i.e., S&I pays, bonuses, and miscellaneous allowances and COLAs. Even in cases where the incidence of these pays is fairly pervasive, such as the Clothing and Uniform allowance, their average dollar values tend to be small. For example, nearly all personnel receive the clothing allowance, but the average amount is less than $400 for enlisted personnel and less than $600 for officers. The similarity in pay outcomes and relatively small overall role of non-RMC components also stem from the common foundation of basic pay and similarities in the services' promotion systems in terms of promotion phase points and promotion criteria.

These similarities in compensation across personnel and the similarities in the promotion systems provide tangible evidence of the military's commitment to equity of pay opportunities—regardless of skill area. Nonetheless, that equity results in remarkable similarity in the retention profiles of personnel across the services and across occupational groups. In other words, the experience mix of occupational groups varies relatively little within each service, despite the enormous diversity in the skill requirements and duties of the personnel in these groups. Further, although notable differences exist in the experience mix across the services, with the Marine Corps having a more junior force and the Air Force having a more senior force, the similarities in the experience mixes of personnel in the different services are also notable. To the extent that the services would like to achieve more variable career lengths and more diversity in the experience mix of different occupations, the analysis in this report suggests that greater differentiation in military pay and changes in the structure of military compensation may be required.

1. INTRODUCTION

Every four years, the level and structure of military compensation are reviewed to determine their adequacy for meeting the military personnel supply needs of the services. Military compensation presents a complicated picture because of the large number of special and incentive (S&I) pays and allowances that have been created over time. These pays and allowances address specific concerns about such factors as housing costs, dangerous duty, arduous duty, separation from family, and pay differences related to particular skill areas, such as medicine and aviation. It is possible that they create wide differences in military compensation among personnel.

At the same time, military compensation is built on the foundation of basic pay. The Army, Navy, Air Force, Marine Corps, and Coast Guard share the same basic pay tables for officers and enlisted personnel. These common basic pay tables may lead to the expectation that the actual level of military compensation by year of service and pay grade (rank) is similar across the services.

Further, if basic pay were the dominant element of military compensation, the fact that basic pay tables are common across the services implies that servicemembers face largely similar compensation incentives to remain in service. If so, one might expect a high degree of similarity in retention profiles by year of service, across the services. However, the services differ in their desired personnel force structure—for example, the Marine Corps prefers a heavily junior force. Its first-term reenlistment rate is about half that of the other services. Thus, compensation incentives are not the only mediator of the personnel force structure. Even so, common basic pay tables and similar promotion practices would suggest a small amount of pay diversity among retained personnel, which is the opposite of what one might expect from the many S&I pays and allowances.

The purpose of this report is to put S&I pays in perspective as elements of military cash compensation. We investigate how large a portion of military compensation they currently represent and how much they contribute to the variance in military compensation across personnel. Although military compensation is a pivotal factor in recruiting and retention, this report is intended to describe military compensation rather than relate it to behavioral outcomes.

Given the recruiting difficulties experienced in the late 1990s by the Army, the Navy, and the Air Force and the retention problems experienced in some occupational areas, it is of interest to consider how

military compensation differs among subgroups and how it compares to civilian pay. Furthermore, the dispersion of earnings in the private-sector economy has grown since the early 1980s, and differences in skill, education, and ability help explain that trend. Given the importance of private-sector earnings opportunities relative to military earnings opportunities in the retention decision, it is also of interest to understand the amount of variation in military earnings and the importance of skill versus other factors (such as location or duty type) in explaining that variation.

A recent RAND study (Kilburn, Louie, and Goldman, 2001) examined patterns in the level and variance of enlisted compensation among some subgroups, but the study did not examine components of compensation among other subgroups, most notably in different occupational areas or among officers. This report provides information to fill that gap. We address the following questions:

- What is the relative size of different components of pay over enlisted and officer careers? The components include basic pay, allowances, S&I pays, bonuses, and the federal tax advantage.
- How do enlisted and officer pay profiles vary by service and by occupational area?
- How do the level and range of variation in military pay compare to the level and range in civilian pay?

Chapter Two defines the elements of military compensation addressed in this study and describes the sources of data. Chapter Three presents a variety of pay comparisons in tables and figures, and Chapter Four contains our conclusions.

2. PAY DEFINITION AND DATA

DEFINITION OF MILITARY PAY

We focus on the cash elements of military compensation for active-duty personnel. These include basic pay, BAS, BAH, S&I pays, bonuses, miscellaneous allowances, and cost of living adjustments (COLAs). The exceptions to limiting the analysis strictly to a member's cash pay are to assign BAS and BAH to members who live in on-base housing and to

include a "tax advantage" attributable to the fact that BAS and BAH are not subject to federal income tax. The allocation BAS and BAH to members living on base assumes that BAS and BAH amounts are reasonable approximations of the value of meals and housing provided in kind. The tax adjustment is made to put BAS and BAH on par with other pays, all of which are pretax. Descriptions of pays and allowances may be found in the Uniformed Services Almanac (2001). Also, the Department of Defense is developing a military pay Web site (http://militarypay.dtic.mil).

Cash pay does not include military health care, retirement benefits, educational benefits, and the in-kind provision of training and education. It also does not include in-kind services provided through morale, welfare, and recreation (MWR) accounts such as childcare, family counseling, and recreation facilities. Kilburn, Louie, and Goldman (2001) present estimates of the value of military health care by family size, measured in terms of the private-sector health insurance premium for similar coverage. They also estimate the present discounted value of a servicemember's expected retirement benefits, by year of service.

DATA

The military pay data used for this analysis cover the 1999 calendar year and indicate the incidence and level of all pays for each individual on active duty, as well as the individual's grade, occupation, year of service, and other characteristics.

We created the data file from three sources. The first is the Joint Uniform Military Pay System (JUMPS) files for each of the 12 months of calendar year 1999, provided by the Defense Manpower Data Center (DMDC). The monthly JUMPS file has a record for each active-duty member who was paid. For each type of pay, the data indicate whether the individual received the pay in that month and the dollar amount.

In this report, we present tables and tabulations based on members who were in the military for all 12 months of calendar 1999. This approach captures payments made at irregular intervals during the year and provides information about the incidence, level, and variance of pays from the perspective of career members or those contemplating a career. However, another source of pay variation comes from the turnover of military personnel during the year, and it is possible that the inclusion of members who leave the military would present a different picture of compensation. For instance, leavers might have relatively lower ranks at a given year of service or receive fewer S&I pays. Therefore, to present a perspective on pay that includes the entire population of military

personnel—those who stay throughout the year as well as those who arrive or leave during the year—we prepared tabulations for a given month during the year: June. These tabulations, which appear in Appendix A, show the incidence and amount of pays in June 1999 for members present all year and members present in June whether or not they served the entire year. Although the percentages of members receiving S&I pays and certain allowances differ somewhat in the month view versus the all-year view, the message about the relative contribution of such pays is much the same.

The second data source, also provided by DMDC, is known as the Proxy Personnel Tempo (PERSTEMPO) data file. It is built from the Active-Duty Master files and contains information on occupation and date of entry into the military. We used monthly information from the PERSTEMPO file for the first nine months of 1999; data were not available for later months. Such time-sensitive variables as occupation were taken as of September 1999. These data were then merged with the JUMPS records for each individual.

The Directorate of Compensation, OSD, provided the final source of data. These are estimates of the average amount of BAH, BAS, and the federal tax advantage for 1999, by pay grade, year of service, and marital status for officer and enlisted personnel. We applied the average BAH, BAS, and tax advantage data to officers and enlisted, given their pay grade and marital status. This allowed us to place members on a comparable footing. If we had instead relied on actual BAH, members living in military housing would have had zero values of BAH. Also, we wanted to include the tax advantage, the OSD computation of which depends on average BAS, so we included average BAS. (The JUMPS data contain actual BAS and housing allowances at the individual level for months in which servicemembers received those allowances.)

To construct the analysis file, we merged the 12 JUMPS files for 1999, allowing us to compute total 1999 pay, by pay component, for each servicemember. These data were then merged with the PERTEMPO data to capture occupation and entry or commissioning date and OSD data on average BAH, BAS, and tax advantage by grade and marital status.

Inflow and outflow of personnel during a year can affect the computation of annual pay. Because we restricted the analysis to members who served all 12 months of 1999,[1] we excluded new entrants in calendar year 1999 except those who entered in January 1999. This

[1] As mentioned, the tables in Appendix A allow for a comparison between an all-year population and one with an inflow and outflow of personnel.

restricted the number of new entrants in our data, so we included in the analysis file those who entered in October 1998 through December 1998—i.e., who entered in the first quarter of FY 1999. Thus, the "first year" members of the analysis file are an undercount of personnel in their first year but should be sufficient to provide measures of annual pay comparable with those of personnel in later years of service. Annual pay was defined as pay during the 12 months in calendar year 1999 regardless of entry date. With these restrictions and inclusions, the analysis file contained 967,000 enlisted records and 96,000 officer records, out of the 1,490,000 in the JUMPS files.

In separate tabulations of enlistment bonus incidence and amount, we included *all* personnel in the first year of service, not just those who served all twelve months of 1999. This ensured an accurate representation of the percentage of first-year personnel receiving an enlistment bonus.

The analysis of enlisted personnel includes all individuals who meet the data restrictions described in the previous paragraphs. The analysis of officers also includes individuals who meet these restrictions as well as one additional restriction. Officers must have as commissioning source either a military academy or ROTC. We exclude individuals who were direct appointments or commissioned via Officer Candidate School (OCS) or Officer Candidate Training (OCT). The reason is that OCS/OCT officers often have more years of service as a result of entering the military as part of the enlisted force, while direct-appointment officers enter at a higher rank and so often have a higher pay grade. Because most of our pay analysis is conducted by year of service, the inclusion of OCS/OCT or direct-appointment officers would yield misleading figures about how the average value of officer pay varied by YOS. Nevertheless, we recognize that OCS, OCT, and direct appointments are significant sources of officers. Therefore, we have prepared tables (Appendix B) that include all commissioned officers and all commissioned officers and warrant officers. These more comprehensive populations are companions to the service academy/ROTC population discussed in the text. The incidence and amounts of pays are somewhat different for the more inclusive populations, but the main findings about the relative contribution of S&I pays and allowances are basically the same.

The key variables in the analysis are years of service and the different components of military pay. Years of service are measured as of September 30, 1999 (i.e., the end of FY 1999). The analysis also focuses on seven categories of pay components. The first four are basic pay, BAS, BAH, and federal tax advantage. These four constitute RMC. The final three categories are S&I pays, bonuses, and miscellaneous allowances. (Bonuses are often counted among S&I pays, but we treat them as a

separate category.) These three categories include many different pays, as Tables 3.1 and 3.2 reveal.

Finally, the year-of-service numbering convention we use is as follows. "YOS 1" refers to the period *during* the first year of service. This is the usual convention. It contrasts with the convention for stating one's age, where "one-year-old" refers to an infant in the second year of life. Hence, someone who enlists for a four-year term and extends for three months would make a reenlistment decision in YOS 5.

3. PAY LEVEL AND VARIANCE

This chapter shows that the incidence and average amounts of non-RMC pays and allowances differ across the services. These differences are overshadowed, however, by similarity in the average amount of RMC. The similar values of average RMC at a given YOS and the fact that RMC accounts for 85 percent or more of total pay mean that average total pay is similar for individuals at a given YOS, regardless of service branch or broad occupational area. That is, we find that average total pay differences at a given YOS are relatively small.

Several exceptions occur: doctors, aviators, and nuclear officers receive S&I pays and bonuses that increase their pay well above the average pay for officers in other occupational areas.

THE INCIDENCE OF PAY COMPONENTS

Table 3.1 shows the incidence and the average amount of military pay for enlisted personnel in 1999. Table 3.2 is a similar table for officers whose source of commissioning was either a military academy or ROTC. Care is needed in interpreting the enlistment and selective reenlistment bonus figures because the averages in Tables 3.1 and 3.2 confound initial payment of the bonus, which may be large, with smaller anniversary payments.

Enlisted RMC (Table 3.1) averaged $30,509 in the Army, $31,398 in the Air Force, $28,241 in the Marine Corps, and $30,655 in the Navy. The Army, Air Force, and Navy averages are close to one another, suggesting an overall similarity in the services' YOS/pay grade mix. The

Marine Corps, which has about 70 percent of its enlisted personnel in the first term of service, has an average about $2,000 lower.

Officer RMC (Table 3.2) exhibits virtually no difference between the Army and Air Force: $61,689 and $61,599, respectively. The Marine Corps has the lowest average at $58,707, probably reflecting the more-junior nature of its officer corps. The Navy's average, $59,761, also suggests a more-junior officer corps than that of the Army and Air Force.

As these tables make clear, the incidence and average amounts of S&I pays and of allowances varied considerably across branch of service in 1999. As expected, career sea pay is pervasive in the Navy. About 40 percent of enlisted personnel and 19 percent of officers receive career sea pay and, of these, 5 percent of enlisted personnel and 4 percent of officers also receive career sea pay premiums. Among enlisted personnel, no other S&I pay is so dominant as sea pay. Among Air Force and Army enlisted personnel, Foreign-Duty Pay covered about a quarter of individuals in 1999. Hostile Fire Pay also covered a significant fraction of personnel—about 15 percent of Army personnel, 20 percent of Air Force enlisted personnel, 12 percent of Marine Corps enlisted personnel, and 26 percent of Navy personnel. For enlisted personnel, the average of all S&I pays was $482 for the Army, $301 for the Air Force, $317 for the Marine Corps, and $1,345 for the Navy.

In a number cases, few enlisted personnel in a given service received a certain type of pay. For example, less than 2 percent of Navy personnel and less than 1 percent of personnel in the other services received Diving Duty Pay. Several instances occur where less than 1 percent of enlisted personnel in service in 1999 received a pay. Examples include Demolition Duty Pay, Experimental Stress Duty Pay, Toxic Fuels Duty Pay, and Chemical Munitions Pay.

On the other hand, even when the incidence of a pay component is relatively pervasive among servicemembers, the average dollar amount is not always large. For example, the vast majority of enlisted personnel receive a Uniform Clothing Allowance. But the average ranges from $229 to $336, a small amount compared to some of the S&I and other pays.

Table 3.1 Incidence and Average Amounts of Enlisted Pay, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	19,542	100.0	20,371	100.0	17,611	100.0	19,757
BAH (Green Book)	100.0	6,497	100.0	6,559	100.0	6,245	100.0	6,453
BAS (Green Book)	100.0	2,738	100.0	2,738	100.0	2,738	100.0	2,738
Tax Advantage (Green Book)	100.0	1,732	100.0	1,731	100.0	1,647	100.0	1,707
Average RMC		**30,509**		**31,398**		**28,241**		**30,655**
Foreign-Duty Pay	28.1	73	25.2	65	10.3	35	5.3	90
Proficiency Pay	6.1	2,699	3.0	2,285	5.8	2,583	9.4	2,108
Oversea Extension Pay	0.4	696	0.1	434	1.5	1,212	0.4	675
Career Sea Pay	0.1	1,314	1.0	112	9.0	205	40.5	1,624
Career Sea Pay Premium	1.0	742	0.0		1.0	734	5.1	684
Hostile Fire Pay	15.7	633	19.8	570	12.1	468	26.1	511
Diving Duty Pay	0.1	1,744	0.3	1,687	0.3	1,800	1.7	2,007
Submarine Duty Pay	0.0		0.0		0.0		7.5	2,094
Foreign Language Pay (1)	1.5	675	1.5	806	0.7	620	0.5	715
Foreign Language Pay (2)	0.2	332	0.1	360	0.0		1.0	373
Flying Pay (Crew Member)	1.0	1,688	3.1	1,979	1.3	1,847	1.9	2,120
Flying Pay (Noncrew)	0.0		0.0		0.8	1,003	0.0	
Parachute Duty Pay	10.1	1,471	0.2	1,078	0.7	1,095	0.3	1,417
Flight Deck Duty Pay	1.0	1,200	1.0	85	2.4	471	9.0	591
Demolition Duty Pay	0.4	1,567	0.4	1,641	0.3	1,475	0.5	1,406
Experimental Stress Pay	1.0	870	0.2	1,261	1.0	1,387	0.2	747
Toxic Fuels Duty Pay	1.0	261	0.3	1,507	0.0		1.0	303
Toxic Pesticides Duty	1.0	532	1.0	1,166	0.0		1.0	998
High- Altitude Low Opening	0.3	2,297	0.3	2,399	0.2	2,207	0.5	2,498
Chemical Munitions Duty Pay	0.1	927	1.0	813	0.0		1.0	546
Average S&I Pay*		**482**		**301**		**317**		**1,345**
FSA I	1.4	181	0.7	308	0.0		0.8	180
FSA II	19.9	417	17.1	333	19.2	385	23.0	399
CONUS COLA	0.6	730	0.6	355	1.4	612	0.7	697
Oversea COLA	24.6	1,849	24.1	2,904	21.4	2,240	19.4	2,748
Clothing/Uniform Allowance	87.2	329	90.8	281	97.9	229	99.7	336
Average Misc Allow./COLAs[a]		**832**		**1,015**		**785**		**967**
Enlistment Bonus	3.0	5,193	1.7	3,749	0.5	2,137	2.2	4,139
SRB	11.2	1,949	10.1	3,167	1.0	5,329	15.4	4,452
Average Bonus*		**372**		**381**		**11**		**777**
Average Annual Pay[a]		**32,195**		**33,095**		**29,355**		**33,743**

NOTE: Foreign Language Pay (2) is received by members who have mastered a second foreign language. FSA II is received by members who are involuntarily separated from their families.

[a] *Averaged over all members including those not receiving these pays.*

Table 3.2 Incidence and Average Amounts of Officer Pay, Commission Source is ROTC or a Military Academy, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	45,322	100.0	45,127	100.0	42,675	100.0	43,558
BAH (Green Book)	100.0	10,584	100.0	10,683	100.0	10,522	100.0	10,376
BAS (Green Book)	100.0	1,887	100.0	1,887	100.0	1,887	100.0	1,887
Tax Advantage (Green Book)	100.0	3,896	100.0	3,902	100.0	3,623	100.0	3,939
Average RMC		**61,689**		**61,599**		**58,707**		**59,761**
Saved Pay	0.0		0.0		0.0		0.0	4,248
Health Professional Saved Pay	0.0		0.0		0.0		0.0	
Variable Special Pay	0.3	8,141	0.1	8,517	0.0		0.4	3,656
Board-Certified Pay	1.8	3236	1.0	3435	0.0		0.4	3656
Aviation Career Incentive Pay	9.4	5917	41.8	6155	33.0	5370	38.5	5456
Responsibility Pay	0.0		0.0		0.0		0.0	
Career Sea Pay	0.0		0.0	150	0.2	418	18.9	1272
Career Sea Pay Premium	0.0		0.0	67	0.0		3.8	544
Hostile Fire Pay	17.6	621	21.8	576	15.5	474	24.8	525
Diving Duty Pay	0.1	1,599	0.1	1,682	0.5	1,650	2.8	2,249
Submarine Duty Pay	0.0		0.0		0.0		9.9	5,004
Foreign Language Pay (1)	3.1	730	2.6	915	1.4	802	0.8	739
Foreign Language Pay (2)	0.4	349	0.1	321	0.0		0.0	400
Flying Pay (Crew Member)	0.1	1,735	0.8	1,551	0.0		0.1	1,722
Flying Pay (Noncrew Member)	0.1	1,047	0.1	604	0.1	774	0.1	728
Air Weapons Controller (Crew)	0.0	2,028	1.0	2,564	0.0		0.0	2,400
Parachute Duty Pay	11.2	1,264	0.2	1,019	1.6	1,057	0.6	1,421
Flight Deck Duty Pay	0.0		0.0		0.2	558	4.8	485
Demolition Duty Pay	0.3	1,413	0.1	1,374	0.1	547	0.8	1,360
Experimental Stress Duty Pay	0.0	1,028	0.3	1,049	0.0		0.1	785
Toxic Fuels Duty Pay	0.0		0.1	1,438	0.0		0.0	
High- Altitude Low Opening	0.2	1,981	0.2	2,181	0.0	2,700	0.7	2,504
Chemical Munitions Duty Pay	0.0	964	0.0		0.0		0.0	
Average S&I Pay*		**927**		**2,810**		**1,889**		**3,134**
FSA I	1.3	520	0.6	603	0.0		0.7	189
FSA II	15.2	387	14.5	306	18.3	346	21.5	380
CONUS COLA	1.2	985	1.9	439	1.6	1,007	1.2	1,070
Oversea COLA	23.2	3,243	16.7	4,300	14.5	4,996	17.6	4,391
Clothing/Uniform Allowance	1.3	529	0.8	575	1.2	371	1.3	384
Personal Money Allowance	0.0	843	0.0	321	0.0		0.0	497
Average Misc Allow./COLAs[a]		**837**		**779**		**810**		**872**

Table 3.2 Incidence and Average Amounts of Officer Pay, Commission Source is ROTC or a Military Academy, 1999 (continued)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $)Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Nuclear Officer Accession Bonus	0.0		0.0		0.0		0.0	7,000
Medical Officer Retention Bonus	0.8	36,260	0.4	35,355	0.0		0.2	36,576
Nuclear Career Accession Bonus	0.0		0.0		0.0		1.2	2,039
Nuclear Career Annual Incentive Bonus	0.0		0.0		0.0		2.5	7,402
Additional Special Pay, Medical Officer	2.0	14,729	1.1	15,000	0.0	42	0.6	14,707
Incentive Special Pay Medical Officer	0.4	20,852	0.3	18,304	0.0		0.1	22,195
Nuclear-Qualified Officer Continuation	0.0		0.0		0.0		5.5	17,435
Aviation Officer Continuation	0.0		7.6	17,657	6.8	11,136	6.7	12,163
Average Bonus[a]		**673**		**1,695**		**756**		**2,172**
Average Annual Pay		**64,125**		**66,883**		**62,161**		**65,940**

NOTE: Foreign Language Pay (2) is received by members who have mastered a second foreign language. FSA II is received by members who are involuntarily separated from their families.

[a] *Averaged over all members including those not receiving these pays.*

The incidence of different pays differs across services. In part, these differences reflect the services' pay usage choices. An important example is the Selective Reenlistment Bonus (SRB). As shown in Table 3.1, about 11 percent of Army, 15 percent of Navy, and about 10 percent of all Air Force enlisted personnel received an SRB payment in 1999. The program was not offered in the Marine Corps. The differences across the services also reflect differences in their occupational mix. For example, 10 percent of Army personnel received parachute duty pay, but less than 1 percent of enlisted personnel in the other services received this pay.

Among officers whose commissioning source was a service academy or ROTC, S&I pays and allowances varied across service branches as well (Table 3.2). As mentioned, S&I pays for medical officers are particularly high. For Air Force officers, Aviator Career Incentive Pay is among the most prevalent S&I pays, covering about 42 percent of officers commissioned from ROTC or academies.[2] This source of pay was also

[2] Table 3.2 shows that 41.8 percent of Air Force officers received Aviation Career Incentive Pay, but according to the May 2001 issue of *Air Force Magazine*, the number

prevalent among Marine Corps and Navy officers. However, the average dollar amount was somewhat higher in the Air Force. The incidence and average dollar amount of Aviation Officer Continuation Pay is also higher in the Air Force, although only covering 7.6 percent of officers in 1999. Other pervasive non-RMC pay components were Hostile Fire Pay and Family Separation Pay. S&I pays in total averaged $927 for Army officers, $2,810 for Air Force officers, $1,889 for Marine Corps officers, and $3,134 for Navy officers.

ENLISTMENT AND REENLISTMENT BONUSES

Because bonus payments may be spread out over several years, the bonus figures in Table 3.1 include both those receiving a bonus for the first time and those receiving an anniversary payment. Table 3.3 contains summary information on bonus amounts distinguishing between initial and anniversary payments. In addition, Table 3.4 presents information on the percentage of personnel receiving an enlistment bonus and the average amount received, by year of service. Figures 3.1 through 3.6 present similar information for SRBs.

Table 3.3 shows that the Army used enlistment bonuses most frequently, followed by the Navy and Air Force. The Marine Corps made the least use of enlistment bonuses. Initial bonus payments average $5,249 in the Army, $4,321 in the Navy, $3,744 in the Air Force, and $2,137 in the Marine Corps. Anniversary bonus payments were less than half this size, respectively, for each service. The initial payment was large in comparison with a servicemember's basic pay: 40 percent for a soldier, 31 percent for a sailor, 29 percent for an airman, and 16 percent for a Marine.

With respect to SRB use, the percentage of personnel receiving a first payment was similar for the Army, Navy, and Air Force: 3.7 percent, 4.0 percent, and 4.3 percent, respectively. However, the average amount of the

was 23.5 percent. We have sought to reconcile these numbers. When we expanded the officer population to include all commissioned officers, the result was 32.4 percent (see Appendix B). When we removed the restriction of being present throughout 1999 and looked at officers present in September, the result was 31 percent for ROTC and academy officers and 29.5 percent for all commissioned officers. Moreover, we checked on the possibility that ACIP included Retention Bonuses in the JUMPS files. We did a frequency on the pay amounts for ACIP by month and by and large, the amounts match what is published for ACIP payments. If bonuses were given, the payment amounts would have been different. The remaining difference (29.5 minus 23.5 equals 6) may be due to different years (1999 versus 2001) or other, unknown factors.

first payment differed by service: Army, $3,424; Navy, $8,973; and Air Force, $5,672. The Navy first payment was equivalent to 51 percent of basic pay, on average, while the Army and Air Force bonuses were equivalent to 19 percent and 33 percent of basic pay. The Marine Corps did not use SRBs.

Table 3.3 Incidence and Average Amount of Enlistment and Selective Reenlistment Bonuses, 1999

Bonus Incidence and Amount	Army	Air Force	Marine Corps	Navy
Enlistment Bonuses				
Percentage receiving first payment[a]	2.1	1.7	0.5	1.9
Average first payment	$5,249	$3,744	$2,137	$4,321
First payment as percentage of basic pay	40.1	29.2	16.5	31.3
Percentage receiving anniversary payment[a]	1.7	0.0	0.0	0.7
Average anniversary payment	$2,312	$1,200	.	$982
Anniversary payment as percentage of basic pay	17.4	9.3	.	6.6
Selective Reenlistment Bonuses				
Percentage receiving first payment[a]	3.7	4.3	0.0	4.0
Average first payment	$3,424	$5,672	.	$8,973
First payment as percentage of basic pay	19.4	32.8	.	51.3
Percentage receiving anniversary payment[a]	7.8	6.0	0.0	14.2
Average anniversary payment	$1,060	$1,293	.	$2,388
Anniversary payment as percentage of basic pay	5.4	6.7	.	12.1

[a] *Percentages are computed relative to the total number of personnel in service for all 12 months of 1999. For first-year personnel, the sample includes personnel who entered service in October–December 1998, plus those entering in January 1999, and who stayed in service throughout 1999. Because first payments of enlistment bonuses are received on entering service, but the sample contains only four-months worth of entrants (October–January), the sample undercounts the percentage of personnel receiving first payments of enlistment bonuses. Allowing for entrants throughout the year would approximately triple the percentage.*

The percentages of personnel receiving an initial or anniversary payment shown in Table 3.3 are relative to all enlisted personnel in service throughout 1999. To obtain a precise view of bonus usage among enlistees and reenlistees, we computed bonus information by year of service. As Table 3.4 shows, the percentages of first-year personnel who received an

initial enlistment bonus payment are considerably higher than the values in Table 3.3. In the Army, 8 percent of YOS 1 personnel received an initial payment, compared with 9.9 percent in the Navy, 15.5 percent in the Air Force, and 0.9 percent in the Marine Corps. The average amounts of the payments are similar to the values in Table 3.3. Table 3.4 also shows that first payments are received by personnel in YOS 2 and higher. These higher-year payments reflect the payment of bonuses conditional on completing advanced individual training.

Table 3.4 Incidence and Average Amount of Enlistment Bonuses by Year of Service, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Initial Payment								
YOS 1*	8.0	4,584	15.5	3,837	0.9	2,884	9.9	3,435
YOS 2	11.9	5,358	10.8	3,616	2.1	2,053	9.1	4,027
YOS 3	1.1	4,420	1.3	4,101	0.1	2,606	6.0	5,005
YOS 4	0.2	4,699	0.3	3,967	0.0	.	0.4	4,943
YOS 5	0.0	3,563	0.0	3,500	0.0	.	0.1	3,444
YOS 6	0.0	5,850	0.0	1,000	0.0	.	0.0	6,283
Anniversary Payment								
YOS 1*	1.4	1,263	0.0	813	0.0	.	0.1	649
YOS 2	9.6	2,494	0.1	1,267	0.0	.	1.6	665
YOS 3	1.9	1,688	0.0	1,000	0.0	.	3.7	1,109
YOS 4	0.1	785	0.0	1,000	0.0	.	0.5	1,253
YOS 5	0.0	1,601	0.0	.	0.0	.	0.0	1,375
YOS 6	0.0	1,417	0.0	.	0.0	.	0.0	1,175

** The YOS 1 category includes all personnel in their first year of service in 1999, including those with less than 12 months of service during 1999. Therefore, the percentage receiving an enlistment bonus is representative of first-year personnel.*

For SRBs, which are paid over a broader year-of-service range than enlistment bonuses, the patterns are more apparent in figures than in tables. SRBs are payable to members who have completed at least 17 months and not more than 14 years of continuous active duty. Figure 3.1 displays the percentage of Army personnel receiving a first payment or an anniversary payment of an SRB, by year of service. As shown, 8–10 percent of personnel received a first payment in the YOS 4–7 range. In YOS 5–7 more than 25 percent of Army personnel receive a bonus payment, often an anniversary payment. Therefore, over this "early

midcareer" year-of-service range, bonus payment are prevalent. The percentage receiving an anniversary payment happens to peak at YOS 7, which suggests that the Army made extensive use of bonuses several years ago (i.e., offered SRBs in many specialties) and that many of the personnel who received bonuses remained in service. Figure 3.2 shows that first payments averaged $3,000–$4,000 up to YOS 7 and around $5,000 in YOS 8–13. By comparison, anniversary payments were about $1,000 up to YOS 7 and ranged around $1,500 in YOS 8–13.

Figure 3.1 Percentage of Enlisted Personnel Receiving SRBs, Army, 1999

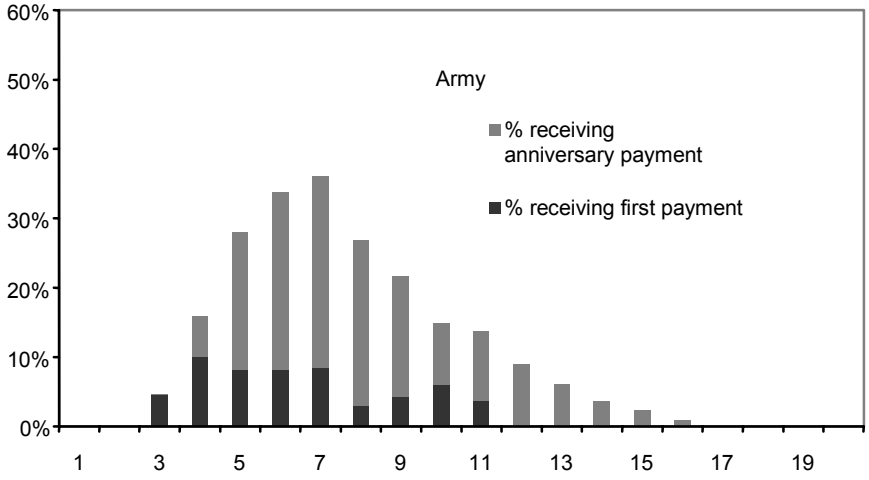
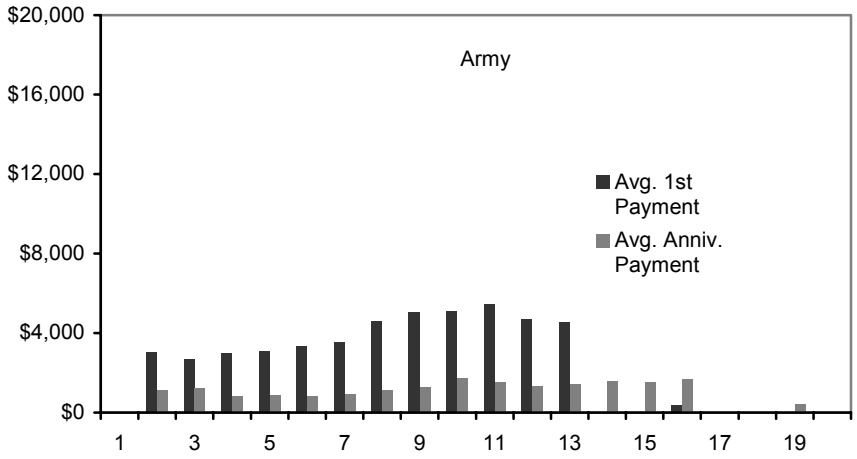


Figure 3.2 Average SRB, Army, 1999



Air Force SRB usage and amounts (Figures 3.3 and 3.4) are broadly similar to the Army's. However, the Air Force appears to cover more second-term personnel with bonuses. In YOS 6–11, 20–30 percent of Air Force personnel received a bonus payment in 1999. The spike at YOS 5 (first-term reenlistment) probably indicates an intensified usage of bonuses in 1999 in response to low reenlistment rates. Also, on average the initial SRB payments are higher in the Air Force than in the Army; for YOS 4–11 initial payments are $4,000–$7,000.

Figure 3.3 Percentage of Enlisted Personnel Receiving SRBs, Air Force, 1999

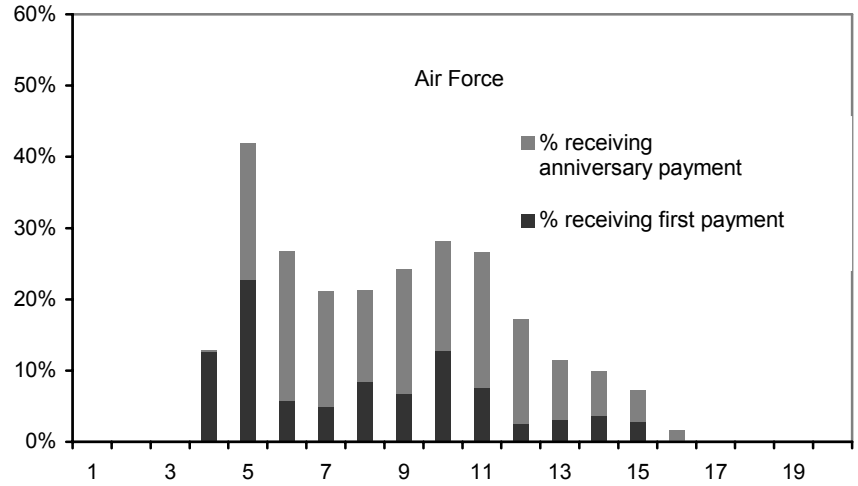
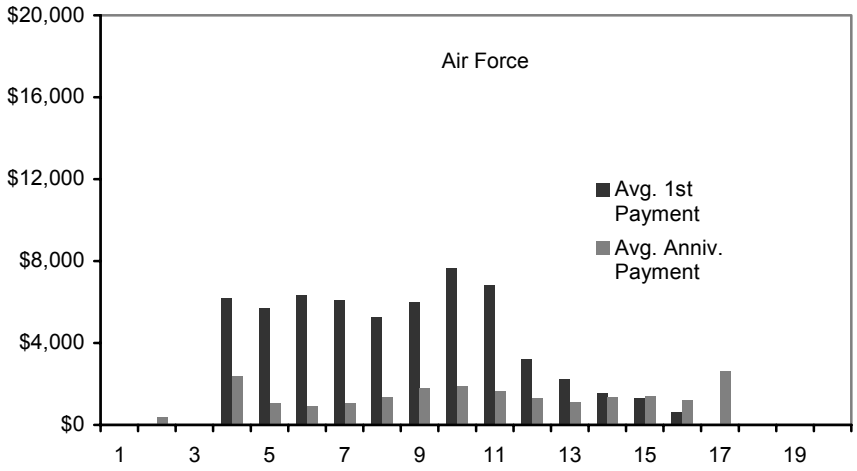


Figure 3.4 Average SRB, Air Force, 1999



The Navy (Figures 3.5 and 3.6) makes the most extensive use of SRBs and also pays higher bonuses. In YOS 5–11, upward of 40 percent of Navy enlisted personnel receive bonus payments. At first-term reenlistment, 20 percent of personnel received a bonus, and another 20 percent received an anniversary payment. In YOS 5–11, first payments averaged $7,000–$10,000, while anniversary payments were $2,000–$4,000.

Figure 3.5 Percentage of Enlisted Personnel Receiving SRBs, Navy, 1999

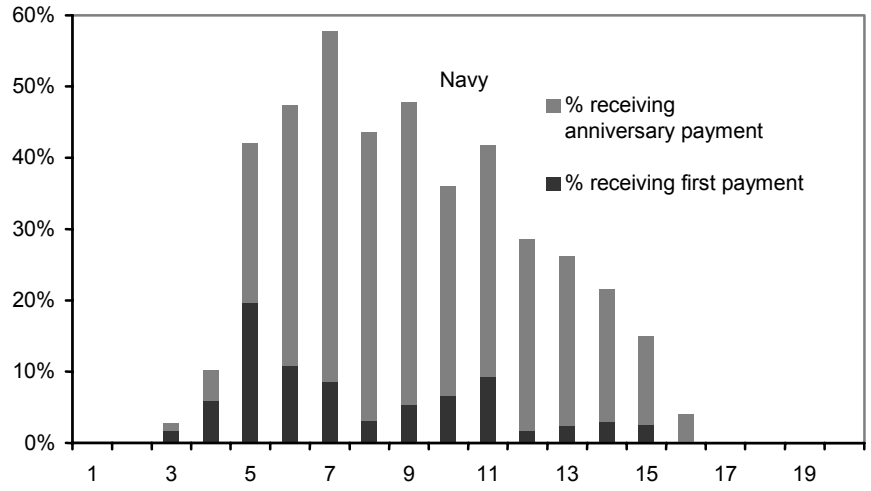
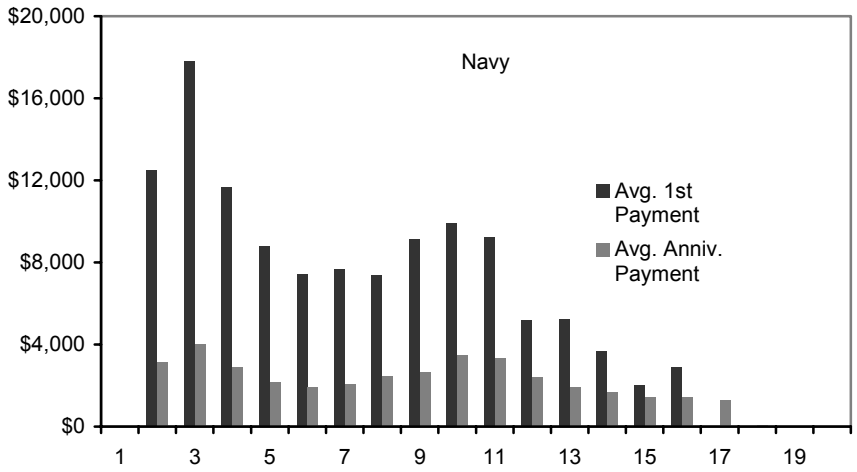


Figure 3.6 Average SRB, Navy, 1999



AVERAGE PAY BY YEAR OF SERVICE

Despite the differences across the services in S&I and other pays and allowances shown in Tables 3.1 and 3.2, average total pay is similar across the branches of service, for a given year of service. This may be seen in Figures 3.7 and 3.8, which show average total enlisted pay and average total officer pay by service, displayed by year of service. The enlisted pay lines of the Army, Navy and Marine Corps are quite close to one another, while the Air Force pay line is lower. The officer pay lines show a range across services that widens with year of service, reaching about $10,000 at year 20.

In the case of enlisted personnel, the lower pay line for airmen comes in part from the Air Force's longer time to E-5 promotion. This creates a relative decrement in pay that seems to persist over later years. In the case of officers, average total pay is typically higher in the Navy and the Air Force relative to the Army and then the Marine Corps. However, the Marine Corps has no doctors in its ranks, and because doctors are among the most highly paid officers their absence reduces the Marine Corps average.

When all categories of pay are included, average annual enlisted pay for a new recruit in YOS 1 is about $23,000 (Figure 3.7). Average pay has grown to about $35,000 by YOS 10 and $42,000 by YOS 20. Average annual pay grows steeply after YOS 20 because enlisted personnel in lower grades retire at YOS 20, and those who remain are a highly selected group of senior enlisted personnel who are in higher grades, particularly E-8 and E-9.

Although enlisted average total pay varies by year of service, it does not vary much across services for a given year of service for the Army, Navy, and Marine Corps. At YOS 10, average total pay was $35,007 for the Army, $35,675 for the Marine Corps, $35,863 for the Navy, and $33,621 for the Air Force. Again, the lower figure for the Air Force reflects a slower promotion tempo relative to the other services that tends to depress enlisted basic pay in the Air Force for a member at a given year of service. Time to E-5 is about two years slower than in the other services. It also reflects the different incidence and use of S&I pay, shown in Tables 3.1 and 3.2. Average pay also rises by year of service for officers (whose commissioning source is academy or ROTC), starting around $35,500 at YOS 1 and growing to $102,000 at YOS 30. Relative to other services, Marine Corps officers' average pay appears lower than that of Army, Navy, and Air Force officers over their careers. For

example, average pay at YOS 6 was $56,000 for Air Force officers, $58,000 for Army and Navy officers and $44,400 for Marine Corps officers. At YOS 25, average total pay was $91,262 for Air Force officers, $88,130 for Army officers, $91,202 for Navy officers and $85,283 for Marine Corps officers. As mentioned, the Marine Corps' lower figure partially reflects the exclusion of medical officers from the Marine ranks.

Figure 3.7 Average Total Pay of Enlisted Pay by Service and Year of Service, 1999

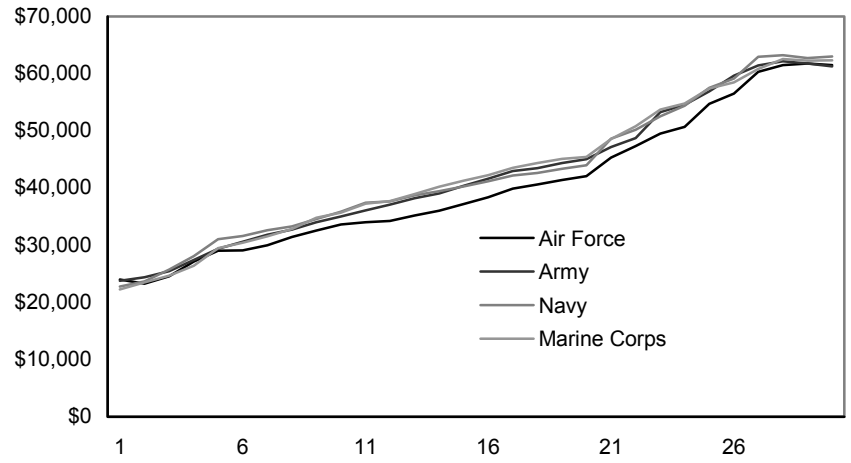
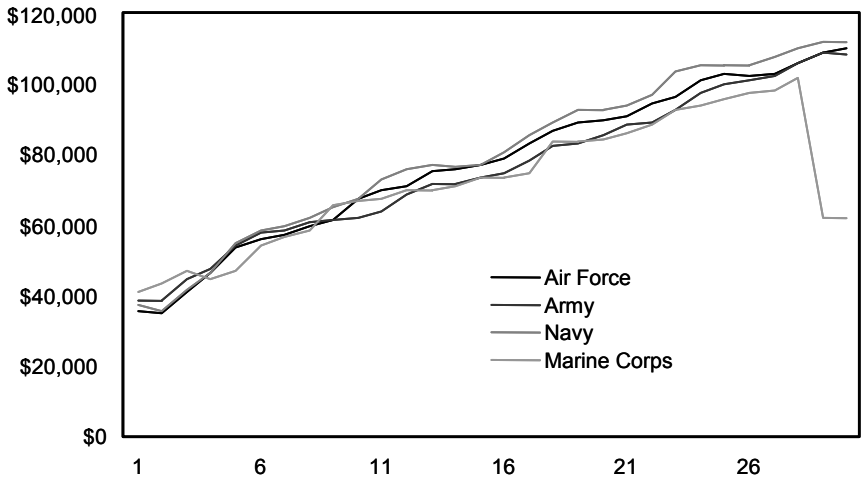


Figure 3.8 Average Total Officer Pay by Service and Year of Service, 1999



Figures 3.9 and 3.10 show average enlisted pay and average officer pay separately by service and year of service and broken out by category: basic pay, BAH, BAS, federal tax advantage, S&I pays, bonuses, miscellaneous allowances, and COLAs. (Figure 3.10 shows the averages for officers whose source of commission was either ROTC or a military academy.) Despite the large number of pay components, most compensation comes in the form of RMC.

Figures 3.11 and 3.12 show the percentage of average pay coming from non-RMC components, by YOS, for enlisted and officers, respectively, where the non-RMC components are S&I pays, bonuses, and miscellaneous allowances. The percentage of total compensation that is not RMC is at most 15 percent and is usually less than 10 percent.

Although non-RMC components are not large on average, some identifiable variations can be found in these components by year of service and by service. That is, the services vary in their usage of these components and the importance of these components differs during the course of a military career. Figures 3.9 and 3.10 make clear that the average value of non-RMC components is greatest in the early and midcareer, YOS 4–12. It is also greatest in the Navy for both officers and enlisted personnel. As shown earlier, the Navy makes significant use of bonuses, especially reenlistment bonuses and S&I pays. In part, the Navy use of these pays reflects the importance of sea pay in Navy compensation. But, even excluding sea pay, the average value of non-RMC sources of pay is largest in the Navy for enlisted personnel. In the case of officers, non-RMC components are also relatively large in the Air Force, peaking at YOS 10.

Average Pay by Occupational Area

Because of differences in the targeting of S&I pays and in promotion speed across occupational areas, we would expect average pay to vary somewhat across personnel in different areas. And to the contrary, we might expect average pay to vary little by occupational area because Figures 3.7 and 3.8 show that average total pay is dominated by RMC, not S&I and other pays, and the average amounts of these other pays across all personnel are small. This section shows that despite the targeting of S&I pays, average pay indeed varies little by occupational area.

Figure 3.9 Average Total Enlisted Pay by Years of Service, 1999

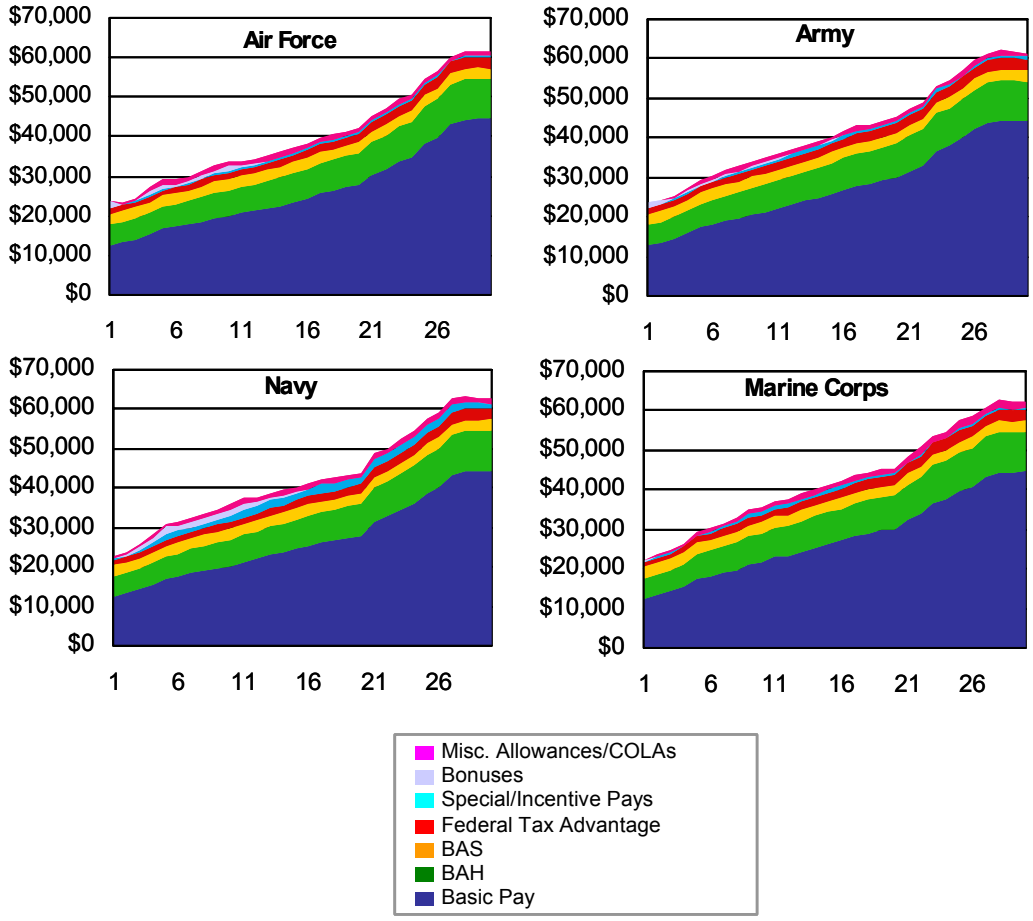


Figure 3.10 Average Officer Pay by Years of Service (Commissioning Source is Academy or ROTC), 1999

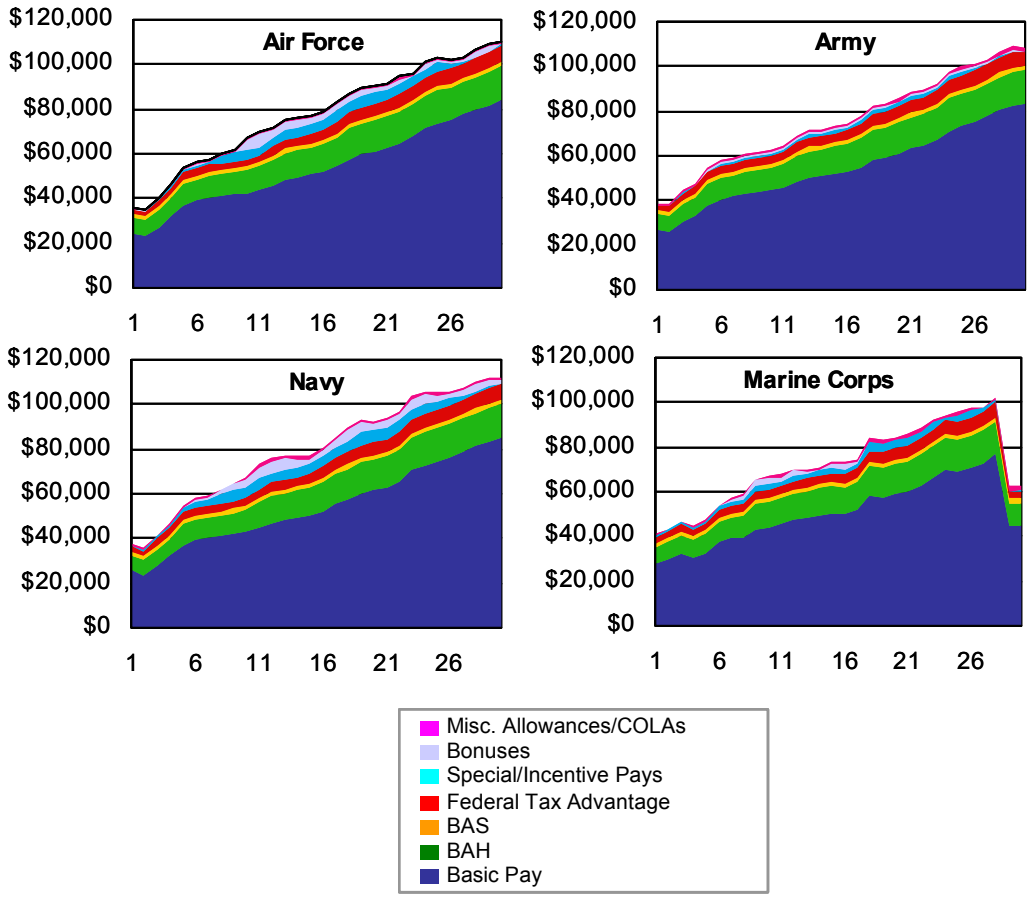


Figure 3.11 Non-RMC Components of Enlisted Pay as a Fraction of Average Total Pay, 1999

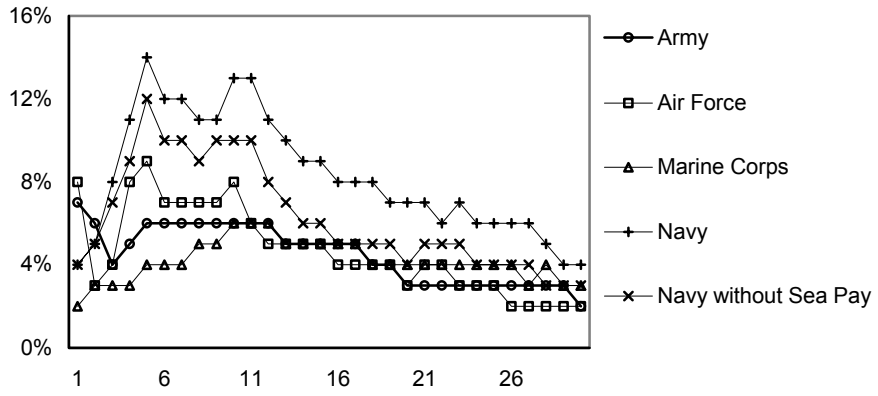
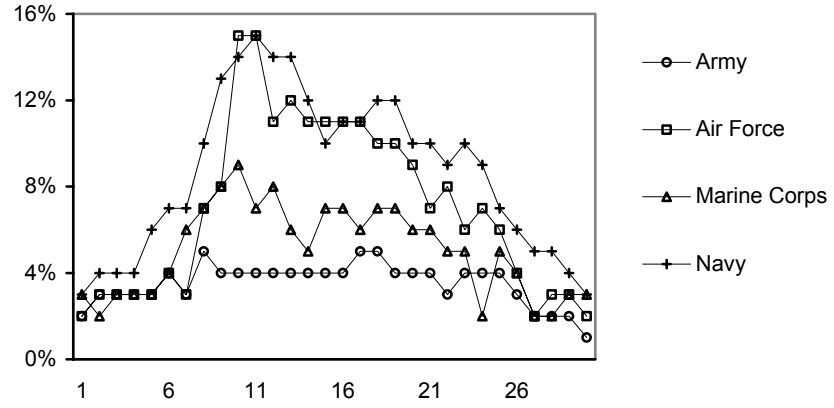


Figure 3.12 Non-RMC Components of Officer Pay as a Fraction of Average Total Pay, 1999



We define occupation in terms of broad one-digit DoD codes because these codes facilitate comparisons across the branches of service. Of course, occupations may differ considerably within a one-digit occupational code. On the other hand, when we use one-digit occupational areas, sample sizes are larger and there is less noise (i.e., variation in data stemming form smaller samples) in the earnings estimates. Later we show pay comparisons for more narrowly defined occupational groups.

Average total pay by year of service varies little by broadly defined occupational areas, as shown in Figure 3.13 for enlisted personnel and Figure 3.14 for officers. In part, the similarity in the average pay profiles across occupational areas reflects the broad definition of each area and each area's inclusion of many diverse occupational specialties. However, even when we define occupation more narrowly, the pay similarities remain. For example, Figure 3.15 shows the average enlisted pay profiles for information technology (IT) versus non-IT-related occupations, where IT occupations are as defined by an OSD commission on Information Technology/Information Assurance Personnel. Figure 3.16 shows the average total pay profiles for individuals in air-related versus nonair-related occupational areas, where "air"-related occupations are identified by occupational titles related to the operation, maintenance, or support of aircraft. For instance, any job title containing "pilot" or "aircraft" was determined to be air-related. Any description that indicated support or maintenance of aircraft was also included. Again, the profiles are nearly identical. Therefore, any S&I pay differences across these occupations are dominated on average by similarities in other pay components. They are also dominated by similarities in the resulting retention and grade mix at each year of service, which influences the average pay level at each year of service in the figures.

Table 3.5 shows the FY 1999 distribution of enlisted personnel across years of service by broad occupational categories, and Table 3.6 shows the distribution for officers. The information come from the DMDS and reflects the inventory as of the end of FY 1999. Consequently, the data are not subject to the sample restrictions used to derive the figures in the earlier tables and figures.

The percentage of the force in each year of service group is quite similar across occupational areas. These figures together with the pay figures point to a clear conclusion: *in most cases, differences in pay and retention by broad occupational area are quite small*. They suggest that although S&I and other pays are used, their effect is fairly small in terms of creating much differentiation in pay. Furthermore, the similarity in the YOS mix across broad occupational areas suggests that the services provide very similar career and pay opportunities to personnel, regardless of occupational area. Still, as suggested above, exceptions to this arise: aviators, medical, and nuclear-trained personnel received comparatively large levels of special pay.

Figure 3.13 Average Enlisted Pay by Years of Service and Occupational Area, 1999

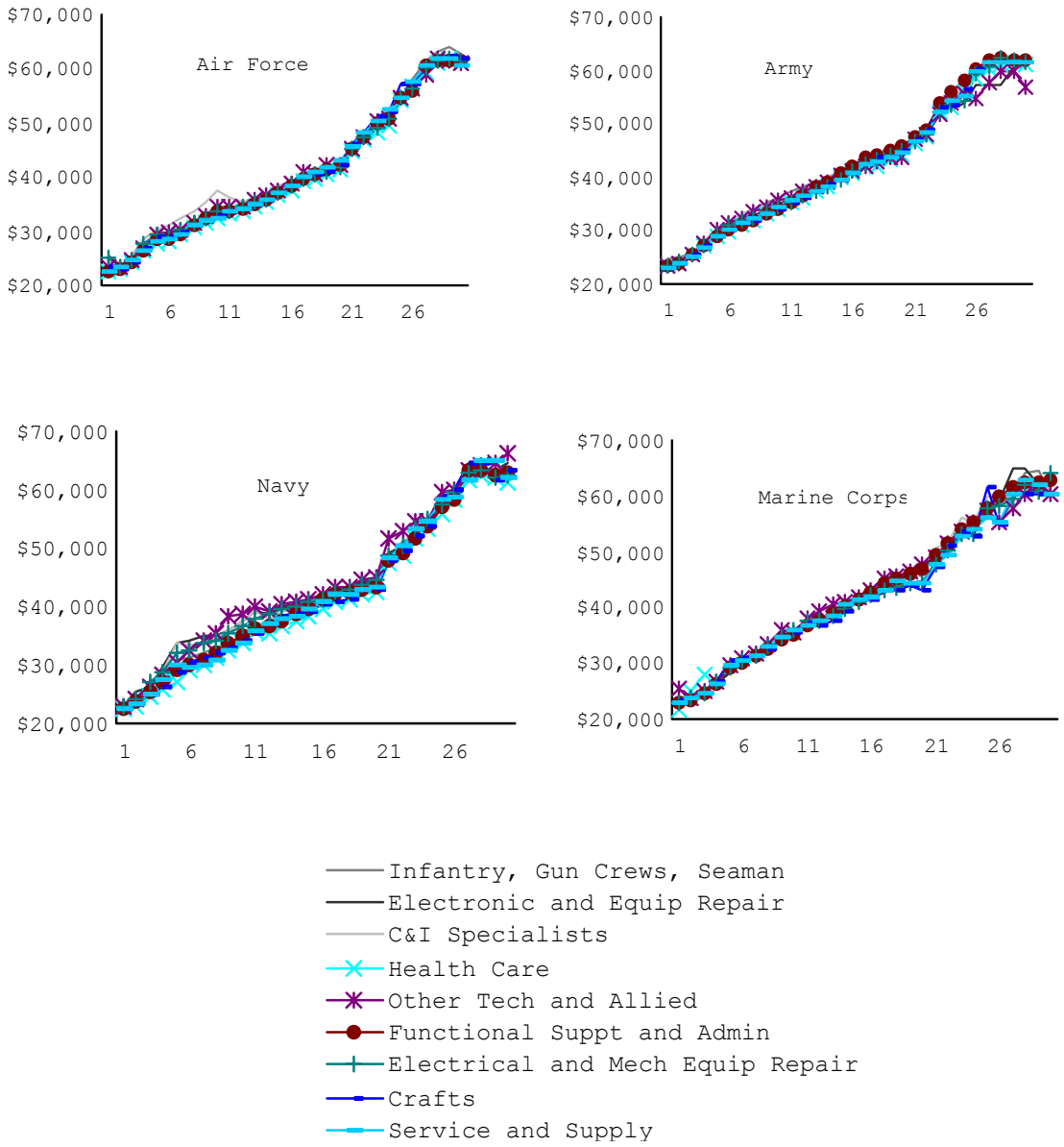


Figure 3.14 Average Officer Pay by Years of Service and Occupational Area, Except Medical Officers, 1999

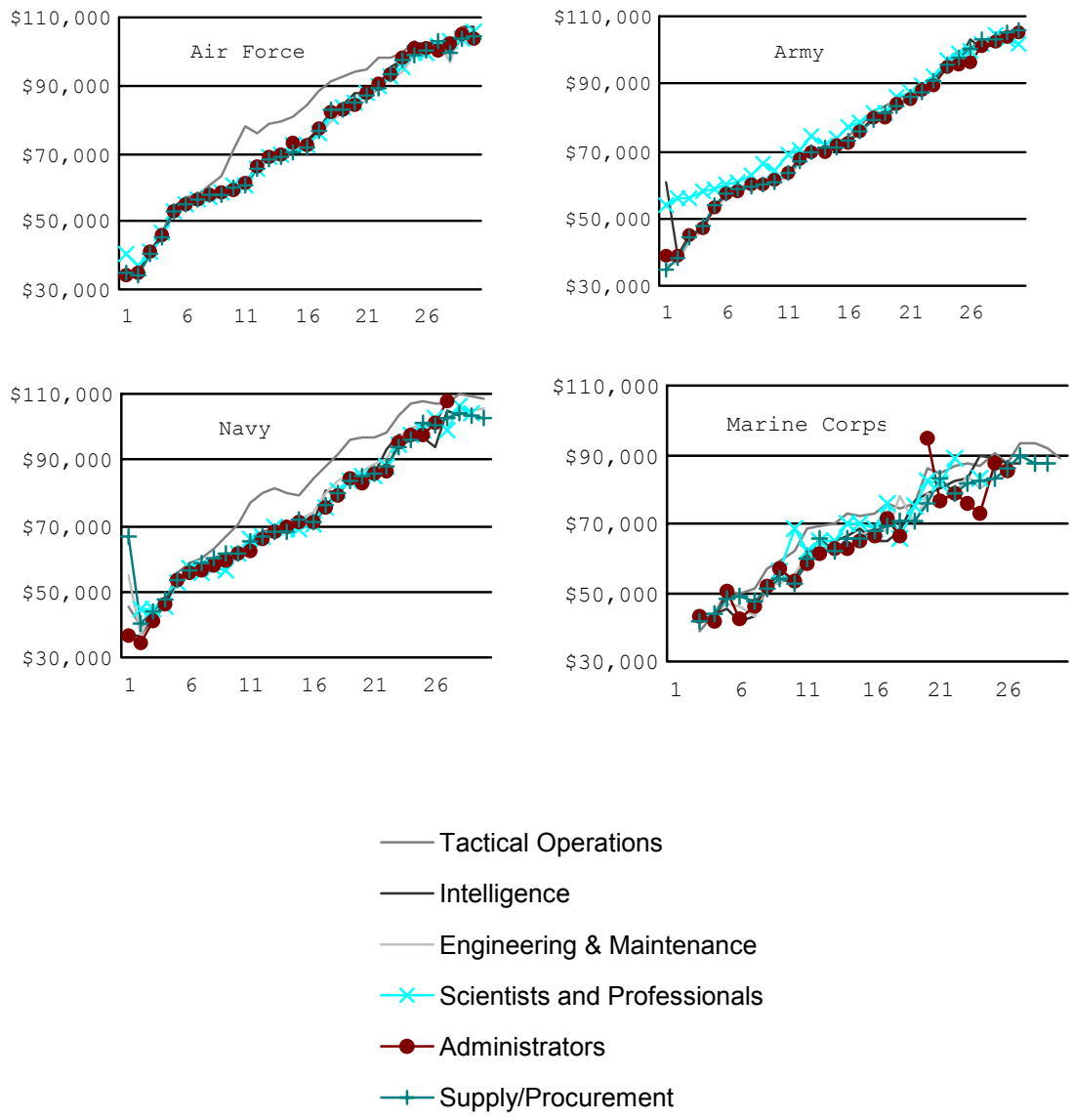


Figure 3.15 Average Enlisted Pay by Years of Service and IT-Occupational Category, 1999

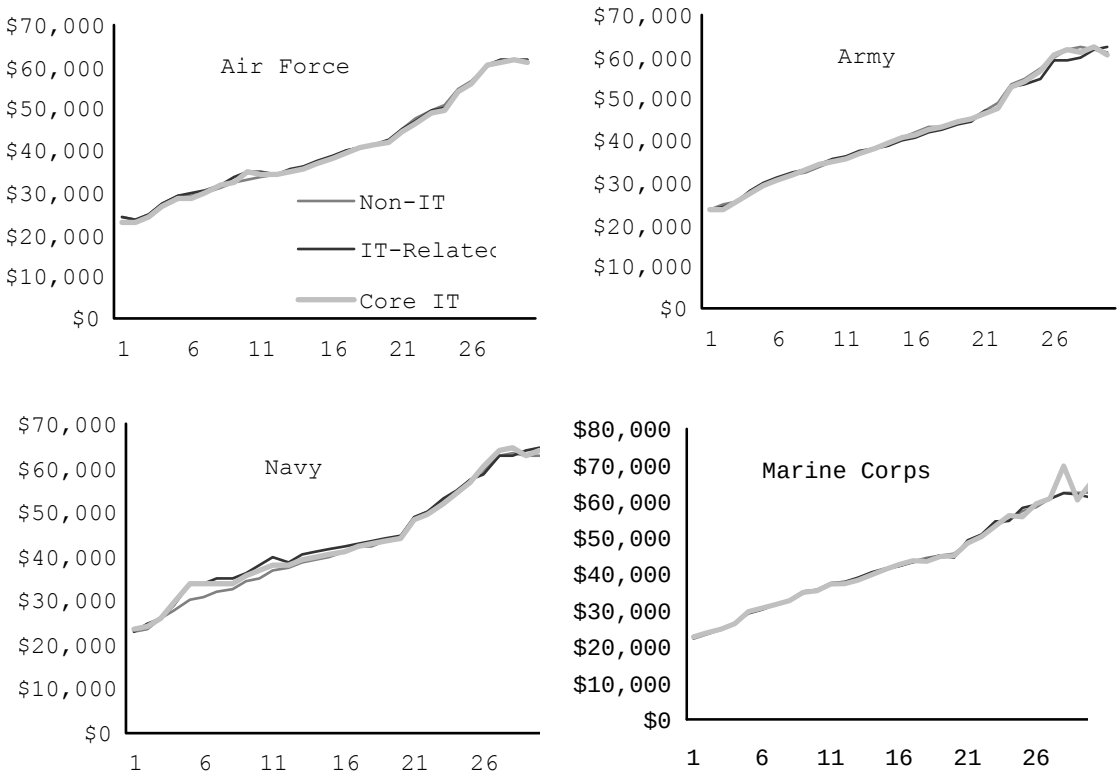


Figure 3.16 Average Enlisted Pay by Years of Service and Air versus Nonair Occupational Areas, 1999

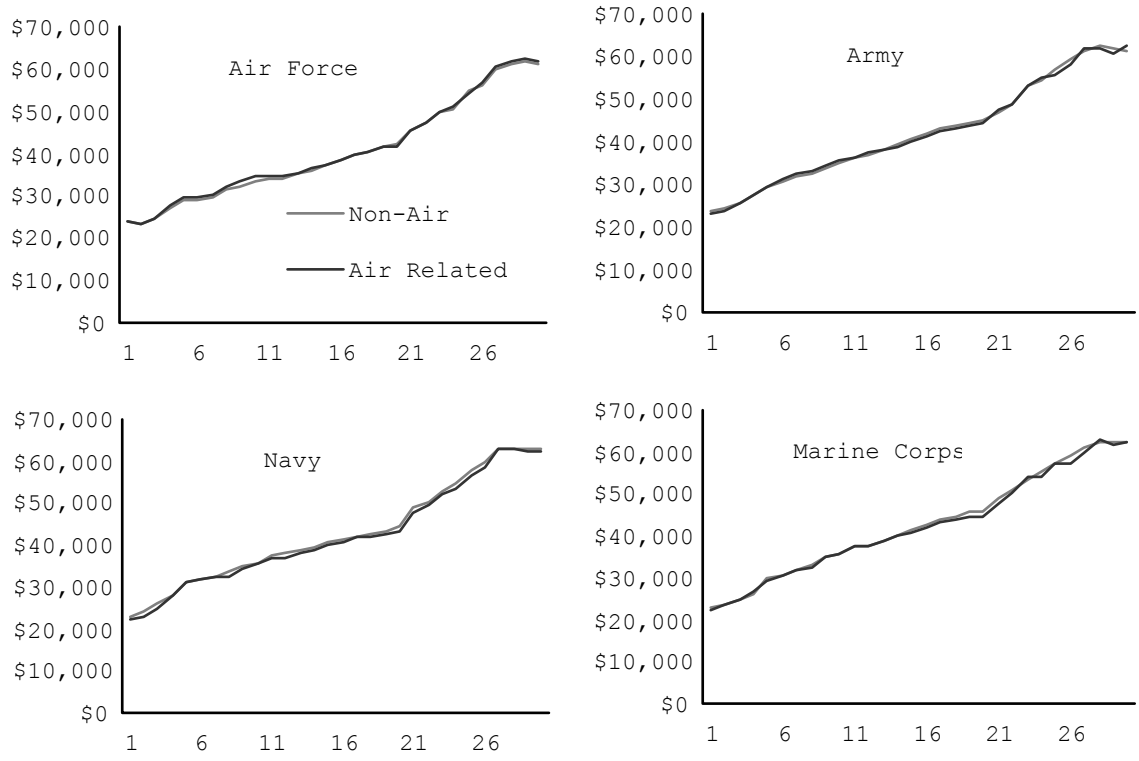


Table 3.5 Enlisted YOS Distribution by One-Digit DoD Occupational Code, FY 99

One-Digit Occupational Area	YOS 1-5	YOS 6-10	YOS 11-20	YOS 21-30
Army				
Infantry, Gun Crews, and Seamanship Specialists	57.3	16.9	22.6	3.2
Electronic Equipment Repairers	59.3	18.4	20.3	2.0
Communications and Intelligence Specialists	56.1	17.8	23.5	2.6
Health Care Specialists	49.3	25.0	23.1	2.6
Other Technical and Allied Specialists	48.0	20.2	28.0	3.7
Functional Support and Administration	44.6	21.9	27.7	5.8
Electrical and Mechanical Equipment Repairers	55.8	20.8	21.1	2.4
Craftsmen	61.2	19.2	17.7	2.0
Service and Supply Handlers	56.5	20.5	21.1	1.9
Navy				
Infantry, Gun Crews, and Seamanship Specialists	55.3	13.3	28.1	3.3
Electronic Equipment Repairers	39.2	20.1	37.0	3.6
Communications and Intelligence Specialists	44.6	20.8	31.5	3.2
Health Care Specialists	40.3	27.7	28.8	3.2
Other Technical and Allied Specialists	22.8	19.8	50.2	7.1
Functional Support and Administration	24.8	22.1	47.0	6.1
Electrical and Mechanical Equipment Repairers	46.6	18.7	31.2	3.5
Craftsmen	32.7	22.1	42.4	2.8
Service and Supply Handlers	28.2	24.5	43.6	3.7
Marine Corps				
Infantry, Gun Crews, and Seamanship Specialists	77.1	10.6	10.9	1.4
Electronic Equipment Repairers	59.9	18.6	17.7	3.7
Communications and Intelligence Specialists	59.1	17.7	19.6	3.6
Health Care Specialists	38.3	21.2	36.0	4.5
Other Technical and Allied Specialists	57.9	18.6	19.9	3.5
Functional Support and Administration	54.7	15.8	22.2	7.3
Electrical and Mechanical Equipment Repairers	63.5	17.0	16.5	3.0
Craftsmen	68.7	14.7	14.8	1.8
Service and Supply Handlers	70.2	14.2	13.2	2.3
Air Force				
Infantry, Gun Crews, and Seamanship Specialists	43.0	17.6	35.0	4.4
Electronic Equipment Repairers	33.4	18.4	41.9	6.4
Communications and Intelligence Specialists	35.9	16.8	40.8	6.5
Health Care Specialists	43.3	24.8	28.6	3.4
Other Technical and Allied Specialists	39.3	16.8	38.2	5.7
Functional Support and Administration	28.5	19.3	44.3	8.0
Electrical and Mechanical Equipment Repairers	35.5	18.4	39.4	6.7
Craftsmen	36.4	18.6	37.1	7.9
Service and Supply Handlers	36.0	22.0	35.5	6.5

Note: Data were obtained from the DMDC and reflect the percentages in the end of FY 1999 active-duty inventory. Because the data are for a specific time, they are not subject to any sample restrictions.

Table 3.6 Officer YOS Distribution by One-Digit DoD Occupational Code, FY 99

One-Digit Occupational Area	YOS 1-5	YOS 6-10	YOS 11-20	YOS 21-30
Army				
Tactical Operations Officers	31.7	22.3	34.1	11.9
Intelligence Officers	24.4	22.5	43.3	9.8
Engineering and Maintenance Officers	39.0	20.1	33.1	7.8
Scientists and Professionals	23.7	17.9	42.4	16.0
Health Care Officers	30.4	23.2	35.6	10.8
Administrators	23.1	19.5	41.0	16.5
Supply, Procurement, and Allied Officers	26.6	21.0	41.2	11.2
Navy				
Tactical Operations Officers	15.8	30.0	39.5	14.7
Intelligence Officers	20.5	22.3	43.2	14.0
Engineering and Maintenance Officers	6.7	7.1	51.1	35.1
Scientists and Professionals	17.6	23.5	43.8	15.2
Health Care Officers	29.0	22.2	36.2	12.6
Administrators	46.7	10.6	31.3	11.4
Supply, Procurement, and Allied Officers	15.2	21.2	45.5	18.1
Marine Corps				
Tactical Operations Officers	20.6	33.3	36.3	9.7
Intelligence Officers	27.1	26.5	34.4	12.0
Engineering and Maintenance Officers	16.8	20.6	37.9	24.7
Scientists and Professionals	31.1	25.5	37.0	6.3
Health Care Officers	32.7	22.5	36.8	8.1
Administrators	25.9	26.5	33.3	14.4
Supply, Procurement, and Allied Officers	26.7	26.7	33.3	13.3
Air Force				
Tactical Operations Officers	14.9	26.8	46.1	12.2
Intelligence Officers	28.2	23.1	33.1	15.6
Engineering and Maintenance Officers	26.9	23.1	38.9	11.1
Scientists and Professionals	25.0	21.3	39.4	14.3
Health Care Officers	30.8	22.7	36.2	10.4
Administrators	24.0	21.4	31.1	23.5
Supply, Procurement, and Allied Officers	19.4	17.4	38.6	24.5

Note: Data were obtained from the DMDC and reflect the percentages in the end of FY 1999 active-duty inventory. Because the data are for a specific time, they are not subject to any sample restrictions.

Range of Variation in the Components of Pay

The earlier comparisons focused on average levels of total pay. Also of interest are the size and determinants of variation in military pay and how its variation compares to variation in civilian earnings. In this section, we present information on the range of pay variation by means of plots of pay percentiles and examine the sources of variation with respect to four increasingly inclusive measures of pay. These are RMC, RMC plus S&I pays, RMC plus S&I plus bonuses, and RMC plus S&I plus bonuses plus

miscellaneous allowances and COLAs. The components of these groupings match the components in Tables 3.1 and 3.2.

Figure 3.17 shows the 10th, 25th, 50th, 75th, and 90th percentiles of total pay by years of service for enlisted personnel in all services combined. Figure 3.18 shows the profiles for officers whose commissioning source was ROTC or a military academy. At the 50th percentile (or median), half of the members earned more, and half earned less, than the indicated amount. Similarly, at the 90th percentile 10 percent of the members earned more and 90 percent earned less than the indicated amount.

The difference between the highest and lowest percentile provides a measure of the variance in total pay among military personnel. The difference varies somewhat with YOS. For enlisted personnel, it is about $8,000 at YOS 5, about $10,000 at YOS 10, about $12,000 at YOS 20, and $11,000 at YOS 25. In other words, the difference is largest in the midcareer although it changes little beyond YOS 10.

The range of variation in military compensation in part reflects the different pay grades of personnel at each YOS. For instance, in the July 2000 basic pay table, the difference between an E-6 and an E-5 at YOS 10 is $2,174.10–$1,962.90 = $211.20 per month, or $2,534.40 per year. Thus, some part of the $2,500 of the $10,000 difference at YOS 10 is due to differences in grade. Additional variation comes from differences in the receipt of S&I pays, which are related to duty (e.g., sea pay), risk (e.g., Toxic Fuels Duty Pay), skill (e.g., Foreign Language Pay), and exposure to danger during military operations (Hostile Fire Pay). Bonuses also add to the variation in pay as they vary in presence and amount across specialties and year of service. Finally, miscellaneous allowances and COLAs also vary (e.g., Family Separation Allowance, CONUS COLA, Overseas COLA).

It is interesting to compare the range of variation in enlisted earnings with the range in the civilian sector. Figure 3.19 shows the percentile of civilian earnings for males with some college in 1999.[3] We use the 30th percentile as the lower bound because the military targets high-quality enlistees who score well on the AFQT. Such individuals are unlikely to be found in the lowest percentiles of civilian earnings, even for those with some college.

[3] We thank John Warner for providing the predicted percentiles of private-sector annual earnings.

Figure 3.17 Enlisted Pay Percentiles, 1999

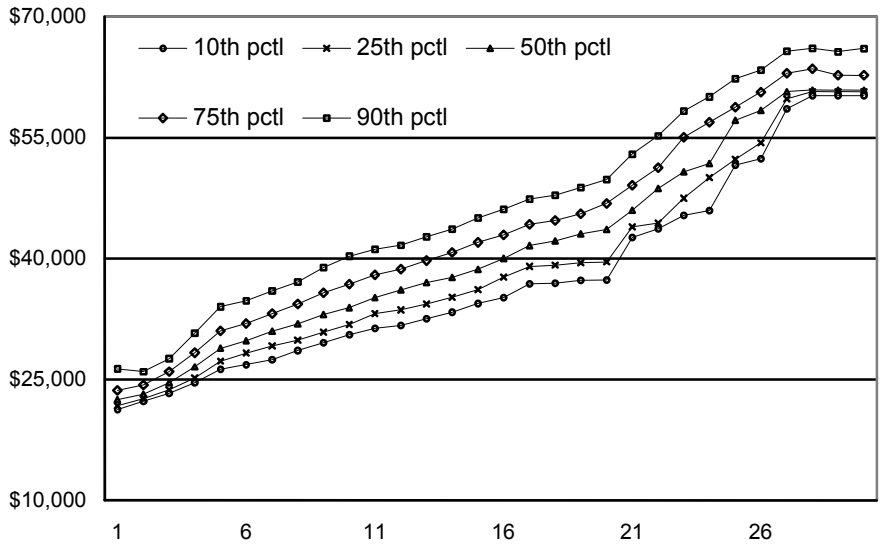


Figure 3.18 Officer Pay Percentiles, 1999

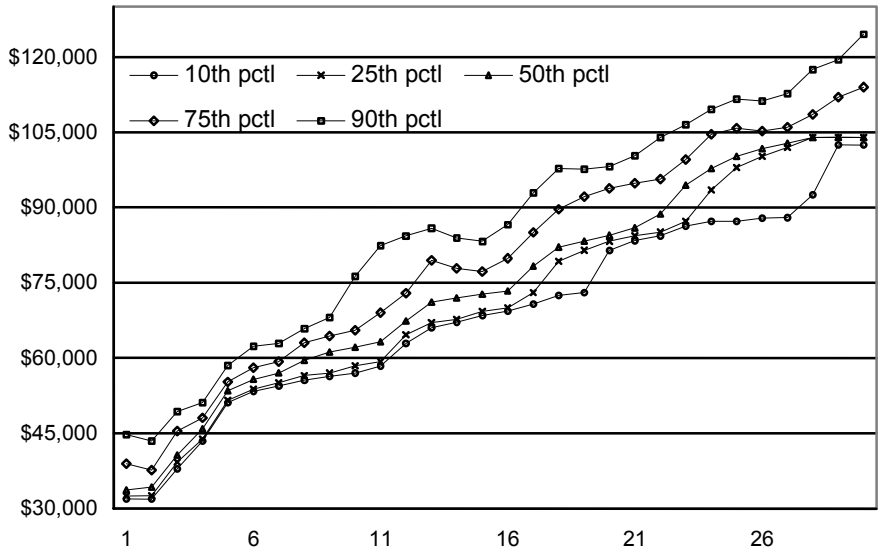
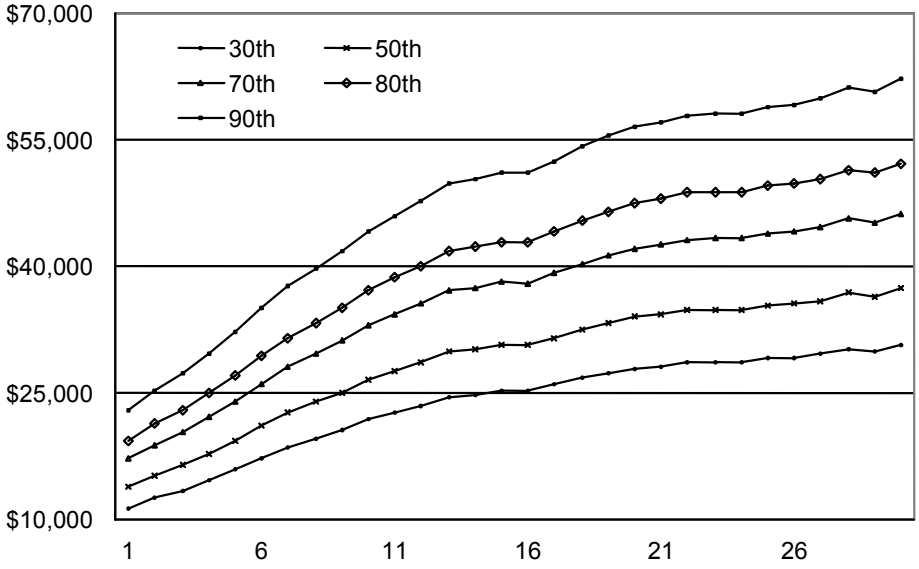


Figure 3.19 Predicted Earnings Percentiles, Civilian Males with Some College, 1999



The variation in civilian pay as measured by the difference between the 90th and 30th percentiles is significantly larger than the range in enlisted earnings. For instance, at 10 years of experience, the difference is about $23,000, which may be compared with the military's $10,000 difference between the 90th and 10th percentiles at YOS 10. At 20 years of experience, the difference is about $30,000. These ranges are far larger than the ranges for enlisted personnel at similar levels of experience.

The civilian earnings figures are averaged across many civilian firms that differ in their hiring requirements, occupational mixes, industry conditions, and location-specific conditions. Although the military has a diverse workforce, it is more homogeneous in terms of these factors than is the civilian economy at large. For instance, the services might be thought of as a large firm with four divisions, all operating under a common basic pay table, whereas the private market contains thousands of firms, each with its own pay table. Consequently, we would expect to observe more variation in civilian earnings than in military earnings. Nonetheless, the range of variation among males with some college is far larger than the range shown in enlisted earnings—more than we might expect—because of the heterogeneity of the civilian firms.

Furthermore, by comparison with enlisted earnings, probably a minor portion of, say, the $23,000 range of variation in civilian pay at 10 years

of experience is related to location or circumstance. Although speculation, it seems likely to us that much of the variation in civilian pay traces to differences in individual ability, motivation, education, and occupation. Certainly, there are geographic differences in wage, holding constant other factors. Wages tend to be lower in the South, higher in Alaska, and higher in cities, for example. Similarly, there are risk-related differences in wages. Some jobs entail a high risk of injury or impairment (e.g., police, fire fighting, construction) or a health risk (e.g., dental hygienist, mining, work involving toxic substances). Nonetheless, much of the variation in private-sector wages may stem from knowledge, skill and ability, with knowledge and skill being the product of education, training, and experience.

To quantify the extent to which the components of military pay contribute to variation, we computed the variance of pay for the four, increasingly inclusive measures of pay given above. For instance, suppose x represents RMC and y represents S&I pays. Then the variance of RMC plus S&I pays can be expressed as

$$\text{var}(x + y) = \text{var}(x) + \text{var}(y) + 2\ \text{cov}(x, y)$$

The variance of the more inclusive measure of pay, (x + y), equals the variance of x plus the variance of y, which are positive, plus twice the covariance between x and y. The variance of (x + y) will be greater than the variance of x unless the covariance of x and y is negative and "large." Thus, it is possible for the variance of a more inclusive pay measure to be less than the variance of a less inclusive measure. But with rare exception, we find in our tabulations that variance increases as the pay measure includes more elements of pay.

Further, because of the way we have created RMC, its variance reflects differences in pay grade and marital status among personnel. In general, RMC includes basic pay, BAS, BAH, and the tax advantage, and the level of BAH depends on family size. However, we have used the average value of BAH given pay grade, year of service, and marital status (but not family size). RMC variance will therefore be somewhat less than its variance would be if family size were also included. Also, BAH naturally varies by locale because of differences in the cost of housing. Use of average BAH eliminates this source of variation—a source of variation that BAH is in fact intended to eliminate.

Figures 3.20 through 3.27 present the standard deviations of enlisted and officer pay, respectively, by year of service for each service, for RMC, RMC plus S&I, RMC plus S&I plus bonuses, and RMC plus S&I plus bonuses plus miscellaneous allowances and COLAs. (The standard

deviation is the square root of the variance, and we use the standard deviation because its units (dollars) are comparable to those in our other tables and figures.) For Air Force enlisted (Figure 3.20), pay variation stemming from RMC is low for the first dozen years of service, rising from under $1,000 at YOS 1 to around $1,500 at YOS 12. From there, it rises rapidly to $4,000 at YOS 20. At YOS 24 it begins a rapid descent toward zero, falling below $1,000 by YOS 28. The rapid decline reflects the increasing homogeneity in rank of senior enlisted personnel—i.e., all E-8 or E-9. Similarly, the increase in variation over YOS 12–20 reflects an increasing diversity in pay grade as personnel are promoted at different speeds and reach different ranks. When S&I pays are included, little additional variation occurs; the RMC plus S&I line tracks closely the RMC line. However, the inclusion of bonuses causes a substantial increase in variation during YOS 4–11. From YOS 12 onward, bonuses contribute little to pay variation. Instead, additional pay variation comes from miscellaneous allowances and COLAs. These add about $750 to variation from YOS 12–27. As a rough gauge, the standard deviation of Air Force enlisted pay is in the $3,000–$5,000 range over most years of service, with about half due to bonuses during YOS 4–11, after which variation in RMC accounts for most of the variation.

The standard deviation of Army enlisted pay (Figure 3.21) lies within a fairly narrow band between $3,000 and $4,000 over YOS 6–25, with somewhat less variation in YOS 1–5. Unlike in the Air Force, pay variation due to RMC is more prominent in YOS 1–8, while variation arising from bonuses is less prominent. This difference traces to the Air Force's slower promotion tempo; Army personnel reach E-5 about two years sooner than Air Force personnel, and at YOS 1–8 there is more diversity of rank in the Army than in the Air Force. The Army also appears to make more use of S&I pays during YOS 10–20 than does the Air Force, as variation caused by S&I pay is greater in the Army over those years.

The Marine Corps' enlisted pay variation (Figure 3.22) rises steadily from about $1,500 at YOS 1 to $5,000 at YOS 24. The increase is propelled by variation in RMC (hence variation in rank and marital status) and miscellaneous allowances and COLAs. The Marine Corps makes scant use of enlistment bonuses and does not use reenlistment bonuses, hence virtually no variation can be attributed to bonuses. (In the figure, the RMC plus S&I plus bonuses line lies directly on top of the RMC plus S&I line.)

The Navy has the greatest variation in enlisted pay (Figure 23). During the first term (say YOS 1–4), the standard deviation of pay total pay rises from about $2,000 to $5,000, with most of the increase

attributable to bonuses. Further, the role of S&I pay becomes increasingly prominent over this range, probably reflecting the growing proportion of sailors who qualify for and receive sea pay. Over YOS 5–25 the standard deviation is in the $5,000–$6,000 range. Up to YOS 12, about half the variation comes from bonuses, and afterwards most of the variation comes from RMC, followed by S&I pays (especially sea pay and sea pay premiums, most likely). The Navy is like the Air Force in the sense that bonuses play a prominent role in creating pay differentiation during the early and early midcareer years of service.

Among officers (Figures 3.24 through 3.27), the standard deviation of RMC for the Air Force, Army, and Navy is near $8,000 in the first few years of commissioned service, then declines to around $4,000 or less at YOS 3 and still lower in YOS 4–12. The Marine Corps' figures are a bit higher although have the same pattern of decline.

In all services, the amount of pay variation attributable to miscellaneous allowances and COLAs is minimal. However, the inclusion of S&I pays adds about $1,000 to the standard deviation of RMC alone, and the further addition of bonuses adds a great deal to pay variance. The major bonuses are Aviation Officer Continuation Pay, Medical Officer Retention Bonus, Additional Special Pay for Medical Officers, Incentive Specialty Pay for Medical Officers, Nuclear Officer Accession Bonus, Nuclear-Officer Retention Bonus, Nuclear Career Annual Incentive Bonus, and Nuclear Qualified Officer Continuation Pay. Although only a small percentage of officers receive these bonuses, their large amounts significantly increase pay variation. Therefore, when examining the standard deviations of officer pay, it is worth remembering that much of the pay variation arises from bonuses received by a small proportion of officers. Around 3 percent of Army officers, 9 percent of Air Force officers, 7 percent of Marine Corps officers, and 13–14 percent of Navy officers receive these bonuses.

The bulk of officers do not receive any of these bonuses, and we may assume the standard deviation of RMC plus S&I pays largely reflects their pay variation. For the Air Force, Army, and Navy, this measure of pay variation rises from $2,000–$3,000 at YOS 3 to $6,000–$7,000 at YOS 20. Marine Corps officers' pay variation at YOS 5–7 is above $8,000 then declines to $6,000–$7,000 by YOS 9 and stays there until YOS 20.

Figure 3.20 Standard Deviation of Enlisted Pay by Year of Service, Air Force, 1999

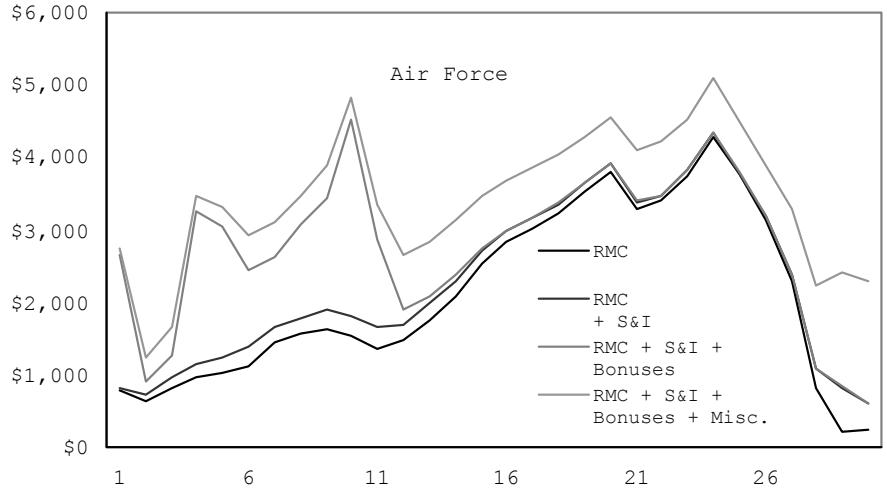


Figure 3.21 Standard Deviation of Enlisted Pay by Year of Service, Army, 1999

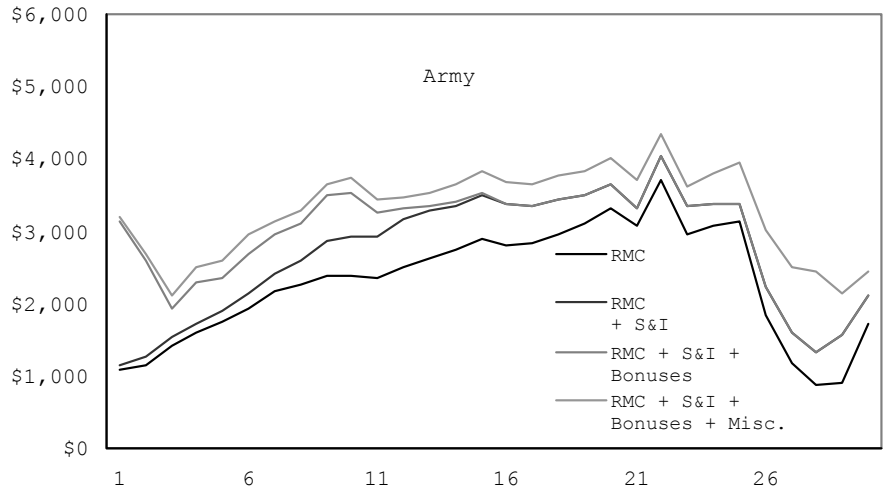


Figure 3.22 Standard Deviation of Enlisted Pay by Year of Service, Marine Corps, 1999

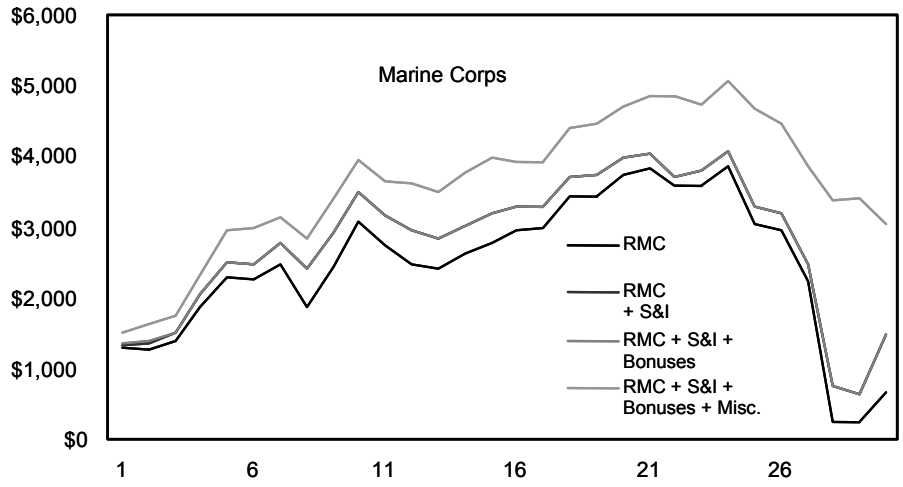


Figure 3.23 Standard Deviation of Enlisted Pay by Year of Service, Navy, 1999

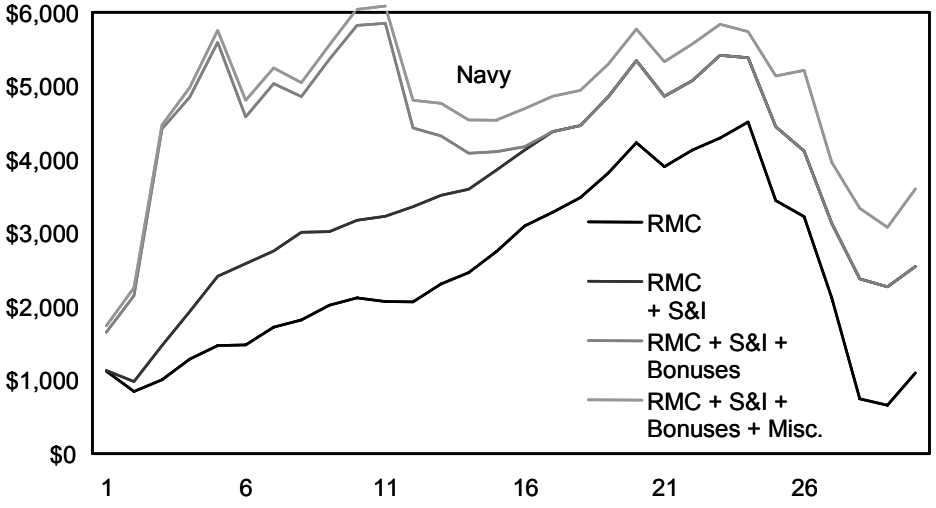


Figure 3.24 Standard Deviation of Officer Pay by Year of Service, Air Force, 1999

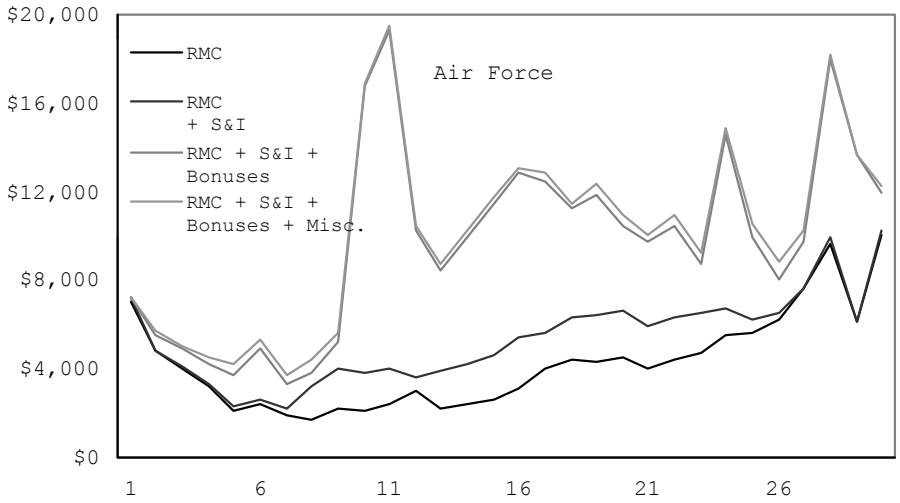


Figure 3.25 Standard Deviation of Officer Pay by Year of Service, Army, 1999

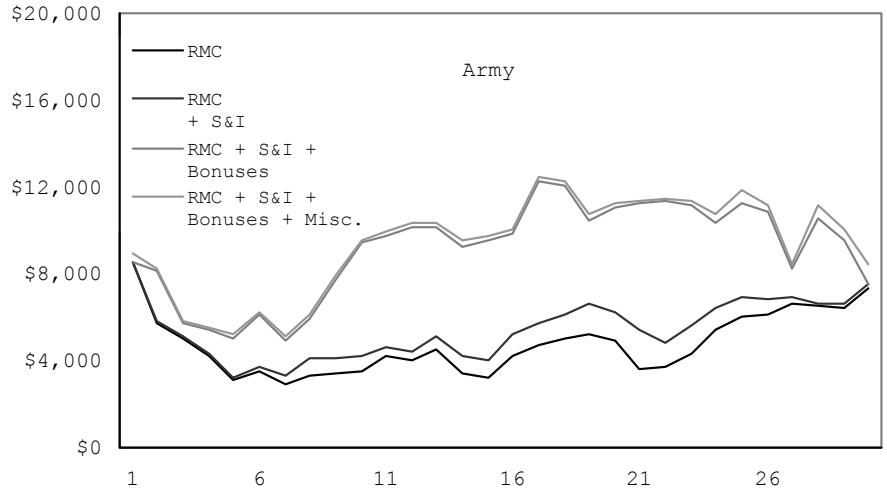


Figure 3.26 Standard Deviation of Officer Pay by Year of Service, Marine Corps, 1999

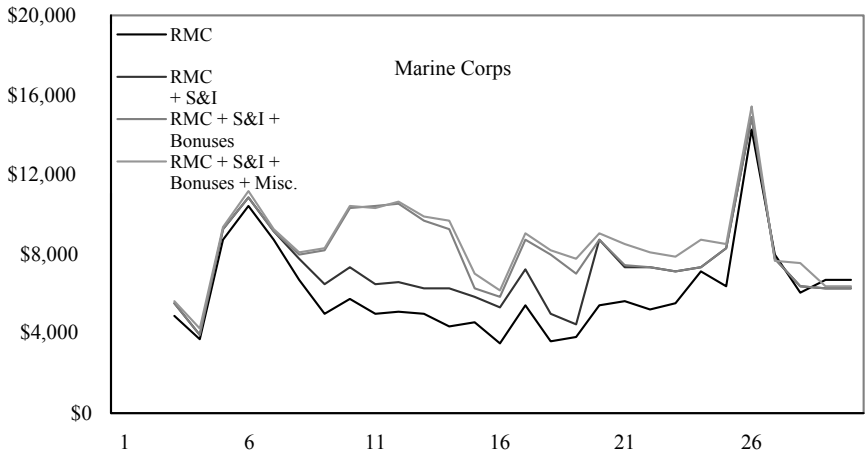
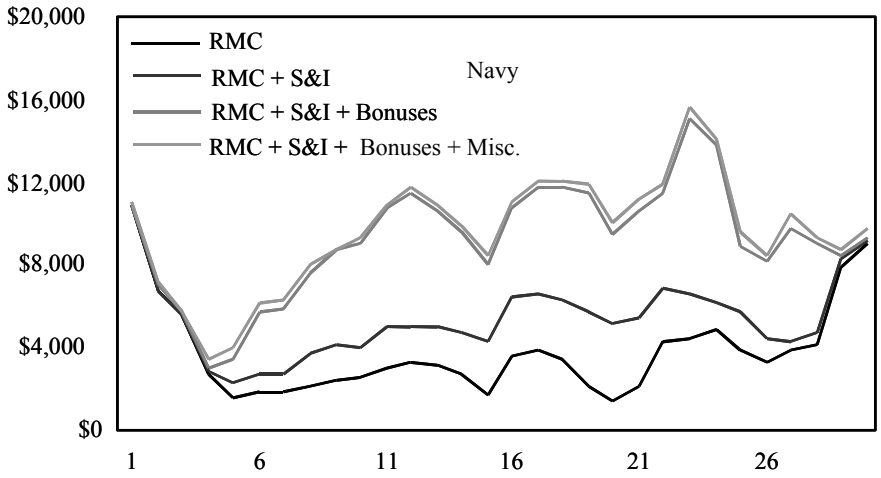


Figure 3.27 Standard Deviation of Officer Pay by Year of Service, Navy, 1999



4. CONCLUSION

A chief finding of our research is the high degree of similarity of outcomes in military compensation across the branches of service. This is somewhat surprising in that compensation outcomes depend not only on basic pay tables, but also on service policies and servicemember decisions affecting retention and promotion. Furthermore, a host of S&I pays, bonuses, and miscellaneous allowances and COLAs lend variance to pay outcomes. Nevertheless, our findings show a striking degree of similarity in military cash compensation by year of service across the services. This is true for both officers and enlisted, with few exceptions. In particular, Air Force enlisted personnel, promoted more slowly to E-5 than personnel in other services, have slightly lower average pay by year of service. Also, officers in medical, aviation, and nuclear fields receive S&I pays and bonuses that raise their average compensation well above that of other officers. Yet apart from these exceptions, equity in compensation outcomes prevails across the services.

Although S&I pays create some variation in compensation, because these pays are typically received by few personnel and are often not large in annual amount, they do not cause prominent differences in pay. Similarly, enlistment and reenlistment bonuses result in only minor differences in average pay between bonus recipients and nonrecipients, and most personnel do not receive bonuses. Despite the fact that initial bonus payments typically represent a substantial fraction of basic pay (often on the order of one-third to two-thirds of basic pay, sometimes higher), anniversary bonus payments are lower, around $2,000. Further, miscellaneous allowances and COLAs also create fairly minor differences in compensation. For example, the Clothing and Uniform Allowance is received by nearly all personnel but is small and varies little. About one-fifth of personnel receive Family Separation Allowances, but in no case is the average annual amount greater than $500. Overseas COLAs, also received by about a fifth of personnel, average $2,000–$4,000 per year. They are a small fraction of average enlisted pay (about $32,000) and a still smaller fraction of average officer pay (about $64,000).

The similarity of cash compensation outcomes by year of service emerges from several factors. The first is a common "foundation" of pay—namely RMC. In addition, the services have similar promotion criteria and promotion phase points, although we grant that each service has its own criteria and promotion system. (The services' enlisted promotion criteria are described in Williamson [1998].) Finally, as

mentioned, S&I pays, bonuses, and miscellaneous allowances and COLAs do not average out to large amounts. RMC accounts for $30,000 of the $32,000 average enlisted pay and $60,000 of the $64,000 average officer pay (Tables 3.1 and 3.2).

Given the common foundation of pay, similar promotion systems, and relatively small average amounts of non-RMC pays, it is not surprising to find highly similar patterns of retention. Retention profiles are most alike across occupational areas within a service. Of course, reenlistment bonuses are a factor in sustaining these similarities; when reenlistment rates are below target in a specialty, a bonus is added or increased. Retention profiles are also similar across the services, although differences arise from different desired force structures. For example, the Marine Corps emphasizes a junior enlisted force, whereas the Air Force seeks a more experienced enlisted force.

We view similar compensation structures and promotion systems as key mechanisms for supporting similar retention patterns within a service. Having the same compensation structure and promotion system for all personnel in a service serves to support a service's commitment to equity of opportunity, regardless of specialty. It also facilitates unit-manning practices whereby units (e.g., companies, ship crews, air wings, Marine expeditionary units) are designed to contain a particular set of specialties and yet have similar experience and rank structures regardless of specialty. Alternatively, unit-manning practices may be viewed as a response to compensation and promotion systems that largely induce similar patterns of retention and promotion among servicemembers. From this perspective, it follows that if future force structures called for manning patterns with substantially different career lengths by specialty, changes in the compensation structure and the promotion system would be necessary.

APPENDIX A

MONTHLY PAY COMPARISONS

In contrast to Tables 3.1 and 3.2, which are based on enlisted and officer personnel who served throughout all 12 months of 1999, the tables in this appendix are based on members in service in a single month, June 1999. There are two tables each for enlisted and officer personnel. The first table is based the June 1999 pay of the members who served throughout 1999, and the second table does not impose that restriction. The second table includes members who may have arrived before or left service after June.

Table A.1 Incidence and Average Amounts of Enlisted Pay for June 1999, for Members on Active Duty All 12 Months of 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	1624	100.0		100.0		100.0	
BAH (Green Book)	100.0	537	100.0		100.0		100.0	
BAS (Green Book)	100.0	228	100.0		100.0		100.0	
Tax Advantage (Green Book)	100.0	143	100.0		100.0		100.0	
Average RMC		**2,533**		**2,609**		**2,345**		**2,545**
Foreign-Duty Pay	12.7	13	10.3	13	2.9	12	2.9	14
Proficiency Pay	5.1	270	2.5	227	4.5	283	7.9	213
Oversea Extension Pay	0.2	102	0.0	62	0.9	176	0.2	172
Career Sea Pay	0.1	180	0.0		2.8	43	27.8	194
Career Sea Pay Premium	0.0	100	0.0		0.0	100	2.7	102
Hostile Fire Pay	5.4	174	7.3	206	2.9	180	9.1	189
Diving Duty Pay	0.1	179	0.2	151	0.3	183	1.6	172
Submarine Duty Pay	0.0		0.0		0.0		6.8	189
Foreign Language Pay (1)	1.2	66	1.3	77	0.5	72	0.4	70
Foreign Language Pay (2)	0.2	38	0.1	35	0.0		0.0	43
Flying Pay (Crew Member)	0.8	184	2.8	195	1.0	188	1.7	194
Flying Pay (Noncrew)	0.0		0.0		0.5	144	0.0	
Parachute Duty Pay	8.3	150	0.1	160	0.4	148	0.3	152
Flight Deck Duty Pay	0.0	150	0.0		0.4	134	2.5	142
Demolition Duty Pay	0.4	150	0.4	150	0.3	150	0.4	149
Experimental Stress Pay	0.0	144	0.2	151	0.0	150	0.1	165
Toxic Fuels Duty Pay	0.0		0.3	150	0.0		0.0	
Toxic Pesticides Duty	0.0		0.0	79	0.0		0.0	129
High- Altitude Low Opening	0.3	227	0.3	232	0.2	225	0.5	227
Chemical Munitions Duty Pay	0.0	149	0.0	150	0.0		0.0	150
Average S&I Pay*		**41**		**31**		**26**		**116**
FSA I	0.4	94	0.2	131	0.0		0.2	121
FSA II	6.9	104	3.7	135	7.1	86	6.8	102
CONUS COLA	0.4	84	0.5	36	1.0	68	0.5	78
Oversea COLA	20.3	171	19.9	258	15.1	219	15.3	256
Clothing/Uniform Allowance	8.9	275	8.8	240	11.5	221	10.0	312
Average Misc Allow./COLAs[a]		**67**		**78**		**65**		**78**
Enlistment Bonus	0.6	2,176	0.1	3,734	0.0	2,083	0.3	2,069
SRB	1.1	1,649	0.9	2,546	0.0		0.4	8,152
Average Bonus*		**32**		**27**		**1**		**40**
Average Monthly Pay*		**2,673**		**,2745**		**2,438**		**2,778**

[a] *Averaged over all members including those not receiving these pays.*

Table A.2 Incidence and Average Amounts of Officer Pay for June 1999, for Members on Active Duty All 12 Months of 1999 (Commission Source Is ROTC or a Military Academy)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	3,784	100.0	3,792	100.0	3,590	100.0	3,668
BAH (Green Book)	100.0	866	100.0	881	100.0	869	100.0	857
BAS (Green Book)	100.0	157	100.0	157	100.0	157	100.0	157
Tax Advantage (Green Book)	100.0	313	100.0	318	100.0	296	100.0	322
Average RMC		**5,121**		**5,148**		**4,913**		**5,004**
Saved Pay	0.0		0.0		0.0		0.0	422
Health Professional Saved Pay	0.0		0.0		0.0		0.0	
Variable Special Pay	0.3	671	0.1	711	0.0		0.0	729
Board-Certified Pay	1.6	298	0.9	301	0.0		0.4	336
Aviation Career Incentive Pay	9.3	488	40.2	521	31.4	464	37.7	457
Responsibility Pay	0.0		0.0		0.0		0.0	
Career Sea Pay	0.0		0.0		0.1	165	11.2	177
Career Sea Pay Premium	0.0		0.0		0.0		1.8	107
Hostile Fire Pay	5.8	176	8.7	193	4.4	165	8.3	189
Diving Duty Pay	0.0	176	0.1	157	0.3	222	2.7	191
Submarine Duty Pay	0.0		0.0		0.0		9.3	460
Foreign Language Pay (1)	2.7	70	2.3	86	1.1	80	0.7	77
Foreign Language Pay (2)	0.4	35	0.1	29	0.0		0.0	33
Flying Pay (Crew Member)	0.1	211	0.6	188	0.0		0.1	225
Flying Pay (Noncrew Member)	0.0	150	0.0	217	0.1	150	0.0	150
Air Weapons Controller (Crew)	0.0	156	0.8	274	0.0		0.0	200
Parachute Duty Pay	8.1	143	0.1	148	1.0	136	0.5	149
Flight Deck Duty Pay	0.0		0.0		0.1	150	1.3	136
Demolition Duty Pay	0.2	149	0.1	150	0.0	150	0.6	148
Experimental Stress Duty Pay	0.0	100	0.1	144	0.0		0.0	150
Toxic Fuels Duty Pay	0.0		0.1	142	0.0		0.0	
High- Altitude Low Opening	0.1	230	0.1	230	0.0	225	0.7	225
Chemical Munitions Duty Pay	0.0	150	0.0		0.0		0.0	
Average S&I Pay*		**77**		**236**		**156**		**265**
FSA I	0.4	180	0.2	345	0.0		0.1	124
FSA II	4.9	106	2.8	148	6.5	89	6.2	104
CONUS COLA	0.8	126	1.5	46	1.3	113	0.9	118
Oversea COLA	18.4	306	13.0	411	10.6	457	13.0	442
Clothing/Uniform Allowance	0.1	497	0.1	554	0.0		0.2	341
Personal Money Allowance	0.0	89	0.0	42	0.0		0.0	42

Table A.2 Incidence and Average Amounts of Officer Pay for June 1999, for Members on Active Duty All 12 Months of 1999 (Commission Source Is ROTC or a Military Academy) (continued)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Average Misc Allow./COLAs[a]		**64**		**59**		**56**		**66**
Nuclear Officer Accession Bonus	0.0		0.0		0.0		0.0	2,000
Medical Officer Retention Bonus	0.1	12,987	0.0	18,058	0.0		0.0	18,000
Nuclear Career Accession Bonus	0.0		0.0		0.0		0.0	
Nuclear Career Annual Incentive Bonus	0.0		0.0		0.0		0.0	
Additional Special Pay, Medical Officer	0.0	8,857	0.1	15,000	0.0		0.0	12,833
Incentive Special Pay Medical Officer	0.0	15,667	0.0	18,500	0.0		0.0	8,000
Nuclear-Qualified Officer Continuation	0.0		0.0		0.0		1.2	14,507
Aviation Officer Continuation	0.0		0.7	11,956	0.2	12,000	0.1	10,529
Average Bonus[a]		**22**		**108**		**24**		**195**
Average Monthly Pay[a]		**5,283**		**5,551**		**5,149**		**5,529**

[a] *Averaged over all members including those not receiving these pays.*

Table A.3 Incidence and Average Amounts of Enlisted Pay for June 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	1,551	100.0	1,647	100.0	1,401	100.0	1,562
BAH (Green Book)	100.0	528	100.0	537	100.0	508	100.0	526
BAS (Green Book)	100.0	227	100.0	228	100.0	227	100.0	227
Tax Advantage (Green Book)	100.0	140	100.0	141	100.0	133	100.0	139
Average RMC		**2,447**		**2,553**		**2,269**		**2,454**
Foreign-Duty Pay	11.3	13	9.4	13	2.4	12	2.6	13
Proficiency Pay	4.4	269	2.3	227	3.6	280	7.1	211
Oversea Extension Pay	0.2	100	0.0	62	0.7	173	0.1	175
Career Sea Pay	0.1	178	0.0		2.5	41	25.9	191
Career Sea Pay Premium	0.0	100	0.0		0.0	100	3.1	99
Hostile Fire Pay	4.7	174	6.7	206	2.4	180	8.2	188
Diving Duty Pay	0.1	178	0.2	151	0.2	181	1.4	171
Submarine Duty Pay	0.0		0.0		0.0		6.0	188
Foreign Language Pay (1)	1.2	66	1.2	77	0.4	72	0.4	70
Foreign Language Pay (2)	0.1	38	0.1	35	0.0		0.0	42
Flying Pay (Crew Member)	0.7	182	2.6	194	0.9	188	1.6	191
Flying Pay (Noncrew)	0.0		0.0		0.4	142	0.0	
Parachute Duty Pay	7.5	148	0.1	158	0.4	146	0.2	150
Flight Deck Duty Pay	0.0	150	0.0		0.3	134	2.4	143
Demolition Duty Pay	0.3	150	0.4	150	0.2	150	0.3	149
Experimental Stress Pay	0.0	144	0.2	149	0.0	146	0.1	164
Toxic Fuels Duty Pay	0.0		0.3	150	0.0		0.0	
Toxic Pesticides Duty	0.0		0.0	85	0.0		0.0	131
High- Altitude Low Opening	0.2	227	0.2	233	0.1	225	0.4	227
Chemical Munitions Duty Pay	0.0	148	0.0	150	0.0		0.0	150
Average S&I Pay*		**36**		**29**		**22**		**105**
FSA I	0.4	77	0.2	118	0.0	- 3	0.2	96
FSA II	6.8	101	3.6	133	6.6	86	6.3	101
CONUS COLA	0.4	83	0.5	36	0.9	67	0.5	77
Oversea COLA	18.1	168	18.2	254	12.9	213	13.6	251
Clothing/Uniform Allowance	9.2	267	9.2	233	11.3	224	11.5	296
Average Misc Allow./COLAs[a]		**62**		**73**		**59**		**75**
Enlistment Bonus	0.6	2,182	0.1	3,577	0.0	2,078	0.3	2,010
SRB	1.0	1,547	0.8	2,463	0.0		0.4	7,304
Average Bonus*		**28**		**24**		**1**		**32**
Average Monthly Pay*		**2,546**		**2,654**		**2,350**		**2,634**

[a] *Averaged over all members including those not receiving these pays.*

Table A.4 Incidence and Average Amounts of Officer Pay for June 1999 (Commission Source Is ROTC or a Military Academy)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	3,690	100.0	3,722	100.0	3,504	100.0	3,574
BAH (Green Book)	100.0	848	100.0	868	100.0	852	100.0	837
BAS (Green Book)	100.0	157	100.0	157	100.0	157	100.0	157
Tax Advantage (Green Book)	100.0	304	100.0	312	100.0	289	100.0	312
Average RMC		**4,998**		**5,059**		**4,802**		**4,880**
Saved Pay	0.0		0.0		0.0		0.0	422
Health Professional Saved Pay	0.0		0.0		0.0		0.0	
Variable Special Pay	0.3	669	0.0	711	0.0		0.0	729
Board-Certified Pay	1.5	299	0.9	303	0.0		0.4	343
Aviation Career Incentive Pay	8.9	485	38.8	525	29.5	466	35.2	459
Responsibility Pay	0.0		0.0		0.0		0.0	
Career Sea Pay	0.0		0.0		0.1	165	10.5	176
Career Sea Pay Premium	0.0		0.0		0.0		1.7	108
Hostile Fire Pay	5.4	175	8.4	193	4.2	164	7.8	189
Diving Duty Pay	0.0	176	0.1	157	0.3	220	2.5	191
Submarine Duty Pay	0.0		0.0		0.0		8.8	459
Foreign Language Pay (1)	2.5	70	2.2	86	1.0	81	0.6	78
Foreign Language Pay (2)	0.3	35	0.1	30	0.0		0.0	33
Flying Pay (Crew Member)	0.1	211	0.5	188	0.0		0.1	225
Flying Pay (Noncrew Member)	0.0	150	0.0	217	0.1	150	0.0	150
Air Weapons Controller (Crew)	0.0	156	0.8	275	0.0		0.0	200
Parachute Duty Pay	7.7	143	0.1	148	0.9	137	0.4	149
Flight Deck Duty Pay	0.0		0.0		0.1	150	1.2	137
Demolition Duty Pay	0.2	149	0.0	150	0.0	150	0.6	148
Experimental Stress Duty Pay	0.0	100	0.1	144	0.0		0.0	150
Toxic Fuels Duty Pay	0.0		0.0	142	0.0		0.0	
High- Altitude Low Opening	0.1	230	0.1	230	0.1	225	0.6	225
Chemical Munitions Duty Pay	0.0	150	0.0		0.0		0.0	
Average S&I Pay*		**73**		**229**		**147**		**248**
FSA I	0.4	178	0.2	337	0.0		0.1	84
FSA II	4.7	106	2.7	149	6.1	88	5.8	105
CONUS COLA	0.8	125	1.4	46	1.3	111	1.0	111
Oversea COLA	17.3	305	12.4	411	10.0	459	12.2	440
Clothing/Uniform Allowance	3.6	251	2.7	307	1.8	300	5.1	281
Personal Money Allowance	0.0	89	0.0	42	0.0		0.0	42

Table A.4 Incidence and Average Amounts of Officer Pay for June 1999 (Commission Source Is ROTC or a Military Academy) (continued)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Average Misc Allow./COLAs[a]		**68**		**64**		**58**		**75**
Nuclear Officer Accession Bonus	0.0		0.0		0.0		0.0	6,800
Medical Officer Retention Bonus	0.1	12,987	0.0	18,058	0.0		0.0	18,000
Nuclear Career Accession Bonus	0.0		0.0		0.0		0.0	
Nuclear Career Annual Incentive Bonus	0.0		0.0		0.0		0.0	
Additional Special Pay, Medical Officer	0.0	8,857	0.1	15,000	0.0		0.0	12,833
Incentive Special Pay Medical Officer	0.0	15,667	0.0	18,500	0.0		0.0	8,000
Nuclear-Qualified Officer Continuation	0.0		0.0		0.0		1.1	14,507
Aviation Officer Continuation	0.0		0.7	11,778	0.2	12,000	0.1	10,529
Average Bonus[a]		**20**		**102**		**23**		**180**
Average Monthly Pay[a]		**5,160**		**5,455**		**5,030**		**5,383**

[a] *Averaged over all members including those not receiving these pays.*

APPENDIX B

ADDITIONAL OFFICER PAY TABLES

Table 3.2 in the body of this report is based on officers commissioned from ROTC or a military academy. Table B.1 in this appendix expands that population by including officers whose source of commission was OCS, OCT, or a direct appointment. In other words, Table B.1 is based on all commissioned officers. Table B.2 then adds warrant officers. As in Table 3.2, Tables B.1 and B.2 are based on members who served all 12 months of 1999.

Table B.1 Incidence and Average Amounts of Officer Pay, All Commissioned Officers, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	3,784	100.0	3,792	100.0	3,590	100.0	3,668
BAH (Green Book)	100.0	866	100.0	881	100.0	869	100.0	857
BAS (Green Book)	100.0	157	100.0	157	100.0	157	100.0	157
Tax Advantage (Green Book)	100.0	313	100.0	318	100.0	296	100.0	322
Average RMC		**5,121**		**5,148**		**4,913**		**5,004**
Saved Pay	0.0		0.0		0.0		0.0	422
Health Professional Saved Pay	0.0		0.0		0.0		0.0	
Variable Special Pay	0.3	671	0.1	711	0.0		0.0	729
Board-Certified Pay	1.6	298	0.9	301	0.0		0.4	336
Aviation Career Incentive Pay	9.3	488	40.2	521	31.4	464	37.7	457
Responsibility Pay	0.0		0.0		0.0		0.0	
Career Sea Pay	0.0		0.0		0.1	165	11.2	177
Career Sea Pay Premium	0.0		0.0		0.0		1.8	107
Hostile Fire Pay	5.8	176	8.7	193	4.4	165	8.3	189
Diving Duty Pay	0.0	176	0.1	157	0.3	222	2.7	191
Submarine Duty Pay	0.0		0.0		0.0		9.3	460
Foreign Language Pay (1)	2.7	70	2.3	86	1.1	80	0.7	77
Foreign Language Pay (2)	0.4	35	0.1	29	0.0		0.0	33
Flying Pay (Crew Member)	0.1	211	0.6	188	0.0		0.1	225
Flying Pay (Noncrew Member)	0.0	150	0.0	217	0.1	150	0.0	150
Air Weapons Controller (Crew)	0.0	156	0.8	274	0.0		0.0	200
Parachute Duty Pay	8.1	143	0.1	148	1.0	136	0.5	149
Flight Deck Duty Pay	0.0		0.0		0.1	150	1.3	136
Demolition Duty Pay	0.2	149	0.1	150	0.0	150	0.6	148
Experimental Stress Duty Pay	0.0	100	0.1	144	0.0		0.0	150
Toxic Fuels Duty Pay	0.0		0.1	142	0.0		0.0	
High- Altitude Low Opening	0.1	230	0.1	230	0.0	225	0.7	225
Chemical Munitions Duty Pay	0.0	150	0.0		0.0		0.0	
Average S&I Pay*		**77**		**236**		**156**		**265**
FSA I	0.4	180	0.2	345	0.0		0.1	124
FSA II	4.9	106	2.8	148	6.5	89	6.2	104
CONUS COLA	0.8	126	1.5	46	1.3	113	0.9	118
Oversea COLA	18.4	306	13.0	411	10.6	457	13.0	442
Clothing/Uniform Allowance	0.1	497	0.1	554	0.0		0.2	341
Personal Money Allowance	0.0	89	0.0	42	0.0		0.0	42

Table B.1 Incidence and Average Amounts of Officer Pay, All Commissioned Officers, 1999 (continued)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Average Misc Allow./COLAs[a]		**64**		**59**		**56**		**66**
Nuclear Officer Accession Bonus	0.0		0.0		0.0		0.0	2,000
Medical Officer Retention Bonus	0.1	12,987	0.0	18,058	0.0		0.0	18,000
Nuclear Career Accession Bonus	0.0		0.0		0.0		0.0	
Nuclear Career Annual Incentive Bonus	0.0		0.0		0.0		0.0	
Additional Special Pay, Medical Officer	0.0	8,857	0.1	15,000	0.0		0.0	12,833
Incentive Special Pay Medical Officer	0.0	15,667	0.0	18,500	0.0		0.0	8,000
Nuclear-Qualified Officer Continuation	0.0		0.0		0.0		1.2	14,507
Aviation Officer Continuation	0.0		0.7	11,956	0.2	12,000	0.1	10,529
Average Bonus[a]		**22**		**108**		**24**		**195**
Average Monthly Pay[a]		**5,283**		**5,551**		**5,149**		**5,529**

[a] *Averaged over all members including those not receiving these pays.*

Table B.2 Incidence and Average Amounts of Officer Pay, All Commissioned Officers and Warrant Officers, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Basic Pay	100.0	3,690	100.0	3,722	100.0	3,504	100.0	3,574
BAH (Green Book)	100.0	848	100.0	868	100.0	852	100.0	837
BAS (Green Book)	100.0	157	100.0	157	100.0	157	100.0	157
Tax Advantage (Green Book)	100.0	304	100.0	312	100.0	289	100.0	312
Average RMC		**4,998**		**5,059**		**4,802**		**4,880**
Saved Pay	0.0		0.0		0.0		0.0	422
Health Professional Saved Pay	0.0		0.0		0.0		0.0	
Variable Special Pay	0.3	669	0.0	711	0.0		0.0	729
Board-Certified Pay	1.5	299	0.9	303	0.0		0.4	343
Aviation Career Incentive Pay	8.9	485	38.8	525	29.5	466	35.2	459
Responsibility Pay	0.0		0.0		0.0		0.0	
Career Sea Pay	0.0		0.0		0.1	165	10.5	176
Career Sea Pay Premium	0.0		0.0		0.0		1.7	108
Hostile Fire Pay	5.4	175	8.4	193	4.2	164	7.8	189
Diving Duty Pay	0.0	176	0.1	157	0.3	220	2.5	191

Table B.2 Incidence and Average Amounts of Officer Pay, All Commissioned Officers and Warrant Officers, 1999 (cont.)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.	Pct. Rec'g	Avg. $ Amt.
Submarine Duty Pay	0.0		0.0		0.0		8.8	459
Foreign Language Pay (1)	2.5	70	2.2	86	1.0	81	0.6	78
Foreign Language Pay (2)	0.3	35	0.1	30	0.0		0.0	33
Flying Pay (Crew Member)	0.1	211	0.5	188	0.0		0.1	225
Flying Pay (Noncrew Member)	0.0	150	0.0	217	0.1	150	0.0	150
Air Weapons Controller (Crew)	0.0	156	0.8	275	0.0		0.0	200
Parachute Duty Pay	7.7	143	0.1	148	0.9	137	0.4	149
Flight Deck Duty Pay	0.0		0.0		0.1	150	1.2	137
Demolition Duty Pay	0.2	149	0.0	150	0.0	150	0.6	148
Experimental Stress Duty Pay	0.0	100	0.1	144	0.0		0.0	150
Toxic Fuels Duty Pay	0.0		0.0	142	0.0		0.0	
High- Altitude Low Opening	0.1	230	0.1	230	0.1	225	0.6	225
Chemical Munitions Duty Pay	0.0	150	0.0		0.0		0.0	
Average S&I Pay*		**73**		**229**		**147**		**248**
FSA I	0.4	178	0.2	337	0.0		0.1	84
FSA II	4.7	106	2.7	149	6.1	88	5.8	105
CONUS COLA	0.8	125	1.4	46	1.3	111	1.0	111
Oversea COLA	17.3	305	12.4	411	10.0	459	12.2	440
Clothing/Uniform Allowance	3.6	251	2.7	307	1.8	300	5.1	281
Personal Money Allowance	0.0	89	0.0	42	0.0		0.0	42
Average Misc Allow./COLAs[a]		**68**		**64**		**58**		**75**
Nuclear Officer Accession Bonus	0.0		0.0		0.0		0.0	6,800
Medical Officer Retention Bonus	0.1	12,987	0.0	18,058	0.0		0.0	18,000
Nuclear Career Accession Bonus	0.0		0.0		0.0		0.0	
Nuclear Career Annual Incentive Bonus	0.0		0.0		0.0		0.0	
Additional Special Pay, Medical Officer	0.0	8,857	0.1	15,000	0.0		0.0	12,833
Incentive Special Pay Medical Officer	0.0	15,667	0.0	18,500	0.0		0.0	8,000
Nuclear-Qualified Officer Continuation	0.0		0.0		0.0		1.1	14,507
Aviation Officer Continuation	0.0		0.7	11,778	0.2	12,000	0.1	10,529
Average Bonus[a]		**20**		**102**		**23**		**180**
Average Monthly Pay[a]		**5,160**		**5,455**		**5,030**		**5,383**

[a] *Averaged over all members including those not receiving these pays.*

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CHAPTER II

A SURVEY OF ENLISTED RETENTION: MODELS AND FINDINGS

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The views expressed in this paper represent those of the author and are not necessarily those of the Department of Defense.

INTRODUCTION AND SUMMARY

The supply of manpower has always been a concern to the military, but this issue took on greater importance in the events leading up to the creation of the All-Volunteer Force (AVF) in 1973. In 1969, President Nixon established the President's Commission on an All-Volunteer Force, commonly known as the Gates Commission. The commission's staff papers were among the first to systematically study the supply of both enlistments and reenlistments to the military. These papers, along with concurrent literature in the professional economics journals, demonstrated that an AVF was feasible from a fiscal perspective.[1]

A variety of studies through the early and mid-1970s continued to examine the supply of reenlistments.[2] A major advance occurred during the late 1970s with development of the Annualized-Cost-of-Leaving (ACOL) model. Under this model, the primary driver of the reenlistment decision is the discounted difference between the military pay stream from reenlisting, and the civilian pay stream from leaving the military. In particular, ACOL combined all the elements of military pay (basic pay, allowances, reenlistment bonuses, retirement pay) into a single, discounted present value. Moreover, ACOL suggested a time horizon over which the military and civilian pay streams must be measured and compared. From a statistical perspective, ACOL expressed the reenlistment rate as a logit or probit function of the discounted pay difference, and possibly other regressors.

In parallel to ACOL, Glenn Gotz and John McCall developed a dynamic-programming model of Air Force officer retention [9, 10]. Rather than specifying a single, dominant time horizon, their model allowed for probabilistic weighting of multiple time horizons. Although their model was theoretically elegant, it proved difficult to estimate given the computer hardware and software environment of the early 1980s.

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[1] The concurrent literature includes Altman and Fechter [1], Fisher [2], Hansen and Weisbrod [3], Miller [4], and Oi [5]. These papers also made the important distinction between the fiscal cost of an AVF and the opportunity cost of diverting individuals from the civilian careers they would otherwise have pursued.

[2] For example, see [6, 7, and 8].

ACOL remained the conventional point of departure for much of the research conducted during the 1980s and 1990s. However, considerable effort went into improving the statistical estimation of reenlistment models. That research effort took two major directions. First, panel probit models were formulated to better track the composition of cohorts making successive reenlistment decisions during their military careers. For example, those induced to reenlist by a Selective Reenlistment Bonus (SRB) might have less of a taste for military life than others who would have reenlisted even absent an SRB. These bonus-induced individuals would be less likely to remain in the military at subsequent decision points, unless the SRB were sustained. Panel probit models are designed precisely to capture the effects of cohort composition on the outcome of successive binary decisions.

The second research direction was to recognize the distinction between reenlistments (i.e., commitments for 36 or more additional months of service) and shorter extensions. Only individuals who reenlist are eligible to receive SRBs. Thus, an increase in SRB levels not only will increase the total retention rate but also will change the mix of individuals retained between those who reenlist and those who merely extend. The resulting change in the mix of commitments is clearly important for personnel planning purposes. Thus, a binary logit or probit model was replaced by a trichotomous model, such as conditional logit, multinomial logit, or nested logit.

The statistics literature tells us little about adding cohort-composition effects to trichotomous choice models. The panel probit approach and the various trichotomous logit approaches have advanced essentially independently, although some of the same researchers have applied both approaches, at one time or another, in modeling the reenlistment decision.

Other statistical problems have prompted researchers to modify or enhance the logit or probit models in various ways. First, there may be reverse causation between pay and the reenlistment rate. The goal of the analysis is to estimate the positive effects of SRB and other incentives on the reenlistment rate. However, enlisted occupations with chronically low reenlistment rates tend to be compensated with higher SRB levels. This pattern of reverse causation may lead to a downward bias in the estimated pay coefficient. At least two studies [11 and 12] have used panel data and applied a fixed-effect estimator in an effort to alleviate this source of bias.

We have already discussed the possibility that people who reenlist for an SRB might be less likely to reenlist a second time. Similarly, those who enlist for an accession bonus might be less likely to reenlist at the first-

term decision point. Two studies [13 and 14] have attempted to control for the composition of the accession cohort when modeling the first-term reenlistment decision. They did so by jointly modeling survival to the first-term decision point with the outcome of that decision.

Several issues arise in computing the elasticity of the reenlistment rate with respect to military pay. The definition of "reenlistment" is complicated by a number of factors, including reenlistment eligibility and the treatment of extensions. Some studies exclude individuals declared ineligible to reenlist from the denominator of the reenlistment rate. However, the eligibility determination may be endogenous if, for example, individuals expressing a disinclination to reenlist are subsequently declared ineligible by their units. Some studies combine extensions with reenlistments, modeling total retention. Others defer their analysis of extensions, instead tracking them to learn whether they ultimately reenlist. It is difficult to compare the pay elasticities from studies that differ in their treatment of extensions.

Computation of the pay elasticity is further complicated by the definition of "military pay." Many studies measure pay in terms of ACOL or some other difference between the military and civilian pay streams. However, it is perilous to directly compute the elasticity of the reenlistment rate with respect to a pay *difference*. The elasticity, so computed, will have the same algebraic sign as the baseline pay difference. Thus, even if increased pay has a positive effect in encouraging more reenlistments, the elasticity may be zero or even negative. Instead, the model should be exercised by hypothesizing a fixed, discrete increase in military pay (e.g., $1,000). Express this increase as a percentage of baseline military pay, and divide the resulting percentage increase in the reenlistment rate by the percentage increase in military pay. This procedure estimates the arc elasticity with respect to military pay *(not* the pay difference), and is guaranteed to yield the correct algebraic sign.

At various points in time, the SRB has been paid either as a lump-sum on the date of reenlistment, or in equal annual installments over the duration of the reenlistment contract (with no indexing for inflation). To the first order of approximation, lump-sum bonuses are cost-effective if military members' discount rates exceed that of the federal government.[3] Since

[3] Other considerations include progressive income taxation and government recoupment of lump-sum bonuses from individuals who separate during the contract period. Empirically, these factors are minor and do not change the basic conclusion.

1992, the Office of Management and Budget (OMB) has tied the federal government's discount rate to the market rate on Treasury bonds. Several studies have estimated the discount rates of military members. Two of these studies [12 and 15] exploited the natural experiment that occurred when the method of SRB payment switched from annual installments to lump-sum payments. The estimates of military members' real (i.e., inflation-adjusted) discount rates are in the range of 6 to 26 percent. By contrast, real Treasury rates have generally been in the range of 3 to 4 percent. Thus, lump-sum bonuses are the preferred method of payment.

Finally, several studies have investigated the retention effects of variables other than relative military pay. In studies specific to the Navy, the variables of interest have included the incidence of sea duty, length of deployment, time between deployments, and percentage of time spent under way while not deployed [16, 17, and 18]. The Navy studies have also estimated the SRB and other incentives required to compensate for adverse changes in these duty characteristics. A more recent study has measured additional duty characteristics and extended the analysis to all four military services [19].

The remainder of this report reviews each of the aforementioned methodological issues in detail. It also presents a summary of the pay elasticities estimated using the various measurement and statistical techniques. Although we cannot rationalize all of the variation in pay elasticities, we attempt to correlate the elasticities with the techniques used to estimate them.

ACOL MODEL

John Warner and his various collaborators developed the ACOL model in a series of papers. The initial motivation was to study a proposal by the President's Commission on Military Compensation (PCMC) to reform the military retirement system [20]. Warner also programmed a forecasting version of the model in the APL language. He distributed the model to the Navy Bureau of Personnel (BuPers) and, later, to the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics). BuPers started using the model to analyze manpower issues in the Navy's Program Objectives Memorandum (POM), beginning with POM 1982. By the early 1980s, the ACOL model was well known and accepted throughout the defense manpower community.

The ACOL model's first appearance in the academic literature was a 1984 paper by three of its codevelopers, Enns, Nelson, and Warner [21]. During that same year, Warner and Goldberg [18] published an application of the ACOL model in a mainstream economics journal. Parallel developments were taking place in the literature on retirement from civilian-sector jobs (e.g., Stock and Wise [22], who were apparently unaware of the ACOL model). The two strands in the literature were eventually brought together by Lumsdaine, Stock, and Wise [23] and Daula and Moffitt [24].

Economic theory suggests that individuals combine all the elements of compensation associated with any alternative into a single measure, typically the discounted present value. In our context, SRBs provide both cross-section (i.e., across military occupations) and time-series variation in discounted pay. Civilian earnings provide time-series variation, and may provide additional cross-section variation to the extent that the civilian earnings functions account for military occupation. Military pay excluding SRBs (i.e., Regular Military Compensation, or RMC) provides time-series variation but only minimal cross-section variation (to the extent that differences in promotion rates are captured).

If the three pay components (SRBs, civilian earnings, and RMC) were entered as separate regressors, their respective coefficients would almost certainly be different. RMC would probably have the least significant coefficient because RMC has the least sample variation. However, it would be wrong to conclude that increases in RMC have the smallest impact on retention. To estimate the effect of RMC more precisely, one could divide RMC by civilian earnings, thereby forming an index of relative military pay. The coefficient on this index would be driven largely by the variation in civilian earnings, but it could be used to forecast the effects of changes in RMC on retention. These forecasts would be valid as long as individuals were indifferent between an increase in RMC and an equal percentage decrease in civilian earnings.

It is even more difficult to compare the efficacy of increases in RMC versus increases in SRBs. One difference is that SRBs can be targeted to military occupations experiencing retention problems. Another difference is that SRBs have a different time dimension from RMC. SRBs represent one-time payments or, at most, a short series of annual installments. On the contrary, a given dollar increase in RMC persists for the duration of a person's military career. Thus, an increase in RMC cannot be evaluated without knowing (or at least estimating) the person's time horizon. Moreover, for those whose time horizons extend to 20 or more years of

service, basic pay (the largest element of RMC) also affects their retirement annuity. Table 1 compares the time dimensions of these various elements of pay.

The ACOL approach solves the dimensionality problem by combining all the elements of compensation into a single measure. In particular, the rich sample variation in SRBs can be brought to bear in estimating the coefficient on the ACOL variable in a logit or probit choice model. The ACOL coefficient, in turn, can be used to forecast the effects of any change in compensation, including changes in the retirement system. Indeed, the ACOL approach was developed precisely to study the military retirement system. We will also argue, in a later section, that the ACOL approach is consistent with the results of studies that segmented compensation into multiple measures (e.g., the SRB level and an index of relative military pay).

Table 1. Elements of pay and their time dimensions

Pay Element	Time Dimensions
RMC (basic pay + allowances + tax advantage)	Persists over entire military career
Basic Pay	Persists over entire military career Determines retirement annuity
SRBs	Lump-sum is instantaneous Annual installments over the reenlistment contract
Civilian Earnings Stream	Entire working life

ACOL Time Horizon

The ACOL approach suggests a time horizon for comparing the military and civilian discounted pay streams. However, construction of the ACOL variable requires an assumption on military members' discount rates. We will describe methods for estimating discount rates in a later section. For now, we merely report that enlisted personnel at their first-term and second-term reenlistment points appear to have real (i.e., net of inflation) discount rates of 6 to 26 percent.

To develop the ACOL variable, suppose initially that the retention decision were made solely by comparing the military and civilian discounted pay streams. Then, assuming that the pay streams could be

measured precisely, we could predict with certainty the choice made by any individual—simply the one yielding the highest discounted pay stream.

Relaxing these assumptions gradually, suppose next that the pay streams were known exactly to the individual decision-maker, but not to the data analyst. This would be the case if the analyst were using a regression function to predict civilian earnings, yet the individual had more precise knowledge of his or her own earnings potential. In this situation, we could no longer predict an individual's choice with certainty. Instead, we could predict only the probabilities of staying or leaving for each individual.

As a further relaxation, we can recognize that a person's occupational choice depends on a comparison not only of discounted pay streams but also of the nonmonetary advantages and disadvantages of military versus civilian life. A general assumption in the literature is that the nonmonetary factors may be expressed as monetary equivalents (e.g., "I will remain in the military only if they pay me $1,000 more per year than I could earn as a civilian"). Most authors further combine the nonmonetary factors with the unmeasured portion of the pay streams, and label the result the "taste factor." Continuing the example, suppose that the same person who requires a $1,000 annual premium also knows that his or her potential civilian earnings are $500 above the regression prediction. The taste factor for this person would be the sum, $1,500. Note also that the taste factor could be negative if people prefer military life or if their potential civilian earnings are below the regression prediction.

Suppose, for the moment, that a person currently in year of service (YOS) t is contemplating only two choices: remain in the military for an additional s years, or leave immediately. He or she will remain in the military if:

$$\sum_{j=t+1}^{t+s} M_j \times (1+r)^{t-j} \quad > \quad \sum_{j=t+1}^{t+s} (C_j + v) \times (1+r)^{t-j}, \qquad (1)$$

where M_j is military pay (including any SRBs) in YOS j, C_j is potential civilian pay in the same year, and v is the taste factor. Note that the taste

factor is assumed to be time-invariant.[4] Equivalently, the person will remain in the military if:

$$\text{ACOL}_s \equiv \frac{\sum_{j=t+1}^{t+s} (M_j - C_j) \times (1+r)^{t-j}}{\sum_{j=t+1}^{t+s} (1+r)^{t-j}} > v. \quad (2)$$

As its name suggests, the ACOL variable is simply the annualized (or annuitized) difference between the military and civilian pay streams. Put differently, a stream of s pay differences, each equal to ACOL_s, has the same discounted value as the pay stream $\{(M_j - C_j),\ j = t+1, \text{K}\ , t+s\}$, namely, the numerator of the previous expression for ACOL_s.

Now considering *all* possible horizons $\{s = 1, 2, 3, \text{K}\}$, the person will remain in the military if there is at least one horizon over which ACOL exceeds the taste factor. Mathematically, this condition is equivalent to having the maximum ACOL greater than the taste factor:

$$\text{Max}_s \{\text{ACOL}_s\} > v. \quad (3)$$

Conversely, the individual will leave the military immediately if there is no horizon over which ACOL exceeds the taste factor. Mathematically, this condition is equivalent to having the maximum ACOL less than the taste factor:

$$\text{Max}_s \{\text{ACOL}_s\} < v. \quad (4)$$

Thus, the maximum ACOL summarizes all of the information on pay streams necessary to predict a person's retention decision. Earnings further than s^* years into the future (where s^* is the horizon that maximizes ACOL) need not be considered. This result is impressive because earnings beyond s^*, even when discounted, need not be negligible numerically; yet the retention decision can be made without considering them.

[4] Inequality (1) is written so that potential civilian pay depends on calendar year (equivalently, the person's age), but not on the length of his or her military career (i.e., not upon the value of s). This assumption can be relaxed, at the expense of some additional terms that measure the gain or loss in potential civilian pay from continued military service. The ACOL expression under this relaxation is found in [11] or [23].

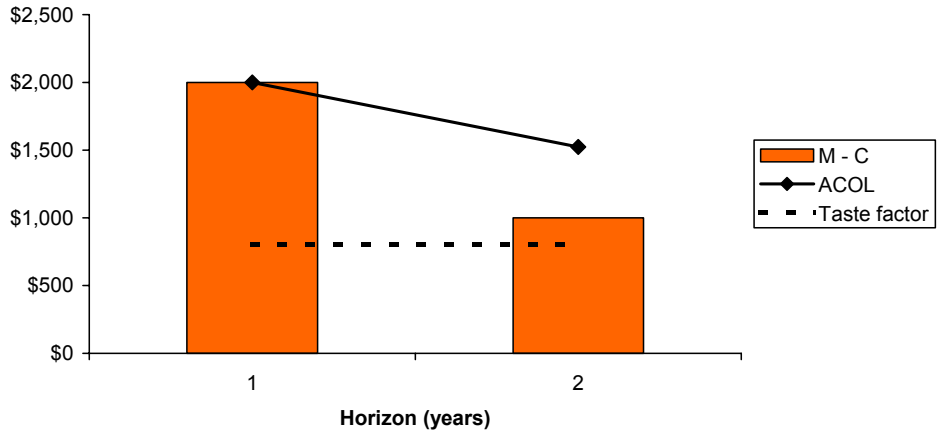
"OPTIMALITY" OF THE ACOL TIME HORIZON

The horizon s^* is sometimes called the "optimal horizon," but this nomenclature is misleading. It seems to imply that, among all possible horizons that involve remaining in the military at least one additional year, the horizon s^* is the most preferred. However, some simple counterexamples disprove this conjecture.[5]

Suppose the only two possible career lengths involve staying for one additional year ($s = 1$) or two additional years ($s = 2$). Suppose further that the military/civilian pay differences are \$2,000 in the first year and \$1,000 in the second year. If the discount rate is 10 percent, the ACOL values are $ACOL_1$ = \$2,000 and $ACOL_2$ = \$1,524. The optimal horizon over which ACOL is maximized is s = 1 year. Thus, the person will stay in the military for *some* duration if the taste factor is less than the maximum ACOL, or \$2,000. Yet he or she would prefer to stay for two additional years, rather than just one, if the taste factor is sufficiently small (or negative). Specifically, having already stayed for one additional year, the person would prefer to stay for the second year as well if the taste factor is less than the military/civilian pay difference in that year, \$1,000. Figure 1 illustrates this situation.

[5] In one of many published examples of the misleading use of the term "optimal horizon," Gotz [25, p. 266] states that, "associated with [the ACOL variable] is a known optimal future quitting date." Black, Moffitt, and Warner [26, p. 270] agree with Gotz on this point: "the ACOL model assumes that the individual picks a single optimal date of leaving some time in the future." A rare correct statement is found in Mackin et al. [27, p. C-5]: "Note that the ACOL measure should be considered an index describing the financial incentive to stay at least one more year. The horizon associated with the maximum ACOL is *not necessarily* the optimal leaving point" [emphasis added].

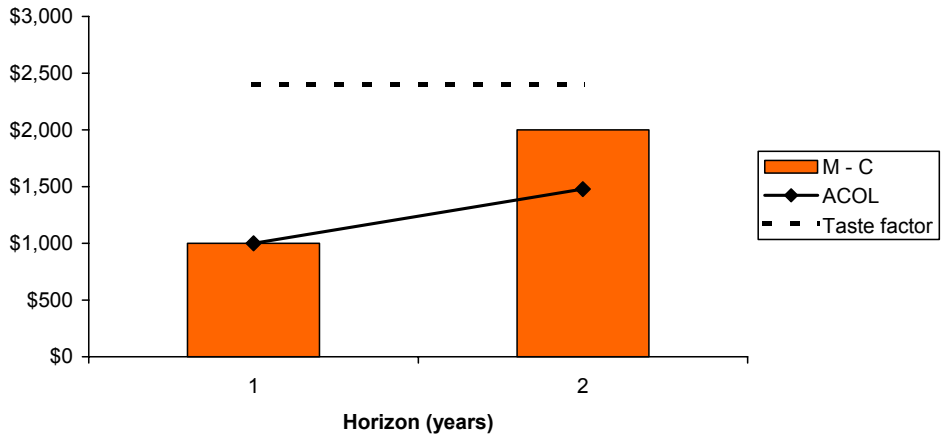
Figure 1. First Counterexample to Optimality of ACOL Time Horizon



Conversely, suppose the military/civilian pay differences are $1,000 in the first year and $2,000 in the second year. In this case, the ACOL values are $ACOL_1$ = $1,000 and $ACOL_2$ = $1,476. The optimal horizon over which ACOL is maximized is now s = 2 years. Yet the individual would prefer to leave the military after just one additional year, rather than two, if the taste factor is sufficiently large. Specifically, having already stayed for one additional year, the individual would prefer to leave before the second additional year if the taste factor is greater than the pay difference in that year, $2,000. It remains true that, because the taste factor exceeds the maximum ACOL, the individual would most prefer to leave the military immediately. Our point, however, is that among the various career lengths that involve staying, the so-called optimal horizon is not necessarily the most preferred. We show this situation in figure 2.

Intuitively, a comparison of the $ACOL_s$ values among the various horizons $\{s = 1,2,3,\mathrm{K}\}$ cannot determine the optimal leaving date because ACOL does not account for the taste factor, only the relative earnings. An individual may choose to remain until later, despite a decreasing sequence of ACOL values, because he or she has a net preference for military life (i.e., a sufficiently small taste factor). Conversely, a person may choose to leave sooner despite an increasing sequence of ACOL values, because the taste factor is overwhelmingly large.

Figure 2. Second Counterexample to Optimality of ACOL Time Horizon



Daula and Moffitt [24] pointed out that, even if the taste factor is identically zero, the optimal horizon that maximizes ACOL may differ from the horizon that maximizes the discounted present value of earnings. Returning to the first example, suppose that military earnings are $10,000 in both years. With the stated differentials, civilian earnings are $8,000 in the first year and $9,000 in the second year. The discounted present values (again using a 10-percent discount rate) are $16,182 for leaving immediately, $18,182 for staying one additional year and then leaving, and $19,091 for staying two additional years. In this example, ACOL is maximized at s = 1, yet the discounted present value of earnings is maximized at s = 2. With the assumed zero taste factor, the individual would prefer to stay for the second year in order to maximize discounted earnings. He or she would be undeterred by the decline in ACOL values from $ACOL_1$ = $2,000 to $ACOL_2$ = $1,524.

As a technical matter, the ACOL calculation truncates the military and civilian earnings streams after *s* years. However, the discounted present value of earnings is calculated through a predetermined horizon—in practice, through an individual's entire working life, or even longer if retirement pay is considered. Because it is truncated, ACOL is *not* a monotonic transformation of the discounted present value over the predetermined horizon. Thus, the two expressions could easily achieve their respective maxima at different values of *s*.

None of these arguments vitiate the use of maximized ACOL to predict the individual's retention decision (although we will soon consider

some different arguments against the ACOL approach). But the arguments do militate against labeling as "optimal" the horizon over which ACOL is maximized.

STATISTICAL ESTIMATION OF THE ACOL MODEL

If the distribution of the taste factor across decision-makers is normal, the probability of staying in the military follows a probit model. If the distribution of the taste factor is logistic, the probability of staying follows a logit model. Both of these models take the form of S-curves, so that the estimated probability of staying increases up to a limit of 1.0 as conditions become more conducive to staying (e.g., as relative military compensation increases). Conversely, the probability of staying decreases to a limit of 0.0 as conditions become less conducive to staying. When properly calibrated, the probit and logit S-curves are virtually indistinguishable, although the logit model is somewhat simpler mathematically and easier to compute. Software is readily available to estimate both models.

The logit and probit models allow for the introduction of additional regressors, apart from the maximum ACOL, that help explain the retention decision. For example, the retention rate has been found to vary directly with the civilian unemployment rate. The retention rate is also related to personal characteristics, such as marital status, race, education, and mental group.

The older studies estimated first-term and second-term retention models completely independently of each other. Many studies used grouped data, but even studies that used individual (panel) data made no allowance for correlation over time in the taste factor for a given person. We will argue later that disregard for intertemporal correlation likely led to upward-biased estimates of the coefficient on the ACOL variable. As we will see, the ACOL–2 model imposes a permanent/transitory error structure in an effort to avoid this source of bias.

Independent of the ACOL developments, David Wise and his various collaborators developed an essentially equivalent model in their research on retirement from civilian-sector jobs. In particular, they independently discovered the "maximum ACOL" condition (our equation 3).[6]

[6] Stock and Wise [22], equations 2.12 through 2.14 on p. 1162; or Lumsdaine, Stock, and Wise [23], equation 10 on p. 27.

Operationally, the only difference from ACOL is that Wise specified a first-order autocorrelation (AR1) error structure when estimating sequential retention decisions using panel data.

Interestingly, for a time Wise seemed unaware of the connection between ACOL and his own research on civilian retirement. He was the discussant on Warner and Solon's [14] paper at an Army retention conference. Although the proceedings were published in 1991, the conference actually took place in 1989, at which time Wise must have been working on his paper with James Stock that would be published in 1990. Yet Wise [28, p. 278] made the following comment on Warner and Solon, indicating his apparent lack of familiarity with the ACOL concept:

> the ACOL variable should be explained briefly in [Warner and Solon's] paper. The authors refer the reader to explanations presented in other project reports. But the variable plays a key role in the analysis; several of the other variables that are included make little sense if the reader does not understand what the ACOL variable is supposed to capture.

The two strands in the literature were finally brought together by Lumsdaine, Stock and Wise [23], some 3 years after the Army retention conference; further developments were contained in Daula and Moffitt [24].

PANEL PROBIT MODELS

Critics of the ACOL approach point to its poor treatment of the dynamics of retention over a person's military career. The ACOL values often increase over one's career, as fewer years remain until retirement and the discounted value of the retirement annuity dramatically increases. According to a strict interpretation of the ACOL approach, anyone who stayed at the first decision point would certainly stay at all subsequent decision points because the taste factor is assumed time-invariant yet the financial incentive to stay (as measured by the ACOL value) increases with time. As an empirical matter, however, we know that retention rates at the second and third decision points are significantly below 1.0.

To develop a second criticism, consider a person who would have left the military after one term of service except for the lure of an SRB. This

person has a larger taste factor (i.e., a larger distaste for military life) than others who would have stayed even absent an SRB. Unless the SRB is sustained, bonus-induced people are less likely to remain in the military at the second and subsequent decision points.

As an example, suppose the person had a taste factor of $2,000 and a first-term baseline ACOL of $1,000, but was offered an SRB that raised ACOL to $3,000. This person would stay through the first decision point because ACOL ($3,000, including the SRB) exceeds the taste factor ($2,000). However, the same individual would leave at the second decision point unless a sustained SRB or other compensation incentive raised ACOL above the baseline value of $1,000 to some value exceeding the (time-invariant) taste factor of $2,000. By contrast, a non-bonus-induced person would stay at the second decision point absent any compensation incentives. The latter individual, by definition, had a taste factor less than the baseline ACOL value of $1,000. This person would stay at the second decision point because the taste factor is time-invariant whereas ACOL tends, if anything, to increase as retirement approaches.

We see that the second-term reenlistment rate depends on the circumstances under which a person survived the first-term reenlistment decision. In an effort to capture this effect, Warner and Simon [29] included the lagged first-term ACOL value in a model to predict the second-term reenlistment rate. Along similar lines, Goldberg and Warner [30] include the lagged first-term SRB multiple in the second-term reenlistment model. The effect of lagged SRB was marginally significant with an unexpected positive sign for one occupational group (Electronics), and highly significant with the expected negative sign for one other occupational group (Non-electronics). Despite the names of these two groups, they are *not* mutually exhaustive. Goldberg and Warner's taxonomy contained six other occupational groups, for which the lagged SRB effect was statistically insignificant.

ACOL–2 Model

The ACOL–2 model was an attempt to improve on ad hoc inclusion of lagged variables in second-term reenlistment models. Black, Hogan, and Sylwester [31] used the ACOL–2 model to predict retention decisions of Navy enlisted personnel. Black, Moffitt, and Warner [32] applied the model to retention decisions of Department of Defense (DoD) civilian employees. The ACOL–2 model was further developed in a dialogue

between the latter authors and Glenn Gotz [25], and in a subsequent paper on Army reenlistments by Daula and Moffitt [24].

The ACOL–2 model follows a long tradition in the literature on panel data. Specifically, the taste factor for each person is decomposed into (a) a permanent component, constant over time through all decision points, and (b) a transitory component, randomly varying over time from one decision point to another. This permanent/transitory structure has several advantages. First, the retention rate is no longer predicted as 1.0 at the second and third decision points. Returning to the example above, the person who stayed at the first decision point might choose to leave at the second decision point, if the transitory component of the taste factor were sufficiently positive. Several events, such as an unusually arduous tour of duty or failure to receive an expected promotion, could "sour" a person at the second decision point. This effect might offset the general tendency for ACOL to increase over the individual's career, causing him or her to leave the military at the second decision point.

Simply pooling retention data from several decision points, without imposing a permanent/transitory structure, would lead to an upward-biased estimate of the ACOL coefficient. We have noted both the general tendency for ACOL to increase over an individual's career, and the general tendency for retention rates to increase (though not all the way to 1.0). Suppose that the first- and second-term data were pooled, but the two decisions for each person were treated as statistically independent. Then the entire increase in retention rates would be attributed to the increase in ACOL, leading to a large ACOL coefficient. In fact, however, part of the increase in retention rates results from the early departure from the sample of people with a stronger distaste for the military. Put differently, the ACOL coefficient would pick up not only the effect of changes in relative compensation on a fixed population, but also changes in the population composition itself. This phenomenon, known as "unobserved heterogeneity," leads to biased coefficient estimates.

Note that unobserved heterogeneity would not lead to any bias in the ACOL coefficient estimated from a single cross-section of first-term reenlistment decisions. Nor would there be any bias if data were pooled on first-term reenlistment decisions made by different cohorts of individuals in consecutive fiscal years. Instead, the bias arises from the failure of the simple ACOL model to adequately track a cohort (or cohorts) of individuals through successive decision points. Thus, the bias would be manifest in simple ACOL models only when applied at the second-term (or later) decision points.

The ACOL–2 model avoids the problem of unobserved heterogeneity by explicitly tracking the permanent taste distribution as a given cohort advances through successive decision points. At each decision point, the main forcing variable is again the maximum ACOL over all possible horizons. Suppose, for example, that the first reenlistment decision occurs in 1990 after 4 years of service, and the second reenlistment decision occurs in 1994 after 8 years of service. Then the first-term reenlistment decision is driven by the maximum ACOL over the horizons of staying 1 additional year up to 26 additional years (assuming mandatory retirement after 30 years of service). For the second-term reenlistment decision, ACOL is recomputed over the horizons of staying 1 additional year up to 22 additional years. Both ACOL values are computed using data from the fiscal years in which the respective decisions were made (e.g., a person's first-term decision might be modeled using the military and civilian wages that prevailed in 1990, but then the second-term decision would be modeled using the wages that prevailed in 1994). Thus, the model captures not only a person's progression through a fixed military pay table but also any growth over time in the military pay table or in civilian wages.[7] The ACOL–2 model also allows additional regressors, such as the civilian unemployment rate. This variable, too, is measured contemporaneously with the decision years, thus capturing additional information on trends in the civilian economy.

Black, Moffitt, and Warner [32] applied the ACOL–2 model to separation decisions of DoD civilian employees. Because estimation of the ACOL–2 model requires numerical integration of the multivariate normal density, they achieved a considerable computational efficiency by adopting a likelihood-factorization technique previously developed by Butler and Moffitt [33]. Glenn Gotz [25] wrote a comment on Black, Moffitt, and Warner, to which they immediately responded. Some of Gotz's points apparently spurred Robert Moffitt and his various collaborators to further improve on the ACOL–2 formulation.

[7] For example, in their study of Navy enlisted retention, Black, Hogan, and Sylwester [31] reported that the sample average ACOL value doubled (in constant dollars) from the first-term to the second-term decision point. The average ACOL value nearly doubled again from the second-term to the third-term decision point.

In his comment, Gotz [25, p. 266] makes the following statement:

> Recall that associated with [the ACOL variable] is a known optimal future quitting date [*sic*], $t + s^*$.…By construction of [Black, Moffitt and Warner's] model, any reduction in civil service pay more than s^* years from t [i.e., beyond the "optimal future quitting date"] will have absolutely no effect on the predicted quit rate at t.

Gotz's statement is too severe. When simulating a policy change, knowledgeable users of the ACOL model always recompute the sequence of ACOL values and locate the new maximum ACOL value. Consider, for example, an increase in military retirement pay, and suppose that the individual's horizon was initially 4 years ahead ($t + 4$). Gotz's statement implies that the horizon would remain fixed at $t + 4$ and, thus, the increase in retirement pay would have no effect on retention. In fact, the horizon might easily move out to year 20, so that retirement pay now enters the calculation and affects retention.[8]

Figure 3 illustrates this situation for a first-term decision-maker. In the base case, ACOL is maximized over the horizon of a 4-year reenlistment. The prospect of retirement pay after 20 years causes a jump in the ACOL value to nearly $4,500 at YOS 20, but that value still lies below the maximum ACOL of $5,000. Now consider an increase in the present value of retirement pay, equal to $100,000 when discounted to the date of retirement. The ACOL value jumps to almost $7,000 at YOS 20, so the ACOL horizon now encompasses the 20-year retirement point. The increase in the maximum ACOL from $5,000 to $7,000 provides a substantial retention incentive, even though the underlying change in compensation takes place beyond the initial ACOL horizon.

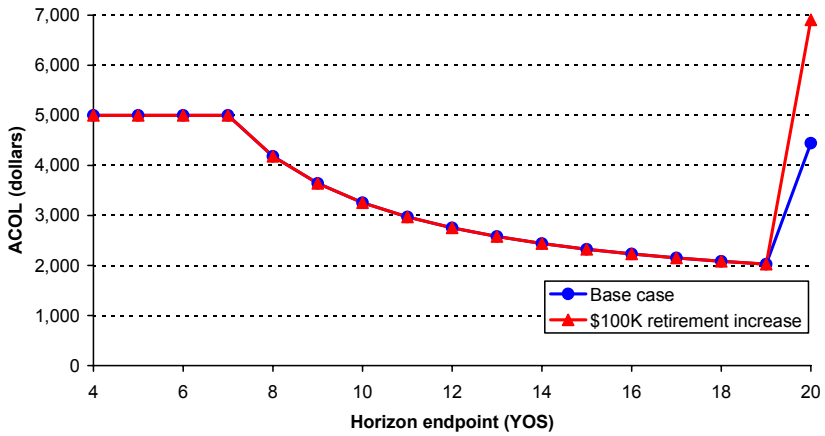
Paradoxically, Gotz and his collaborators had already recognized this point 5 years earlier, although, like many others, they misinterpreted the ACOL horizon as the planned leave point. According to Fernandez, Gotz, and Bell [34, p. 16]:

> the calculated ACOL for any particular decision point reflects a specific horizon, the planned leave point [*sic*] for the marginal individual. Changes in earnings beyond that horizon generally do not affect the [maximum] ACOL value, and so cannot change the model's retention predictions for earlier decision points. Only an

[8] Indeed, recalculation of the ACOL horizon was included in the forecasting version of the ACOL model developed by John Warner in the early 1980s.

increase in military earnings (or decrease in potential civilian earnings) large enough to move the horizon outward can have any effect.

Figure 3. Example of Shift in ACOL Time Horizon



It was clearly the intention of Black, Moffitt, and Warner [32, pp. 258-259] that the maximum ACOL be recalculated after a policy change:

> To incorporate [the effects of a policy change] a new set of [ACOL] values must be calculated and a [maximum] selected for each individual in the file. The recalculated [maximum ACOL] is then inserted into the quit model, along with the other variables and their respective parameters, to obtain a simulated pattern of quit rates.

Other authors, such as Daula and Moffitt [24, p. 520], recognized the need to recalculate the maximum ACOL after a policy change, though again mislabeling the ACOL horizon as "optimal":

> To construct the…ACOL forecasts…would require recalculating optimal leaving dates [*sic*] at every date in the future (each of which requires rechecking all possible future leaving dates at each future date).

DYNAMIC-PROGRAMMING MODELS

Along with John McCall, Glenn Gotz had developed a dynamic-programming model of Air Force officer retention [9, 10]. Their approach was particularly well suited to modeling officer retention because it offered the individual an opportunity to leave the military during every future year. Although military officers certainly face minimum service requirements, their mid-career commitments are usually less rigid than the typical 4-year terms served by enlisted personnel. Gotz and McCall were also very careful in modeling alternative promotion paths, capturing the adverse retention effect of being passed over for promotion.

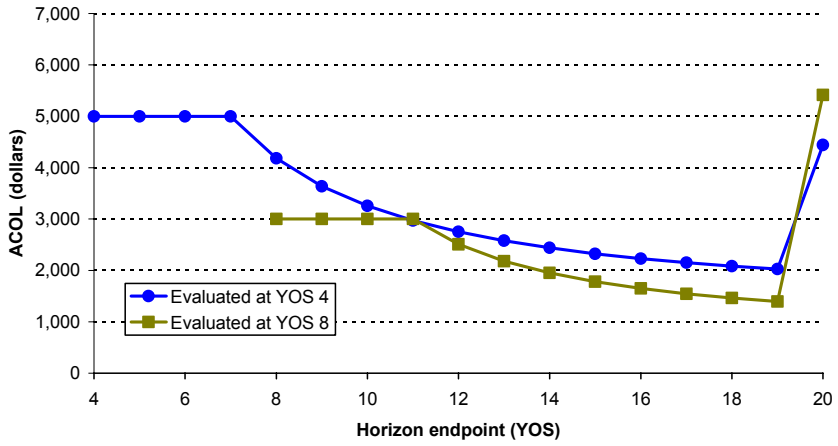
Unfortunately, Gotz and McCall's formulation was computationally intensive, especially given the computer hardware and software environment of the early 1980s. They were able to estimate only three model parameters: the mean and standard deviation of the permanent taste factor, and the standard deviation of the transitory taste factor (the latter factor has a mean of zero by assumption). In particular, they did not estimate the effects of other regressors, such as the unemployment rate or various personal characteristics. Nor did they estimate the discount rate, which they fixed a priori. Finally, they were unable to estimate the standard errors of the three model parameters.[9]

Moffitt and his collaborators took some lessons from Gotz and went on to develop a dynamic-programming model of their own. Their approach was crystallized in an impressive paper by Daula and Moffitt [24]. Recall that the simple ACOL model summarizes the military and civilian pay streams with a single discounting calculation over the dominant optimal horizon. The ACOL–2 model tracks individuals through time, using contemporaneous pay streams to update the ACOL calculation at each decision point. Thus, under ACOL–2 there is a single, dominant horizon at the first-term decision point; a single (generally different) dominant horizon at the second-term decision point; and so on. These calculations are illustrated in figure 4, where the dominant horizon shifts

[9] A simple approximation was developed by Warner [35, pp. 27-28], who fit the three model parameters to the cross-sectional survival profile (by term of service) that prevailed in the Navy enlisted force in FY 1979. Using a grid search, Warner estimated the mean permanent taste factor as $2,800 (in FY 1979 dollars), the standard deviation of the permanent taste factor as $3,500, and the standard deviation of the transitory taste factor as $4,500. However, Warner reported that his objective function was extremely flat, so that many alternative sets of parameter values fit the data about equally as well.

from YOS 7 when evaluated at the first-term decision point to YOS 20 when reevaluated at the second-term decision point.

Figure 4. Example of Recalculation of Dominant Time Horizon



By contrast, at any particular decision point, Daula and Moffitt probabilistically weight the discounted pay differences over *all* future leaving points. Thus, there is no longer a single, dominant horizon.[10] In addition, Daula and Moffitt were more careful in their specification of the error terms than had been Black, Moffitt, and Warner [32]. Finally, they estimated their model by embedding the dynamic program inside the panel probit approach of Butler and Moffitt [33].

Daula and Moffitt [24] touted the ease with which their estimates were computed: "we show that dynamic retention models are considerably less difficult to estimate than [the] literature implies" (p. 500); "estimation of the model in this form is not difficult…no difficult calculations are involved" (p. 503); and "since the single-period model is not overly burdensome itself, its multiple evaluation [using panel data] is still well within the power of modern computational facilities" (p. 507). However, they later conceded that estimation took about 450 CPU minutes per iteration, and six or seven iterations per model run (p. 514). Thus, each

[10] The equivalence between dynamic programming and probabilistic weighting in this context had previously been established by Warner [35]. Further theoretical developments along these lines are found in Hotz and Miller [36].

model run took about 48 hours—hardly an improvement over Gotz and McCall.

For comparison purposes, Daula and Moffitt also estimated the ACOL–2 model using the bivariate probit technique.[11] Interestingly, they report that the log-likelihood value is slightly better for the ACOL–2 model than for their dynamic-programming model. In light of the computational difficulty of the latter (notwithstanding the authors' statements to the contrary), the ACOL–2 model becomes an extremely compelling alternative.

CONDITIONAL LOGIT MODELS

More detailed models partition the event "staying" into reenlistments and extensions. Reenlistments are defined as commitments to stay in the military for 36 months or longer, whereas extensions are defined as commitments to stay for fewer than 36 months. The distinction between reenlistments and extensions is clearly important for personnel planning purposes. There are also behavioral differences, because only those who reenlist are eligible to receive SRBs. We would expect an increase in the SRB level to increase the total probability of staying. Underlying that effect, we would expect an increase in the SRB level to reduce the probability of extending but to increase the probability of reenlisting by a larger magnitude.

Various models are available to estimate the three probabilities of reenlisting, extending, or leaving. One approach, the conditional logit model, was pursued by Goldberg and Warner [30] and Goldberg [11]. These authors collected data on reenlistment, extension, and separation

[11] As Daula and Moffitt correctly point out, multivariate probit is equivalent to Butler and Moffitt's panel probit technique. The latter was developed primarily for long panels spanning three or more decision points, to avoid numerical integration of the trivariate (or higher order) normal density. These days, both techniques are available in the LIMDEP package developed by Econometric Software, Inc. (www.limdep.com). In fact, LIMDEP is advertised as being able to estimate the multivariate probit model with up to 20 correlated decisions, though one must be skeptical about the computational speed of such high-dimensional models. Also, it should be possible to program the panel probit model in PROC NLMIXED of SAS.

rates in cells defined by fiscal year, Navy enlisted rating, and years of service (in the range of 3 to 6 years). They computed a discounted pay stream associated with each of the three choices for the "typical" sailor in each cell. In particular, the pay stream associated with reenlistment contained the SRB, whereas the pay stream associated with extension did not. Their models contained background variables, including the civilian unemployment rate, marital status (i.e., percentage married in each cell), race, education, and mental group. They estimated coefficients from which one can compute the marginal effect of each background variable on the three choice probabilities.

Goldberg and Warner also estimated a single pay coefficient, interpretable as the "marginal utility of income." Using this coefficient, one can compute the reallocation of the three choice probabilities in response to a change in the discounted pay stream associated with one or more of the three choices. For example, a change in the SRB level affects only the pay stream associated with reenlistment (which we denote as M), but affects all three choice probabilities as follows:

$$\begin{aligned} \partial P_R/\partial M &= b\, P_R\, (1 - P_R), \\ \partial P_E/\partial M &= -\, b\, P_E\, P_R, \\ \partial P_L/\partial M &= -\, b\, P_L\, P_R, \end{aligned} \tag{5}$$

where b is the pay coefficient and P_R, P_E, and P_L are the respective probabilities of reenlisting, extending, and leaving.

Hogan and Black [37, p. 41] opine that,

> The conditional logit model…is a poor choice in the analysis of extensions versus reenlistments because it constrains reenlistment bonuses to reduce extensions by the same percentage that it reduces losses.

Their statement of this mathematical property of the conditional logit model is correct; in terms of percentage changes:

$$(\partial P_E/\partial M)/\, P_E = -\, b\, P_R = (\partial P_L/\partial M)/\, P_L. \tag{6}$$

Hogan and Black argue that reenlisting and extending are closer substitutes than are reenlisting and leaving. If that were the case, an increase in the SRB level would draw more reenlistments from those who otherwise would have extended, rather than from those who otherwise

would have left. Thus, one might prefer an alternative model with the following mathematical property:

$$(\partial P_E / \partial M) / P_E < (\partial P_L / \partial M) / P_L < 0. \quad (7)$$

LOGIT MODELS WITH CORRELATED TASTE FACTORS

Alternative models, satisfying the Hogan and Black critique, may be formulated by returning to the theoretical underpinnings of occupational choice. For this purpose, we change the notation slightly so that each choice has its own taste factor. Thus, v_R is the monetary equivalent of the nonmonetary factors associated with reenlisting; v_E and v_L are defined similarly for extending and leaving. The single "taste factor" in the earlier discussion would be interpreted as $v = v_L - v_R$, the net preference for civilian life.

McFadden [38] showed that the conditional logit model arises when the taste factors are independent across choices, each with an extreme-value distribution. It is not as well appreciated that the conditional logit model also arises when the taste factors have Gumbel's multivariate logistic distribution, with correlations of 0.5 between each pair of taste factors.[12] In either case, Hogan and Black's critique comes into greater focus. Suppose that reenlisting and extending are indeed closer substitutes than either of the other two pairs of choices. If so, the correlation between the taste factors for reenlisting and extending should be larger than for the other two pairs of choices. For example, because reenlisting and extending are more similar, an individual who requires an above-average premium for reenlisting rather than leaving should also require an above-average premium for extending rather than leaving. In other words, the taste factors for these two choices should have a particularly high correlation. However, the conditional logit model implicitly assumes equal correlations between all three pairs of choices.[13]

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[12] This result is due to Goldberg [11, pp. 80-81]; Gumbel's multivariate logistic distribution is described in Johnson and Kotz [39, pp. 291-293]. The oft-cited converse to McFadden's theorem states that, *if* the taste factors are independent and the choice probabilities are of the logit form, then the taste factors are extreme-value distributed. However, the latter result does *not* rule out correlated taste factors.

[13] Another expression of the difficulty with the conditional logit model is the "independence of irrelevant alternatives." In our example, the relative probability of

NESTED LOGIT MODEL

McFadden's [40, 41] nested logit model allows for unequal correlations. Under this model, the taste factors associated with reenlisting and extending have a bivariate extreme-value distribution, with a correlation coefficient that is free to vary in the range of 0 to +1. The taste factor associated with leaving has a univariate extreme-value distribution and is independent of the other two taste factors. In the special case where the correlation coefficient equals zero, the three taste factors are all independent extreme-value distributed, and the conditional logit model results. If the correlation coefficient is positive, however, the probability equations differ from those of the conditional logit model. In particular, the probability equations contain the correlation coefficient as a free parameter.

During the mid-1980s, Goldberg and Warner attempted to apply the nested logit model to grouped data on first-term reenlistment decisions in the Navy. Goldberg and Warner never published their results because they could not achieve convergence to reasonable parameter estimates. Nor could Mackin et al. [27] using microdata on individual Navy sailors.

Even when using microdata, there are two approaches to estimating the nested logit model. The first proceeds in two stages: (1) a logit model is estimated among individuals who stay, to predict probability of reenlisting versus extending, and (2) another logit model is estimated to predict the probability of staying (i.e., either reenlisting or extending) versus leaving. However, the second stage is not a standard logit model. Instead, it contains an additional variable, known as the "inclusive value," that must be constructed based on the results of the first stage. To avoid model failure due to multicollinearity, the inclusive value must be computed from at least some variables that are absent from the second-stage (stay/leave) model. That is, there must be some variables that drive the reenlist/extend decision but *not* the stay/leave decision. Mackin et al. opine that, because individual decision-makers ultimately compare all

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extending versus leaving depends on only the background variables and the discounted pay streams associated with these two choices. The relative probability does *not* depend on the pay stream associated with reenlisting. In particular, it does not depend on the SRB level. Yet a person who extends could subsequently choose to reenlist and thereby receive an SRB. Thus, for many, the SRB level is an important determinant of the decision to extend versus leave.

three choices simultaneously, the required identifying variables simply do not exist.[14]

The second approach to estimating the nested logit model is full-information maximum-likelihood. This approach has only recently become available using commercial software.[15] It would be interesting to apply this approach to the retention decision, to determine whether it circumvents the problem of multicollinearity.

Another expedient was attempted by Warner [42], using grouped data on first-term and second-term reenlistment decisions in the Marine Corps. Warner estimated sequential logit models, but simply omitted the inclusive value from the second-stage model. These sequential logit models had good explanatory power and produced reasonable estimates of the pay elasticities. However, it is not known what joint distribution of the taste factors, if any, would yield the sequential logit probability equations (without the inclusive value). Thus, Warner's approach, though pragmatic, does not have strong theoretical underpinnings.

MULTINOMIAL LOGIT MODELS

Recall that Goldberg and Warner [30] and Goldberg [11] computed a discounted pay stream associated with each of the three choices, and estimated a single pay coefficient interpretable as the "marginal utility of income." Thus, their models contain terms of the form $b\,M_R$, $b\,M_E$, and $b\,M_L$, where M_R, M_E, and M_L are the respective pay streams. An alternative approach is to enter the pay variables in the same manner as the background variables. Recall that a background variable, such as the unemployment rate, affects the probabilities of all three choices. Three separate coefficients are estimated, from which one can compute the effect of a change in the unemployment rate on each choice probability. Similarly, one could enter a pay variable, such as the SRB multiple or

[14] Theoretically, the nested logit model is identified because the inclusive value is a nonlinear construct, thus not perfectly predictable from any linear combination of second-stage regressors. As a practical matter, however, the degree of nonlinearity may not be adequate to identify the model.

[15] LIMDEP version 7.0 includes this feature in the module NLOGIT version 2.0.

dollar amount, as a background variable, and compute its effect on each choice probability. Thus, the alternative model would contain terms of the form b_R SRB, b_E SRB, and b_L SRB.

In the econometrics literature, logit models in which the coefficients are fixed across choices, but the regressors vary, are known as "conditional logit models." By contrast, logit models in which the regressors are fixed across choices, but the coefficients vary, are known as "multinomial logit models."[16]

The multinomial logit model satisfies the Hogan and Black [37] critique and breaks the "independence of irrelevant alternatives." Under the multinomial logit model, the relative probability of extending versus leaving is sensitive to the pay stream associated with reenlisting, particularly the SRB level. The extension and separation rates change by (possibly) different percentages in response to an SRB increase:

$$(\partial P_E/\partial \text{SRB})/P_E - (\partial P_L/\partial \text{SRB})/P_L = b_E - b_L. \quad (8)$$

This difference is precisely the coefficient on SRB in an extend/leave log-odds model, and is a free parameter that may be of either algebraic sign (not necessarily zero).

Hosek and Peterson [12] and Lakhani and Gilroy [44] estimated multinomial logit models. Reference [12, appendix B] reports negative coefficients on the SRB level in extend/leave log-odds models, at both the first-term and second-term decision points. These results indicate that P_E/P_L declines with increases in the SRB level, so that increased bonuses draw more reenlistments from those who otherwise would have extended than from those who otherwise would have left.

Figure 5 shows the difference between the conditional and multinomial logit models. Under the conditional logit model, a hypothetical SRB increase causes the probabilities of extending and leaving to both decrease by 20 percent. Under the multinomial logit model, more reenlistments are drawn from those who would have extended, so the extension probability decreases even more severely but the separation probability decreases less severely.

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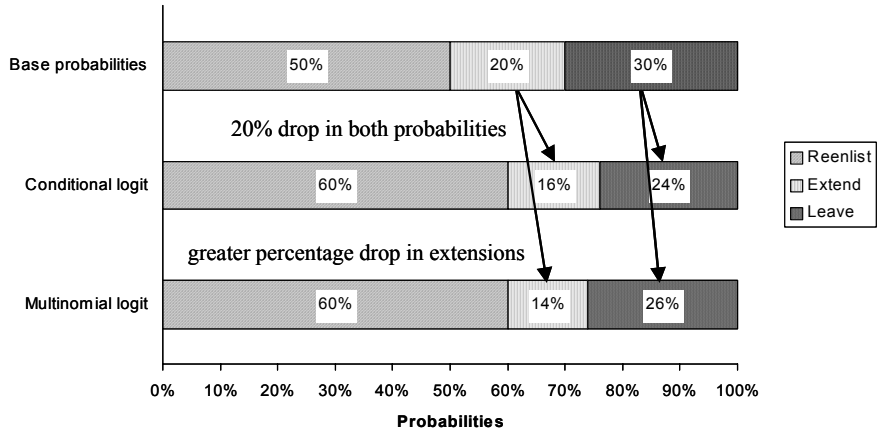
[16] The term "conditional logit model" is unfortunate because it is not clear, in any statistical sense, which variable is conditional on which other variable. Nor is it clear why one model is "conditional" and the other (multinomial) model is, presumably, "unconditional." More recently, Greene [43] has suggested the terminology "discrete choice model" to replace "conditional logit model."

Figure 5. Reallocation of Probabilities When SRB Level Increases



Hogan [45] cautions that the pay coefficients b_R, b_E, and b_L in the multinomial logit model are not the same as the partial effects and, further, may even differ in sign from the partial effects. For example, the partial effect of the SRB level on the reenlistment rate is given by:

$$\partial P_R/\partial SRB = (b_R - b_L)\, P_R\, (1 - P_R) - (b_E - b_L)\, P_E\, P_R,$$

$$= P_R\, [b_R\, (1 - P_R) - b_E\, P_E - b_L\, P_L]. \qquad (9)$$

This expression will differ in sign from b_R if b_R, b_E, and b_L all have the same sign, but b_R has the smallest magnitude and P_R is close to 1.0. Moreover, the standard error of $\partial P_R/\partial$SRB is not immediately available from those of b_R, b_E, and b_L, but can be derived from the underlying variances and covariances.[17]

[17] The formula is given in Hosek and Peterson [12, appendix C].

INTERPRETATION OF THE MULTINOMIAL LOGIT MODEL

Although the multinomial logit model breaks the "independence of irrelevant alternatives," it leads to other problems of interpretation. We argued earlier in favor of the ACOL approach, which combines all the elements of compensation into a single measure. The multinomial logit models, as estimated by Hosek and Peterson [12] and Lakhani and Gilroy [44], do not use a single measure of compensation. Instead, they segment compensation into two measures: the SRB level and an index of relative military pay.

Lakhani and Gilroy seem to believe that, if the ACOL approach were correct, segmenting compensation into multiple measures should produce equal elasticities on all of the measures. Conversely, if the elasticities prove unequal, the compensation measures should remain distinct rather than being combined into a single ACOL variable.

Lakhani and Gilroy report that the SRB elasticities across Army occupations are, if anything, negatively correlated with the relative-pay elasticities. They interpret this finding as evidence against the ACOL approach, concluding [44, p. 241]:

> It is, therefore, somewhat presumptuous to assume that the effect of SRB is the same as that of relative pay, as is often done in the existing literature: Their dollar values are added to retirement to represent the cost of leaving in the Annualized Cost of Leaving (ACOL) model.

We will now argue that, based on economic theory, there is no reason to expect a positive correlation between the SRB and relative-pay elasticities. Further, we will argue that the ACOL approach can rationalize the observed negative correlation if there is, in turn, a positive correlation between SRB levels and civilian earnings opportunities. This will be the case if military occupations with superior civilian alternatives have chronically poor retention, and if SRBs are used to combat these retention problems. Thus, the observed negative correlation between the two elasticities, rather than being a paradox that vitiates the ACOL approach, is actually quite consistent with that approach.

To simplify the algebra, suppose that the difference between military pay (RMC) and civilian pay is constant over the individual's planning horizon. We denote the annual difference as $(M–C)$. The ACOL variable equals this quantity plus the annualized bonus. Again, to simplify the

algebra, assume a lump-sum SRB. The annualized value of the SRB, over an *s*–year horizon, is given by:[18]

$$\text{SRB} \Big/ \sum_{j=1}^{s} (1+r)^{-j} = \text{SRB} / D\,. \tag{10}$$

Thus, ACOL is given by:

$$\text{ACOL} = (\text{M} - \text{C}) + \text{SRB} / \text{D}. \tag{11}$$

Suppose we have an estimate of the elasticity of the retention probability (*P)* with respect to ACOL:

$$\text{E} = (\text{ACOL} / \text{P})\ (\partial \text{P} / \partial \text{ACOL}). \tag{12}$$

We can derive the elasticity of the retention probability with respect to the military/civilian pay difference:

$$\begin{aligned}[(\text{M} - \text{C}) / \text{P}]\ [\partial \text{P} / \partial (\text{M} - \text{C})] \\ &= [(\text{M} - \text{C}) / \text{P}]\ [\partial \text{P} / \partial \text{ACOL}]\ [\partial \text{ACOL} / \partial (\text{M} - \text{C})] \\ &= \text{E} \times (\text{M} - \text{C}) / \text{ACOL};\end{aligned} \tag{13}$$

and with respect to the SRB amount:

$$\begin{aligned}[\text{SRB} / \text{P}]\ [\partial \text{P} / \partial \text{SRB}] \\ &= [\text{SRB} / \text{P}]\ [\partial \text{P} / \partial \text{ACOL}]\ [\partial \text{ACOL} / \partial \text{SRB}] \\ &= (\text{E} \times \text{SRB}) / (\text{D} \times \text{ACOL}).\end{aligned} \tag{14}$$

Because all of the other terms are common, the correlation (across occupations) between the latter two elasticities is essentially the correlation between *(M – C)* and SRB. Thus, the ACOL framework is consistent with a negative correlation if SRBs are employed to compensate for salary shortfalls in selected military occupations.

[18] For example, consider a lump-sum bonus, a 4–year planning horizon, and a 10-percent discount rate. Under these assumptions, the annualized bonus evaluates at 0.315 × SRB. If this amount were paid at the end of each year over the 4–year planning horizon, the *undiscounted* total payment would be 1.26 × SRB, but the *discounted* total payment would be exactly 1.00 × SRB.

CONCLUSIONS

We conclude that both the conditional logit model and the multinomial logit model have considerable merit. The former is more firmly grounded in economic theory, combining all the elements of compensation into a single measure of discounted pay. A wealth-maximizing individual would make his or her reenlistment decision based on this single measure, and no information is added by partitioning it into multiple components. Moreover, the rich sample variation in SRBs can be brought to bear in estimating the single pay coefficient.

On the other hand, the conditional logit model suffers from the independence of irrelevant alternatives. The multinomial logit model relaxes this restrictive assumption. However, as just demonstrated, the elasticities on the multiple pay components must be interpreted with caution. Moreover, some of the elasticities may be underestimated for lack of sample variation (e.g., the index of relative military pay).

We agree with Hogan [45, p. 258], who states:

> In the trichotomous logit model specified by Lakhani and Gilroy, both the SRB and relative wage variables are identical across choices, while the coefficients on the variables vary across the alternatives. Hosek and Peterson (1985) also specified the logit model in this way, whereas Goldberg (1984) constrained the coefficients to be the same and varied the level of the independent variable across choices. It is not clear to me which specification is preferable.

Finally, we will see later (in table 2) that the pay effects estimated from the two models are quite similar. Thus, a stark choice between the two models is not entirely necessary.

REVERSE CAUSATION BETWEEN BONUSES AND THE REENLISTMENT RATE

Goldberg [11] and Hosek and Peterson [12] were concerned about reverse causation in the relationship between pay and the reenlistment rate. The goal of the analysis is to estimate the positive effect of pay, particularly reenlistment bonuses, in encouraging reenlistments. However,

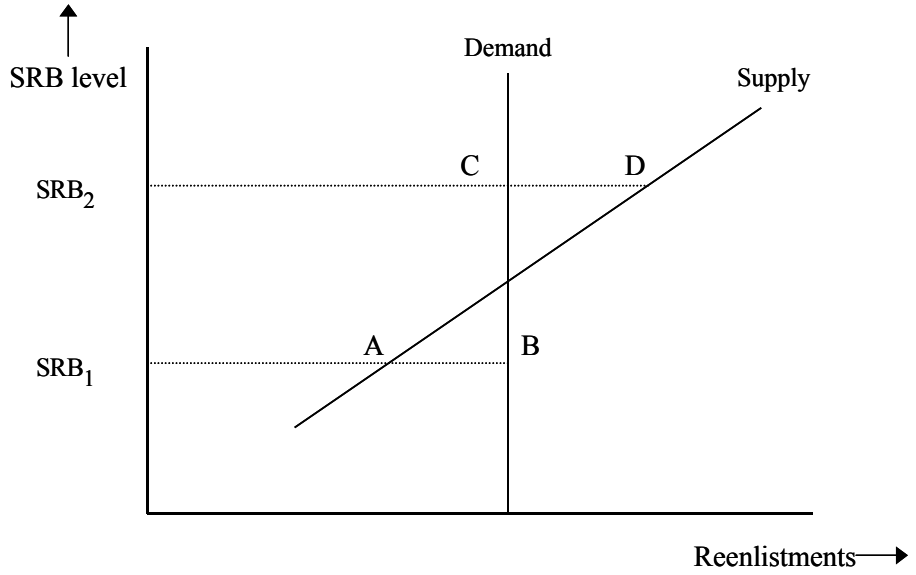
some enlisted occupations have suffered chronically poor retention because of arduous duty (e.g., Navy ratings with a high percentage of time at sea), slow promotions, or lucrative civilian opportunities. The enlisted occupations with chronically poor retention are generally awarded higher SRB levels. This pattern of reverse causation leads to a downward bias in the estimated effect of pay on the reenlistment rate.

INDIVIDUAL DATA

It is commonly believed that individual decision-makers are "price-takers" in the sense that, while their decisions may well be affected by SRB levels, their decisions do not, in turn, affect SRB levels. However, even individual data may be plagued by reverse causation that leads to biased estimation of the bonus effect.

Figure 6 illustrates the situation. We have drawn the supply and demand curves for reenlistments, both as a function of the SRB level. We have drawn the demand curve as a vertical line, to capture rigid personnel requirements that are insensitive to the price level. However, the analysis is virtually identical even if the demand curve exhibits some elasticity.

Figure 6. Supply and Demand of Reenlistments



The military service attempts to set SRB levels to equate the supply of reenlistments to the desired level of demand. If the service errs on the side of too low an SRB level (e.g., SRB_1), too few people reenlist (point A), and a shortfall occurs (the distance AB). To alleviate the shortfall, SRB levels will have to be increased, either mid-year (if the problem is detected early enough and if funding is available) or during the following year. If the service sets too high an SRB level (e.g., SRB_2), too many people desire to reenlist, and a surplus occurs (the distance CD). In the latter instance, the service may suspend bonus payments partway through the fiscal year, only to resume payments at the start of the following fiscal year when new funding becomes available.

In either of these instances, a savvy person may wait until the start of the new fiscal year (executing a short extension, if necessary) in order to enjoy the restored (and possibly increased) SRB level. Thus, a degree of reverse causation exists in that the person's decision to wait until (or extend into) the new fiscal year may affect the SRB level that he or she is offered.

A careful analysis of this situation would examine the pattern of reenlistments and extensions, accounting for seasonality over the course of the fiscal year and, in particular, mid-year bonus freezes and adjustments. Econometric techniques for disequilibrium models could be applied, although such models require an auxiliary equation to determine whether a particular observation is drawn from the supply curve (e.g., point A) or the demand curve (e.g., point C).[19] This approach has never, to our knowledge, been applied to reenlistment models, but seems worthy of serious consideration.

PANEL DATA

Reverse causation always presents an estimation problem when using grouped data because the collective reenlistment decisions of the group will feed back (albeit possibly with a lag) into the SRB levels that they are offered. However, the downward bias can be alleviated by applying a fixed-effect estimator. Under this approach, each enlisted occupation is

[19] Disequilibrium estimation is discussed in Maddala [46, chapter 10]. These techniques have been successfully applied to distinguish supply-constrained from demand-constrained observations in enlisted recruiting models; see Daula and Smith [47] and Dertouzos [48].

assigned a dummy variable intended to capture permanent deviations between that occupation's reenlistment rate and the overall sample average. Computationally, it is not actually necessary to include the multiple dummy variables in the regression equation. Instead, an exactly equivalent approach is to measure each observation (both left-hand and right-hand variables) as a deviation from the sample average for that occupation across all of the time periods.[20]

Both Goldberg [11] and Hosek and Peterson [12] applied a fixed-effect estimator to grouped data when estimating the two log-odds equations for reenlist versus leave and extend versus leave. Hosek and Peterson (in their table 5) report that the SRB effect on the second-term probability of reenlistment is actually *negative* when estimated without the fixed effects. Incorporation of fixed effects restores the expected positive coefficient and considerably increases the magnitude of the (already) positive coefficient on the first-term probability of reenlistment.

Yet another alternative would be to explicitly model the SRB levels in an auxiliary regression equation. The SRB equation and the retention equations could then be jointly estimated by two-stage least squares. Although this approach does not appear to have been attempted, it, too, seems worthy of consideration.

JOINT MODELS OF ATTRITION AND RETENTION

We have already discussed the possibility that conditions at the first-term reenlistment point (e.g., SRB levels) may affect subsequent second-term reenlistment rates. Similarly, conditions at the accession point (e.g., the civilian unemployment rate, accession bonus levels) may affect subsequent first-term reenlistment rates. More generally, the probability of surviving to the first-term reenlistment point may be correlated with the outcome of that reenlistment decision. When several years of data are pooled, the various accession cohorts may differ in both the conditions

[20] See Baltagi [49, pp. 9-13] or Hsiao [50, pp. 25-32]. Goldberg [11, p. 96] noticed that differencing around the occupational averages introduces both serial correlation and heteroskedasticity. However, Baltagi [51; 49, p. 23] has shown that applying generalized least squares (GLS), in an effort to circumvent these statistical problems, is equivalent to applying ordinary least squares (OLS) in this situation.

that prevailed at their respective accession points and the resulting survival rates. The reenlistment model is designed to pick up the effects of changes in SRBs and other variables on a fixed population. However, the reenlistment model may be confounded if these variables are correlated with changes in the population composition itself.

One way to model attrition is as a binary outcome: the person either survives to the first-term reenlistment point, or does not. A variety of functional forms, such as logit and probit, may be used for this purpose. The logit and probit functions monotonically map a linear combination of regressors (in principle, taking on any real value, either positive or negative) into an attrition probability that is restricted to the unit interval. In fact, any cumulative density function (CDF) defined over the entire real line has the same property and, thus, potentially qualifies as a binary attrition model.

An alternative approach is to model attrition as a continuous-time process, and to attempt to predict the exact number of months of service at which a person attrites (if indeed he or she attrites at all within the sample period). For example, Baldwin and Daula [52] modeled Army first-term attrition using a Weibull distribution. Depending on the estimated shape parameter, the Weibull distribution implies that the hazard rate (i.e., the instantaneous probability of attrition) is (a) constant, (b) always increasing, or (c) always decreasing. In particular, the Weibull distribution does *not* allow the hazard rate to behave nonmonotonically (i.e., first increase, then decrease; or first decrease, then increase).

BINARY ATTRITION MODELS

The proportional hazards model is considerably more flexible than the Weibull distribution. The hazard rate depends on time (*t)* and a set of regressors (*X)* in the following manner:

$$h(t, X) = g(t) \times exp[-(\alpha + X\beta)]. \quad (15)$$

In this formulation, $g(t)$ is a step function that may behave non-monotonically if so indicated by the data. Note also the sign convention: because of the minus sign inside the exponential, a positive coefficient β_i implies that an increase in the corresponding variable X_i serves to *reduce* the hazard rate, and thus *increase* the survival probability.

It is also interesting to consider the binary attrition model that results if the underlying hazard function follows the proportional hazards model. Suppose we have two month-of-service markers, $0 \le t_a < t_b$. Given that a person is still on active duty at time t_a, the probability that he or she will remain on active duty at the later time t_b is given by:[21]

$$P(t_a, t_b) = \exp\left[-e^{-(\alpha + X\beta)} \times \int_{t_a}^{t_b} g(s)\, ds \right]$$

Again, given our sign convention, a positive coefficient β_i implies that the corresponding variable X_i is positively related to the survival probability. Moreover, if we absorb the integrated hazard into the intercept α, the double-exponential form is actually the CDF for Gumbel's Type I extreme-value distribution[22] with argument $z = (\alpha + X\beta)$. This observation is consistent with our earlier assertion that any CDF qualifies as a binary attrition model.

This result implies that neither logit nor probit is the correct model for binary attrition under the proportional hazards assumption. Interestingly, however, Warner and Solon [14] showed that the logit model may be recovered if the intercept α is itself randomly distributed across individuals according to an exponential distribution[23] with mean 1.0.

More precisely, suppose that the integrated hazard in equation 16, $\int_{t_a}^{t_b} g(s)\, ds$, has a gamma distribution across individuals with mean 1.0 and variance θ^{-1}. The assumption of unit mean is innocuous because any non-

[21] See Prentice and Gloeckler [53] or Kalbfleisch and Prentice [54, pp. 36-37, 98-99].

[22] See Johnson and Kotz [55, chapter 21] or Mann, Schafer and Singpurwalla [56, pp. 108-111]. This is the same distribution that McFadden [38] used to derive the conditional logit model. The context, however, was quite different. McFadden assumed that the taste factor associated with any particular outcome is distributed across individuals according to the extreme-value distribution; further, the distributions across outcomes are statistically independent. Maximization of utility then leads to a logistic probability of choosing any particular outcome. In the situation discussed in the text, an underlying proportional-hazards model implies an extreme-value (*not* logistic) survival probability over a discrete time interval. The latter result follows solely from the proportional hazards assumption, and bears no relationship to utility maximization.

[23] This result actually goes back to Dubey [57].

unit portion can be absorbed into the intercept, α. Then the probability of surviving from t_a to t_b becomes:

$$P(t_a, t_b) = \left[1 + \theta^{-1} e^{-(\alpha + X\beta)}\right]^{-\theta}. \qquad (17)$$

This probability reduces to a logit form if the variance θ^{-1} equals 1.0. However, a gamma distribution with both mean and variance of 1.0 is just a unit exponential distribution.

Warner and Solon estimated a model of this form to predict survival to the first-term reenlistment decision point (though *not* the exact months-of-service if the individual attrites), jointly with a probit model to predict first-term reenlistments among those surviving to the reenlistment decision point. They allowed for correlation between the disturbances in the two models, but found that the correlation was not statistically significant.

CONTINUOUS-TIME MODELS OF ATTRITION AND REENLISTMENT

Yet another alternative would be to estimate a single, continuous-time model to predict the exact months-of-service at which a person:

- Attrites before the reenlistment decision point; or
- Survives to the reenlistment decision point, but decides to separate at that point; or
- Survives to the reenlistment decision point, and decides to reenlist at that point, but separates at some subsequent point [either before or at the individual's updated expiration of term-of-service (ETS)].

When estimating this type of model, one danger is that the proportional hazards assumption constrains the regressor effects to be the same in the attrition phase as in the reenlistment phase. For example, suppose that a particular dummy variable (perhaps identifying a particular demographic group) has a coefficient of 0.15. This coefficient indicates that members of the highlighted group are 14 percent less likely than members of the base group to separate at any point in time (conditional on

survival to that point).[24] However, using separate attrition and reenlistment models, Warner and Solon found that high school graduates (HSGs) are more likely than nongraduates to survive to the reenlistment decision point, but less likely than nongraduates to reenlist. Clearly, no single coefficient on HSG status could capture both effects.

Follmann, Goldberg, and May [13, 58] addressed this problem by developing a continuous-time model with different regressor effects along different intervals of the time axis. In their example, they modeled the probability of an unemployed worker finding a job as a function of the duration of his or her unemployment spell. A disproportionate number of unemployed workers find jobs during the week that their unemployment insurance (UI) benefits expire, typically the 26th or 39th week of the unemployment spell. This phenomenon could apparently be accommodated using a proportional hazards model with a nonmonotonic step function, $g(t)$. However, the conventional proportional-hazards model constrains the regressor effects to be the same throughout the entire time axis.

Instead, Follmann, Goldberg, and May modeled the probability of finding a job as an extreme-value regression (equation 16) during the week that UI benefits expire. They modeled the probability of finding a job using a conventional proportional-hazards model over the remainder of the time axis. Importantly, they allowed for different regressor effects over the two time intervals. Indeed, they found that college graduates residing in counties with low unemployment rates were most likely to find jobs during the week their UI benefits expire; but that older, white workers were more likely to find jobs at all other times.

Although similar in spirit, there are some important differences between the approaches of Follmann et al. and Warner and Solon. Follmann et al. define the "spike event" as the period during which a disproportionate number of transitions occur. In their example, the spike event was the week in which UI benefits expire. If applied to attrition and reenlistment in the military, the spike event would be the period immediately preceding ETS. They modeled the probability of a spike event using extreme-value regression, although other models, such as logit or probit could have been used instead. They modeled events away from

[24] A coefficient of 0.15 serves to scale down the hazard function by the factor $e^{-0.15} = .86$, a 14-percent reduction. It is convenient—but imprecise—to associate, for example, a coefficient of 0.15 with a 15-percent reduction.

the spike using a continuous-time, proportional-hazards model. The advantage of using extreme-value regression is that the coefficient vector β in equation 16 is commensurable with the corresponding coefficient vector in the proportional-hazards model (equation 15) away from the spike. Although Follmann et al. allowed the two coefficient vectors to differ, it remains meaningful to statistically test their equality. A similar result would hold if generalized logit regression (equation 17) were used in place of extreme-value regression at the spike. However, a probit coefficient vector at the spike would be scaled differently from the coefficients in the proportional-hazards model, and the two could not easily be tested for equality.

Warner and Solon modeled their spike event—reenlistment during the period immediately preceding ETS—using probit regression. They modeled attrition away from the spike as a binary outcome using, variously, probit, logit, or generalized logit regression (i.e., equation 17). However, they did *not* estimate the entire, continuous-time hazard function, *g*(*t*). Instead, they estimated the annual survival rates for the baseline demographic group (i.e., the group with regressors $X = 0$). The annual survival rates are the values of expression 17 when evaluated at successive annual intervals; i.e., $(t_a, t_b) = \{(0,1),(1,2),(2,3),(3,4),\}$.[25] Thus, Warner and Solon claim too much when they state [14, p. 263], "The main advantage of the proportional hazard results is that they trace out the temporal pattern of attrition." By estimating only the annual survival rates, rather than the entire hazard function *g*(*t*), their resolution is limited to an annual view of the attrition process. The month-to-month hazard function could have been estimated using, for example, the Kaplan-Meier nonparametric procedure.[26]

The approaches of Follmann et al. and Warner and Solon both have merit, and it would be interesting to compare their performance on a common data set. Off-the-shelf statistical software could be used if the reenlistment decision were modeled using logit or probit regression.[27]

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[25] The annual hazard rates are obtained from the parameters α_1 through α_4 in table 6.7 of [12], using the transformation $\left[1 + \theta^{-1} \exp(-\alpha_t)\right]^{-\theta}$. The survival rates are obtained by cumulating the annual hazard rates.

[26] See Kalbfleisch and Prentice [54, pp. 10-16].

[27] The earlier paper by Follmann et al. [13] actually made a start in this direction, examining attrition of non-prior-service Marine Corps reservists. At the time that paper was written, the authors were not yet aware of the special commensurability

However, extreme-value regression would require specialized software, and incorporation of a permanent-transitory error structure would be even more difficult.[28]

ELASTICITY COMPUTATION

Care must be exercised in computing the elasticity of reenlistment with respect to military pay. The elasticity is sensitive to both the definition of "reenlistment" and the definition of "military pay."

DEFINITION OF REENLISTMENT

The definition of "reenlistment" is complicated by the following factors:[29]

- Early attrition
- Early reenlistment
- Reenlistment eligibility
- Extensions
- Reenlistments to retrain in a different military occupation.

Presumably, personnel who attrite before their ETS have a larger net preference for civilian life. Failure to control for early attrition could confound the reenlistment model, if attrition rates are correlated with variables included in the model. However, Warner and Solon's [14] results imply that the correlation between attrition and reenlistment may not be a major source of bias.

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between extreme-value regression and the proportional-hazards model. Thus, they used logit regression rather than extreme-value regression at the spike (the end of the 4-year contract); and a Weibull model rather than a proportional-hazards model away from the spike. Nonetheless, they found that distinct subsets of regressors had significant effects on the hazard function at the spike versus away from the spike.

[28] Extreme-value regression could be estimated using LIMDEP. See chapter 21.7, "User Defined Index Models for Binary Choice," in the on-line manual for LIMDEP version 7.0 (www.limdep.com).

[29] The next few paragraphs borrow heavily from the excellent discussion in Smith, Sylwester, and Villa [59, pp. 56-61].

Some personnel reenlist early (e.g., more than 6 months before their ETS date), perhaps in preparation for an overseas assignment. Their inclusion in a reenlistment model may lead to a slight bias if the pay variable is expressed in ACOL form. We have noted that ACOL values tend to increase over a person's career. Those who reenlist early, therefore, would tend to have smaller ACOL values, leading to a downward bias in the ACOL coefficient. Smith, Sylwester, and Villa [59] solve this problem by evaluating ACOL at the original ETS date rather than at the early decision point.

Some personnel are declared ineligible to reenlist. Among the many reasons are poor test scores, failure to meet medical or physical fitness standards, disciplinary problems, or missed promotions. One temptation is to exclude these people from any model of voluntary reenlistment. There are two counterarguments, however. First, some people are declared ineligible after expressing a disinclination to reenlist (e.g., turning down a required overseas assignment). Excluding such people will overstate the reenlistment rate, and may also confound the model estimates if eligibility is correlated with variables in the model. Second, for the purposes of force planning, models that include ineligibles are probably more valuable because the total population at ETS (including ineligibles) is the base to which predicted reenlistment rates are generally applied.

Extensions have already been discussed at length. One difficulty with some of the older studies is that they do not document their treatment of extensions. For example, some studies drop extensions entirely and model the dichotomy between immediate reenlistments and separations. Other studies combine extensions with reenlistments and model total retention. Still other studies track extensions to determine whether they ultimately reenlist, thus retrospectively classifying extensions as either reenlistments or separations. It is difficult to compare the elasticities from studies that differ in their treatment of extensions.

Finally, individuals who reenlist to retrain in a different military occupation are not eligible to receive an SRB. Not all studies (particularly those using grouped data) correctly identify this group. Thus, the military pay variables are measured with error, and the pay coefficients may be downward biased.

DEFINITION OF MILITARY PAY

We now turn to the definition of "military pay." Warner and Goldberg [18, p. 33] describe the preferred method to compute a pay elasticity:

> The pay elasticity is calculated as the percentage increase in the reenlistment rate brought about by a one-level SRB increase, divided by the percentage increase in [annualized military pay] implied by the SRB increase.[30]

Along similar lines, Smith et al. [59, p. 86] construct a "typical military pay raise" as a simultaneous 1-percent increase in basic pay, basic allowance for subsistence (BAS), and basic allowance for quarters (BAQ). These methods are preferred because the increase in military pay is measured as a percentage relative to the base value of military pay, and the latter is always strictly positive.

When the retention model is estimated from individual data, it is preferable to compute the increase in the reenlistment probability for each person in the sample and then aggregate, rather than to work directly with the sample averages. For example, a 1-percent increase in military pay might lead to a 1.0-percent increase in the reenlistment probability for one person, a 1.5-percent increase for a second person, and so on. The simple average of these probability increases should be used to form the numerator of the elasticity. Using, instead, the percentage increase in the reenlistment probability for the "average" person is less accurate and—because the model is nonlinear—could lead to a numerically different answer.

Some other studies compute the pay elasticity with a denominator equal to the percentage change in the military/civilian pay *difference*. For example, Daula and Moffitt [60] measure the percentage change in reenlistment generated by a (presumably sustained) increase in the military/civilian pay difference: $\Delta(M-C)/(M-C)$. In a later paper, Daula and Moffitt [24] make the same computation for some of their estimates. However, they also report elasticities using the Warner/Goldberg method, increasing military pay alone: $\Delta M/M$. They even report elasticities using the percentage change in ACOL, Δ ACOL / ACOL, and the percentage change in the *total* (not annualized)

[30] Under the installment arrangement, the annual SRB payment equals an SRB "level" or "multiple" (an integer or half-integer in the range 0 to 6) × monthly basic pay at the date of reenlistment. Under the lump-sum arrangement, the single payment equals the product of the SRB level, monthly basic pay, and the number of years of reenlistment. In either case, a one-level SRB increase implies an increase in undiscounted dollars equal to monthly basic pay × number of years of reenlistment. However, this increase is enjoyed only by reenlisting, not by merely extending.

discounted pay difference over a predetermined (not necessarily "optimal") horizon (their so-called Total Cost of Leaving or TCOL).

Elasticities estimated by these latter methods are unstable, and should not be used for policy evaluation. A pay difference near zero implies a zero elasticity; even a slightly negative pay difference implies a negative elasticity, even when retention and military pay move in the same direction. To see these points, consider the elasticity when the denominator is measured relative to the military/civilian pay difference:

$$[\Delta P / P] / [\Delta (M - C) / (M - C)$$

$$= [(M - C) \times (\Delta P)] / [P \times \Delta (M - C)]. \quad (18)$$

Suppose that the base military/civilian pay difference happens to equal zero. Then the percentage change appearing in the denominator on the left-hand side is infinite, implying that the elasticity itself (the entire right-hand side) equals zero. As another example, if the base military/civilian pay difference is negative, the elasticity will also be negative, even if increased pay has a positive effect in encouraging more reenlistments (i.e., even if the changes ΔP and $\Delta (M - C)$ have the same algebraic sign). In neither case is the computed elasticity useful for policy evaluation. Our situation is unique because, unlike most policy evaluations, the base value of our independent variable does not always take the same algebraic sign, leading to instability in the conventionally computed elasticity.

Finally, recall that Hosek and Peterson [12] used two compensation measures: the SRB level and an index of relative military pay. They report the percentage-point increase in the reenlistment rate associated with a one-level SRB increase. Although not an elasticity, the interpretation of this quantity is straightforward.

Hosek and Peterson also report the percentage increase in the *retention* (i.e., reenlistment plus extension) rate associated with a 1-percentage-point increase in the military/civilian wage index. Unless the base value of the wage index is 1.0, a *1-percentage-point* increase in the wage index does not equate to a *1-percent* increase. In fact, the mean value of the wage index was 0.94 in Hosek and Peterson's sample. Thus, to obtain the elasticity of retention with respect to relative military pay, their reported percentage increase in the retention rate must be multiplied by the factor 0.94.[31]

[31] This correction is sometimes neglected, for example, by Warner and Asch [61, table 5].

ELASTICITY ESTIMATES

PAY ELASTICITIES

Table 2 summarizes the pay elasticities from various studies. The left-hand panel shows the elasticity of the reenlistment rate (or, in some cases, the total retention rate) with respect to some measure of military pay. As we have discussed, the most stable estimates use military pay alone, rather than the military/civilian pay difference, in the denominator of the elasticity. We will limit our discussion to the former estimates.

Goldberg and Warner [30] report first-term pay elasticities in the range of 1.1 to 2.7, whereas Warner and Goldberg [18] report a similar range of 1.1 to 3.4. Considering the other studies that use military pay alone in the denominator, most of the elasticities cluster within the even narrower range of 1.2 to 2.2. These other studies include Cooke, Marcus, and Quester [16], Daula and Moffitt [24], Shiells and McMahon [17], Smith et al. [59], and Warner and Solon [14]. All of the studies cited in this paragraph use individual data, except for Goldberg and Warner [30], who use grouped data.

Three studies do not conform to this pattern, instead reporting considerably lower first-term pay elasticities. Mackin et al. [27] estimated pay elasticities by Navy occupational group. Even their most responsive occupational group had an elasticity of only 1.5. Two of the studies used the ACOL–2 approach, but correctly computed the pay elasticities with respect to military pay alone, rather than with respect to the ACOL pay difference. Mackin [62] reports elasticities by service, ranging from 0.5 to 1.4. Black, Hogan, and Sylwester [31] report an elasticity of 0.8 to 0.9 for Navy enlisted personnel. As we discussed earlier, the ACOL-2 approach was designed, in part, to correct an upward bias in simple ACOL models when applied at the second-term (or later) decision points. Thus, we would expect the ACOL–2 approach to yield lower pay elasticities for these later decisions. However, it is surprising that the approach yields such lower pay elasticities at the first-term decision point.

Table 2. Pay Elasticities From Various Studies

Study	Pay Variable	Sample Restrictions	Pay Elasticity		SRB Effect on Reenlistment (not total retention) Rate (pp's = percentage points)			
					First Term		Second Term	
			First Term	Second Term	Installment	Lump-sum	Installment	Lump-sum
Black, Hogan, and Sylwester [31]	ACOL–2; but elasticity of reenlistment with respect to military pay	Navy enlisted	0.8 – 0.9	0.3				
Cooke, Marcus, and Quester [16]	Military/civilian pay index; SRB	Navy enlisted	1.6		2.5 pp's			
Daula and Moffitt [60]	Military/civilian pay difference	Army infantry	1.2					
Daula and Moffitt [24]	Military/civilian pay difference	Army infantry	0.5	0.5				
	Military pay alone	Army infantry	2.2	1.3				
	ACOL–2	Army infantry	0.8	0.6				
Goldberg and Warner [30]	Total retention; military pay alone (RMC)	Navy enlisted, by occupational group	1.1 – 2.7	0.9 – 3.8	1.5 – 3.0 pp's	2.0 – 3.9pp's	1.6 – 9.1pp's	2.1 – 11.4pp's
Gotz and McCall [9]	Military/civilian pay difference	USAF pilots, YOS 7-8		0.8				
		USAF non-rated officers, YOS 6-7		1.4				
Hosek and Peterson [12]	Military/civilian pay index; SRB	Enlisted males, four services	3.6	1.6	1.8 pp's	2.5 pp's	2.3 pp's	2.2 pp's

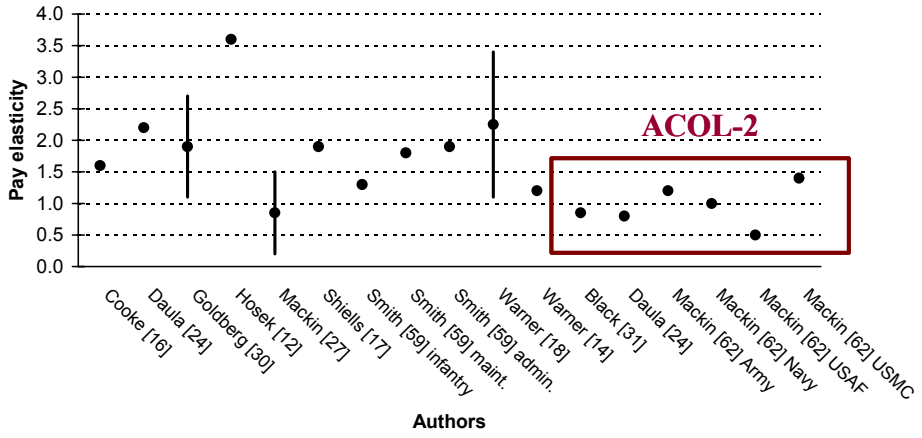
Table 2. Pay Elasticities From Various Studies (continued)

Study	Pay Variable	Sample Restrictions	Pay Elasticity		SRB Effect on Reenlistment (not total retention) Rate (pp's = percentage points)			
			First Term	Second Term	First Term		Second Term	
					Installment	Lump-sum	Installment	Lump-sum
Mackin [62]	ACOL–2; but elasticity of reenlistment with respect to military pay	Army enlisted	1.2	1.0				
		Navy enlisted	1.0	0.8				
		USAF enlisted	0.5	0.4				
		USMC enlisted	1.4	1.1				
Mackin et al. [27], conditional logit model	Reenlistment; military pay alone	Navy enlisted, by occupational group	0.2 – 1.5	0.5 – 1.1	0.4 – 2.8 pp's		1.9 – 2.6 pp's	
	Total retention; military pay alone		0.2 – 0.9	0.5 – 1.0				
Shiells and McMahon [17]	Military/civilian pay index; SRB	Navy enlisted	1.9		1.5 pp's			
Smith et.al	Military pay alone	Army infantry	1.3	0.9	2.2 pp's		1.7 pp's	
		Army maintenance	1.8	1.1				
		Army administration	1.9	1.8				
Warner and Goldberg [18]	Military pay alone (SRB)	Navy enlisted, by occupational group	1.1 – 3.4		1.8 – 5.5 pp's			
Warner and Solon [14]	ACOL; but elasticity of reenlistment with respect to military pay	Army infantry	1.2					

Notes: pps = percentage points, USAF = United States Air Force, USMC = United States Marine Corps, YOS = Years of Service.

Figure 7 plots the various first-term pay elasticities. In constructing this figure, we arrayed the elasticities from left to right, alphabetically by the last name of the first author, except that we grouped the ACOL–2 studies to the extreme right. For studies that estimated separate elasticities by occupational group, we used a vertical bar to depict the range of elasticities, and a circle to indicate the midpoint of the range. We see that there is considerable dispersion in the elasticity estimates, but the ACOL–2 estimates tend to be concentrated at the lower end.

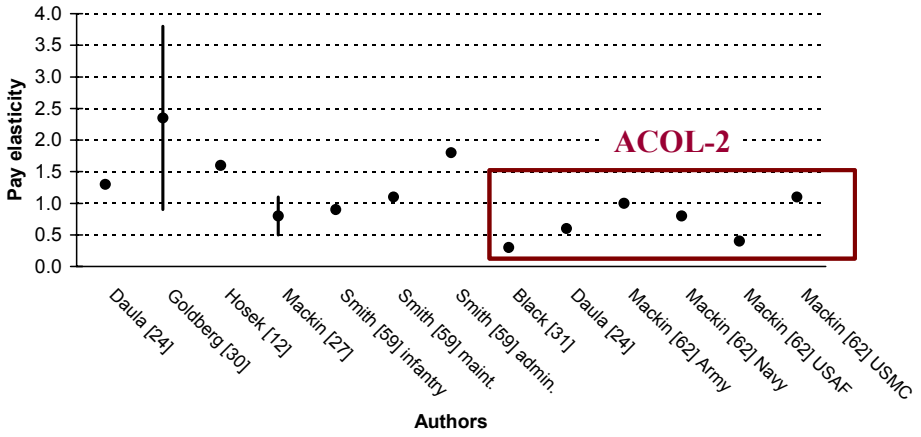
Figure 7. Elasticity of First-term Retention with Respect to Pay



We now turn to the second-term pay elasticities. Goldberg and Warner [30] report pay elasticities in the range of 0.9 to 3.8. Daula and Moffitt [24] and Smith et al. [59] report pay elasticities that cluster within the considerably narrower range of 0.9 to 1.8. Mackin et al. [27] report somewhat lower pay elasticities, in the range 0.5 to 1.1. Using the ACOL–2 approach, Mackin [62] reports elasticities by service ranging from 0.4 to 1.1. Finally, Black, Hogan, and Sylwester [31] report an elasticity of only 0.3 for Navy enlisted personnel.

In figure 8, we plot the second-term pay elasticities. Not surprising in this case, the ACOL–2 estimates again tend to be concentrated at the lower end.

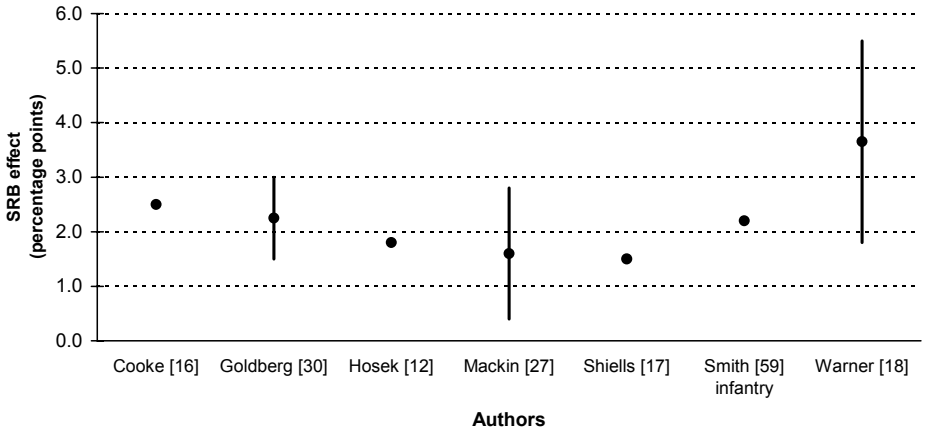
Figure 8. Elasticity of Second-Term Retention with Respect to Pay



SRB Effects

Table 2 also summarizes the effect of a one-level SRB increase on the reenlistment (*not* total retention) rate. The most interesting comparison is between the two studies that used grouped data: Goldberg and Warner [30], who estimated a conditional logit model, and Hosek and Peterson [12], who estimated a multinomial logit model. According to Goldberg and Warner, a one-level increase in the first-term SRB, if paid in annual installments, serves to increase the reenlistment rate by 1.5 to 3.0 percentage points. Hosek and Peterson's point estimate of 1.8 percentage points falls within this range. Similarly, Goldberg and Warner report second-term installment SRB effects in the range of 1.6 to 9.1 percentage points; excluding a high outlier narrows the range to 1.6 to 5.2. Hosek and Peterson's point estimate of 2.3 percentage points falls within that range. The other studies tend to confirm the ranges established by Goldberg and Warner. Three other studies [16, 17, and 59] report first-term SRB effects in the range of 1.5 to 3.0 percentage points. Both Mackin et al. [27] and Warner and Goldberg [18] estimated SRB effects by Navy occupational group. In both cases, the occupational groups were rather dispersed, with a few producing SRB effects outside the range of 1.5 to 3.0. The first-term SRB effects are plotted in figure 9.

Figure 9. Effect of One-Level SRB Increase on First-Term Reenlistment Rate



The second-term SRB effects are plotted in figure 10. All of the second-term SRB effects fall within the range of 1.6 to 5.2 percentage points established by Goldberg and Warner. In fact, the other estimates cluster within the considerably narrower range of 1.7 to 2.6 percentage points.

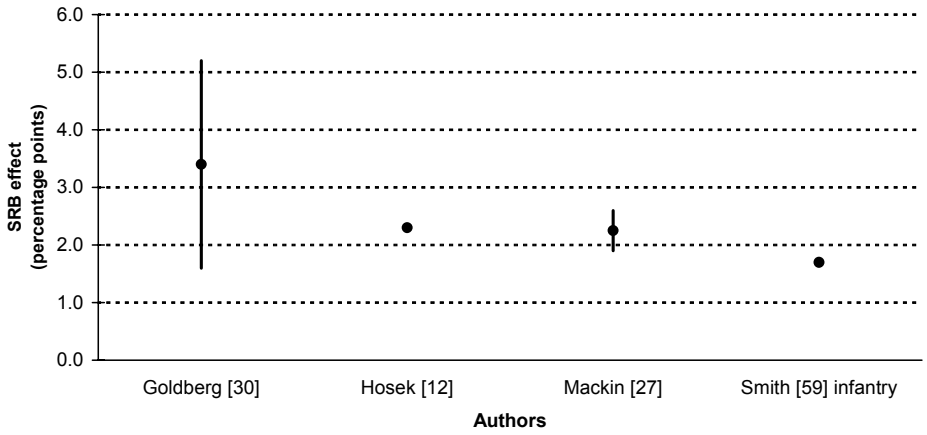
Combining the first-term and second-term results, it appears as a rough rule of thumb that a one-level SRB increase leads to an increase in the reenlistment rate of about 2 percentage points.

RELATIVE STABILITY OF SRB EFFECTS

We observe a pattern in which the SRB effects are much more stable across studies than are the pay elasticities. To understand this pattern, recall that we usually estimate binary retention models using logit or probit functional forms, both of which are S–shaped curves. Both functions are very nearly linear over moderate ranges. The SRB effect is the slope of the retention function with respect to a particular type of pay increase, and the slope is essentially a constant throughout the range over which the retention function is nearly linear. On the other hand, the pay *elasticity* is not constant along a nearly linear retention function. Put differently, the elasticity is a measure of curvature for an iso-elastic

approximation to the retention function. The best-fitting iso-elastic function is extremely sensitive to the point of evaluation (i.e., the sample average retention rate). Thus, elasticity estimates from a logit or probit function tend to be unstable.

Figure 10. Effect of One-level SRB Increase on Second-term Reenlistment Rate



These arguments are illustrated in figures 11 and 12. A logit function and a linear function are virtually indistinguishable over a range of reenlistment rates. However, an iso-elastic function has greater curvature and bends noticeably away from the logit function, even over a relatively modest 12-percentage-point range of reenlistment rates.

Figure 12 increases the magnification within a plausible range of reenlistment rates. The logit function is essentially linear, with a slope of 0.02 reflecting the 2-percentage-point increase in the reenlistment rate with each unit increase in the SRB level. Also shown are three iso-elastic curves with very different elasticities. A small perturbation in the point of evaluation can lead to a nearly threefold variation in the pay elasticity.

Figure 11. Logit Function is Closer to Linear Than to Iso-elastic

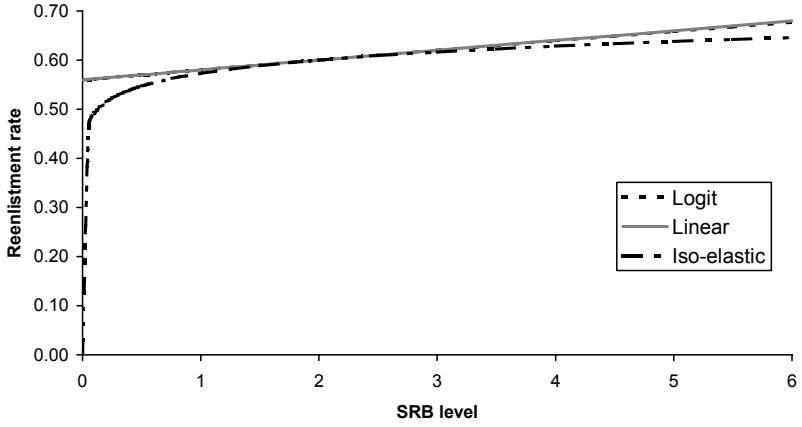
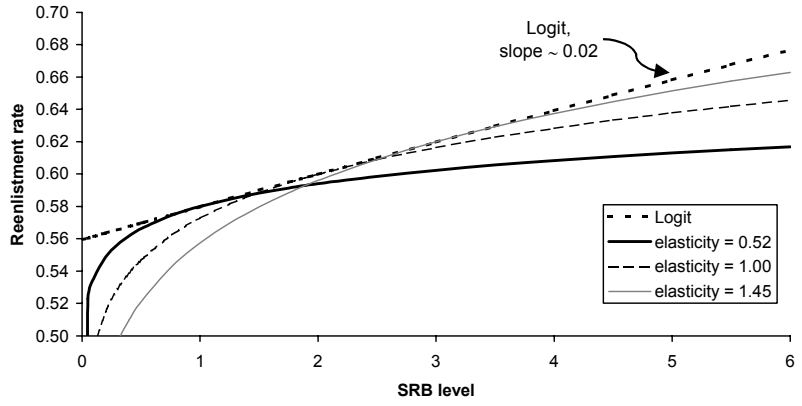


Figure 12. Point Estimates of Elasticities are Unstable



The studies summarized in table 2 vary considerably in the sample average retention rate. The theoretical threefold variation in pay elasticities is supported by figure 7: most of the first-term elasticities fall within the range of 1.2 to 2.2, but a few fall below 1.0, and others exceed 3.0. Thus, while the SRB effects are relatively stable, the pay elasticities are rather unstable. If either, it is the former that is closer in character to a "natural constant."

ESTIMATION OF DISCOUNT RATES

Hosek and Peterson [12, p. 1] state that, "The chief purpose of [their] study is to determine whether lump-sum reenlistment bonuses are more cost-effective than installment bonuses." The primary factor in this determination is a comparison of discount rates between military members and the federal government. Interestingly, Hosek and Peterson did *not* use their findings to explicitly infer a military member's discount rate. Nonetheless, they argued that lump-sum reenlistment bonuses are cost-effective as long as the federal government's real discount rate lies anywhere in the range of 4 to 10 percent. Their report appeared during a period when OMB was still mandating use of a 10-percent real discount rate on government investment projects. Thus, they concluded that lump-sum bonuses are the preferred method of payment.[32]

Hosek and Peterson exploited a natural experiment that occurred in April 1979, when the method of SRB payment switched from annual installments to lump-sum payments. They estimated both a dichotomous model of staying (i.e., either reenlisting or extending) versus leaving, and a trichotomous model of reenlisting, extending, or leaving. They found that, in the former case, installment bonuses were only 82.7 percent as effective as lump-sum bonuses in encouraging first-term enlisted personnel to stay. In the latter case, installment bonuses were 72.8 percent as effective as lump-sum bonuses in encouraging first-term personnel to reenlist. We can use these findings to roughly estimate a military member's real discount rate.

According to economic theory, individuals make their decisions by comparing the discounted present values of the various alternatives. If installment bonuses are only 72.8 percent as effective as lump-sum bonuses, the present value of the former must be only 72.8 percent the present value of the latter. Assume a 4-year reenlistment horizon and, following Hosek and Peterson, a 95-percent annual survival rate within the second term of service. Considering a notional $1,000 bonus, we have the following present-value equation:

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[32] In 1992, OMB revised its guidance and tied the real discount rate to inflation-adjusted market rates on Treasury bonds. Those rates have generally been in the range of 3 percent to 4 percent. The rationale for OMB's revised guidance was provided after the fact by Goldberg [63].

$$0.728 \times \$1{,}000 = \$250 \times \{1 + 0.95/(1+r) + [0.95/(1+r)]^2 + [0.95/(1+r)]^3\}. \quad (19)$$

Note that we have not deflated the $250 annual installments by a price index, so that the installment stream is expressed in *nominal* (i.e., current) dollars. Therefore, the solution to this equation provides an estimate of the *nominal* discount rate.[33] The solution is easily computed as 20.1 percent. Repeating the exercise using a relative effectiveness of 82.7 percent (based on the dichotomous model) yields a nominal discount rate of 8.7 percent.

To convert to real discount rates, we use the following relationship between the nominal discount rate *(r)*, the real discount rate *(d)*, and the rate of inflation *(f):*

$$(1 + r) = (1 + d) \times (1 + f). \quad (20)$$

Over the sample period of FY 1976 through FY 1981, the geometric average rate of increase in the Consumer Price Index (CPI) was 9.2 percent. Applying the above formula, we estimate real discount rates of 9.9 percent from the trichotomous model and –0.5 percent from the dichotomous model. Cylke et al. [15] argue that consideration of progressive income taxes tends to increase the estimated discount rate. We have not performed the detailed analysis of Hosek and Peterson's results, including tax effects. However, their results imply that military members' real discount rates are surely positive, and may well exceed 10 percent.

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[33] Hosek and Peterson's analysis appears to contain an error. Their equation on p. 42 of [12] is essentially the same as our equation 19. They express the annual installment bonus in nominal terms, as 25 percent of the corresponding lump-sum bonus. To properly discount the stream of installment payments, they should be using a *nominal* discount rate. However, they state on p. 43, "In keeping with our having adjusted the bonus amounts in the empirical work for inflation, the interest rate [that solves the equation] should be interpreted as the 'real' rate—that is, the inflation-adjusted rate." This statement is a *non sequitur*; having normalized the various years' bonus amounts in the regression analysis does not relieve the requirement to either discount a nominal payment stream with a nominal discount rate, or a real payment stream with a real discount rate. Hosek and Peterson attribute to real discounting *all* of the military member's preference for a lump-sum bonus. In fact, some of that preference should instead be attributed to the automatic inflation protection provided by an immediate, lump-sum payment.

Other Discount-Rate Estimates

Table 3 summarizes the real discount rates estimated from various studies. Cylke et al. [15] followed a procedure similar to Hosek and Peterson, comparing the effectiveness of SRBs when paid in annual installments (pre-April 1979) versus a single lump-sum (post-April 1979). Daula and Moffitt, by contrast, used the method of maximum likelihood to estimate the discount rate as one parameter in the dynamic program. Warner and Pleeter [64] compared military members' choices between installment and lump-sum severance pay when the two were offered concurrently; we will discuss their study in the next section.

Table 3. Estimates of Real Discount Rates

Study	Sample Restrictions	Term of Service	Real Discount Rate
Cylke et al. [15]	Navy Enlisted	1st Term Only	17%
Daula and Moffitt [60]	Army Infantry	1st Term Only	4.0% - 535%
	Army Infantry	1st and 2nd terms	10.5%
Hosek and Peterson [12]	Army Infantry	1st and 2nd terms	10% - 14%
Warner and Pleeter [64]	Army, Navy, Air Force Officers	YOS 7 through 15	6% - 26%
	Army, Navy, Air Force Enlisted	YOS 7 through 15	26% - 37%

Note: Real discount rate from Hosek and Peterson [12] is inferred in the current paper.

Looking across all of the studies, the estimated discount rates range between 4 and 37 percent. However, excluding Daula and Moffitt's [60] low first-term estimates, as well as Warner and Pleeter's high estimates for enlisted personnel, the remaining estimates range between 6 and 26 percent. These rates all exceed the federal government's real discount rate of 3 to 4 percent, leaving little doubt that lump-sum bonuses are the preferred method of payment.

WARNER AND PLEETER STUDY

Warner and Pleeter [64] exploited a natural experiment that occurred when DoD reduced military endstrength during FY 1992 and FY 1993. Recall that both Cylke et al. and Hosek and Peterson compared a time period during which SRBs were paid in annual installments to a time period during which SRBs were paid as a single lump-sum. By contrast, Warner and Pleeter examined a single time period during which both installment and lump-sum severance pay were offered concurrently. What makes their study unique is that military members were offered a *contemporaneous choice* between the two payment options.

Specifically, DoD offered severance packages to mid-career personnel (both officer and enlisted) in selected combinations of military occupation, paygrade, and years of service. The Voluntary Separation Incentive (VSI) provided annual payments equal to 2.5 percent of terminal basic pay, multiplied by terminal years of service. The annual payments would continue for a period of time equal to twice the terminal years of service, with no indexing for inflation. The Special Separation Benefit (SSB) provided a lump-sum payment equal to 15 percent of terminal basic pay, multiplied by terminal years of service.[34]

If individuals did not discount, the annuity option would be preferred as long as YOS > 3 (for then 2.5% × basic pay × YOS × 2 × YOS> 15% × basic pay × YOS). With discounting, the breakeven career length is somewhat longer. Put differently, for any given career length of YOS > 7 (the minimum for buyout eligibility), one can compare the discounted present values of the two payment options at various discount rates. In fact, when announcing the program, DoD published a pamphlet giving the comparison of present values at a 7-percent nominal discount rate, which was the typical yield on money market funds at the time. Using that discount rate, the present value of the annuity option was as much as twice the size of the lump-sum payment.

[34] Mehay and Hogan [65] report that, during FY 1992, less than 10 percent of the Navy enlisted force met the occupation/paygrade/YOS eligibility criteria. Among these individuals, 12 percent accepted some form of buyout. Mehay and Hogan did not explicitly analyze the choice between the two payment options. However, they report that among Navy enlisted personnel who accepted some form of buyout, 85 percent chose the SSB (lump-sum) payment option.

One can also calculate the breakeven discount rate—the rate at which a person must discount the annuity payments to yield a present value equal to the lump-sum payment. Warner and Pleeter computed before-tax breakeven discount rates ranging from 17.5 to 19.8 percent, varying solely as a function of YOS. They also computed after-tax breakeven discount rates ranging from 17.5 to 23.6 percent.

Despite these high breakeven rates, most people chose the lump-sum payment option, indicating that their personal discount rates were even higher. According to Warner and Pleeter:

> Among the officers with less than 10 years of service, more than half took the lump-sum. Among the E-5 enlisted personnel with less than 10 years, over 90 percent did so. Almost 75 percent of E-7 enlisted personnel with 15 years of service took the lump-sum. Even among the more senior officers, 30 percent or more took the lump-sum. Overall, about half of the officers chose the lump-sum while over 90 percent of the enlisted personnel did so.

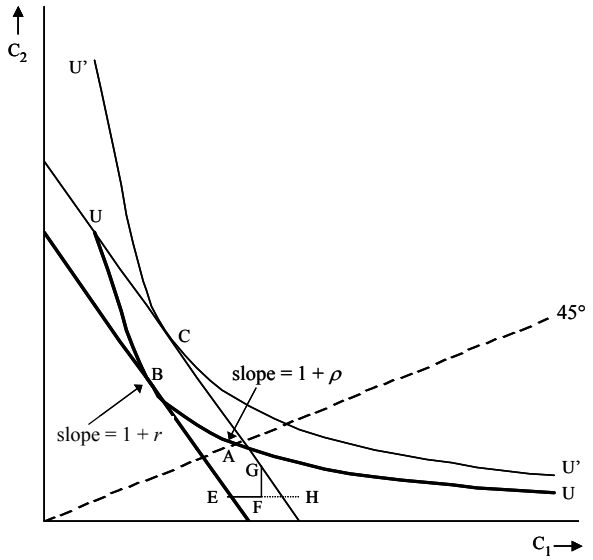
Warner and Pleeter's estimated discount rates were shown earlier in table 3. They ranged from 6 to 26 percent for officers, and from 26 to 37 percent for enlisted personnel.

We use some diagrammatic tools from microeconomic theory to illuminate these calculations. Figure 13 is an indifference-curve diagram for a person choosing between the annuity and lump-sum payment options. The axes measure consumption of goods and services in the first and second time periods, respectively. Absent either severance pay or access to financial markets, the person would simply consume his or her income in each period. This income "endowment" is depicted as point E. Relaxing these assumptions gradually, suppose next that the person may either borrow or lend at the interest rate r. The resulting budget line passes through point E with negative slope of $1 + r$. As the figure is drawn, this individual would choose to lend money in the first period, reducing consumption in that period but increasing consumption in the second period when the investment comes due. Geometrically, the person moves along the budget line from point E to a consumption optimum at point B.

The slope of the person's indifference curve at point B equals $1+r$. Thus, the observed slope is solely a function of the interest rate at which the person may either borrow or lend. The observed slope is *not* a measure of underlying preference for current versus future consumption. The latter must be measured at some benchmark level of relative consumption that is independent of market opportunities. Conventionally, a measure of time

preference (or "impatience") is derived from the slope of the person's indifference curve at the 45-degree line (the line along which current and future consumption are equal). The slope at the 45-degree line (e.g., at point A) is equated to $1 + \rho$, and ρ is defined as the consumer's "rate of time preference."[35]

Figure 13. Comparison of Annuity and Lump-sum Payment Options

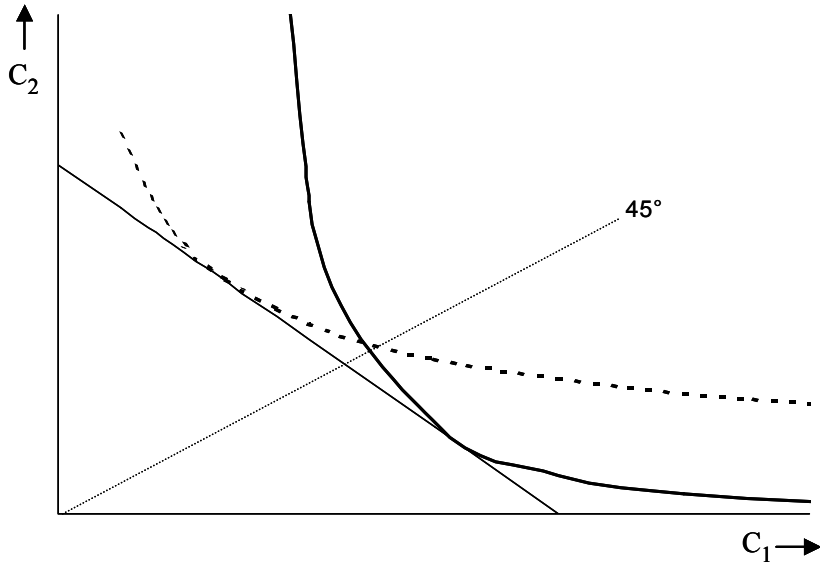


To see this point in another way, consider the two individuals pictured in figure 14. These two have very different preferences for current versus future consumption. The "impatient" one is more concerned with current consumption, and has a steep indifference curve (drawn as a solid curve). By contrast, the "patient" person is more concerned with future consumption, and has a flat indifference curve (drawn as a dashed curve). These differences in time preference are evident by comparing the slopes of the solid and dashed indifference curves at the 45-degree line. Yet, if these two people borrow or lend at the same interest rates as each other, they will reach consumption optima at which each has an indifference

[35] This definition is found in Epstein and Hynes [66], among other places.

curve with slope 1 + *r*. Again, the observed slope measures market opportunities rather than underlying time preference.[36]

Figure 14. Two individuals with different time preferences but equal interest rates



Finally, we compare the annuity and lump-sum severance packages. Returning to figure 13, the annuity option serves to increase income during both the first and second periods. Thus, the annuity option shifts the endowment point both horizontally (point F) and then vertically (point G). The new budget line passes through point G with slope 1 + *r*. The individual may now adjust his consumption path to reach a higher utility level at point C.

By contrast, the lump-sum option serves to increase income during only the first period. Thus, the lump-sum option shifts the endowment

[36] When reviewing studies of "discount rates," one must carefully distinguish between those that measure market opportunities (*r)* and others that measure underlying time preference (ρ). All of the studies in our table 3 are measuring market opportunities. Other studies of market opportunities, outside the military sector, include Gately [67], Gilman [68], and Hausman [69]. Lawrance [70] is the best-known study of the consumer's rate of time preference.

point horizontally beyond point F, perhaps to point H. As drawn in figure 13, point H lies to the northeast of the budget line passing through point G. Thus, the lump-sum option leads to an even higher budget line and, consequently, an even higher utility level (neither of which is explicitly shown in the figure, to avoid clutter).

The consumer's preference for point H (lump-sum option) over point G (annuity option) reveals that his or her budget line is *steeper* than the line segment GH. The slope of the budget line is, again, $1 + r$. However, the slope of the line segment GH equals 1.0 plus the "breakeven rate" computed by Warner and Pleeter. To see why, note that points G and H would lie on the same budget line only if the two payment options yielded exactly the same discounted present value. The line segment GH is, in fact, a subset of the hypothetical budget line with slope equal to 1.0 plus the interest rate that equates the two present values—the breakeven rate.

As is clear from this analysis, the consumer prefers the lump-sum payment option only if his or her personal discount rate exceeds the breakeven rate. Thus, a consumer's choice of either the annuity or lump-sum payment option serves to bound his or her personal discount rate on one side or the other of the predetermined breakeven rate. It is this information that Warner and Pleeter exploit to estimate the distribution of personal discount rates in the military population.

EFFECTS OF VARIABLES OTHER THAN PAY

PERSONAL CHARACTERISTICS

Retention models have often included variables other than pay. Perennial favorites include the civilian unemployment rate, and personal characteristics, such as marital status, race, education, and mental group. One difficulty is that these are some of the same personal characteristics used to predict civilian pay in forming the military/civilian pay difference or pay ratio. Inclusion of these characteristics in the retention model introduces multicollinearity, which tends to depress the estimated

coefficient on the relative pay variable. This problem was noted by Warner [71, pp. 222-223]:

> inclusion of individual attributes such as education, race, and Armed Forces Qualification Test (AFQT) score in the retention equation to control for non-pecuniary factors results in substantial changes in pay parameter estimates. Such changes may occur either because the model is properly specified only with these variables included or because of the multicollinearity introduced, since these factors also help determine the relative pay variable in the equation….A second source of sensitivity…may arise if variables that affect civilian wages are also entered directly in the retention function. I am not sure whether they should or should not be included. I will only comment that I have done it both ways, and I have found maximum-likelihood estimates of pay elasticities to be much more sensitive to inclusion or exclusion of these variables than estimates based on a grouped logit approach.

Whether or not to include personal characteristics remains an open question. Personal characteristics should certainly be included if there is an independent interest in their effects on retention. However, if the primary goal of a particular study is to estimate the pay effects, it may be preferable to exclude the personal characteristics because their inclusion tends to destabilize the pay coefficient.

SEA DUTY

Several studies have examined the effect of sea duty on reenlistment rates of sailors. Warner and Goldberg [18] modeled the first-term reenlistment rate as a function of the expected percentage of time spent on sea duty during the *second* term of service. They assigned each person the expected sea duty specific to his or her Navy rating. They estimated that a 10-percentage-point increase in prospective sea duty would reduce the reenlistment rate by a modest 1.6 percentage points.

The effect of sea duty was revisited by Shiells and McMahon [17]. In the numerical example to illustrate their findings, they increased the prospective sea/shore ratio from 2.6 : 1 (i.e., 2.6 years on sea duty for every year on shore duty) to 3.3 : 1. They estimated that the 25-percent increase in the sea/shore ratio would reduce the reenlistment rate by 1.9 percentage points. Note that Shiells and McMahon did not use the same metric for sea duty as did Warner and Goldberg. Using the latter authors' metric, the percentage of time spent on sea duty would increase from 72 percent (2.6/3.6) to 77 percent (3.3/4.3). Correspondingly, the reenlistment

rate would fall by 0.8 percentage point. Comparing the two estimates, Shiells and McMahon's is over twice as large as Warner and Goldberg's. However, even the larger estimate implies that the hypothesized increase in sea duty could be offset by a one-level SRB increase.

PERSONNEL TEMPO

More recently, a few studies have begun to look at the effect of personnel tempo (Perstempo) on retention. Cooke, Marcus, and Quester [16] examined three measures of Perstempo for male sailors:

- Length of deployment
- Turnaround ratio, defined as time between deployments divided by length of deployment
- Percentage of time under way while not deployed.

Reference [16] found few systematic patterns for sailors with 8 to 10 years of service. However, the authors found several significant effects among 4-year obligors at their first reenlistment point. For instance, they found that longer deployments adversely affected retention, especially among married sailors (roughly one-third of those making reenlistment decisions). Second, a lower turnaround ratio also adversely affected retention, but the effect was smaller and limited to married sailors. Third, the percentage of time under way while not deployed had an adverse effect on retention. The latter effect was most severe among both married sailors and sailors serving in relatively sea-intensive ratings (these two groups overlap).

Among their other results, Cooke, Marcus, and Quester [16] found that retention was lower among sailors deployed at their decision point, even controlling for a sailor's deployment history during the 3-year window leading up to the decision point. Finally, retention was lower among sailors serving on ships that had recently undergone a major maintenance activity (overhaul or restricted availability) that lasted 8 months or longer.

Hosek and Totten [19] developed some additional measures of Perstempo, and extended the analysis to all four military services. They not only examined long duty, but they appear to be the first to examine the effect of hostile duty on retention. They measured long duty as the incidence of the Family Separation Allowance, which is paid to personnel with dependents from whom they are separated for 30 or more consecutive days. They measured hostile duty as the incidence of Hostile Fire Pay,

which is paid to personnel subject to hostile fire or explosion, or those on duty in areas deemed to be hostile.

Hosek and Totten found that some degree of long or hostile duty actually increases first-term retention, particularly among Army and Marine Corps personnel. Beyond a certain point, however, additional long duty reduces retention, especially if that duty is also hostile. Therefore, overall retention might improve if the burden of long and hostile duty were shared among large numbers of military personnel. However, Hosek and Totten caution that duty sharing must be balanced against operational factors, including unit cohesion:

> We found that the impact of added long or hostile duty differs for personnel who have had it from those who have not, and whether it is hostile or non-hostile. Thus, if the added hostile duty can be spread to troops who have not yet been deployed, then the effect on reenlistment is likely to be positive; if the added duty falls to those who have already been deployed, then the effect on reenlistment is likely to be negative. Of course, decisions about how to allocate additional assignments must include a variety of factors beyond effects on retention rates. A Service's capability to share long or hostile duty among units may be influenced by advantages gained from assigning units particular roles for a major theater war and assuring that these units stand at full readiness. For readiness reasons, it may not be advisable to spread such duty more broadly (pp. xvii-xviii); because personnel are attached to units and develop specialized skills and knowledge about the unit's roles and missions, weaponry/equipment, and fellow unit members, simply swapping one person or unit for another is essentially infeasible. A more subtle means must be devised (p. 58).

Finally, consistent with Cooke, Marcus, and Quester [16], Hosek and Totten found much smaller effects of long or hostile duty for early-career personnel (i.e., those beyond the first term but with 10 or fewer years of service) than for first-term personnel.

AREAS FOR FUTURE RESEARCH

This survey has identified several fruitful areas for future research:

- Determine what joint distribution of taste factors, if any, would yield the sequential logit procedure used by Warner [42] to model the stay/leave decision along with the reenlist/extend decision among those who stay.
- Attempt full-information maximum-likelihood estimation of the nested logit model for the stay/leave and reenlist/extend decisions.
- Add cohort-composition effects to trichotomous logit (or probit) models for the reenlist/extend/leave decision.
- When using grouped data, explicitly model SRB levels jointly with reenlistment rates, to control for reverse causation.
- When using individual data, apply disequilibrium estimation to distinguish supply-constrained from demand-constrained observations.
- Continue the joint modeling of attrition and first-term reenlistment. Compare the methods of Follmann, Goldberg, and May [58] and Warner and Solon [14] on a common data set.
- Further investigate the apparently low first-term pay elasticities produced by the ACOL–2 approach.

The current paper has attempted to decompose the variation in pay elasticities in terms of differences in data handling (e.g., treatment of ineligibles and extensions), modeling technique, and elasticity computation. However, this decomposition is confounded by differences in service, occupational group, and time period among the many studies examined. A useful "controlled experiment" would be to apply the various estimation techniques to a common data set, thereby eliminating any confounding differences in sample composition. In light of the changing market for military labor, it seems imperative to conduct this experiment using the most recent available data.

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CHAPTER III

SPECIAL AND INCENTIVE PAYS FOR THE RESERVE COMPONENT

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As recently as 1986, the Department of Defense has reviewed the issue of Special and Incentive (S&I) pays for Reserve component members of the armed forces. Renewed interest in this topic, however, arises from three sources. First, DoD's Total Force policy requires a greater integration of the active and reserve forces. Barriers to that integration, including differences in pay and compensation policy, should be limited to those that can be justified by readiness or efficiency. Second, the role of the Reserves has changed dramatically since the end of the Cold War. During most of the Cold War era, Reserve component members were rarely called to active duty to support limited conflict. Instead, they were a form of pre-trained manpower to be used in the event of full mobilization. Now, Reserve component members are integrated more fully into missions that require less than full mobilization, and are therefore potentially subject to more frequent call-ups than in the past. Because the civilian careers of these members may be subject to greater disruption than in the past, it is prudent to review the use of S&I pays as a way to mitigate any retention or recruiting problems that might emerge among the Reserve components. Third, there have been a number of significant changes in special and incentive pays, including the types of pays for which personnel are eligible and in how they are paid to active-duty personnel.

The QRMC examined the history of S&I pay rules for Reserve component members. We reviewed the policies governing application of these pays to Reserve personnel and compared them to the rules pertaining to members on full-time active duty. We focused special attention on the intended purpose of each pay, and evaluated how well the current rules achieve that purpose for the Reserve forces. We also attempted to determine whether payment rules are applied consistently across both the Active and Reserve components.

BRIEF RESERVE PAY HISTORY

While the earliest instance of compensation to non-Regular members dates back to 1792, it was not until 1942 that special pays were extended to Reserve and Guard members performing certain duties during Inactive Duty for Training (IDT). In 1948, the "1/30th" rule became the standard pay rule for all Reserve component members

engaged in IDT.[1] This rule authorized special pays to pilots, radar technicians and medical personnel for IDT periods under standards specified by the Service Secretary. Hazardous duty incentive pays were extended to IDT reservists in 1949.

S&I pays have been reviewed periodically by the Office of the Secretary of Defense. The 5th QRMC conducted an exhaustive study of Active Duty S&I Pays in 1983, and the 6th QRMC (1986) examined all facets of Reserve Pay, including S&I pays. The 6th QRMC concluded that the 1/30th rule was appropriate for S&I pays:

> *Reservists on ADT or IDT performing in certain specialties receive 1/30th of the basic pay rate for active duty members for each period of duty performed. The 6th QRMC believes this rate of pay is both appropriate and consistent with the manner in which members of the reserve components are compensated.*[2]

This QRMC revisited the issue because of the observed changes in both the scope of S&I pays and in the role of the Reserve forces.

ROLE OF S&I PAYS

There are a myriad of S&I pays. For purposes of the discussion, we group them into three categories. These groupings are based partly on input provided by the Services regarding the primary purpose of each pay.

- ***Hazard/hardship***: Paid primarily to encourage participation in specific onerous or dangerous activities, or to reward a member who encounters the danger as a result of performing assigned duty
- ***Critical career field/skill set with hazard***: This category of pay is primarily to provide an incentive for retention in particular skills, or to acquire skills, but duty in these skills may also be hazardous. Hence, while its primary purpose is to encourage a career in a particular skill, the

[1] The 1/30th rule means that the Reserve Component member receives 1/30th of the monthly pay amount for each drill completed.

[2] 6th QRMC, Volume I, page 5-7:

pay is partial compensation for the hazard associated with duty in the skill.

- ***Critical career field/skill set without hazard***: This category of pay is to provide an incentive for retention in particular skills, or to acquire skills, as in the previous category. Unlike the previous category, duty in these skills is not considered hazardous.

Table 1 lists special and incentive pays by these categories.

Table 1. Special and Incentive Pay Categories

Hazard/Hardship Duty Pays	Hostile fire/imminent danger Demolition Flight pay crew Flight pay non-crew Flight pay, AWAC Parachute duty Flight deck duty Toxic fuels/ chem. Munitions Diving duty Career sea pay Experimental stress Personal exposure (toxic/dangerous) High Or Low Pressure Chamber Human Accel/Decel Subject Responsibility pay
Career or Skill Retention with Hazard	ACIP/CEIP Nuclear qualified Sub duty incentive Op Sub duty
Career or Skill Retention without Hazard	Physician Dentist Veterinarian Optometrists Psychologists/non-physician Nurse anesthetists /reg. Nurses Reserve health care officers Special duty assignment pay Foreign Language Proficiency Pay

The payment method varies across these pay categories. Most of them are paid proportionately (1/30th of the monthly rate per day) to Reserve component members performing Active Duty for Training (ADT). Not all of the pays, however, are paid to IDT reservists.

RESERVE APPLICATION OF S&I PAYS

HAZARDOUS DUTY/HARDSHIP DUTY INCENTIVE PAYS

Hazardous Duty and Hardship Duty Incentive Pays are designed to compensate members for performing hazardous, onerous or unappealing duties. Members must perform the duty to a specified performance standard. In most cases, the pays are based on a "threshold"—if the member is exposed to the risk or performs the duty a minimum number of times, he or she is entitled to the full monthly pay.

Reservists are entitled to these pays for both ADT and IDT. Regardless of the threshold for particular pay, reservists are paid at the 1/30th rate, with the exception of hostile fire/imminent danger pay.[3] Table 2 summarizes active and reserve entitlement to these pays.

Note that, in some cases (e.g., Parachute Duty Pay), the entitlement threshold for Active and Reserve component (AC & RC) members are the same. In other cases, it is conceivable that RC members could easily exceed the active-duty thresholds. In each case, however, RC members will only be paid at the 1/30th rate.

CAREER AND SKILL RETENTION PAYS, WITH HAZARDOUS DUTY

Career and Skill Incentive Pays are primarily retention and attraction tools. They are designed to encourage members to acquire critical skills and to undertake and continue full-time military careers applying those skills. In addition, however, applications of these skills will typically be associated with hazards or risks, or with hardships. Hence, there is an aspect of the pay that compensates the member for risks or onerous conditions that are an inherent part of the skill assignment. Entitlement to these pays may depend on meeting various

[3] For Hostile Fire/Imminent Danger Pay, members (both active and reserve) receive the full monthly payment if they spend even one day in the specified zone during the month. This pay is not applicable to IDT.

career "gates." Members must perform the duty at specified levels in order to continue receiving the pay. RC members are also eligible to receive these pays at the 1/30th rate. Table 3 summarizes the entitlement rules for these pays.

Table 2. Entitlement to Hazardous Duty Incentive Pays—Active and Reserve Components

Payment Type	Active Duty	Reserve Duty (IDT)	Reserve Duty (ADT)
Flight Pay, Crew Flight Pay, Non-Crew	Four hours per month	Two hours per month/unit period	Meet active duty requirement Paid at 1/30th rate for each day of ADT
Parachute Duty	One jump per quarter	One jump per quarter	
Demolition High Or Low Pressure Chamber Human Accel/Decel Subject Experimental Stress Subject Toxic Fuels/ Propellants/Chemical Munitions	Performance primary duty per month	Performance primary duty per month	
Flight Deck Duty	Minimum no. of takeoffs & landings per ship type per month	Performance primary duty per month	
Toxic Pesticides/Virus/ Bacteria	Regular exposure 30 consecutive days	Regular exposure 30 consecutive days	
Diving Duty	4 dives per 6 month period	2 hours involved in duty	Meet acdu req x days ADT x 1/30
Career Sea Pay	Assigned/serving in CAT A/B ship		ADT in CAT A/B ship x 1/30
Hostile Fire/Imminent Danger	Presence in designated area during month		Presence in designated area during month

Table 3. Entitlement to Career and Skill Incentive Pays with Hazardous Duty—Active and Reserve Components

Payment Type	Active Duty	Reserve Duty (IDT)	Reserve Duty (ADT)
Aviation Career Incentive Pay (Officers Only)			
18 Year ACIP Gate	8 fly/12 serve	Same as Active Duty	Same as Active Duty
22 Year ACIP Gate	10 fly/18 serve		
25 Year ACIP Gate	12 fly/18 serve		
Submarine Duty Incentive Duty			
Continuous Sub Duty	6/10 yrs at sea for 12/18 gate	Drills during underway operations	Meet active duty requirement. Paid at 1/30th rate for each day of ADT
Operational Sub Duty	48 hours under-way per 1 month		
Career Enlisted Flyer Incentive Pay (Enlisted Only)			
18 Year CEFIP Gate	6 fly/10 serve	Same as Active Duty	Same as Active Duty
20 Year CEFIP Gate	9 fly/15 serve		
25 Year CEFIP Gate	14 fly/20 serve		

These pays are to encourage careers in aviation (ACIP and CEFIP) and submarine service (continuous and operational submarine duty). But, associated with the respective careers is potential hazardous duty.

Career or Skill Retention, Without Hazardous Duty

These pays are designed to attract and retain members in particular skills or types of duty. However, unlike the pays discussed above, there is not an explicit hazard associated the skill or duty assignment. Hence, the pay is purely to encourage the acquisition of particular skills and the retention of members with those skills. Many of these pays are not currently paid to RC members who perform IDT. Most of the health-related occupation pays, for example, have no provision for IDT payment. A larger number of these pays are paid to RC members when performing ADT.

Table 4 summarizes the entitlement rules for career or skill retention pays that do not entail hazardous duty. Of particular interest is Foreign Language Proficiency Pay. It is somewhat different than the other pays in this category in that it can be paid for the acquisition and maintenance of a language skill, even though the member may not be in an assignment that requires use of the language.

Table 4. Career or Skill Pays, without Hazardous Duty—Active and Reserve Components

Payment Type	Active Duty	Reserve Duty (IDT)	Reserve Duty (ADT)
Special Duty Assignment Pay	According to policy; paid monthly for designated types of duty		Meet acdu req x days ADT x 1/30
Foreign Language Proficiency Pay	Meet annual service proficiency qualification and (1) Serve in assignment using language skill; or (2) Maintain proficiency in critical language skill	2 hours involved in duty	Meet acdu req x days ADT x 1/30
Physicians	Numerous physician pays		$450/mo prorated
Optometrists-monthly	Monthly Pay based on 1 yr contract		
Optometrists-diplomate	Monthly pay based on years of service		
Dentists	Numerous special pays		$350/mo. prorated
Psychologists/ non-physician providers	Monthly pay, based on years of service		
Nurse anesthetists	Single or multi year bonus		
Reserve health care officers			Paid to Reserve Med officers on acdu >30, but <365 days
Veterinarians-monthly	Monthly pay based on 1 year contract		
Veterinarians-diplomate	Monthly pay based on years of service		

FLPP currently has two purposes, at least in its application to the Active component. First, it is paid to retain members with critical skills in jobs that require them to use those skills (e.g., as interpreters). However, members may also receive a lower FLPP payment merely for maintaining proficiency in a critical language, whether or not they use that language in their military jobs. This type of payment is available only to members serving on full-time active duty. RC members receive FLPP at the 1/30th rate only if they use the language in their Reserve jobs for at least two hours during IDT drills.

There is an additional set of special pays for medical personnel. None of these pays are paid to Reservists for IDT, but Physicians and Dentists receive a lower, pro-rated amount when on ADT. Additionally, Reserve health-care officers recalled to active duty for more than thirty days, but fewer than 365 days, receive Reserve Health Care Officers pay.

ARGUMENTS FOR CHANGING RESERVE SPECIAL PAYS

Are there any arguments for changing how S&I Pays are paid to members of the Reserve Components? Because we were not able to obtain sufficient detailed pay and retention data for Reserve components ***our primary recommendation is for further study of these issues***. However, there do are some areas in which a reasonable argument can be made that the application of S&I Pays for RC members is not consistent with how they are paid to AC members.

- Some AC members receive FLPP just to maintain proficiency in a critical language. These members are not using the foreign languages in their military jobs, but are merely available should they be needed in the future. The pay in this case ensures a sufficient pool of qualified personnel. However, there is no corresponding authority to provide the same incentive pay for Reserve component members who meet the same language skill proficiency. If the Services can supply this requirement using only active-duty members (who may be more readily available for rapid deployment), they may not need to offer the pay to Reservists. However, providing the *authority* to pay RC members for language proficiency would increase manning flexibility. Because this version of FLPP is paid just for maintaining proficiency, it would be reasonable to pay Reservists at the same rate ($100/month) if the Services decide to offer them the pay.

  We therefore recommend that Service Secretaries be authorized to pay RC members not serving on active duty the same amount of monthly FLPP as AC members for maintaining proficiency in designated critical languages.

- Because other Career and Skill Retention Pays, without Hazardous Duty (including duty-based FLPP), are retention pays, entitlement and payment ought to be governed by supply and demand considerations. Pay levels for Reservists should be based on the Services' needs to attract and retain in the Total Force. The effects of these pays must also be balanced against their effects on active-component retention. While the pay levels required for Reservists may indeed be lower than those required to ensure sufficient Active-Component retention, the 1/30th rule does not necessarily ensure the proper level.

  Career and Skill Retention Pays, with Hazardous Duty, have both a retention component and a hazardous duty component to the added compensation. While they are historically paid to encourage full-time active-duty careers, increased emphasis on the Total Force and expanding reliance on Reserve Components may lead to a need for such pays to encourage Reserve careers and as partial compensation for hazardous duty. To advance this argument, it will be necessary to collect evidence on Reserve retention and recruiting problems. Are there problem areas in particular skills (e.g., reserve aviation) that could benefit from improved incentives to remain as a drilling Reservist? As in the case of Career and Skill Retention Pays, paying 1/30th of the active-duty rate may not be enough to ensure a sufficient supply of personnel. Providing flexibility to the Service Secretaries to expand the payment period to Reserves, as needed to maintain Reserve staffing levels, may be prudent policy now, so that the authority is in place before serious problems emerge.

  We therefore recommend that more detailed study be conducted regarding changing the manner of payment of all or some of these pays to RC members, and that the study focus on the impact such changes would have on Reserve component recruiting and retention.

- Hazardous Duty and Hardship Incentive Pays are based on exposure to hazardous or onerous working conditions or locations. Because active-duty personnel receive the full monthly amount of these pays provided they meet a

minimum exposure or duty threshold, one can argue that Reservists who meet (or exceed) that same threshold should receive the same monthly payment. A counter-argument may be that, on average, active-duty personnel have greater exposure to the hazards, regardless of threshold levels. However, even those active-personnel who just meet the standards receive the same amount of pay as others who exceed the thresholds.

We therefore recommend that, for those S&I pays based exclusively on the member's level of exposure to a hazard or hardship, RC members meeting the same established thresholds as AC members should be paid in the same manner.

CHAPTER IV

DO THE SERVICES NEED A DEPLOYMENT PAY?

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

INTRODUCTION

Alone, alone, all, all alone,
Alone on a wide wide sea![1]

It has long been recognized that the time away from home often associated with military service can be burdensome to personnel and their families. Resulting hardships, including family separation, increased operational tempo, and unpleasant or dangerous working conditions, can create significant workload, manning, and, ultimately, retention problems.

Although the military offers no explicit deployment pay to date, a variety of military pays historically have been used to compensate for the hardships associated with time away from home. Career Sea Pay and the Career Sea Pay Premium, Submarine Duty Pay, Family Separation Allowances, Overseas Tour Extension Incentive Pay, Hardship Duty Pay, and Hostile Fire/Imminent Danger Pay have been used to achieve this objective. But the use of this patchwork of pays has created several counterintuitive outcomes and perceived inequities. For example, single people do not receive Family Separation Allowances, and Imminent Danger Pay is sometimes granted in areas where conditions may be arduous rather than dangerous.

The 9th Quadrennial Review of Military Compensation (QRMC) is seeking ways to better structure military compensation to alleviate current recruiting, manning, and retention shortfalls. Structured correctly, basic pay and special pays should provide incentives to stay in the military, to gain experience and skills valuable to the services, and to move into critical skill areas or jobs where they are most needed. No existing pays fully answer the need to provide incentives to take on jobs that require serving alone, away from home. For this reason, the 9th QRMC is considering the creation of a new pay that would compensate service members for the hardships associated with deployments.

The difficulty in creating such a pay, however, is establishing consistent definitions and measures of many of the key concepts related to time away from home. Relevant issues include:

- Identifying the goal of any new deployment pay and the hardships for which people should be compensated

[1] Samual Taylor Coleridge, *The Rime of the Ancient Mariner.* Part iv.

- Defining deployments and time away
- Developing a deployment pay structure.

Taken together or separately, these definitional and conceptual issues must be considered when determining the structure or use of a new pay and how it would relate to existing military pays.

In a companion paper, we examine in detail the largest "away" pay, sea pay [1]. Here we summarize that paper's conclusions regarding sea pay and examine several of the other special and incentive pays that historically have been used to compensate people for hardships associated with deployments. We then examine the availability of these pays to date and assess the adequacy of these pays in meeting the military's goals. Finally, we conclude by outlining policy options and recommending compensation changes that would better align existing pays with any newly created pays and with the military's primary goals and objectives.

DEFINITIONS AND KEY CONCEPTS

Before examining the array of existing military pays sometimes used to compensate service members for deployments, we consider a variety of definitional and conceptual issues, such as the following:

- Identifying the goal of any new deployment pay and the hardships for which people should be compensated
- Defining deployments and time away
- Developing a deployment pay structure.

IDENTIFYING GOALS AND HARDSHIPS

The goal of any new deployment pay would be to complement existing pays by recognizing the unique demands of military service. To achieve this goal, however, the services must agree on and clearly identify the hardships for which they want to compensate. For example, is operational deployment itself a hardship, or are the real hardships those associated with family separation, overseas duty, the incidence of deployments, the duration of deployments, the unanticipated nature of deployments, or the unpleasant or dangerous nature of work done while on deployments?

These considerations will affect both the definition of deployment selected and the measures developed to account for time deployed.

Any new deployment pay also should be designed to account for changes in missions and operations that have resulted from the end of the Cold War. One reason to broaden the traditional definition of deployment is that personnel in today's New World Order don't always experience more time away.

RECOGNITION PAYS OR COMPENSATING DIFFERENTIALS?

One type of Special and Incentive pay is a *recognition pay* for hazardous or unpleasant duty. Examples of recognition pays are Parachute Duty Pay, Toxic Fuel Exposure Pay, and Flight Deck Pay. For most of these, the goal is to recognize the danger, difficulty, or unpleasantness of the job by providing some token monetary compensation. The military makes no attempt to tie the amount of pay to market conditions, readiness, or performance measures, and there are usually no clear criteria for changes in the pays unless it is to keep pace with inflation.

Compensating differentials in economic literature are market-established pay differentials that are enough, on the margin, to attract people into dangerous, difficult, or unpleasant jobs [2]. The size of compensating differentials changes if the demand for the work or the supply of people willing to undertake the work changes. Although military recognition pays exist where civilian labor markets might generate compensating differentials, there is usually no intent or effort to size the pay to equate supply and demand.

One example is the Hardship Duty Pay-Location (HDP-L), a pay that began in 2001.[2] This pay ranges from $50 to $150 per month, to reflect the relative hardship of different locations. State and Defense Department surveys evaluate hardships, taking into account many factors having to do with physical environment, living conditions, and personal security. There is no intent, however, to set the pay at levels that would induce enough people to volunteer for each location.

One difficulty with setting pay levels based on surveys or other assessments of the level of hardship is the variability of people's tastes and willingness to endure various working conditions. Being away from home may be a hardship to some, whereas those who joined the military for adventure may consider it a benefit. If more pay is granted, however,

[2] We describe this pay in more detail later in this paper.

based on how much hardship is endured, it's difficult to elicit unbiased evaluations of working conditions.

Other work being done for the 9th QRMC suggests that the services consider moving away from hardship recognition pays set at arbitrary levels and toward compensating differentials tied to readiness-related factors. The readiness-related factors could include job performance measures or keeping critical billets filled [3].

DEFINING DEPLOYMENTS

If we accept that people should be compensated for deployments, we must also consider how to delineate deployed time.

Today *deployment* refers loosely to time spent away from home. The strict definition of the term and the services' historical interpretation, however, differ considerably from this general usage.

> The *DoD Dictionary of Military Terms* defines deployment four ways:
>
> 1. In naval usage, the change from a cruising approach or contact disposition to a disposition for battle
> 2. The movement of forces within areas of operation
> 3. The positioning of forces into a formation for battle
> 4. The relocation of forces and material to desired areas of operations.

Deployment encompasses all activities from origin or home station through destination, specifically including intracontinental United States, intertheater, and intratheater movement legs, staging, and holding areas.[3]

In addition to this official notion of deployment, the services' historical interpretation of the term also included a duration-related component.[4] This arose from recognized differences in the services' missions, equipment, and operating procedures. Navy deployments required that a unit be away from its home port for at least 56 days. Marine Corps deployments were defined as 10 or more days away from the home station. The Army counted 7 days or more away from home base as a deployment. Finally, the Air Force counted 1 day or more of away time as a deployment because of its ability to accomplish flight missions in a single day by flying out and back.

[3] http://www.dtic.mil/doctrine/jel/doddict/.
[4] Material in this section comes from [4] and [5].

Given these working definitions, each of the services had also established official policies or conventions determining acceptable deployment lengths (and, in the case of the Navy and the Marine Corps, an optimal pace of deployments). A Navy policy limits a ship's deployment to 6 months, with at least twice as much time spent back in home port before the ship's next deployment. A model Marine Corps deployment is usually thought to be an entire unit going on a 6-month unaccompanied tour, either OCONUS or on a ship. As with the Navy, at least twice as much post-deployment time is spent at the home station before another deployment can occur. Although neither the Army nor the Air Force had official policies in place limiting deployment lengths, the Army tried to avoid single deployments of over 6 months and the Air Force tried to avoid assigning Airmen away from home for more than 3 months annually.

These traditional interpretations of deployment were reexamined when the 2000 National Defense Authorization Acts (NDAA) mandated that the services begin to track and report how many days each service member spends deployed. The law first defined *Personnel Tempo (PERSTEMPO)* as:

> the amount of time members of the armed forces are engaged in their official duties, including official duties at a location or under circumstances that make it infeasible for a member to spend off-duty time in the housing in which the member resides when on garrison duty at the member's PDS [permanent duty station].

It then separates PERSTEMPO into deployed and nondeployed events. A deployed event is:

> any day on which pursuant to orders the member is *performing service in a training exercise or operation* at a location or under circumstances that make it impossible or infeasible for the member to spend off-duty time in the housing in which the member resides when on garrison duty at the member's PDS or homeport.[5]

A service member is not deployed if he or she is performing service as a student or trainee at a school or performing administrative, shift work, guard, or detail duties in garrison at the member's PDS.

Congress also required that any person deployed more than 400 days in the previous 2 years receive $100 per day for each additional deployment day [6]. Officials called the plan the PERSTEMPO Program, and the new pay is referred to variously as Burdensome Tempo Pay

[5] This definition was established in U.S. Code, Title 10, Section 991.

(BTP), High Deployment Per Diem, or Individual Tempo (ITEMPO) pay. As implemented, those with a deployment PERSTEMPO event will accrue high-deployment days. Even 1 day away from home adds to the counter, and deployments need not be of a certain length to qualify.[6] Deployment PERSTEMPO events, all of which include temporary duty assignments, are:

- Operations
- Named exercises
- Unit training
- Home station training in a field environment or in the local operating area of a ship or vessel
- Mission support temporary duty assignments such as meetings, conferences, staff visits, and staff augmentation.

Nondeployment PERSTEMPO events, which don't count toward the per diem, include individual training and schools (including temporary duty assignments), duty (such as guard duty within the garrison or home port), hospitalization, discipline, muster duty, and funeral honors duty.

This broader definition of deployment serves as a better approximation of time away from home than the historical meaning of the term because it encompasses the away time that is frequently associated with military service, such as absences due to temporary duty assignments, cross-decking, and short-term missions. Throughout this paper, when we use the terms deployment or deployed time, we will refer to this broader definition—that is, any days away from home when performing service in a training exercise or operation.

Another issue in defining time away from home is identifying what constitutes home. People may consider their homes to be somewhere other than their units' home bases or their places of legal residence. For example, a nuclear family may be left at a previous location and families of origin or in-laws may live in other locations. Official residences may not be where a member feels at home if they are chosen for tax purposes or as a future retirement home. In some cases, a deployment or temporary assignment away from home base may actually move an individual closer to loved ones. Whether and how all these nuances can be fully incorporated into a pay element isn't clear.

[6] This pay was recently suspended because of the military action in Afghanistan. See [7].

DEVELOPING A DEPLOYMENT PAY STRUCTURE

After identifying deployment time and developing measures to account for this time, one needs to consider the structure of deployment pay.

Length of Time Away

Several structural elements warrant examination. For example, at what point in time does hardship become onerous enough to require extra compensation? Should a deployment pay include stepwise increases as time away lengthens? If law establishing a deployment pay allows—but does not mandate—graduated pay rates, the services could decide this question themselves and even change the trigger points as service needs and member preferences evolve.

Should the accumulation of all deployed days matter (so that multiple short spells away count the same as fewer, more lengthy spells), or should a deployment pay reward frequent deployments and lengthy deployments differently? In some cases, the higher pace of operations associated with shorter, more frequent absences could pose a greater hardship than with longer, less frequent absences if the trips are numerous and their timing is unpredictable.

Another option is not to base the pay on days deployed, but to use a proxy, such as assignment to a sea-duty billet. The DoN's sea pay is paid for an entire sea tour, which typically includes at least one 6-month deployment, other short spells away from homeport, and time spent in homeport. Thus, sea pay is not just a deployment pay, but uses a sea tour as a proxy for an assignment in which a significant amount of time is spent deployed. This alleviates the need to count days, but prevents using a graduated scale.

Planned vs. Unplanned Absences

Should the pay also give different rewards for unexpected deployments? Unplanned spells away from home probably impose greater hardships than deployments that are announced in time to allow advance planning. The Air Force's idea of placing certain units on-call might require a pay that compensates personnel for uncertainty, regardless of actual time deployed.[7]

[7] In the private sector, this is often called “sleeper” or “standby” pay, which is separate from “call-in” pay received when an employee is actually called to perform work.

The Role of Dependency Status

Under current military policies, service members must have dependents and be subject to an enforced family separation—that is, an assignment to which they are not allowed to bring dependents—in order to receive the Family Separation Allowance. For someone with a spouse, children, or other dependents, the hardships of being away from home are obvious and the enforced separation is easily identifiable. But single members on deployments also experience hardships, including those associated with separation from loved ones, paying bills, arranging pet care, breaking leases, and storing autos and other possessions. In addition, some hardships of deployments, such as danger and arduous working conditions, are the same whether a person is single or married. Ensuring perceived equity should include consideration of the way in which these allowances are disbursed.

PAYS USED TO COMPENSATE FOR DEPLOYMENT-RELATED HARDSHIPS

Although an explicit military deployment pay does not currently exist, a variety of existing pays historically have been used to compensate for hardships associated with deployments (see table 1).[8] In this section, we describe these pays and examine their prevalence and use to date. Because they aren't, strictly speaking, deployment pays, we refer to them as "away pays."

[8] Table 1 describes what each pay is for, who receives it, what the typical amount is, and its FY01 budget for all services. The table entries are brief and may leave out many of the nuances regarding who qualifies for a pay and how it's paid. Also, it concentrates on the enlisted force. Please see the text of this section for full details and information on officers.

Table 1. Summary of Existing Away Pays

Pay	Paid for	Amount	Varies with	Other Restrictions	FY01 Budet ($M)[a]
Career Sea Pay[b]	Assignment to ship	$50- 520/month, avg., $200 for E-6	Paygrade and cumulative sea duty	Paygrade E-4 and above	216 combined
Carrier Sea Pay Premium[c]	Extensions at sea beyond 36 months	$100/month	Fixed	Paid to E-4s and a few E-5's and above	
Submarine Duty Pay	Operational sub duty for lower PGs, sub qualification for higher PGs	$75-$355/ month, avg. $230 for E-6	Paygrade and years of sub service		46
Family Separation Allowance	Enforced family separations	$100/month prorated daily	Fixed	Must have spouse and/or dependants, be away for > 30 days	84
Hostile Fire/Imminent Danger Pay	Subjected to hostile fire or hostile mine	$150/month	Fixed	IDP plus HDP-L shouldn't exceed $250/month	28
Hardship Duty Pay - Mission	Designated hard-ship mission, e.g., POW remains recovery	$150/month	Fixed		26 combined
Hardship Duty Pay - Location	Poor living conditions	$50-$150/ month	Severity of hardships	OCONUS locations[d]	
Overseas Tour Extension incentive Pay	Extending OCONUS tour at least 1 year	$80/month or extra leave[e]	Fixed	Paid to specific MOSs	5
Combat Zone Tax Exclusion	Serving in designated combat zone	Taxes on basic and some special pays	Income level	Officer income exclusions have upper limits	N/A
Burdensome Tempo Pay	Days deployed in excess of 400/730	$100/day	Fixed		0 for 2001

[a] *The amounts are in millions of dollars and are enlisted military personnel appropriations only.*
[b] *These amounts and restrictions were in effect before 1 October 2001. See the CSP section for a description of changes since that time.*
[c] *These amounts and restrictions were in effect before 1 October 2001. See the CSPP section for a description of changes since that time*
[d] *Permanent duty assignments collect pay from first day. TAD/TDY must be there at least 30 days; then collect pay retroactively.*
[e] *Some locations and MOSs qualify for $2,000 lump sum payments.*

CAREER SEA PAY (CSP)

Career Sea Pay (CSP or sea pay)—one of the military's oldest special pays—is perhaps most similar in nature to a deployment pay.[9] Most eligible service members, however, receive sea pay over their entire sea duty tour, not just when deployed. Anybody meeting the criteria for sea pay may receive it, but it is paid primarily to Sailors on naval sea duty. The current rationale underlying sea pay is that it serves as a distribution and retention tool, increases fleet readiness, and compensates for the inherent hardships of all phases of sea duty.

According to U.S. Code, Title 37, Section 305a, sea duty qualifying for sea pay is duty performed by a service member while permanently or temporarily assigned to a ship, the primary mission of which is accomplished while under way, or

- While serving as a member of the off-crew of a two-crew submarine; or
- While serving as a member of a tender-class ship (with the hull classification of submarine or destroyer); or
- While permanently or temporarily assigned to a ship and while serving on a ship, the primary mission of which is normally accomplished while in port, but only when the ship is away from its home port (which it defines as (a) at sea or (b) in a port that is more than 50 miles from its home port); or
- While permanently or temporarily assigned to a ship-based staff or other unit (at the discretion of the Secretariat).

In general, crews on deploying ships and submarines are eligible for continuous sea pay, whereas Sailors in squadrons and ship-based staffs can only receive sea pay while deployed at sea.

Before 1 October 2001, the amount of CSP service members received varied between $50 and $520 per month and was based on rank and years of cumulative sea duty. Enlisted received $50 to $520 monthly, warrant officers received $130 to $500 monthly, and officers received $150 to $380 monthly. Those below paygrade E-4 and officers with less than 3 years of cumulative sea duty were not eligible for CSP. Table 2 shows CSP amounts previously payable to enlisted personnel.

[9] For a complete discussion of the history of sea pay and its effectiveness as a distribution and retention tool, see [1].

It is estimated that the Navy (which makes the majority of all sea pay expenditures) spent about $211.3 million on sea pay in FY01. Almost 95 percent of these expenditures went to enlisted Sailors, with the balance going to warrant officers and commissioned officers.

Although rates for sea pay were previously set in Title 37, Section 305a, of the U.S. Code, the FY01 NDAA changed this practice. Instead of requiring congressional action, rates can now be set—within prescribed boundaries—by the service secretaries. The maximum allowable sea pay rate has been initially set at $750.

Effective 1 October 2001, the Navy fundamentally restructured its sea pay program. Under this reform measure (referred to as enhanced sea pay), existing CSP rates increased (the top rate is now $700 per month) and CSP was extended to E-1–E-3 enlisted and officers with less than 3 years of sea duty. Table 3 reports CSP amounts currently available to enlisted service members under enhanced sea pay.

Table 2. Enlisted Monthly CSP by Paygrade, Effective July 2000

Cumulative Years of Sea Duty	CSP by Paygrade ($)				
	E-4	E-5	E-6	E-7 and E-8	E-9
1 year or less	50	50	100	100	100
Over 1 year	60	60	100	100	100
Over 2 years	120	120	120	120	120
Over 3 years	150	150	150	175	175
Over 4 years	160	170	170	190	190
Over 5 years	160	315	315	350	350
Over 6 years	160	325	325	350	350
Over 7 years	160	350	350	375	375
Over 8 years	160	350	350	390	390
Over 9 years	160	350	365	400	400
Over 10 years	160	350	365	400	400
Over 11 years	160	350	365	410	410
Over 12 years	160	350	380	420	420
Over 13 years	160	350	395	450	450
Over 14 years	160	350	410	475	475
Over 16 years	160	350	425	500	520
Over 20 years	160	350	425	500	520

Table 3. Enlisted Monthly CSP for Paygrades E-1 through E-9, Effective 1 October 2001

Cumulative Years of Sea Duty	CSP by Paygrade ($)								
	E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9
1 year or less	50	50	50	70	70	135	135	135	135
Over 1 year	50	60	60	80	80	135	135	135	135
Over 2 years	50	75	100	160	160	160	160	160	160
Over 3 years	50	75	100	280	280	280	305	305	305
Over 4 years	50	75	100	290	300	300	320	320	320
Over 5 years	50	75	100	290	315	315	350	350	350
Over 6 years	50	75	100	290	325	325	350	350	350
Over 7 years	50	75	100	290	350	350	375	375	375
Over 8 years	50	75	100	390	450	450	490	490	490
Over 9 years	50	75	100	390	450	460	500	500	500
Over 10 years	50	75	100	390	450	465	500	500	500
Over 11 years	50	75	100	390	450	465	510	510	510
Over 12 years	50	75	100	390	450	480	520	520	520
Over 13 years	50	75	100	390	450	495	550	550	550
Over 14 years	50	75	100	390	450	510	575	575	575
Over 16 years	50	75	100	390	450	525	600	600	620
Over 18 years						550	600	620	620
Over 20 years	50	75	100	390	450				

CAREER SEA PAY PREMIUM (CSPP)

Established in 1981, the Career Sea Pay Premium (CSPP) was created as a means of encouraging sea duty extensions and rewarding lengthy sea tours.

Before 1 October 2001, the CSPP was payable for 36 or more consecutive months of sea duty, and was available to all enlisted Sailors in paygrade E-4 and Sailors in paygrades E-5 and above with less than 5 years of cumulative sea duty. All warrant officers and commissioned officers who qualified for CSP were also eligible for the CSPP. The CSPP rate was fixed at $100 a month.

The Navy spent an estimated $15.5 million on CSPP—91 percent of which went to enlisted Sailors—in FY01.

As described above, legislative changes made through the FY01 NDAA allowed the service secretaries to determine CSPP rates. The maximum allowable CSPP rate has been initially set at $350.

Effective 1 October 2001, CSPP rules changed as part of enhanced sea pay. Although the payment is still fixed at $100 a month, qualifying enlisted E5-E9 personnel now receive CSPP as a separate payment through the seventh year of sea duty. With over 8 years of sea duty, the premium is embedded into the E5-E9 CSP table and is not contingent on consecutive time at sea.

Enhanced sea pay (which includes the CSP increase and changed rules for CSPP) is anticipated to increase enlisted Navy sea pay costs by $93 million annually [1]. These changes imply a substantial increase in the amount of sea pays available to service members serving aboard ships and submarines. For example, using data on average sea tour lengths and conservative assumptions on promotion rates, [8] estimates that an MS could earn an additional $10,420 (in unadjusted current dollars) over a 20-year career.

SUBMARINE DUTY PAY (SDP)

Authorized under U.S. Code, Title 37, Section 301c, Submarine Duty Pay (SDP) is designed to attract and retain volunteers for submarine duty on a career basis. Two types of SDP are offered—continuous and operational.

Active-duty members with less than required minimum amounts of submarine service receive operational SDP if they frequently perform regular operational submarine duty. Service members earn operational SDP on a prorated, day-for-day basis for any period of time in which they are attached under orders to operational submarine duty, whether temporarily or permanently. Both the Blue and Gold crews of ballistic missile submarines get operational SDP.

Continuous monthly SDP is given to active-duty naval officers and enlisted personnel through 26 years of service who hold a submarine duty designator and remain in the submarine service on a career basis. This pay is given to career submarine personnel with 12 to 18 years of submarine service, regardless of whether their current assignment is to an operational submarine. Members are entitled to this pay, however, only if they performed a minimum amount of operational submarine duty over earlier

years of submarine service.[10] The minimums are either 6 of the first 12 or 10 of the first 18 years of submarine service. Someone who fails to meet these minimums loses his or her entitlement to continuous SDP, but may still qualify for operational SDP.

In practice, all personnel assigned to operational submarines receive incentive pay during their assignment. In addition, career submarine personnel (at least 12 years of submarine service) with enough cumulative operational duty (at least 6 years) get continuous SDP regardless of their assignment. From this description, it is clear that operational SDP compensates for duty that requires deployed time, but continuous SDP will be received regardless of whether a member is in an operational, deployed position. For our purposes, it would be ideal to separate out the deployment-related portion of this pay, but neither the budget nor the JUMPS data available are detailed enough to make this possible.

Current enlisted SDP rates vary by paygrade and years of submarine service from $75 monthly for E1s to $355 monthly for E9s. Officer SDP rates also vary by rank and years of service, from $175 monthly for an O-1 new to submarine service to a maximum of $595 for most O-3s and O-6s, then back down to $355 for O-7s to O-10s.

FAMILY SEPARATION ALLOWANCE (FSA)

Authorized under Title 37, Section 427, of the U.S. Code, the Family Separation Allowance (FSA) compensates service members with dependents for additional expenses incurred because of an enforced family separation of over 30 consecutive days.[11] The allowance is payable to qualified people serving either inside or outside the United States, but is not authorized when under permissive orders.

[10] Continuous SDP can be paid for the first 22 vice 28 years of service, if somewhat less time is spent in operational duty over the first 18 years.

[11] Effective 23 September 1996, service member couples with no other dependents are entitled to FSA, provided the couple resided together immediately before being separated by reason of execution of military orders. Not more than one monthly allowance may be paid with respect to a married military couple for any month. Each may be entitled to FSA within the same month, but both cannot be simultaneously entitled. Payment will be made to the person whose orders resulted in the separation. If both service members receive orders requiring departure on the same day, payment will go to whoever is senior.

FSA has three subcategories:[12]

- **FSA-R** is authorized when someone is transferred to a restricted station where transportation of dependents is not authorized at government expense and the dependents do not live at or near the service member's permanent duty station (PDS) or home port.
- **FSA-S** is authorized when someone is on duty aboard a ship that is away from its home port continuously for more than 30 days.[13] Effective 20 June 1994, a service member is also entitled to continuous FSA-S if he or she returns home from an initial deployment for a period of 30 days or less and then deploys again for a period of more than 30 days.
- **FSA-T** is authorized when someone is on temporary duty (TDY) or temporary additional duty (TAD) away from the PDS, including TDY/TAD aboard ship, continuously for more than 30 days, and their dependents do not reside at or near the TDY/TAD station. This includes people who are required to perform a period of TDY before reporting to their initial station of assignment. Effective 20 June 1994, a service member is entitled to continuous FSA-T if he or she returns home from an initial deployment for a period of 30 days or less and then deploys again for a period of more than 30 days.

Before 1 October 1980, FSA was payable only to enlisted in paygrades E-4 (over 4 years service) and above with dependents. After that date, FSA became payable to all enlisted with dependents. On 23 September 1996, FSA also became payable on behalf of active duty spouses.

FSA, which was $60 per month from 1 October 1985 to 14 January 1991, and $75 per month from 15 January 1991 to 1 January 1998, now stands at $100 per month and is prorated daily.

[12] Although a service member may qualify for more than one type of FSA in any given period, he or she may not receive more than one FSA payment for that period. Previously, the FSA described here was named FSA-II.

[13] Between 1 December 1994 and 9 February 1996, dependents were required to live in the vicinity of the home port or PDS. This requirement was lifted as of 10 February 1996.

HOSTILE FIRE/IMMINENT DANGER PAY (HF/IDP)

Hostile Fire/Imminent Danger Pay (HF/IDP) is authorized under Title 37, Section 310, of the U.S. Code. A service member is entitled to HF/IDP for a month during any part of which he or she is:

- Subjected to hostile fire or explosion of a hostile mine
- On duty in an area close to a hostile fire incident and the service member is in danger of being exposed to the same dangers actually experienced by other service members subjected to hostile fire or explosion of hostile mines
- Killed, injured, or wounded by hostile fire, explosion of a hostile mine, or any other hostile action.
- On official duty in a designated IDP area.

In the wake of the terrorist actions of 11 September 2001, the pay was recently extended to individuals at the Pentagon or at the World Trade Centers during the attacks. HF pay was made available for the month of September—those hospitalized with injuries can receive the pay for up to 3 additional months or for the period of hospitalization, whichever is less [9].

From 1 October 1985 through 31 July 1990, the monthly HF/IDP rate was $110.00. This rate was increased to its current amount of $150.00 as of 1 August 1990.

In practice, most HF/IDP goes to personnel serving overseas in areas where terrorism or wartime conditions pose a threat. There should be some indication of impending danger, not just a foe with a theoretical capability.

Although no law requires that HDP-L and HF/IDP locations be distinct, areas were originally designated in this way. New HF/IDP zones created in response to the 11 September 2001 attacks, however, encompass areas of Central Asia and the Middle East that are also still eligible for HDP-L pay. In these areas, the HDP-L amount recently was reduced below the maximum amount allowable [10].

HARDSHIP DUTY PAY (HDP)

As its name indicates, Hardship Duty Pay—which replaces the former Foreign Duty Pay or Certain Places Pay—is designed to compensate for hardships associated with location or mission. Authorized under Title 37,

Section 305, of the U.S. Code, HDP is in this respect similar in purpose to the arduous duty concept underlying sea pay.

The two types of HDP are HDP-Mission (HDP-M) and HDP-Location (HDP-L). The total of the two pays cannot exceed $300 per month.

HDP-M

Created in FY99, HDP-M is payable to service members—either officer or enlisted—who perform a designated hardship mission. Currently, this pay is available only to people assigned to, on temporary duty with, or otherwise under the Defense Prisoner of War/Missing Personnel Office, the Operational Control of the Joint Task Force-Full Accounting, or the Central Identification Lab-Hawaii, which perform investigative duty or recover U.S. service members' remains in remote, isolated areas. HDP-M designated areas include Laos, Cambodia, Vietnam, and North Korea.

The FY01 HDP-M pay rate for all grades is $150.[14] HDP-M is payable for each month, during any part of which the service member serves in the designated hardship area.

HDP-L

Implemented in January 2001, the current HDP-L replaced Certain Places Pay (CPP) or Foreign Duty Pay (FDP). The 2001 change included substantial modification of eligibility criteria and rates.

Authorized under Title 37, Section 305, of the U.S. Code, HDP-L is available to all service members—not just enlisted, as was the case with its predecessor pays—in land or ice shelf areas outside the contiguous United States where living conditions are deemed to be substantially below the standard of service assignment areas within the contiguous United States. The criteria for HDP-L designation include hardship associated with the physical environment (including physical isolation, climate, and social isolation), living conditions (including sanitation and disease, medical and hospital facilities, housing, food, recreational facilities, and community facilities), and personal security and related factors (including political violence, crime, and political harassment).

Initial hardship locations mirror those that the U.S. State Department has designated as eligible for the Hardship Differential for Federal

[14] Defense Finance and Accounting Service, *2000 Military Pay Rates, Complete Active Duty and Reserve Monthly Pay Tables* (including Special Pay). http://www.dfas.mil/money/milpay/pay.

Civilian Employees. Defense Department designations differ from State Departments in areas eligible for Imminent Danger Pay or when:

- Military location/living conditions differ from those for state department civilians,
- The military location has no state department presence.

In these areas, local commanding officers assess these factors using the DoD Hardship Location Assessment Questionnaire.

Service members permanently reassigned to a designated HDP-L area are eligible for HDP-L from their day of arrival. Those assigned temporary duty in an HDP-L area are not eligible for the pay for the first 30 days, but receive the pay retroactively after that period [11]. Unlike its earlier incarnations, HDP-L is also available to those receiving sea pay. FY01 HDP-L pay rates vary by the severity of the location's hardships and are set at $50, $100, or $150 per month, which is significantly above the $8 to $22.50 per month previously available.

Overseas Tour Extension Incentive Pay (OTEIP)

Begun in 1981, the Overseas Tour Extension Incentive Pay (OTEIP) program is a monthly incentive offered to enlisted soldiers in specific military occupational specialties (MOSs) who extend their current OCONUS tour for at least 1 year. Authorized under Title 37, Section 314, and Title 10, Section 705, of the U.S. Code and reviewed yearly, the program is designed to improve personnel retention, enhance readiness, and increase stabilization and turnaround time between OCONUS assignments. The OTEIP program is used as a distribution tool for either short-term or hard-to-fill OCONUS assignments and, consequently, reduces PCS expenditures.

Service members are eligible for the OTEIP program if they:

- Are enlisted and entitled to basic pay
- Possess a specialty and skill that is on the current OTEIP MOS list
- Have completed a tour of duty at a location outside the 48 contiguous states and the District of Columbia that qualifies them for the OTEIP program
- Execute an agreement to extend the foreign service tour for at least 1 year.

Through the program, eligible service members may choose one of the following entitlements:

- Special pay of $80 per month for the length of the extension
- 30 days consecutive non-chargeable leave
- 15 days consecutive non-chargeable leave and round-trip transportation to CONUS and return for the soldier only
- $2,000 in one lump sum (limited to Korea and other OCONUS shortage MOSs).

COMBAT ZONE TAX EXCLUSION (CZTE)

CZTE, as enacted in Title 26, Section 112, of the U.S. Code, allows military personnel who serve in a qualified combat zone[15] to exclude certain pay from their income for tax purposes.[16] A service member is entitled to CZTE if he or she served in the combat zone or was hospitalized as a result of wounds, disease, or injury incurred while serving in the combat zone.[17] If a service member serves in a combat zone for 1 or more days during a particular month, he or she is entitled to an exclusion for that entire month. If, as a result of serving in a combat zone, a person becomes a prisoner of war or is missing in action, that person is considered to be serving in the combat zone.

Several types of military service do not qualify as service in a combat zone. These include:

- Presence in a combat zone while on leave from a duty station located outside the combat zone

[15] A combat zone is any area the U.S. President designates by Executive Order as an area in which the U.S. Armed Forces are engaging or have engaged in combat. An area usually becomes and ceases to be a combat zone on the dates the President designates by Executive Order

[16] http://www.irs.ustreas.gov/plain/forms_pubs/pubs/p303.htm and http://uscode.house.gov/usc.htm, search for Title 26, Section 112.

[17] The exclusion of military pay while hospitalized does not apply to any month that begins more than 2 years after the end of combat activities in that combat zone. Service in a combat zone includes periods during which someone is absent from duty because of sickness, wounds, or leave. Certain types of military service outside a combat zone also qualify as service performed in a combat zone. These include service in direct support of military operations in the combat zone; service qualifying the service member for HF/IDP if other CZTE requirements are met; and service for which you get HF/IDP if the basis for getting HF/IDP is danger or risk in the combat zone.

- Passage over or through a combat zone in a non-duty status during a trip between two points that are outside a combat zone
- Presence in a combat zone solely for personal convenience.

In practice, CZTE is applied over carefully delineated geographic regions and periods of time. It is meant to be a supplement to HF/IDP when conditions are even more dangerous and to eliminate the need to file tax returns when operating under combat conditions. In the past, Korea and Vietnam received CZTE. Since 1991, CZTE has been applied to the Persian Gulf area, including the Red Sea, the Gulf of Oman, portions of the Arabian Sea and the Gulf of Aden, and the total land areas of Iraq, Kuwait, Saudi Arabia, Oman, Bahrain, Qatar, and the United Arab Emirates.

Congress has, however, added some areas with peacekeeping operations to the list of CZTE-eligible areas: Bosnia and Herzegovina, Croatia, and Macedonia in 1995, and the Federal Republic of Yugoslavia (Serbia/Montenegro), Albania, the Adriatic Sea, and the Northern Ionian Sea in 1999. In response to the 11 September 2001 attacks, the addition of more areas is currently under consideration [12].

Exclusion Amounts

Enlisted personnel and warrant officers can exclude the following amounts from their income:

- Active duty pay earned in any month served in a combat zone.
- HF/IDP
- A reenlistment bonus if the voluntary extension or reenlistment occurs in a month in which the service member served in a combat zone.
- Pay for accrued leave earned in any month in which the service member served in a combat zone.
- Pay received for duties as a member of the Armed Forces in clubs, messes, post and station theaters, and other nonappropriated fund activities. The pay must be earned in a month served in a combat zone.
- Awards for suggestions, inventions, or scientific achievements to which the service member is entitled because

of a submission made in a month he/she served in a combat zone.

- Student loan repayments that are attributable to a service member's period of service in a combat zone (provided a full year's service is performed to earn the repayment).

Officers can also exclude these amounts from military pay; however, the exclusion is limited to the maximum enlisted pay plus the amount of HF/IDP received.

Combat Zone/Military Action Forgiveness

If someone dies while on active service in a combat zone—from wounds, disease, or other injury received in a combat zone, or as a result of military action—the decedent's entire income tax liability is forgiven for the year in which the death occurred, and for any prior taxable year the member served in the combat zone. Any forgiven tax liability that has been paid will be refunded, and any unpaid tax liability at the date of death will be forgiven. In addition, any unpaid taxes for prior years will be forgiven and any prior year taxes that are paid after date of death will be refunded. The forgiveness provision also applies to people serving outside the combat zone if they meet the necessary eligibility criteria.

BURDENSOME TEMPO PAY (BTP)

Outlined in Title 37, Section 435, of the U.S. Code, Burdensome Tempo Pay (BTP), also called High Deployment Per Diem or Individual Tempo (ITEMPO) pay, was passed by Congress to create a strong incentive for the services not to overwork their troops.

First created in the FY00 NDAA, BTP was initially required for service members deployed for more than 250 out of 365 days. By law, these people would receive an additional $100 a day while still deployed. The legislation also required that each person's deployment days be individually tracked as of 1 October 2000. "Gates" that required flag approval at 182 and 220 deployment days out of 365 were put into place to ensure adequate deployment management.

As discussed earlier in this paper, for the purposes of the legislation, a day of deployment was defined as

> any day on which pursuant to orders the member is performing service in a training exercise or operation at a location or under circumstances that make it impossible or infeasible for the member to spend off-duty

> time in the housing in which the member resides when on garrison duty at the member's PDS.[18]

This definition included temporary duty assignments in support of command administration and functions. Exceptions were days spent in school or watchstanding at one's PDS.

The FY01 NDAA modified these BTP conditions. It broadened the definition of a day of deployment to include days after a vessel leaves its home port. It also defined deployment for reservists, and added exemptions for those hospitalized in the vicinity of their PDS, home port, or permanent residence and those subject to disciplinary action. Under the new law, members are entitled to receive an additional $100 a day for deployment days in excess of 400 out of 730 days. In August 2001, the House Armed Services Committee added a provision in its version of the 2002 defense authorization bill specifying that the special pay would be paid out of the Operation & Maintenance budget for the specific service of the eligible individual [13].

These matters were put on hold as a result of the conflict in Afghanistan. On 8 October 2001, Deputy Defense Secretary Paul Wolfowitz invoked the "national security waiver" authorized in the initial law, which suspends the payments. When the waiver is lifted, the services will resume counting people's deployed days where they left off [14].

OTHER PAYS

Several other pays could be used as compensation for being deployed, but they are used primarily for other purposes:

- Most people who get Flight Deck Duty Pay also get sea pay. So, if the sea pay compensates for time away, the extra Flight Deck Duty Pay compensates mostly for the extra danger associated with working on a flight deck.
- Special Duty Assignment Pay (SDAP), may be applied to billets that require spending time away from home, in certain circumstances. However, because it is mostly used for a variety of other purposes, we chose not to include it in our analysis.
- The Army has been targeting Selective Reenlistment Bonuses (SRBs) to people who reenlist to serve in certain hard-to-fill locations. SRBs could be used to compensate

[18] This definition comes from Title 10, Section 991, of the U.S. Code.

personnel for serving in billets that require high amounts of deployed time, but this isn't a common justification for SRBs.

USE OF CURRENT AWAY PAYS

In this section, we review the extent to which the services use existing pays that are similar to deployment pays in some way. Again, we refer to these pays as "away pays" because they aren't, strictly speaking, deployment pays.

We use two data sources:

- FY01 budget data[19]
- Actual pay data from Defense Finance and Accounting Service's Joint Uniform Military Pay System (JUMPS) files compiled by RAND for the 9th QRMC [15].

BUDGET DATA

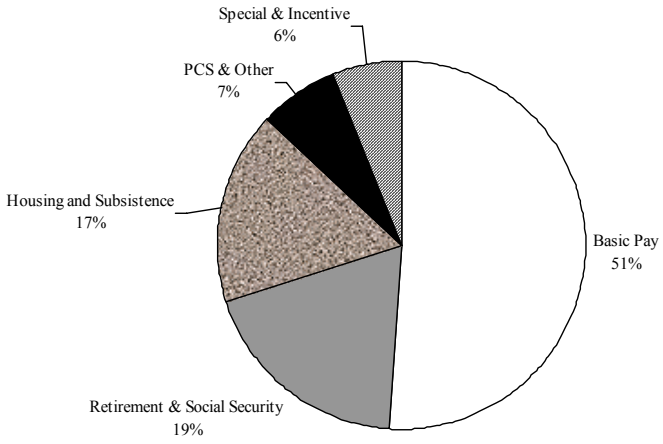
Figure 1 shows how all the services combined allocated their FY01 enlisted personnel budget across major pay categories. The appendix contains detailed data for each of the services. The first three categories—basic pay, retirement and social security, and housing and subsistence—account for 87 percent of enlisted personnel appropriations. This varies slightly by service: Marine Corps, 89 percent; Air Force, 87 percent; Army and Navy, 86 percent.

All of the away pays fall into the Incentive, Special, and Allowance (ISA) pay categories. Table 4 gives detail on all the pays in these categories and their magnitudes relative to other pay elements. All of the ISA pays together compose a small proportion of enlisted personnel budgets. ISA pays in the Army, Air Force, and Marine Corps are all between 5.3 and 6.0 percent of enlisted personnel budgets, whereas the Navy uses 8.7 percent of its budget on ISA pays. The biggest differences

[19] Budget data were obtained from the Defense Technical Information Center web site at http://www.dtic.mil/comptroller/fy2002budget/amendfy2002_m1.xls. The data are from the Amended FY 2002 President's Budget. The numbers we used are budget estimates for FY 2001, current as of June 2001.

between the Navy and the other services is in the use of sea and submarine pay and the amount available for reenlistment bonuses.

Figure 1: Components of Enlisted Pay, FY01 Military Personnel Appropriations[a]



a. Here Retirement and Social Security combines Retired Pay Accrual and Social Security Tax Payments; Housing & Subsistence combines Basic Allowance for Housing and Subsistence; Special & Incentive combines Incentive, Hazard & Aviation Career, Special Pays, and Allowances; Other is Permanent Change of Station Travel, Separation Pay, and Other. The appendix contains more detail on the subcategories and data sources.

The pays that we have classified as related to deployment time are shown in bold in table 4. For all services combined, away pays are just under 1 percent in FY01 enlisted personnel budgets. Again, Navy is higher at 2.2 percent, and the other services are all around 0.2 to 0.4 percent. For the services as a whole, then, away pays are less than 1 percent of the enlisted personnel budget. Even for the Navy, whose Sea and Submarine Duty Pay are two of the larger deployment-related pays, existing away pays are just over 2 percent of the enlisted personnel budget.

If away pays are to be reformed, an important issue to address is whether this small expenditure is sufficient, or whether relatively more of the military personnel budget should be spent compensating people who spend time deployed. Even just bringing the other three services up to the Navy's 2.2-percent level would require spending another $600 million on away pays.

Table 4. Enlisted Incentive, Special, and Allowance (ISA) Pays (FY01 budget estimates in millions of dollars)[a]

	Army	Air Force	Navy	Marine Corps	All Services
Uniform/Clothing Allowance	226	122	185	80	612
Reenlistment Bonus	110	142	267	57	575
Station Allowance Overseas	100	162	138	66	465
Enlistment Bonus	147	120	105	8	381
Sea Duty[b]	**1**	**0**	**201**	**3**	**204**
Special Duty Assignment Pay	60	24	66	20	170
Education Benefits	121	0	28	20	170
Family Separation Allowance	**33**	**11**	**28**	**11**	**82**
Parachute Jump Pay	57	2	6	1	66
Flying Duty Pay	7	25	14	4	51
Submarine Duty	**0**	**0**	**47**	**0**	**47**
Hardship Duty Pay	**27**	**8**	**7**	**2**	**44**
Loan Repayment	33	0	0	0	33
Foreign Language Proficiency Pay	20	7	5	1	33
Other	3	5	21	2	32
Hostile Fire Pay	**3**	**10**	**0**	**4**	**17**
Diving Duty Pay	1	1	12	1	15
Demolition Pay	2	2	5	1	10
CONUS COLA	2	1	2	1	7
Overseas Extension Pay	**3**	**0**	**1**	**3**	**6**
Total ISA Pays	957	641	1,137	285	2,904
Total Away Pays	**67**	**28**	**283**	**23**	**400**
All Other Pays	14,870	11,339	11,925	5,057	43,190
Total Military Personnel Budget	15,826	11,980	13,061	5,342	46,210
Percent ISA	6.0	5.4	8.7	5.3	6.5
Percent Away Pays	**0.4**	**0.2**	**2.2**	**0.4**	**0.9**

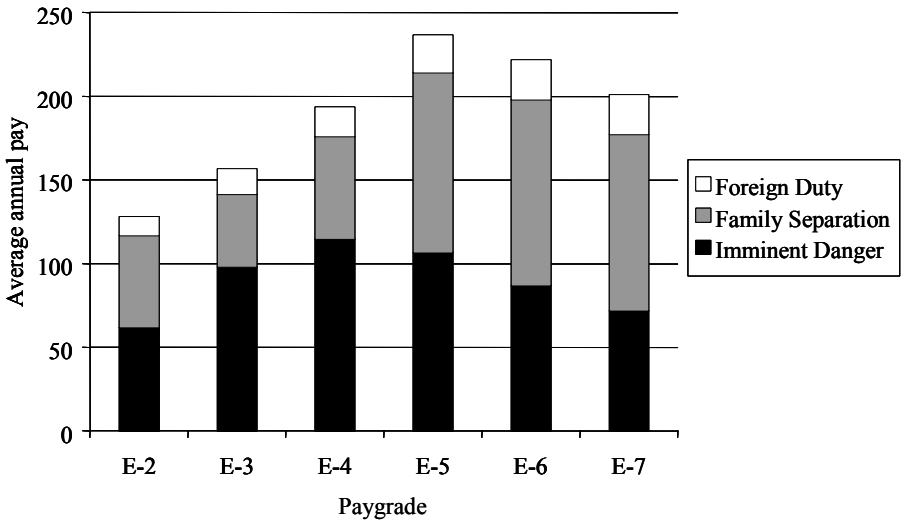
a. Source: These figures are all accessible from the DTIC defense budget web page, www.dtic.mil/comptroller/fy2002budget/index.html. From there, follow the links to detailed budget materials for individual services.

b. Bold entries identify the pays that we have classified as related to deployment time.

ACTUAL PAY DATA

In this section, we use actual pay data from 1999 Defense Finance and Accounting Service's JUMPS files to illustrate differences in the types of away pays offered across the services. Figures 2 through 5 show average annual amounts of away pay by paygrade for each service.[20] These averages are taken over everyone in the paygrade, regardless of whether they receive away pays. Thus, the amounts in the charts reflect both how many people receive the pay and the amount each recipient is paid.

Figure 2. Army: Average Annual Away Pay[a]



a. Source: 1999 JUMPS data as tabulated by RAND.

[20] All of the charts refer to HDP-L as Foreign Duty Pay because the older pay was still in effect in 1999. Each of the services had a small "other" category, never over $10 per year, that has been omitted for clarity.

Figure 3. Air Force: Average Annual Away Pay[a]

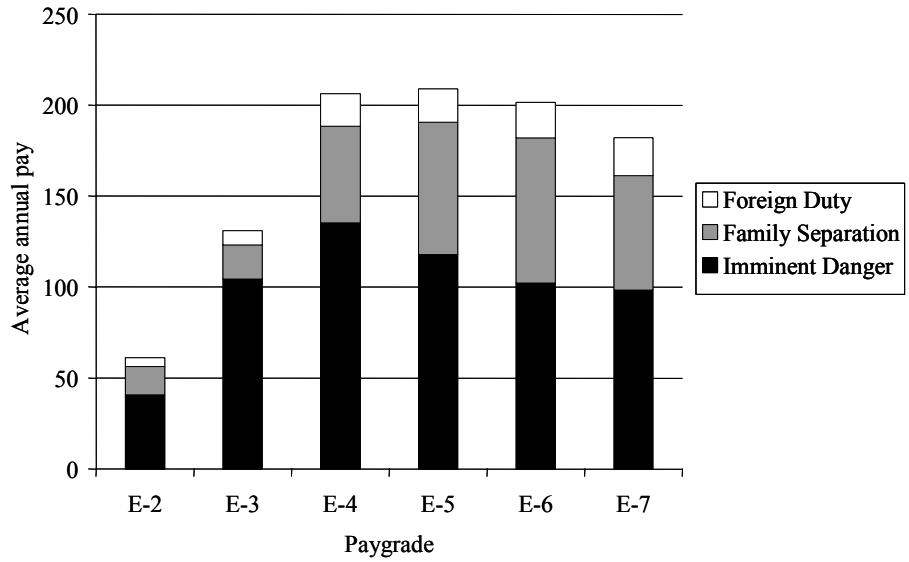
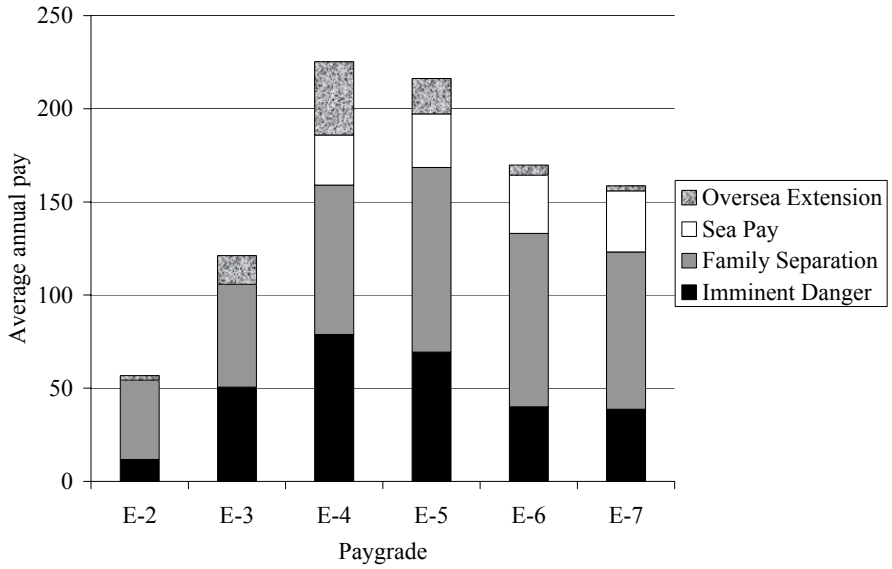
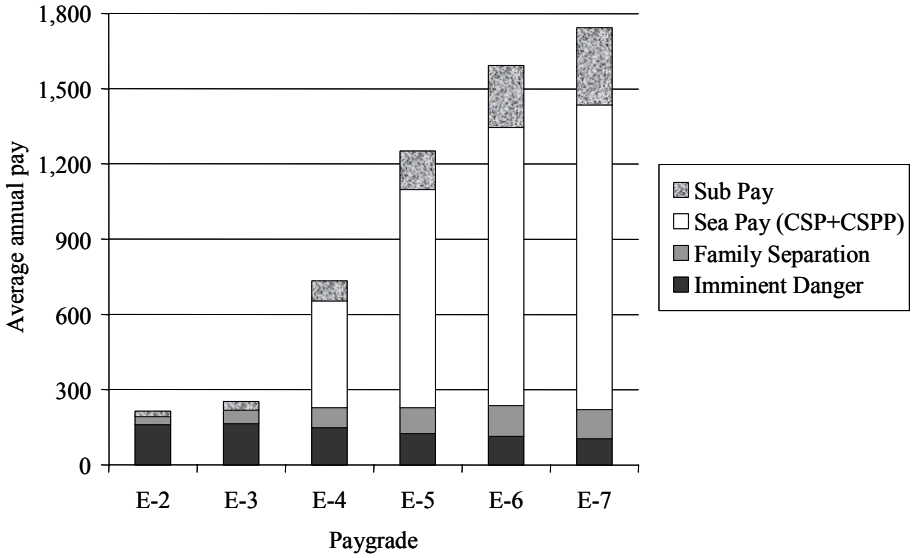


Figure 4. Marine Corps: Average Annual Away Pay[a]



[a] *Source: 1999 JUMPS data as tabulated by RAND.*

Figure 5. Navy: Average Annual Away Pay[a]



[a] *Source: 1999 JUMPS data as tabulated by RAND.*

The Army and Air Force away pay figures are most similar in structure. Both peaked in average amount for an E-5, the Army at about $240 per year and the Air Force at about $210. Both of them paid most of their away pays in Imminent Danger Pay and Family Separation Allowances. Foreign Duty Pay accounted for a relatively small share of the average amount of away pays for these services, a trend that will likely change in the future because HDP-L pay rates were increased substantially earlier this year.

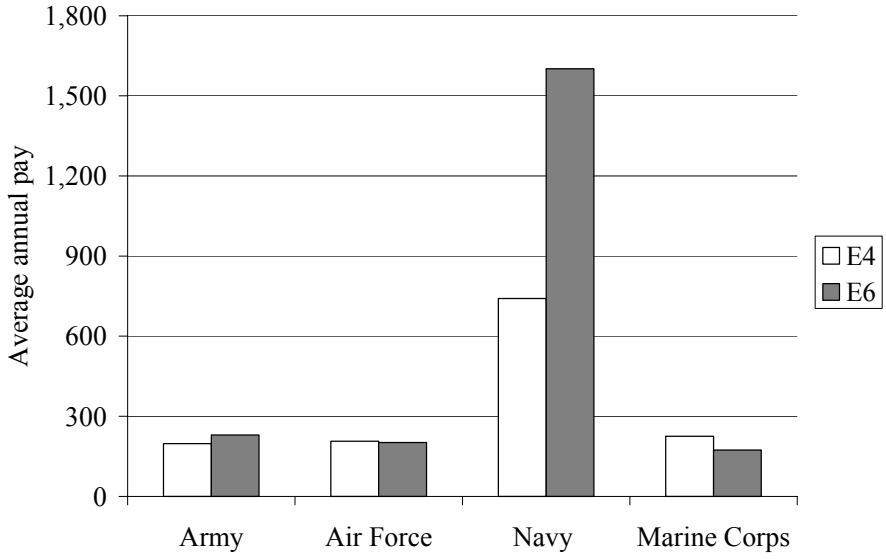
Marine Corps average annual away pays are similar in magnitude to those of the Army and the Air Force, but they differ somewhat in structure. The average away pay amount peaks earlier, at E-4, at $225 per year, stays close to this level for E-5s, then falls away more rapidly at higher paygrades.[21] Although Marines receive negligible amounts of Foreign Duty Pay, sea pay and OTEIP help to bring the total average amount of away pays received by Marines closer to the average received across paygrades in the Air Force and in the Army.

[21] We omitted E-8s and E-9s from these charts to make them easier to read, but the Marine Corps' sharp decline in deployment-related pays at higher paygrades continues through E-8 and E-9. In the Air Force, E-8s are much the same as E-7s, but away pay falls sharply at E-9. In both the Army and the Navy, away pays don't change much from E-7 through E-9.

Compared to the other services, the Navy offers considerably more away pay due to the substantial average amount of sea pay and, to a lesser extent, submarine pay.[22] Because of these pays, the total amount of Navy away pays do not peak; instead, they increase with paygrade through E-7.

Notice that the scale of figure 5 is different from that of figures 2, 3, and 4. As figure 6 shows, the average amount of away pays for an E-4 in the Navy is over 3 times higher than the average for any of the other services, and for an E-6 almost 8 times higher.

Figure 6. Average Away Pays by Service, Selected Paygrades[a]



[a] *Source: 1999 JUMPS data as tabulated by RAND.*

[22] Recall that these are averages across the entire service. Submarine pay averaged across everyone in the Navy is small because the submarine force is relatively small. For Sailors who actually pull the pay, however, the average amount of submarine pay is generally comparable to the sum of CSP and CSPP for Sailors who receive sea pay.

IS A NEW DEPLOYMENT PAY NEEDED?

In this section, we turn to the question of whether the current array of away pays is adequate, and, if not, what additional pays are needed. In particular, we will:

- Examine whether existing away pays meet the military's goals.
- Examine the structure and application of existing away pays.

ARE EXISTING PAYS ADEQUATE?

Although some existing special and incentive pays compensate for unique dangers and arduous conditions associated with some military jobs and locations, only a few pays—notably sea pay and FSA—recognize the time spent away from home alone which is characteristic of most military careers.

Table 5 shows the compensation goals met by existing pays and reveals that all the pays currently used to compensate for time away also have other purposes (refer back to table 1 for some of the restrictions placed on these pays):

- Sea pay is flexible enough to apply to much of the time that Sailors and Marines spend deployed, but not all DoN service members who are deployed qualify for sea pay. Some occupations, notably construction, serve on sea/shore rotations but are only eligible for sea pay for days spent under way. Furthermore, the other services also deploy, but do not have an equivalent to sea pay.
- HDP-L is only paid for locations with multiple hardships. Being away from home can be one qualifying factor, but there also must be other hardships.
- FSA is paid only to people with dependents.
- BTP covers only extremely long periods of time deployed, and few people are expected to qualify for the pay, which has temporarily been suspended due to the military action in Afghanistan.
- No existing pays compensate for frequent, shorter deployments or for unanticipated deployments.

Table 5. Goals and Features of Existing Away Pays

Pay	Pay Intended to Compensate for		
	Deployment/ Away from Home	Danger	Other Hardships
Career Sea Pay	Yes		Rigors of sea duty
Career Sea Pay Premium	Yes		Long sea tours
Submarine Duty Pay	Yes		Rigors of submarine duty
Family Separation Allowance	Yes		
Hostile Fire/Imminent Danger Pay		Yes	On occasion
Hardship Duty Pay – Mission			Designated difficult/unpleasant missions
Hardship Duty Pay – Location	Yes	Yes	Yes (up to 3 hardships total)
Overseas Tour Extension Incentive Pay	Yes		
Combat Zone Tax Exclusion		Yes	
Burdensome Tempo Pay	Yes		Excessive time away

It is apparent from table 6 that current incentive pays do not fully address the needs of people who are deployed but are not on a ship or submarine, or who aren't subjected to other hardships.

Are Existing Pays Appropriately Structured?

The existing array of away, danger, deployment, and other hardship pays is complicated. As a result, people may not fully understand how they benefit from the pays. Furthermore, the pays are sometimes applied inconsistently, causing nonsensical results that may undermine the services' credibility or service members' morale.

Table 6 shows some examples of inconsistencies that existed in February 2000 among imminent danger and combat zone designations and the ability to bring families (an accompanied tour). This table highlights inconsistencies only; in other areas, the rules were applied consistently.

Table 6. Imminent Danger, Combat Zone, and Unaccompanied Tours

Country	Imminent Danger	Combat Zone	Accompanied Tour
Turkey	Yes	Yes	Yes
Jordan	Yes	(direct support) No	Yes
Qatar	Yes	Yes	Yes
Oman	No	Yes	Yes
Azerbaijan	Yes	No	No

Any new deployment pay should be integrated into existing pays so that troops in similar circumstances get the same benefits and any differences can be explained and defended. At the least, any area that qualifies for IDP or CZTE should not allow the presence of family members. In implementing the new HDP-L pay, DOD is addressing some inconsistencies by changing designations.

POLICY OPTIONS

If the services agree on the need for additional deployment compensation, several specific policy options are available. These range from a pay modeled on the Navy's sea pay, to a third type of hardship duty pay for tempo of operations, to creating a market-based distribution pay.

Several recent or current policy initiatives are aimed at improving incentives to make duty that requires substantial time deployed more attractive. In this section, we evaluate some of the strengths and weaknesses of the different policy options under consideration.

A SEA PAY EQUIVALENT FOR NON-SEA SERVICES

Because sea pay was designed to recognize the arduous nature of deploying for long periods of time away from home, and because it has proved helpful to the Navy in meeting manning and retention goals, it may make sense to use sea pay as a model for a deployment pay for the other services. One advantage of sea pay is that there is no need for an exact

count of deployed days. Instead, being on a sea tour is used as a proxy for an assignment that requires significant time deployed.

To the extent that other services have classes of units with more deployed time, they could adopt a sea pay equivalent for these units. For example, the Air Force has moved to reorganize so that at any point in time some units are "on call" for deployments and others are not. All units on call could be given a special pay without counting the actual days spent away from home base.

Adding an equivalent to the Career Sea Pay Premium, or an overseas extension incentive, would allow extra compensation for people who undertake exceptionally long periods away or who save PCS costs by extending at remote locations.

Extend FSA

A second option would be to replace FSA with an allowance that is paid regardless of dependency status. Some argue that being deployed is more difficult for members with dependents. If this belief is strongly held, differential rates could be set for members with and without dependents, as is currently done for the Basic Allowance for Housing.

FSA is currently a fixed amount regardless of rank or the amount of time away, so the services would have to reach consensus regarding these issues. Furthermore, because FSA does not apply until someone is away from home for 30 or more days, it will have to be modified if it is to cover frequent, short periods of time away.

Adopting a New Deployment Pay: HDP-Tempo

Background

When the services developed HDP-M and HDP-L, they also considered an HDP recognizing high PERSTEMPO (HDP-Tempo, or HDP-T). HDP-T was deemed necessary because the risks and hardships associated with new patterns of operations aren't always covered by existing pays we've discussed. Also, problems with the inconsistent application of existing pays could be addressed by integrating a tempo pay into the HDP and IDP structure. This pay hasn't yet gone through, however, because of its estimated cost, disagreements regarding where to set thresholds, and the need to implement BTP.

An initial proposal recommended that service members receive HDP-T compensation for more than 4 out of 12 months spent away from home. Although the Army agreed to this measure, the Air Force favored a threshold of 3 out of 12 months. From the Navy and Marine Corps' perspectives, either 3 or 4 out of 12 months was too short a cycle because a typical Navy deployment is 6 months and a typical Marine Corps deployment is a 6-month unaccompanied tour. Ultimately, consensus on a uniform PERSTEMPO rate wasn't reached.

The HDP-T was temporarily set aside because of the need to implement the BTP passed by Congress. This pay was considered sufficiently difficult to adopt on a fast schedule, but its purpose is different from the type of deployment pay that the services had originally envisioned. By setting the pay at $100 a day and mandating a 400/730-day threshold, the legislation ensures that the pay serves more as a penalty to the services than as a reward to service members. Because of its high rate, the services are unlikely to ever allow many people to qualify for this pay.

A positive effect, however, is that in implementing BTP the services have agreed to the method of defining and counting deployed days described earlier in this paper. The services are currently tracking, for each person, days away from home while engaged in operational duty or unit training exercises. If the services decide to do so, they will now have an easier time implementing a tempo pay that can be graduated based on cumulative time away. The need for a tempo pay might be even more important now that BTP has been temporarily suspended.

Flexibility

A general principle of the 9th QRMC is that the military needs more flexibility in setting pays. Consistent with this principle, designing a deployment pay policy may be made easier if the law creates a pay with guidelines and boundaries that are as general as possible. Because HDP-T is under development, it's still possible to write the law so that individual services have the discretion to set pay levels to fit their own operational patterns and compensation needs.

As new international peacekeeping roles evolve, deployment patterns and risks and hardships to service members are changing. Some services, or branches of services, are maintaining traditional deployment patterns, but others have increased personnel tempo, either through longer deployments or through more frequent, shorter deployments. Also, in a rapidly changing world, there is need for increased flexibility so that incentive pays can be started promptly when conditions warrant, and then stopped immediately when conditions improve.

HDP-M and HDP-L are flexible in that they outline general conditions under which hardship pays can be implemented, but allow the services to name the exact missions and locations that will receive extra compensation. The services can also vary rates of pay, within a fairly generous ceiling set by law. Adding HDP-T to this structure should allow the services to maintain, and even increase, the flexibility built into the other HDPs.

Tax Relief Proposals

Another policy option recently proposed is to apply foreign-earned income exclusion tax laws to overseas service members. Non-governmental personnel working overseas can exclude up to $76,000 of foreign-earned income from U.S. federal income taxes if they are away for the entire tax year. Legislation could be proposed to change the tax code, extending this exclusion to service members stationed overseas.

The average annual tax savings of the initiative has been estimated to be $6,300 if a full $76,000 income exclusion is allowed, and $3,000 if the exclusion is limited to $20,000 of income. With up to 220,000 overseas service members affected, the annual cost of the proposal would be $660 million to $1.4 billion.

A related proposal makes an adjustment for lost spousal income. The Navy proposes a change to the tax code that allows couples transferred overseas to claim a deduction equal to 30 percent of the difference between the spouse's average earnings over the previous 3 years and what he or she can earn overseas. The estimated average tax savings for this proposal is much lower, only $750 per year, and would apply only to service members who had spouses who worked before moving overseas. As a result, the estimated annual cost of this proposal should be well below the $660 million associated with a $20,000 income exclusion for all overseas personnel.

Proponents of tax relief measures argue that they send a clear signal of the uniqueness of military service. A disadvantage of tax relief proposals, however, is that they are less valuable to people in lower tax brackets. Also, people with higher itemized deductions, typically homeowners, benefit less. The adjustment for lost spousal income also may have unintended consequences because it applies only to married members, and then only to married members whose spouses work. Currently, relatively more single people go overseas precisely because it is less costly for them to do so, both in terms of forgone spousal income and family disruptions.

Sending single people overseas also means lower PCS costs for the services. A policy that creates a relatively greater incentive for married people to go overseas would take away some of these savings.

A major shortcoming of tax policies is that they do not allow the services the flexibility to target incentives to meet their needs. If more flexible compensation policies are desired, tax policies should be avoided. Tax incentives that are set in law as part of the tax code cannot be changed at the discretion of the services. Furthermore, the incentive value of tax exemptions can change as a result of changes in other parts of the tax code that are beyond the services' control. For example, the recent tax cuts eroded the value of any tax exclusions.

A deceptively enticing aspect of tax programs is the notion that they do not increase military manpower costs. Although the Treasury would bear the direct cost of lower tax revenues, federal budget authorities have made it clear that DoD would have to concede offsetting budget reductions to cover any tax proposal.

DISTRIBUTION INCENTIVE PAY

Another initiative proposes testing a flexible, market-based incentive pay to encourage members to volunteer for hard-to-fill jobs. The initiative is written to allow payments of up to $6,000 per year adjusted at the Service Secretaries' discretion. One advantage of distribution incentive pay, as opposed to tax policies, is that the benefit can be targeted only where there are manning shortfalls and then can be adjusted to the lowest level that will keep billets fully manned.

The distribution pay proposal specifically creates a flexible pay element that can be adjusted in response to changing conditions. It can be targeted at specific types of billets where manning problems exist. It could be implemented gradually so that the services could experiment until they find the correct level for incentives and establish mechanisms for setting and adjusting bonuses.

In the long run, the distribution incentive pay could be used to address a wide variety of distribution problems, rather than focusing on one narrowly defined problem. Specifying the exact conditions, such as imminent danger, arduous working or living conditions, duty away from home, combat conditions, and so on, requires complicated, bureaucratic structures to establish and implement new pays and the ability to clearly delineate hardships.

Allowing the market to set distribution incentives and allowing people to volunteer for jobs at bonuses that compensate them for negative attributes has many advantages:

- It would allow the services to take advantage of differences in tastes for job attributes. Some people may be willing to accept high operating tempos at relatively low premiums, whereas others demand much higher compensation. Voluntary assignments mean that people who have relatively less distaste for a job volunteer first and at lower prices.
- Market prices would force policy-makers to pay the full, immediate cost of sending people to remote locations or increasing the tempo of operations. The costs are incurred even under an involuntary assignment system, but are observed only indirectly in the form of recruiting, attrition, and retention problems.
- PCS costs would decrease because there will be less need to rotate people quickly through hard-to-fill assignments in order to "share the pain."

RECOMMENDATIONS

Review of Policy Options

Setting a policy to compensate service members for deployment time illustrates the elements of an effective compensation strategy. The strategy should begin with a clear vision of what the pay is trying to accomplish—in this case, to compensate for time away from home, family separation, and onerous duty while deployed. Given these goals, the best policy is to create a pay that is as flexible as possible so that policy-makers can respond to changing conditions as warranted. To the extent possible, the new pay should be designed so that the services do not need to go back through the ULB process or to Congress to make required future changes to the pay. Establishing the broad goals and outlines of the new policy, setting generous ceilings rather than specific amounts, and leaving as many details as possible to the discretion of the services will make the new policy more flexible and more acceptable to both the services and policy-makers.

The military's system of special and incentive (S&I) pays is seriously in need of reform. A proliferation of complicated pays, each addressing one specific problem, has resulted in a cumbersome system of over 60

pays. Many are set at arbitrary levels with no clear criteria for when and how to adjust them. From the individual service member's perspective, the total pay package may seem less valuable if a share of it is in seemingly arbitrary and unpredictable pays.

Many of these arguments support a flexible, market-based distribution pay and a voluntary assignment system. The Army has already been using SRBs as an incentive to reenlist and take a job in a certain location. The Navy is planning to implement a distribution SRB shortly and is also considering other types of distribution pay. Integrating many of the current hardship recognition pays, and incorporating a deployment pay, into a market-determined distribution incentive may be the long-run solution. Many questions remain, however, about how such a pay would be administered and what infrastructure would need to be built. As a result, a distribution incentive pay may be an impractical short-run solution.

Pursue HDP-T

For the present, then, we recommend continuing with the special and incentive pay reforms by adding a deployment or tempo pay within the new Hardship Duty Pay structure. This would allow the services to build on existing successes in designing new pays that are as flexible and integrated as possible.

Under the existing HDP structure, flexibility could be allowed in:

- Amounts to be paid, subject to the current legislated maximum of $300 per month. If no minimum is set, individual services could also decide not to adopt the pay at all.
- Pay thresholds, such as what minimum lengths of away time must be served and how amounts should be graduated as tempo or unpredictability increases.
- How amounts should vary, if at all, by dependency status, rank, occupation, and type of duty.

As far as current rates for the services to set, they should probably fall within the bounds of the other away pays currently paid. Although the maximum sea pay rate was previously set at $520 per month, this amount was paid to a very few Sailors in the highest paygrades with very long cumulative sea duty time. A more common amount of sea pay was previously around $200 per month. Similarly, with submarine pay, the maximum is $355 per month, but an average amount is $230 per month. Recall also that, in addition to compensating for long, repeated

deployments and family separation, sea pay is also meant to cover cramped living and working conditions, unpredictability of operation schedules, limited recreational facilities, and in-port duties to support readiness.

HDP-L ranges from $50 to $150, HDP-M is $150 per month, and IDP is $150 per month. These pays are being integrated, however, so that even if someone has a combination of bad working conditions (such as serving in a location with multiple hardships that also qualifies for Imminent Danger Pay), the maximum combined pay would be $200 to $250 per month. To be comparable to other current pays, then, a deployment pay designed primarily to compensate for the single negative condition of high personnel tempo should probably range from $50 for moderate levels to a $150 to $200 maximum.

In addition, the size of the total S&I pay budget should be kept in mind and a realistic proposal made. A recent Air Force proposal for a deployment pay with a maximum payment of over $500 per month had a total estimated budget of almost $19 million. Table 4 shows that in the 2001 budget the Air Force spent a total of $28 million on all away types of pays. The new pay, then, would increase expenditures on away pays by almost 68 percent. A proposal similar to the Air Force's, but with a range from $50 to $150 per month, would mean a much less drastic budget increase, while keeping payments for tempo hardships in line with other existing hardship pays.

CONCLUSIONS

Deployments are difficult for both military personnel and their families. Although most agree that service members should be compensated for deployed time, careful consideration of the issues and concepts related to deployments is necessary to facilitate adoption of any new pay. The steps to recognizing and resolving these issues include establishing clear goals for the pay, deciding for which hardships the services want to compensate, defining relevant terms, and structuring the pay appropriately.

This approach also can be used to assess the sufficiency of existing away pays. We find that the services use an array of existing pays to compensate for deployments, but these pays make up only a very small share—well under 1 percent for most—of the services' personnel budgets. Though the Navy's sea pay compensates its personnel for the away time

and rigors associated with sea duty, no similar pay exists for the other services.

Existing away pays also suffer from several inconsistencies, which can make them difficult for people to understand and can, ultimately, undermine morale. Some pays require dependents or multiple hardships for receipt, and currently there are no pays available that compensate for unpredictable or frequent, shorter periods away from home.

Finally, many existing away pays lack the flexibility required to effectively target benefits to areas where manning shortfalls exist—regardless of the reasons for these observed shortfalls.

Because flexibility is a key consideration in compensation design, a distribution incentive pay is recommended as a long-run goal. In the short run, however, we recommend implementing a Hardship Duty Pay to cover personnel tempo or deployment time. This pay could be better integrated with other, existing S&I pays and could incorporate and extend the flexibility of the other new Hardship Duty Pays. As a result, it would be a favorable policy alternative to tax relief proposals, extending a sea-pay type of pay to other services, or changing other existing pays—measures that provide relatively less flexibility. A flexible distribution pay or deployment pay policy would also allow for adjustments when the services' goals or circumstances change, without requiring changes through the ULB process or congressional approval.

Given the inherent differences between the services' operations and goals, it is unlikely that any created deployment pay will be uniform across the services. By allowing some structural flexibility, however, it can be possible to institute a pay that both meets the services' needs and adequately recognizes the unique hardships associated with deployment.

APPENDIX

DETAILED ENLISTED MILITARY PERSONNEL BUDGET DATA

The source of the data in this appendix and in figure 1 and table 1 is the Defense Technical Information Center web site at http://www.dtic.mil/comptroller/fy2002budget/amendfy2002_m1.xls.

Definitions of the categories in tables 7 and 8 follow:

- Basic Pay, Retired Pay Accrual, Basic Allowance for Housing, and Subsistence are entitlements 1 through 4, with no subcategories.
- Incentive Pay, Hazardous Duty, and Aviation Career—entitlement 5—contain Flying Duty, Submarine Duty, Parachute Jump, Demolition, and Other Pays.
- Special Pays—entitlement 6—contain Sea Duty, Hardship Duty, Overseas Extension, Foreign Language Proficiency, Diving Duty, Reenlistment Bonus, Special Duty Assignment, Enlistment Bonus, Nuclear Accession Bonus, Education Benefits, Loan Repayment, and Hostile Fire Pays.
- Allowances—entitlement 7—contain the Uniform/Clothing Allowance, Station Allowance Overseas, CONUS COLA, and Family Separation Allowance.
- Separation Pay, Social Security Tax Payments, Permanent Change of Station Travel, and Other Military Personnel Costs are entitlements 8 through 11, with no subcategories.

Table 7. Enlisted Military Personnel Appropriations (dollars)

Pay Category	Army	Air Force	Navy	Marine Corps	Total
FY 1999, Actual					
BASIC PAY	7,437,734	5,787,488	5,967,377	2,613,397	21,805,996
RETIRED PAY ACCRUAL	2,246,196	1,747,821	1,799,487	787,406	6,580,910
BASIC ALLOWANCE FOR HOUSING	1,193,082	1,123,423	1,353,867	385,709	4,056,081
SUBSISTENCE	1,245,084	793,531	782,239	368,743	3,189,597
INCENTIVE, HAZARD & AVIATION CAREER	68,121	25,346	85,226	8,177	186,870
SPECIAL PAYS	281,836	152,848	533,058	63,651	1,031,393
ALLOWANCE	416,240	348,632	431,808	148,700	1,345,380
SEPARATION PAY	222,593	68,659	165,092	46,563	502,907
SOCIAL SECURITY TAX PAYMENTS	638,503	503,330	513,845	222,682	1,878,360
PERMANENT CHANGE OF STATION	813,752	552,415	451,374	151,300	1,968,841
OTHER MILITAR PERSONNEL COSTS	203,758	34,896	98,770	44,166	381,590
TOTAL	**14,766,899**	**11,138,389**	**12,182,143**	**4,840,494**	**42,927,925**
FY 2000, Actual					
BASIC PAY	7,682,372	5,944,627	6,170,509	2,735,499	22,533,007
RETIRED PAY ACCRUAL	2,442,994	1,890,391	1,962,223	867,901	7,163,509
BASIC ALLOWANCE FOR HOUSING	1,265,347	1,136,294	1,446,962	410,172	4,258,775
SUBSISTENCE	1,341,033	799,141	765,503	368,908	3,274,585
INCENTIVE, HAZARD & AVIATION CAREER	68,858	33,069	84,057	8,075	194,059
SPECIAL PAYS	436,100	262,181	627,432	95,271	1,420,984
ALLOWANCE	449,103	353,853	402,292	168,631	1,373,879
SEPARATION PAY	201,466	71,109	89,631	46,634	408,840
SOCIAL SECURITY TAX PAYMENTS	581,587	454,764	471,496	208,788	1,716,635
PERMANENT CHANGE OF STATION	1,097,115	874,398	630,381	241,636	2,843,530
OTHER MILITARY PERSONNEL COSTS	134,365	49,226	69,922	28,864	282,377
TOTAL	**15,700,340**	**11,869,053**	**12,720,408**	**5,180,379**	**45,470,180**
FY 2001, Estimate					
BASIC PAY	8,098,895	6,153,049	6,488,971	2,872,772	23,613,687
RETIRED PAY ACCRUAL	2,397,273	1,821,303	1,918,368	848,381	6,985,325
BASIC ALLOWANCE FOR HOUSING	1,276,208	1,178,892	1,502,003	428,521	4,385,624
SUBSISTENCE	1,225,097	801,842	824,475	408,091	3,259,505

Table 7. Enlisted Military Personnel Appropriations (dollars) (continued)

Pay Category	Army	Air Force	Navy	Marine Corps	Total
FY 2001, Estimate					
INCENTIVE, HAZARD & AVIATION CAREER	69,610	33,810	91,217	8,356	202,993
SPECIAL PAYS	493,763	317,516	693,113	118,418	1,622,810
ALLOWANCE	360,457	301,594	352,536	158,542	1,173,129
SEPARATION PAY	236,986	89,070	118,431	55,235	499,722
SOCIAL SECURITY TAX PAYMENTS	615,313	470,709	491,407	219,262	1,796,691
PERMANENT CHANGE OF STATION	1,122,544	873,379	633,007	250,305	2,879,235
OTHER MILITARY PERSONNEL COSTS	134,365	39,604	66,378	29,560	269,907
TOTAL	**16,030,511**	**12,080,768**	**13,179,906**	**5,397,443**	**46,688,628**
FY 2002, Estimate					
BASIC PAY	8,638,466	6,791,260	7,054,710	3,055,219	25,539,655
RETIRED PAY ACCRUAL	2,617,464	2,057,752	2,135,153	923,588	7,733,957
BASIC ALLOWANCE FOR HOUSING	1,464,926	1,353,415	1,841,733	529,819	5,189,893
SUBSISTENCE	1,316,174	810,790	894,971	435,973	3,457,908
INCENTIVE, HAZARD & AVIATION CAREER	68,302	35,093	89,291	8,356	201,042
SPECIAL PAYS	425,725	455,386	737,536	113,910	1,732,557
ALLOWANCE	376,594	372,481	385,568	172,907	1,307,550
SEPARATION PAY	353,111	196,962	229,464	84,134	863,671
SOCIAL SECURITY TAX PAYMENTS	654,354	516,360	534,685	233,195	1,938,594
PERMANENT CHANGE OF STATION	1,087,922	929,410	689,807	257,556	2,964,695
OTHER MILITARY PERSONNEL COSTS	127,949	70,696	72,400	35,519	306,564
TOTAL	**17,130,987**	**13,589,605**	**14,665,318**	**5,850,176**	**51,236,086**

Table 8. Enlisted Military Personnel Appropriations (percentages)

Pay Category	Army	Air Force	Navy	Marine Corps	Total
FY 1999, Actual					
BASIC PAY	50.4	52.0	49.0	54.0	50.8
RETIRED PAY ACCRUAL	15.2	15.7	14.8	16.3	15.3
BASIC ALLOWANCE FOR HOUSING	8.1	10.1	11.1	8.0	9.4
SUBSISTENCE	8.4	7.1	6.4	7.6	7.4
INCENTIVE, HAZARD & AVIATION CAREER	0.5	0.2	0.7	0.2	0.4
SPECIAL PAYS	1.9	1.4	4.4	1.3	2.4
ALLOWANCE	2.8	3.1	3.5	3.1	3.1
SEPARATION PAY	1.5	0.6	1.4	1.0	1.2
SOCIAL SECURITY TAX PAYMENTS	4.3	4.5	4.2	4.6	4.4
PERMANENT CHANGE OF STATION	5.5	5.0	3.7	3.1	4.6
OTHER MILITARY PERSONNEL COSTS	1.4	0.3	0.8	0.9	0.9
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
FY 2000, Actual					
BASIC PAY	48.9	50.1	48.5	52.8	49.6
RETIRED PAY ACCRUAL	15.6	15.9	15.4	16.8	15.8
BASIC ALLOWANCE FOR HOUSING	8.1	9.6	11.4	7.9	9.4
SUBSISTENCE	8.5	6.7	6.0	7.1	7.2
INCENTIVE, HAZARD & AVIATION CAREER	0.4	0.3	0.7	0.2	0.4
SPECIAL PAYS	2.8	2.2	4.9	1.8	3.1
ALLOWANCE	2.9	3.0	3.2	3.3	3.0
SEPARATION PAY	1.3	0.6	0.7	0.9	0.9
SOCIAL SECURITY TAX PAYMENTS	3.7	3.8	3.7	4.0	3.8
PERMANENT CHANGE OF STATION	7.0	7.4	5.0	4.7	6.3
OTHER MILITARY PERSONNEL COSTS	0.9	0.4	0.5	0.6	0.6
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
FY 2001, Estimate					
BASIC PAY	50.5	50.9	49.2	53.2	50.6
RETIRED PAY ACCRUAL	15.0	15.1	14.6	15.7	15.0
BASIC ALLOWANCE FOR HOUSING	8.0	9.8	11.4	7.9	9.4
SUBSISTENCE	7.6	6.6	6.3	7.6	7.0

Table 8. Enlisted Military Personnel Appropriations (percentages) (continued)

Pay Category	Army	Air Force	Navy	Marine Corps	Total
FY 2001, Estimate					
INCENTIVE, HAZARD & AVIATION CAREER	0.4	0.3	0.7	0.2	0.4
SPECIAL PAYS	3.1	2.6	5.3	2.2	3.5
ALLOWANCE	2.2	2.5	2.7	2.9	2.5
SEPARATION PAY	1.5	0.7	0.9	1.0	1.1
SOCIAL SECURITY TAX PAYMENTS	3.8	3.9	3.7	4.1	3.8
PERMANENT CHANGE OF STATION	7.0	7.2	4.8	4.6	6.2
OTHER MILITARY PERSONNEL COSTS	0.8	0.3	0.5	0.5	0.6
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
FY 2002, Estimate					
BASIC PAY	50.4	50.0	48.1	52.2	49.8
RETIRED PAY ACCRUAL	15.3	15.1	14.6	15.8	15.1
BASIC ALLOWANCE FOR HOUSING	8.6	10.0	12.6	9.1	10.1
SUBSISTENCE	7.7	6.0	6.1	7.5	6.7
INCENTIVE, HAZARD & AVIATION CAREER	0.4	0.3	0.6	0.1	0.4
SPECIAL PAYS	2.5	3.4	5.0	1.9	3.4
ALLOWANCE	2.2	2.7	2.6	3.0	2.6
SEPARATION PAY	2.1	1.4	1.6	1.4	1.7
SOCIAL SECURITY TAX PAYMENTS	3.8	3.8	3.6	4.0	3.8
PERMANENT CHANGE OF STATION	6.4	6.8	4.7	4.4	5.8
OTHER MILITARY PERSONNEL COSTS	0.7	0.5	0.5	0.6	0.6
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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CHAPTER V

NAVY SEA PAY: HISTORY AND RECENT INITIATIVES

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

OVERVIEW

The Ninth Quadrennial Review of Military Compensation (QRMC) is reviewing the role of the military compensation system in past recruiting, manning, and retention shortfalls in search of ways to better structure compensation to mitigate these problems in the future. Structured correctly, basic pay and special pays should provide incentives for servicemembers to stay in the military, to gain experience and skills valuable to the services, and to move into critical skills or jobs when they are most needed.

The military can order servicemembers on deployments, but keeping the billets filled and keeping those servicemembers in the military can be difficult. Because of policy-makers' concerns about the negative consequences of deployments, Congress passed the High Deployment Per Diem, or Individual Tempo pay, in the National Defense Authorization Act (NDAA) of FY00. It mandated that the services pay servicemembers an extra $100 a day when the member's time away from home, over a rolling 2-year period, exceeds 400 days. That pay has been suspended in view of the current conflict.

The QRMC is taking this opportunity to reconsider how to best structure a deployment pay. Its focus is on structuring a new pay that would (a) provide incentives for servicemembers to volunteer for and stay on deployments, (b) keep servicemembers in the military, and (c) be cost-effective.

In designing this pay, the QRMC is looking to existing pays the military uses to alleviate problems filling particular billets. However, few such pays exist. The largest program, with the most extensive history, is sea pay. It is also the pay most similar to a deployment pay. Although it is a servicewide pay, it is paid primarily to Sailors on sea duty. The Navy uses sea pay to retain Sailors at sea and to keep Sailors in the Navy, as well as to compensate for the hardships inherent in all phases of sea duty. Because sea pay is similar to a deployment pay, the QRMC asked CNA to review the history of sea pay and its success in achieving the Navy's goals. It has also asked CNA to explore the applicability of sea pay qualifications, pay rates, and other elements to a multiservice deployment pay.[1]

[1] See [1] for a complete discussion of structuring a servicewide deployment pay.

In this paper, we present a synopsis of sea pay. First, we address the purpose of sea pay and how it has changed through the Navy's history. We look at who has been eligible for sea pay and the size of sea pay relative to basic pay and to manpower expenditures. Much of the material in that section has been documented in previous QRMC or DOD resources, particularly past versions of the *Military Compensation Background Papers*. Our contribution is to organize previously documented historic data in a format that enables review and comparison across time. We also seek to update those papers and to highlight sea pay issues that may be of particular interest to the QRMC.

We next consider sea pay as it has been used in the recent past. We show the sea pay table in place through FY01 and describe the incentives it has provided to Navy Sailors. We also present survey and actual behavioral data suggesting that sea pay helps the Navy fill sea billets, keep Sailors at sea, and retain Sailors. Then, we detail the reforms to sea pay the Navy is currently implementing. We discuss the Navy's objectives and the options they considered. Finally, we consider some implications for a new servicewide deployment pay.

EVOLUTION OF SEA PAY

First instituted in 1835, sea pay is one of the military's oldest special pays. Today, although primarily paid to Navy Sailors, sea pay rewards qualifying members from all services who serve at sea. The rationale for sea pay, sea pay eligibility requirements, and sea pay rates have varied over time as the Navy's manning and retention needs have changed. These modifications in sea pay have, in turn, affected total expenditures. This section traces the evolving nature of sea pay and concurrent changes in sea pay expenditures.

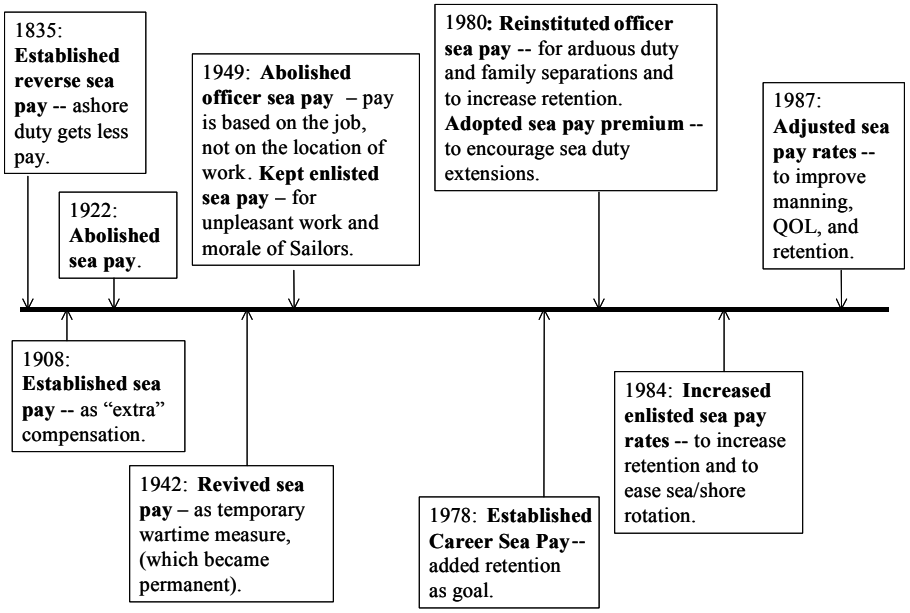
WHY SEA PAY?

Sea pay stems from the belief that sea duty is the essence of a Sailor's job and that a Sailor not serving at sea is "performing less than full-fledged duty" [2, p. 333]. In early Navy history, the Navy recruited enlisted personnel mainly as needed to man a ship as it readied for sea. Officers were often furloughed when a ship returned to port. The result was little shore duty and little need for a sea/shore pay differential.

The first pay differential based on duty status—whether a Sailor was serving at sea or ashore or awaiting orders—was designed so that a Sailor not serving on sea duty received less than full pay. Over time, sea pay became pay above and beyond basic pay. Reversing the original idea of reducing a Sailor's salary while serving ashore, sea pay was implemented as a special and incentive pay to compensate Sailors for the arduous nature of sea duty. The appendix gives a complete history of legislative changes in sea pay, the motivation and goals associated with the changes, and the resulting structure of sea pay.

The rationale for sea pay has evolved as manning and retention needs have changed (see figure 1). Justifications for sea pay fall into the following categories: (a) compensation for arduous duty, (b) retention, (c) distribution incentive, and (d) readiness.

Figure 1. Summary of Evolution of the Rationale for Sea Pay



Today, SECNAV Instruction 7220.77D states that Career Sea Pay (CSP) is designed to recognize "the greater than normal rigors of sea duty, the arduous duty involved in long deployments, and the repetitive nature of assignment to such duty." The Office of the Chief of Naval Operations recently explained in [3] that,

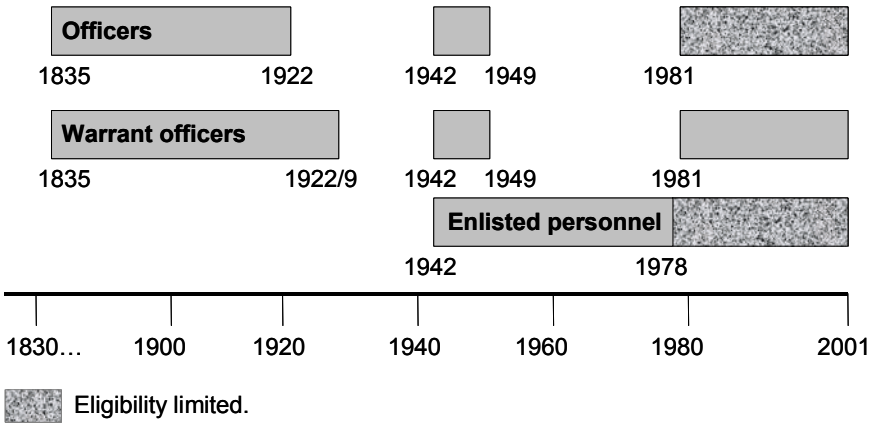
> Career sea-pay reform is intended to provide [the] Navy with a flexible and targeted tool to provide the incentive required to improve sea/shore balance, increase retention, reduce crew turnover and improve overall fleet readiness.…It is also designed to recognize and reward the arduous nature of sea duty.

"Arduous duty" has no formal definition but has generally implied, among other things, long working hours at sea, long and repetitive deployments, cramped living and working conditions aboard ship (both at sea and in home port), unpredictability of operating schedules, limited recreational facilities at sea, and family separations.

As the rationale for sea pay has evolved, the Navy has changed its eligibility rules. Figure 2 indicates when commissioned officers, warrant officers, and enlisted personnel have been entitled to sea pay since its inception in 1835. Periods of partial eligibility include:

- Starting in 1981, only officers who have served a minimum of 3 cumulative years of sea duty have been eligible. Also, from 1981 to 1985, sea pay was not available to O-1s and O-2s with less than 4 years of active enlisted service.
- Starting in 1978, enlisted eligibility has been limited to E-4s and above.

Figure 2. Who Has Been Eligible for Sea Pay and When.[a]



a. Through fiscal year 2001.

Although the information in figure 2 reflects changes in the justification for sea pay over time, we note some apparent contradictions. For example, the oldest justification for sea pay is recognition of the arduous nature of duty at sea, yet E-1s to E-3s who serve at sea—presumably performing arduous duty—have not in recent years been eligible for sea pay. As its name implies, Career Sea Pay (CSP) more accurately seeks to reward personnel who accept sea duty—arduous duty—as part of a longer term career decision. The more sea duty one serves, the greater the reimbursement.

Structure of Sea Pay

As table 1 shows, the structure of sea pay has changed along with its rationale. Often, the Navy has linked sea pay rates to basic pay, paygrade, and/or the amount of sea duty served; however, the Navy has also paid it as a set dollar amount across Sailors. From 1949 to 1979, sea pay was based solely on paygrade. Starting in 1978, when enlisted Career Sea Pay replaced sea duty pay, the monthly pay rate was determined solely by the Sailor's cumulative time on sea duty. Since 1981, CSP rates increase as servicemembers accumulate sea duty and are promoted in rank. Because sea pay rates jump at different points within a Sailor's career, it is possible that a lower ranking Sailor with more years at sea receives more sea pay than a higher ranking Sailor with less sea duty. Overall, the structure rewards careers that are sea intensive and, consequently, is an incentive to servicemembers to serve at sea.

The Career Sea Pay Premium (CSPP), established in 1981, also rewards servicemembers serving on sea duty. The CSPP is a fixed, monthly payment—unrelated to paygrade—that rewards long sea tours. Sailors and officers are eligible for the premium when serving more than 36 consecutive months of sea duty. Through the 1990s, however, enlisted personnel in paygrades E-5 and above with over 5 years of cumulative sea duty could not receive the premium; instead, a higher rate, not contingent on consecutive time at sea, was embedded in the CSP table.

Table 1. Sea Pay Structure and Rates Over Time[a]

Year of Change	Range	Rate Structure	Approximate Ratios of Sea Pay to Basic Pay	
			Enlisted[b]	Officer[c]
1835	Not available	Annual fixed amount	N/A	Not available
1860	Not available	Premium over shore duty pay with breakpoints by length of sea service	N/A	Not available
1899	Not available	15% premium over shore duty pay for officers	N/A	15%
1908	Not available	10% over basic pay; 10% pay differential for enlisted Navy over enlisted Army	N/A	10%
1922	Eliminated sea pay and pay differential	N/A	N/A	N/A
1942	Not available	10% over basic pay for officers; 20% over basic pay for warrant officers and enlisted	20%	10%
1949	$8–$22.50/month	Based on rank	10% in 1949 (2% by 1977)	N/A
1978	$25–$55/month	Enacted Career Sea Pay for enlisted based on years of cumulative sea duty. Breakpoints at over 3, 5, and 12 years	4%	N/A
1980	$29–$115/month	Added more breakpoints of cumulative sea duty: over 3, 5, 7, 9, 10, 11, and 12 years	4%	N/A
1981	$100/month	Added Career Sea Pay Premium at $100 per month after 36 months of sea duty	13% in 1981 (7% by 2001)	5% in 1981 (3% by 2001)
1981	$50–$310/month	Based CSP on both rank and years of cumulative sea duty. Breakpoints for officers at between 3 and 12 years. Breakpoints for warrant officers and enlisted at between 1 and 12 years.	21%	9%
1985	$50–$410/month	Added breakpoints of cumulative sea duty for enlisted: more than 13, 14, 16, and 18 years	18%	8%

Table 1. Sea Pay Structure and Rates Over Time (continued)

Year of Change	Range	Rate Structure	Approximate Ratios of Sea Pay to Basic Pay	
			Enlisted[b]	Officer[c]
1986	No change	Added more breakpoints of cumulative sea duty for officers: over 14, 16, 18, and 20 years	14%	8%
1989	$50–$520/month	No change	17% in 1989 (10% in 2001)	7% in 1989 (5% in 2001)
2001	$50-$700/month. Maximum allowed CSP and CSPP increased to $750 and $350, respectively.	Extended CSP to sailors in paygrades E1 through E3 and to officers with under 3 years cumulative sea duty. Extended eligibility of CSPP to more senior sailors.	18% in 2001	6% in 2001

a. See the appendix for a history of rate changes within the ranges indicated in this table.
b. E-4 with 3 years of sea duty.
c. O-4 with 3 years of sea duty.

SEA PAY RATES

As the objectives and needs of the Navy have changed, so have the monthly sea pay rates (see table 1). Until recently, sea pay rates were regulated by United States Code, so any changes to those rates required congressional legislation. The FY01 National Defense Authorization Act eliminated this step; Congress relinquished control of sea pay rates to the service secretaries, within a defined upper bound of $750 per month.[2]

The last two columns of table 1 show the relative magnitude of sea pay by looking at the ratio of sea pay to basic pay for typical servicemembers: an enlisted member in paygrade E4 and a lieutenant commander, both with 3 years of cumulative sea duty. For this enlisted member, sea pay has ranged from 2 to 21 percent of basic pay between 1942 and 2001; for the officer, it has ranged from 0 to 10 percent.

The increases of 1981 were the largest changes in recent history. In addition to establishing the premium for consecutive duty, the CSP program expanded to include officers, eliminated the minimum eligibility requirement of 3 years of sea duty for enlisted Sailors (though it

[2] *National Defense Authorization Act for Fiscal Year 2001*, Title VI, Sec. 619.

maintained E-4 as the minimum eligible paygrade), and dramatically increased enlisted sea pay rates. For example, Sailors with over 3 years of sea duty received $29 a month in sea pay in 1980 and a minimum of $160 in monthly CSP the following year, plus potentially $100 more in the CSPP.

In contrast, the 1989 sea pay increases were not enough to restore the real value of sea pay to its 1981 levels for most Sailors. Also, Sailors in paygrades E5 and above with over 5 years of cumulative sea duty were no longer eligible for the CSPP. The premium became embedded in the sea pay table for those Sailors—eliminating the 36-month consecutive requirement. These changes increased total sea pay to second-termers upon return to sea duty but did not raise monthly sea pay for Sailors serving over 36 consecutive months. The incentive to return to sea duty was increased, but not the incentive to serve long sea tours.

SEA PAY EXPENDITURES

Figures 3 and 4 illustrate how sea pay expenditures have varied over time. The changes we have described in sea pay eligibility, structure, and rates have contributed to expenditure fluctuations. Other factors include the size and structure of the fleet (which influence manning requirements), deployment patterns, and OPTEMPO.

Enlisted CSP expenditures rose tenfold over the 1980s. The steep jump in the early 1980s (see figure 3) was largely the result of increased rates, implemented in 1980 and 1981, and expanded eligibility also effective in 1981. As we will discuss in the next section, not only were more Sailors receiving sea pay, it appears that Sailors' average time at sea increased. Both factors led to higher sea pay outlays. The increased expenditures in the late 1980s correspond to the sea pay rate changes in 1989.

The 1990s, in contrast, saw a continuous decline in CSP expenditures. By 2001, enlisted CSP expenditures were 30 percent lower than 1990, similar to nominal levels observed in the mid-1980s. Most of the reduction corresponds to the drawdown in endstrength; Navy endstrength dropped over 35 percent over the 1990s. However, because the force became more experienced over that time period and because sea pay is tied to rank and time at sea, the average amount paid to Sailors increased. Consequently, nominal sea pay expenditures did not decrease as much as endstrength.

Although the Career Sea Pay Premium rate has remained at $100 per month since its inception in 1981, total expenditures on the premium have fluctuated as the number of personnel on sea duty and eligibility requirements for servicemembers have varied (see figure 4). The

downward trend in expenditures starting in 1988 reflects tightened eligibility requirements implemented that same year as well as the drawdown.

Figure 3. Career Sea Pay Expenditures Across Time.[ab]

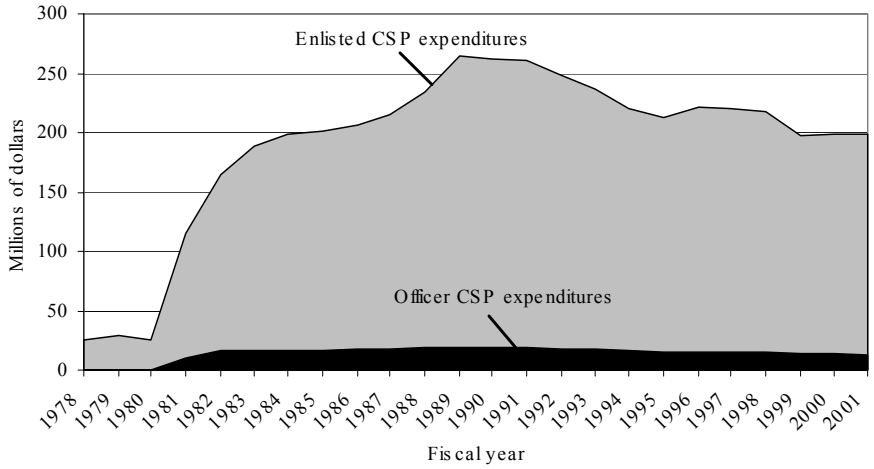
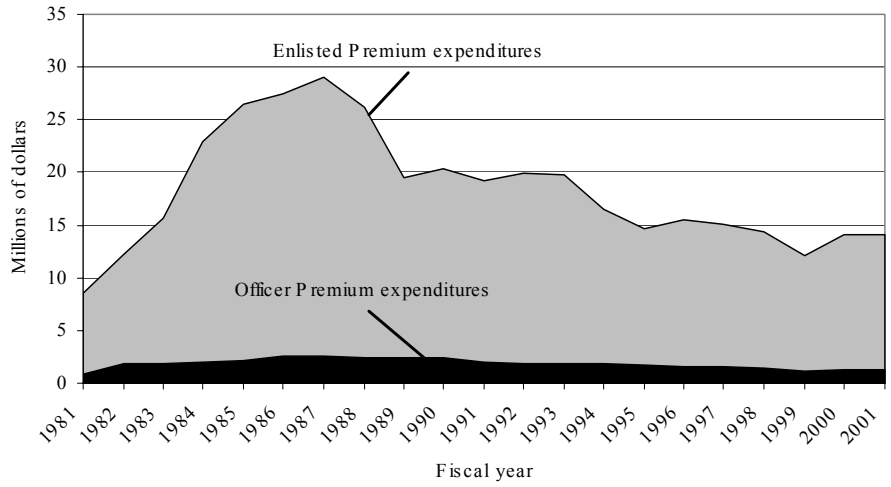


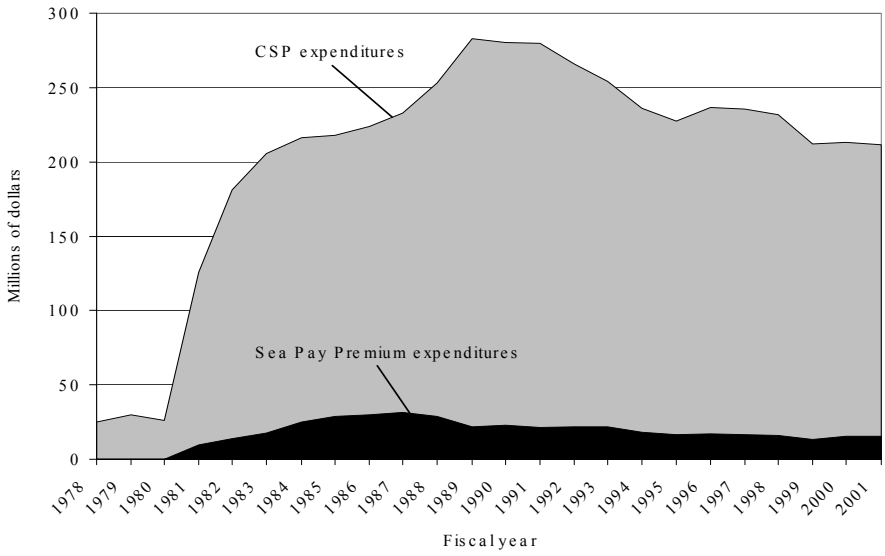
Figure 4. Sea Pay Premium Expenditures Across Time[ab]



a. Figures are in nominal dollars.
b. FY01 is estimated.

Figure 5 shows total sea pay expenditures. The pattern of total sea pay expenditures follows enlisted expenditures closely; by the end of the 1990', they were at about the same levels as in the middle to late 1980's. Taking inflation into account, however, it becomes clear that sea pay expenditures have fallen more rapidly than the force size. In fact, for an ndividual Sailor, sea pay has lost about 40 percent of its value because of inflation since the last changes made in FY89.

Figure 5. Total CSP and SPP Expenditures Across Time[ab]



a. Figures are in nominal dollars.
b. FY01 is estimated.

SEA PAY IN RECENT YEARS

In this section, we describe in greater detail the sea pay program of the 1990s and the incentives it provided. We also present evidence that Sailors do stay at sea longer as sea pay rates increase. Sea pay can be an effective distribution tool.

ELIGIBILITY FOR SEA PAY

Sea pay is designed to compensate for the rigors of sea duty and to allocate Sailors into sea billets. Thus, according to U.S. Code, Title 37, Section 305a, "sea duty qualifying for sea pay" is duty performed by a servicemember:

- While permanently or temporarily assigned to a ship, and
  - While serving on a ship, the primary mission of which is accomplished while under way; or
  - While serving as a member of the off-crew of a two-crew submarine; or
  - While serving as a member of a tender-class ship (with the hull classification of submarine or destroyer).
- While permanently or temporarily assigned to a ship and while serving on a ship, the primary mission of which is normally accomplished while in port, but only during a period that the ship is away from its home port [which it defines as (a) at sea or (b) in a port that is more than 50 miles from its home port].
- While permanently or temporarily assigned to a ship-based staff or other unit (at the discretion of the Secretariat).

In general, crews on deploying ships and submarines are eligible for continuous sea pay, whereas crews of squadrons and most ship-based staffs can only receive sea pay while deployed at sea. Continuous sea pay means that Sailors receive the pay whether their ship is currently deployed or in home port. It's important to recognize that sea pay isn't strictly speaking a deployment pay. It is paid based on being assigned to a ship regardless of whether the ship is deployed.[3,4]

As discussed earlier in this paper, there are restrictions on sea pay eligibility in addition to those just described. Effectively, CSP has been payable, in recent years, to all enlisted Sailors in paygrades E-4 to E-9 while on sea duty, all warrant officers on sea duty, and officers on sea duty who have served a minimum of 3 years of accumulated sea duty. In contrast, the Career Sea Pay Premium has been more restricted. Throughout the 1990s, enlisted Sailors in paygrades E-5 and above with

[3] A typical Navy deployment schedule is 6 months deployed, followed by 12 or more months in home port.

[4] Many Sailors who serve in billets that count as sea duty for rotational purposes do not qualify for sea pay. For example, there are Sailors in overseas shore billets whose duty qualifies as sea duty for rotational purposes but who do not receive sea pay.

more than 5 years of cumulative sea duty were ineligible to receive it. All other Sailors who qualify for CSP were eligible for the premium once they reached the 36-month consecutive sea duty requirement.

SEA PAY AS AN INCENTIVE

By paying more to Sailors on sea duty, the Navy not only compensates them for their arduous duty but also encourages them to go to sea or stay at sea and in the Navy. However, the incentive provided is not the same for every Sailor because both the amount of sea pay and the relative size of sea pay to total pay differ depending on a person's paygrade and total years of sea duty.

In this section, we consider which Sailors typically have received the largest incentives for sea duty. First, we look at the structure of the sea pay over the 1990s and the relative size of sea pay. Then, we provide evidence regarding the effectiveness of sea pay at inducing additional sea duty and retention. In this discussion, we look only at the enlisted force.

Size of Sea Pay

Table 2 shows the portion of the enlisted sea pay table from the 1990s that applied to most Sailors collecting sea pay. An asterisk denotes those Sailors who were eligible to collect the Career Sea Pay Premium (CSPP).

Table 2. Portion of the Career Sea Pay Table Used Through FY01

	Years of Cumulative Sea Duty								
	1 or Less	Over 1	Over 2	Over 3	Over 4	Over 5	Over 6	…	Over 18
E-1 to E-3	0	0	0	0	0	0	0	…	0
E-4	50	60	120	150*	160*	160*	160*	…	160*
E-5	50	60	120	150*	170*	315	325	…	350
E-6	100	100	120	150*	170*	315	325	…	450
E-7	100	100	120	175*	190*	350	350	…	500
E-8/E-9	100	100	120	175*	190*	350	350	…	520

** Eligible for CSPP.*

Career Sea Pay ranged from $50 to $520 per month. Sea pay rates increased as a Sailor's rank or cumulative time on eligible sea duty increased. The largest jump in CSP occurred at 5 years of cumulative sea duty—an amount typically not completed by first-term Sailors. Consequently, CSP provided the largests rewards for careerists with large amounts of sea duty.[5]

The CSPP, available primarily to relatively junior Sailors because of the rank and cumulative-time-at-sea restrictions, is a $100 monthly payment for each month of sea duty exceeding 36 months of continuous sea duty. Structured this way, the premium rewards junior Sailors for long sea tours and, consequently, provides an incentive to complete and extend the first sea tour. Because eligible Sailors are typically at their reenlistment when they begin collecting the premium, it is also an incentive to reenlist into sea duty. At the 5-year cumulative point, the CSPP disappeared for most Sailors; instead, there was a concurrent, larger jump in CSP rates. The net increase should have encouraged Sailors to remain on sea duty.

The larger sea pay is as a proportion of total pay, the more attractive we would expect sea duty to look relative to shore duty. Given that sea pay has been targeted to careerists, do careerists typically receive relatively higher proportions of their pay from sea pay? The answer is yes. When the Career Sea Pay table was changed in FY89, careerists typically collected sea pay that matched or exceeded 15 percent of basic pay, even without the CSPP. Sailors at or just beyond their first reenlistment decision could receive much more. For an E-4 with over 3 years of continuous sea duty, sea pay (CSP and CSPP) totaled 26 percent of basic pay. In contrast, sea pay was often much smaller relative to basic pay for more junior Sailors. For example, for E-4s just beginning their sea tours, sea pay was about 5 percent of their basic pay.

Since FY89, inflation has eroded the value of sea pay by about 40 percent, so that, by the end of the 1990s, sea pay made up a smaller portion of a Sailor's compensation. As the value of sea pay has declined, the incentives for Sailors to go to sea and to stay at sea have also eroded.

Do Sailors Respond to Pay?

We have limited information on the effectiveness of sea pay at influencing Sailors to spend more time at sea and in the Navy; however, the information we have suggests that sea pay can be effective. Here, we

[5] The officer sea pay table reflects the same incentive structure as the enlisted; however, officer rates are lower for a given level of cumulative sea duty.

give a brief synopsis of the empirical evidence linking sea pay to Sailors' behavior. We also cite survey results indicating Sailors' willingness to serve at sea.

Time at Sea

Ideally, to measure whether, and how much, sea pay influences a Sailor's willingness to be on sea duty, we would look at the amount of time the Sailor *chooses* to be on sea duty given different amounts of pay. The Navy, however, relies on compulsory sea duty assignments for prescribed sea tour lengths (PSTs)—currently ranging from 3 to 5 years depending on the paygrade and rating of the Sailor. Because of this, one might expect the time a Sailor spends on sea duty not to reflect a preference for sea duty or responsiveness to sea pay but rather an obligation. In that case, changes in sea pay would have no effect on the amount of time a Sailor serves on sea duty.

The time a Sailor spends on sea duty does, however, reflect in part the willingness of the Sailor to serve at sea. We know this because, despite the obligation, not all Sailors complete their PSTs. For example, for sea tours ending in FY99, 67 percent of Sailors did not complete their sea tours, either because they rotated to shore early or because they left the Navy [4]. Also, for Sailors who do complete sea tours, some extend their sea duty. These extensions are our only measure of voluntary behavior. Variation in extensions in the face of differing levels of sea pay should reflect how Sailors respond to pay.[6]

To determine the effects of the 1981 liberalization of sea pay, Navy manpower analysts examined extensions in sea duty before and after the changes took effect [5]. Using changes in PRD (projected rotation date) to measure additional time served on sea duty,[7] they found a 58-percent jump in extensions following the increases. They concluded that "the gross statistics, therefore, appear to show that sea pay is a primary factor in encouraging voluntary duty at sea" [5].

Recent CNA research [4] also investigated the effects of sea pay on time at sea. Instead of using PRD, analysts compared Sailors' completions and extensions of PST from FY87 to FY99. PST completion rates tell us whether the Navy is getting the sea time it expects from individual Sailors, whereas extensions after PST reflect Sailors' preferences for long sea

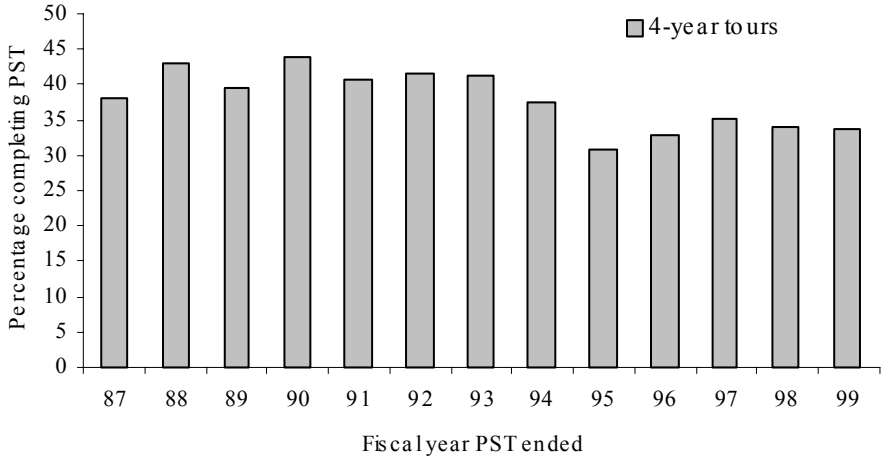
[6] If Sailors do not know they may extend their tours or if extensions are not granted, any increase in extensions will understate Sailors' responsiveness to sea pay.

[7] Consequently, these extensions could have reflected not only voluntary behavior but also Navy obligated changes to tour lengths.

duty. Behavioral changes in time at sea resulting from the FY89 sea pay change and the loss in sea pay's value since then should be reflected in the extension and extension rates.

Figure 6 shows the trend over time in completion rates for Sailors serving 4-year tours.

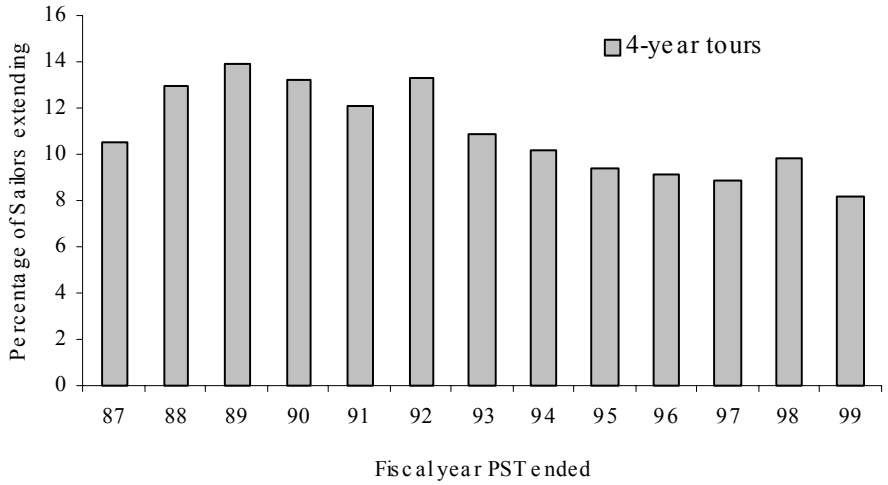
Figure 6. PST Completion Rates Over Time



We see that the highest completion rates the Navy experienced in the last decade occurred in the years immediately surrounding the sea pay increase. In addition, while sea pay declined 40 percent over the decade, completion rates for all Sailors on 4-year tours also declined—by about 20 percent. Although these data do not hold constant other factors that may have been changing over the time period, they suggest that sea pay could affect behavior quite substantially.

Figure 7 shows the percentage of 4-year sea tours extended beyond PST. This extension rate is calculated as the number of Sailors who should have rotated to shore but stayed on sea duty at least 6 months past PST divided by the total number of Sailors who should have ended their sea tours.

Figure 7. Voluntary Extension of Sea Duty Over Time



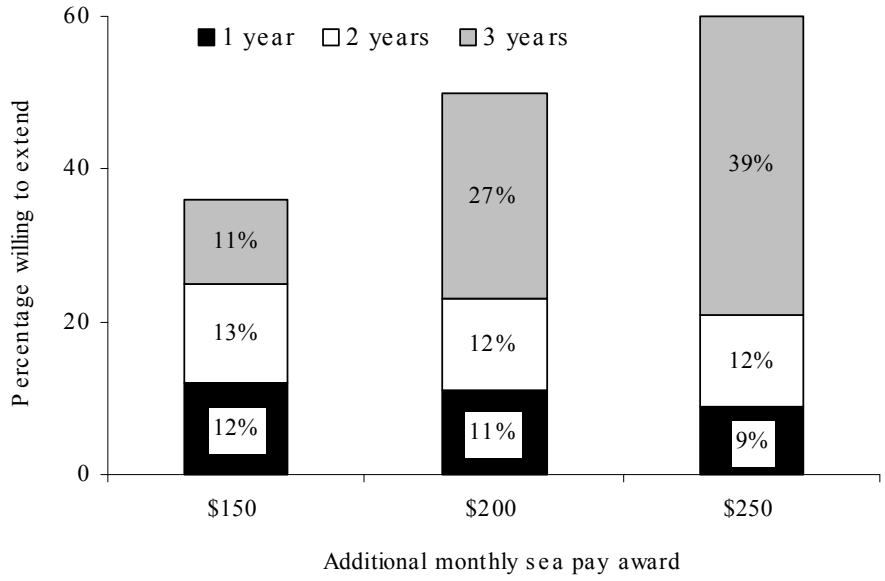
The changes in voluntary extensions are similar in pattern but more dramatic—as one might expect because extensions do not reflect obligated service at sea. Extensions of sea duty peaked at 14 percent in FY89—the year of the sea pay table changes. We see that, as the value of sea pay declined over the decade, the number of voluntary extensions has also dropped—by almost 40 percent.

So far, we have seen that, overall, Sailors do respond to changes in sea pay as we expected. Additional information can be obtained from survey data. Several surveys, such as the annual Navy-wide Personnel Survey and the Navy Homebasing Survey in 1996, have included information on Sailors' willingness to extend on sea duty for additional pay.

In a previous CNA study [6] analyzing restructuring sea pay, analysts reviewed previous survey questions and responses. The Homebasing Survey asked particularly detailed questions about whether the Sailor would extend sea duty, and for how long, given several combinations of additional income and the promise of homebasing. The raw data showed that more than one-half of surveyed Sailors were willing to extend at least 1 year for a sea pay premium of $150 a month and homebasing. Using other survey data and the Enlisted Master Record, the analysts constructed adjusted response rates to quantify how many additional eligible Sailors would extend for additional sea pay alone.[8] Figure 8 shows the additional sea pay awards and the associated extension rates.

[8] The methodology is described in detail in [6].

Figure 8. Additional Pay and Associated Extension Rates



These response rates suggest that over 30 percent of eligible Sailors would extend their sea duty at least 1 year for a sea pay increase of $150 per month. In other words, about 30 percent of Sailors at about 3 years' cumulative time would serve at least 1 additional year on sea duty for a doubling of career sea pay. Given the empirical correlations we've seen, these rates seem plausible. As sea pay increases, more and more Sailors feel adequately compensated for the hardships of sea duty and, thus, additional Sailors are willing to extend.

Retention Effects

Finally, we briefly address the value of sea pay as a retention tool. We know that increasing compensation will increase retention. Sea pay is not, however, targeted specifically to Sailors who are reenlisting. As a result, we do not expect sea pay to be as cost-effective at retaining Sailors as an equivalent amount of money targeted to Sailors at the reenlistment point (e.g., Selective Reenlistment Bonuses (SRBs)).

Previous CNA research [6], using the BuPers Annualized Cost of Leaving (ACOL) model, estimated the retention effects of sea pay. The ACOL model calculates the present value of expected streams of income both in and out of the service, then correlates the difference in income to

retention, holding all other factors fixed. The retention effects depend critically on whether a given increase in aggregate sea pay spending is targeted to Sailors around the reenlistment point or spread evenly across the sea duty population. For example, increasing sea pay back to its real purchasing power in FY89 (about a $93-million increase) across-the-board generates an increase in zone A (LOS 2 through 6) retention of about 0.5 percentage point. If, instead, the additional pay were concentrated to the sea duty population coming to the reenlistment point, the retention increase would be over 1 percentage point. In contrast, SRBs targeted to the first term would be about twice as effective at keeping Sailors in the Navy. Sea pay is an effective distribution tool and only secondarily a retention tool.

SEA PAY REFORM

In the late 1990s, two factors led the Navy to reevaluate sea pay. First, sea pay was becoming less effective as a distribution tool. Sea pay had lost about 40 percent of its value to inflation since the last pay change. This meant that there was less incentive for Sailors to complete their sea tours, to extend on sea duty, and to reenlist into sea duty. At the same time, the need for sea pay was growing. During the drawdown of the early 1990s, ships were decommissioned and their Sailors were released to other sea duty faster than Sailors left the Navy. As a result, the percentage of E-4 to E-9 sea billets filled rose to over 95 percent. After the drawdown ended, however, sea manning for E-4 to E-9 Sailors dropped below 90 percent as retention and recruiting problems became evident. Not only did manning problems exist across most ratings, but certain ratings were consistently more undermanned at sea. The Navy was finding that the current structure of sea pay was not flexible enough to deal with these problems. There was no mechanism to target specific skill or rating shortages at sea.

Because of the problems the Navy was facing, it wanted to restructure its sea pay program to better meet its goals. First, the Navy addressed the problem of across-the-board manning shortages by changing the existing sea pay incentive structure. To reduce undermanning at sea for individual skills and ratings, the Navy pursued a new pay (called Sea Tour Extension Pay, or STEP) that could be targeted by skill. The new sea pay table and STEP program, along with changes in the legislative provisions regarding sea pay, make up the Navy's sea pay reform package. This section

describes the alternatives the Navy considered, the final sea pay reform package, and the Navy's rationale behind its decisions.[9]

Addressing Across-the-Board Undermanning at Sea

Knowing that Sailors are responsive to changes in compensation, the Navy focused on providing incentives to reduce undermanning but also wanted to provide incentives to keep Sailors in the Navy and to reduce crew turnover. The Navy asked CNA analysts to recommend ways the Navy could restructure the sea pay table and premium.

Alternatives

CNA researchers investigated three options targeting different areas of the sea pay table or premium [6]. Using ACOL modeling and survey data on Sailors' willingness to extend, they assessed how well each option performed in increasing time on sea duty, improving Navy retention, and reducing crew turnover. For each alternative, they sized the increase in sea pay to $93 million—the projected loss in value to inflation by FY02 since the last pay change (in FY89).

Targeting First-Term Retention

The first alternative, labeled the accelerated phase-in option, targeted increasing first-term reenlistment. This proposal provided additional Career Sea Pay to Sailors at about their first reenlistment point—moving the jump in the CSP table from 5 years' cumulative sea duty to the 3-year point. Sailors in this portion of the table would see their sea pay increase almost $150 per month—more than double the loss to inflation. Including the sea pay premium, an E-4 with 3 years of sea duty could earn almost $400 in sea pay each month, or about 25 percent of basic pay.

Another aspect of this option was making more senior Sailors eligible for the Career Sea Pay Premium.[10] This would, of course, not affect first-term reenlistments nor would it be an efficient means to generate additional reenlistments among careerists. Instead, it would eliminate sea pay inversions. Without it, junior Sailors, even if they didn't have more

[9] See [6] and [7] for full details of the analyses of sea pay reform.

[10] In this alternative, the premium is embedded in the CSP table for Sailors with more than 8 years of sea duty. That way, Sailors with long careers of sea duty receive the additional payment upon returning to sea duty—not after 36 consecutive months on sea duty.

cumulative sea duty time, could collect more total sea pay than senior Sailors because of their eligibility for the CSPP. This expansion should induce additional senior Sailors to rotate to sea early, stay at sea, and/or reenlist in the Navy.

Targeting Voluntary Extensions of Sea Duty

Another option investigated was to inject all the additional money into an expanded Career Sea Pay Premium to encourage Sailors to serve longer sea tours—regardless of their cumulative sea duty or rank. This proposal would have increased CSPP rates to $200 per month after 48 months on consecutive sea duty, while maintaining the rate at $100 per month for Sailors with 36 to 48 months of consecutive sea duty.

In addition, eligibility for CSPP would have expanded to all Sailors who could receive Career Sea Pay, although careerists who have had sea-intensive careers (greater than 8 years of cumulative sea duty) would receive, instead, $200 per month extra CSP no matter how long they have been on their current sea tour.

Structured in this way, junior Sailors would not see an increase in sea pay until 48 months on sea duty—the $100 increase over the CSPP for which they are currently eligible. All senior Sailors, however, would either receive $200 more per month immediately upon returning to sea duty or $100 or $200 per month more after 3 or 4 years of cumulative sea duty, respectively.

Collecting the additional pay at 3 or 4 years of continuous sea duty should induce additional Sailors to complete or extend their tours. With under 50 percent of Sailors completing their sea tours, persuading a significant proportion of Sailors to extend their tours would generate substantial additional years of sea duty and ease undermanning considerably.

A Mixed Strategy

The Navy will probably be concerned about both first-term retention and undermanning at sea in the foreseeable future. For that reason, one alternative would have increased Career Sea Pay at the reenlistment point for junior Sailors while raising the monthly CSPP rate. To stay within the $93-million limit, the jump in the table would be about $100 per month (less than in the accelerated phase-in alternative), whereas the CSPP would be $100 per month after 3 years and $150 after 4 years (less than in the expanded sea pay premium option).

Effectiveness of Alternatives

So, how effective would each option be in meeting the goals of the Navy? The CNA researchers estimated how much extra retention and work-years of sea duty the Navy would get for each alternative and compared them to a 40-percent across-the-board increase in the sea pay table. Because the accelerated phase-in compensates Sailors at first-reenlistment relatively more than the other options, it should be the most effective at generating reenlistments. The CSPP expansion, which provides additional pay for long sea tours regardless of whether a Sailor is near reenlistment, should generate the most additional sea duty.

Indeed, the modeling confirmed this hypothesis. The accelerated phase-in generated an additional 0.8 percentage point of first-term retention compared to just over 0.3 percentage point for the CSPP expansion (see table 3).[11] Also as expected, the expanded Career Sea Pay Premium generated the most additional work-years of sea duty. The accelerated phase-in, however, would be almost as effective. The Sea Pay Premium sometimes simply shifts sea duty to earlier in careers, whereas the accelerated phase-in serves as an incentive for some Sailors to stay in the Navy to finish their sea tours, after which they leave.

The mixed option and the across-the-board option do significantly worse in creating extra work-years of sea duty. Under these proposals, the additional monthly CSP is just not large enough to create a strong incentive to extend on sea duty.

Table 3. Comparison of Options

	Increase in First Term Retention[a]	Work-years of Sea Duty Generated
Accelerated Phase-in	0.77	9,100
Sea Pay Premium Expansion	0.34	9,500
Mixed Option	0.48	7,700
Across-the-Board Sea Pay Increase	0.48	2,600

a. Percentage points

[11] Although the retention effect from the accelerated phase-in may not seem large, it is costly to buy. Using SRBs, it would cost the Navy at least $40 million

The Navy's New Sea Pay Table

The Navy decided to implement an accelerated phase-in program because both first-term retention and manning are likely to be important in the longer term. However, the recommended table was modified. The Navy opted to pay the most junior Sailors (E1 to E3s) a small monthly award, and Sailors with little time at sea also received some increase in sea pay. Table 4 shows a portion of the Navy's new sea pay table. At an estimated cost of $93 million, these changes should increase overall enlisted sea manning by about 4 percentage points. The new sea pay table and expanded Sea Pay Premium eligibility became effective in October 2001.

Table 4. Portion of the New Sea Pay Table and Eligibility for SPP

	Years of Cumulative Sea Duty									
	1 or Less	Over 1	Over 2	Over 3	Over 4	Over 5	Over 6	Over 7	…	Over 18
E-1	50	50	50	50	50	50	50	50	…	50
E-2	50	60	75	75	75	75	75	75	…	75
E-3	50	60	100	100	100	100	100	100	…	100
E-4	70	80	160	280*	290*	290*	290*	290*	…	390
E-5	70	80	160	280*	300*	315*	325*	350*	…	450
E-6	135	135	160	280*	300*	315*	325*	350*	…	550
E-7	135	135	160	305*	320*	350*	350*	375*	…	600
E-8/E-9	135	135	160	305*	320*	350*	350*	375*	…	620

**Denotes Career Sea Pay Premium eligibility.*

In addition, the Navy actively sought to remove sea pay rates from United States Code, and it succeeded. The NDAA for FY01 permits the service secretaries to set the individual Career Sea Pay rates up to a maximum monthly award of $750 per month. This action allows the services greater flexibility and responsiveness to quickly change the sea pay rates as manning conditions warrant.

Reducing Rating-Specific Shortages at Sea

Changing the structure of Career Sea Pay can alleviate across-the-board sea manning shortages or shortages by rank. The pay table, however, does not have the flexibility to address occupational differences in undermanning.

Because some ratings and skills are perennially undermanned at sea, the Navy proposed a new, rating-targeted sea pay—the Sea Tour Extension Program. The Navy envisioned it as a pay that would induce Sailors in selected ratings or skills to voluntarily extend their sea tours past PRD—when the Sailor would have rotated to shore duty. However, the Navy did not want to encourage Sailors to stay on sea duty indefinitely, so did not want to build in added incentives for very long extensions of sea duty. Instead, STEP was to be a flat monthly award, regardless of the length of the extension. Similar to the SRB program, the Navy would monitor undermanning by rating and add or subtract ratings from the eligible list as manning problems develop or dissipate. This structure then rewards extra-long sea tours while providing flexibility in addressing pockets of undermanning at sea. The Navy has quit pursuing a STEP pay, however, until the implications of the High Deployment Per Diem, or Individual Tempo pay, are fully understood.

CONCLUSION

Historically, the Navy has used sea pay extensively to compensate Sailors—mainly careerists—for the rigors of sea duty. As such, it has not been a deployment pay, but rather paid throughout the sea tour (even when the ship is in port).

Although sea pay is used to compensate Sailors for arduous duty, the Navy has long recognized the role of sea pay in fulfilling its manning and retention needs. Survey and behavioral data confirm that Sailors do respond to changes in sea pay. Additional compensation paid for serving at sea is an inducement for Sailors to go to sea, complete their sea tours, and even extend their tours. The additional pay is also an inducement to stay in the Navy.

Under the most recent sea pay reform, the Navy considered the goals it would like sea pay to help achieve and sought to structure sea pay to

create significant incentives to fulfill those goals. Specifically, the Navy hopes that sea pay can alleviate manning shortages (both across the board and in certain ratings) and increase first-term retention. Consequently, it is increasing sea pay the most for Sailors late in their first sea tours to encourage them to reenlist into sea duty and complete or extend their sea tours. Also, the Navy has worked to create a more flexible sea pay system that can respond more quickly to changing conditions or goals.

What does the Navy's experience suggest about structuring a deployment pay? First, servicemembers do respond to pay. But how large the pay is and its eligibility criteria will determine whether it fulfills the goals of the pay. Because of this, it is important to determine what behavior the military wants to encourage or reward and from whom.

If the services want to reward a career of arduous deployments, one way to do so would be to increase the monthly deployment pay as a servicemember's cumulative time away increases (similar to the rate structure for Career Sea Pay). Another option for the services is to reward servicemembers for long or intensive periods of time away. If, over a given time period, certain thresholds of time away are exceeded, the services could begin paying a bonus. The CSPP, STEP, and the High Deployment Per Diem all incorporate this incentive structure.

In either case, because deployment patterns and time away vary widely by service, the individual services may need to tailor a deployment pay to their individual needs. With resources limited, it is particularly important that any deployment pay be designed both to meet the services' goals and to have sufficient flexibility to meet the services' needs as those needs change.

APPENDIX

EVOLUTION OF SEA PAY OVER TIME

Table 5. Evolution of Sea Pay Over Time[1]

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1813	Act of March 9, 1813	War of 1812	"Special appropriation"	
1835	Act of March 3, 1835	Instituted under the theory that Sailors not at sea were performing "less than 'full-fledged' duty."[2] Sailors serving on shore, therefore, received a reduced pay.	First within-grade differential pay linked to duty status—at sea, on other duty, or on leave or waiting orders. For Navy officers only.	Annual fixed amount paid to lieutenants for sea service. Annual fixed amount paid to warrant officers for sea service and frigate duty (also at sea).
1860	Act of June 1, 1860		For the first time, recognized length of an individual's cumulative sea service pay factor (for some officer grades only). Continued with-in grade differentials for officer sea duty pay.	In addition to duty status differentials, prescribed pay steps based on length of sea service of the grades of LT (from 1860-62) and warrant officers (from 1860-70).
1899	Act of March 3, 1899[3]		Similar rationale to Act of 1835 (see above).	Entitled Navy officers performing sea duty to no less pay than Army officers of corresponding rank, but to 15% less than Army officers when ashore or awaiting orders.

[1] Unless otherwise indicated, all data in the table are from the Fifth Edition of *Military Compenation and Background Papers: Compensation Elements and Related Manpower Cost Items: Their Purposes and Legislative Backgrounds,* published in September 1996 by the Office of the Secretary of Defense, Department of Defense.

[2] *Military Compensation Background Papers: Compensation Elements and Related Manpower Cost Items: Their Purposes and Legislative Backgrounds*. Department of Defense, Office of the Secretary of Defense, Second Edition, July 1982.

[3] All information regarding the Act of March 3, 1999, comes from *Military Compensation Background Papers: Compensation Elements and Related Manpower Cost Items: Their Purposes and Legislative Backgrounds*, Department of Defense, Office of the Secretary of Defense, Third Edition, June 1987.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1908	Act of May 13, 1908		Terminated duty status differentials for commissioned Navy officers. Continued differential for warrant officers and mates. No sea duty pay for enlisted personnel per se, but Act implemented flat 10% pay raise for enlisted, which created 10% differential between Navy enlisted and enlisted in other services.	Established basic pay rates for officers based on grade and length of service. Established the principle of sea pay as "extra" compensation for sea duty by entitling officers to an additional 10% over their basic pay while serving on sea duty.
1922	Joint Services Pay Act[4]		Repeated 10% provision enacted in 1908	
1942	Act of March 7, 1942	World War II	Revived sea pay and foreign duty pay as temporary wartime measures. Extended sea pay to enlisted personnel for first time.	Entitled commissioned officers to receive an additional 10% and enlisted personnel and warrant officers an additional 20% over basic pay while performing sea duty.
1942	Pay Readjustment Act of 1942		Enacted the provisions established by the Act of March 7, 1942, into permanent law.	

[4] Working papers from the 5th QRMC slightly contradict this description of the 1922 Act: the 5th QRMC states that the Joint Services Pay Act terminated all Foreign Duty Pay and most Sea Pay, except for the sea duty differential for Navy warrant officers. It went on to explain that the Act of February 16, 1929, terminated this sea duty differential for warrant officers (after 94 consecutive years).

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1949	Career Compensation Act of 1949	1948 Hook Commission (military compensation study)	Hook Commission recommended that sea pay (and Foreign Duty Pay) be abolished for officers and disconnected from basic pay rates for enlisted (because the Navy is a chosen career and sea duty is a given in a naval career). Also recommended that there be a flat pay raise for enlisted personnel for "disagreeable and unpleasant work as a morale factor."[5] Also said, "Officers, especially, do not deserve extra pay for this type duty, since the pay recommended for them is apportioned to their relative responsibility as executives and administrators, regardless of their site of operation."	Abolished sea duty pay for officers. Prescribed monthly sea duty payments for enlisted personnel (ranging from $8 to $22.50) (in 1949, these equaled roughly 10% of enlisted pay; by 1979, this supplemental pay was only about 2.5% of enlisted pay, thereby losing its incentive value).

[5] *Career Compensation for the Uniformed Forces*, A Report and Recommendation for the Secretary of Defense by the Advisory Commission on Service Pay, pp. 28-29, December 1948.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1967-1970s[6]			Navy proposed sea pay under the "recognition-of-arduous duty" philosophy. OMB and other parties unsuccessfully tried to tie sea pay to retention and/or recruitment efforts and to create a bonus-type sea pay.	
1976	Defense Manpower Commission		Argued that sea pay should be restructured for recruitment and retention of personnel in undermanned skills.	

[6] *Fifth Quadrennial Review of Military Compensation, Volume III: Special and Incentive Pays*; Department of Defense, Office of the Secretary of Defense, November 1983.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1978	OSD report (response to Defense Manpower Commission)		OSD argued that sea pay is "required" to (1) distinguish between sea and shore duty and thus, "increase tolerance for repetitive sea duty tours in the course of navy careers."[7] Stated that the prospect of sea duty actually helps recruitment, but loses its appeal once a Sailor experiences the arduous duty of life onboard a ship, and then it becomes a disincentive to remain in the Navy. It also states, however, that "sea pay…is not the vehicle to address the problem of Navy manpower shortages." Instead, the report argues that Selective Reenlistment Bonuses were best suited for that purpose.	
1978	Legislative Proposal		Navy modified its position that the only reason for sea pay was "recognition of arduous duty" and added the goal of retention as a purpose for sea pay.	

[7] *Fifth Quadrennial Review of Military Compensation, Volume III: Special and Incentive Pays*; Department of Defense, Office of the Secretary of Defense, November 1983, p. 616. Originally written in OSD, *Department of Defense Response to the Report to the President and the Congress by the Defense Manpower Commission*, Washington, DC, January 1978, p. 133.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1978	FY 1979 Department of Defense Appropriation Authorization Act, 1979, and codified by 37 U.S.C. 305a.	CSP was initially proposed as part of the Carter Administration's Defense Legislative Program for the 95th Congress. DOD cited "unique conditions" of sea duty[8] and "competition for quality manpower among the services and with civilian industry." Effective October 1978 and September 1980.	Enacted CSP to address a perceived problem with retention of qualified Navy enlisted personnel and to achieve "stabilized manning [of Navy ships] with experienced personnel."	**Enacted Career Sea Pay (CSP).** An enlisted E-4 or above (of any service) who had served more than 3 years on sea duty qualified for monthly CSP payments when performing such duty. CSP was rated under the idea that those who serve longer at sea deserve more pay. ▪ For FY79-80, authorized pay for 3 types of career sea duty: over 3, 5, and 12 years. For FY81: over 3, 5, 7, and 12 years. Beginning Oct. 1981: over 3, 5, 7, 9, 10, 11, and 12 years. ▪ For FY 79-81, CSP rates ranged from monthly payments of $25 to $55. Beginning Oct. 1, 1981, CSP rates ranged from $25 to $100 a month. Periods of sea duty served before implementation of the act were credited to determine a member's eligibility and pay rate.

[8] Specifically, the report cited the following "unique conditions": cramped living and working conditions aboard ship; the unpredictability of operating schedules of Navy ships; limited recreational facilities at sea; inport duties assigned to shipboard personnel to maintain ship readiness; long working hours at sea; long and repetitive deployments; and family separations.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1980	Military Personnel and Compensation Amendments of 1980 (aka the Nunn-Warner Bill)	Apparent poor effect of sea pay and loss of experienced personnel.[9] Effective September 1, 1980.	According to the amendment: "to provide retention incentives to Navy personnel coming to the end of their first term of enlistment."[10] According to the conference report: "the Navy's shortage of petty officers, especially those with six to twelve years of service."	Increased (by 15%) and accelerated effective date of sea pay rates as proposed by the 1979 DOD Appropriation Authorization Act.

[9] *Fifth Quadrennial Review of Military Compensation, Volume III: Special and Incentive Pays*; Department of Defense, Office of the Secretary of Defense, November 1983, p. 617.

[10] *Fifth Quadrennial Review of Military Compensation, Volume III: Special and Incentive Pays*; Department of Defense, Office of the Secretary of Defense, November 1983, p. 559. Originally found in: Rader, Norvin E.; Pappas, Linda D.; Gilliam, C. Forrest; and Finneran, John G., Analysis of Sea Pay Program (GRC Report 1077-22-80-CR), McLean, VA: General Research Corporation, June 1980, p. 144.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1981	Military Pay and Allowances Benefits Act of 1980	Effective Jan. 1, 1981.	Rejected Hook Commission's notion that sea duty was "normal service for Navy officers." Reinstituted officer sea pay as reward for arduous duty and family separations and to address retention problems among Navy officers in certain skills. Adopted CSP Premium "to compensate…members who are on three year shore tours or less and who volunteer beyond the prescribed sea service tour."[11]	**Extended CSP to officers**, except those in grades O-1 and O-2 who had served less than four years of active enlisted or NCO service. Made CSP rates dependent on years of cumulative sea duty and pay grade (new). Increased enlisted CSP rates "substantially." Entitled all enlisted members in pay grades E-4 and above and all warrant officers assigned to sea duty (as defined in 37 U.S. Code 305a)—not just those with more than 3 years of sea duty—to sea pay. On the other hand, CSP was available only to those officers who had accumulated more than three years of sea duty. Made CSP payable to personnel assigned to a ship, a ship-based staff, or a ship-based aviation unit while actually serving on a ship. Personnel serving on ships whose primary mission was achieved in port were only eligible for sea pay when the ship was away from its homeport for 30 consecutive days or more. Also **established a flat monthly Sea Pay "Premium"** to be paid to military personnel

[11] Original quote came from Senate Report No. 96-1051, p. 2, accompanying H.R. 7626, 96th Congress, 2d Session.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
				(of any service) for each subsequent month of sea duty immediately following completion of 36 months of *consecutive* sea duty.
1981	Uniformed Services Pay Act of 1981		According to the Senator who proposed the legislation: "to be an incentive and a compensation to…SSBN [crews]…that…have to remain on station for a prolonged period of time."[12] Sen. Tower also explained that sub crew members spent 50% of their time at sea, which is more than others entitled to CSP. Also, because there is a requirement for officers to accumulate 36 months of cumulative sea duty to qualify for CSP, officers on two-crew subs take much longer to qualify, which adversely affects retention.	Extended CSP entitlement to members of the "off-crew of two-crew submarines.

[12] Original quote from U.S. Senator Tower of Texas. *Congressional Record*, September 10, 1981, Volume 127, No. 124, p.S9393.

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1984	Department of Defense Authorization Act, 1985		The stated purpose was to increase retention of enlisted personnel, in order to, in turn, "ease sea-to-shore rotation pressures, thereby facilitating increased utilization of the reserves."[13]	Increased E-6 through E-9 CSP rates. Added four more cumulative-years-of-sea-duty categories for all qualifying enlisted personnel: over 13, 14, 16, and 18 years.
1985	Department of Defense Authorization Act, 1986	Perhaps the conclusions of the Fifth QRMC, which had included the finding that surface warfare O-2s had retention rates "well below 50 percent."	Congress submitted no justification, but implemented exact recommendations of 5th QRMC, which had argued that it was an "inappropriate penalty" to withhold CSP from O-1 and O-2 grade officers who had served three years of sea duty.	Increased warrant officer (W-3 and W-4) CSP rates. Added four more cumulative-years-of-sea-duty categories for all warrant and commissioned officers: over 14, 16, 18, and 20 years. Extended CSP to officers in O-1 and O-2 pay grades with less than four years of active enlisted or NCO service.

[13]Original quote is from House Report No. 98-1080 (Committee of Conference), p. 298, accompanying H.R. 5167, 98th Congress, 2d Session (1984).

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
1987	National Defense Authorization Act (NDAA) for FYs 1988 and 1989	At the urging of DOD. Enlisted sea pay rate changes effective 1 May 1988. Warrant officer sea pay rate changes effective 1 January 1989.	"To improve the quality of life of service members and their families, while preserving high levels of personnel readiness."[14] Justification by the House Armed Services Committee included the purpose of increasing compensation for personnel on their second sea tour and decreasing compensation for personnel on their first sea tour.	Adjusted rates of CSP for enlisted personnel and warrant officers: increased rates for enlisted with >5 years of sea duty, decreased rates for enlisted with <5 years of sea duty; increased rates for W-1-W-3s with >9 yrs of sea duty and W-4s with >10 yrs of sea duty. Did not change officer CSP rates. Eliminated Sea Pay Premium for enlisted E-5s and above with >5 yrs sea duty.[15] Changed definition of "sea duty" to include *all* time spent on ships, the primary mission of which is accomplished in port (including time in port and time at sea for less than 30 consecutive days, as previously regulated). Adopted a "save pay" provision to prevent a cut-in-pay entitlement for personnel whose career sea pay entitlement would otherwise have been cut under the new rates, as long as they stayed assigned to the same duty station.

[14] 1998 Annual Report to the President and the U.S. Congress. William S. Cohen.

[15] The Fifth Edition of the *Military Compensation Background Papers* notes that the effect of this change, together with the change in sea pay rates, was "such that enlisted personnel with more than five years of sea duty are now automatically entitled to roughly the same career sea duty pay they would have been entitled to if they had served more than 36 consecutive months of sea duty and had accordingly been entitled to premium career sea duty pay in addition to their regular career sea duty pay."

Table 5. Evolution of Sea Pay Over Time (continued)

Year	Implementing Document	Associated Event/Driver	Purpose/Justification	Nature of the Pay
2000	FY 2001 Defense Authorization Act		Congress relinquished control of sea pay rates to the Navy, within defined monetary bounds.	

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The Report of the Ninth Quadrennial Review of Military Compensation

Office of the Under Secretary of Defense for Personnel and Readiness
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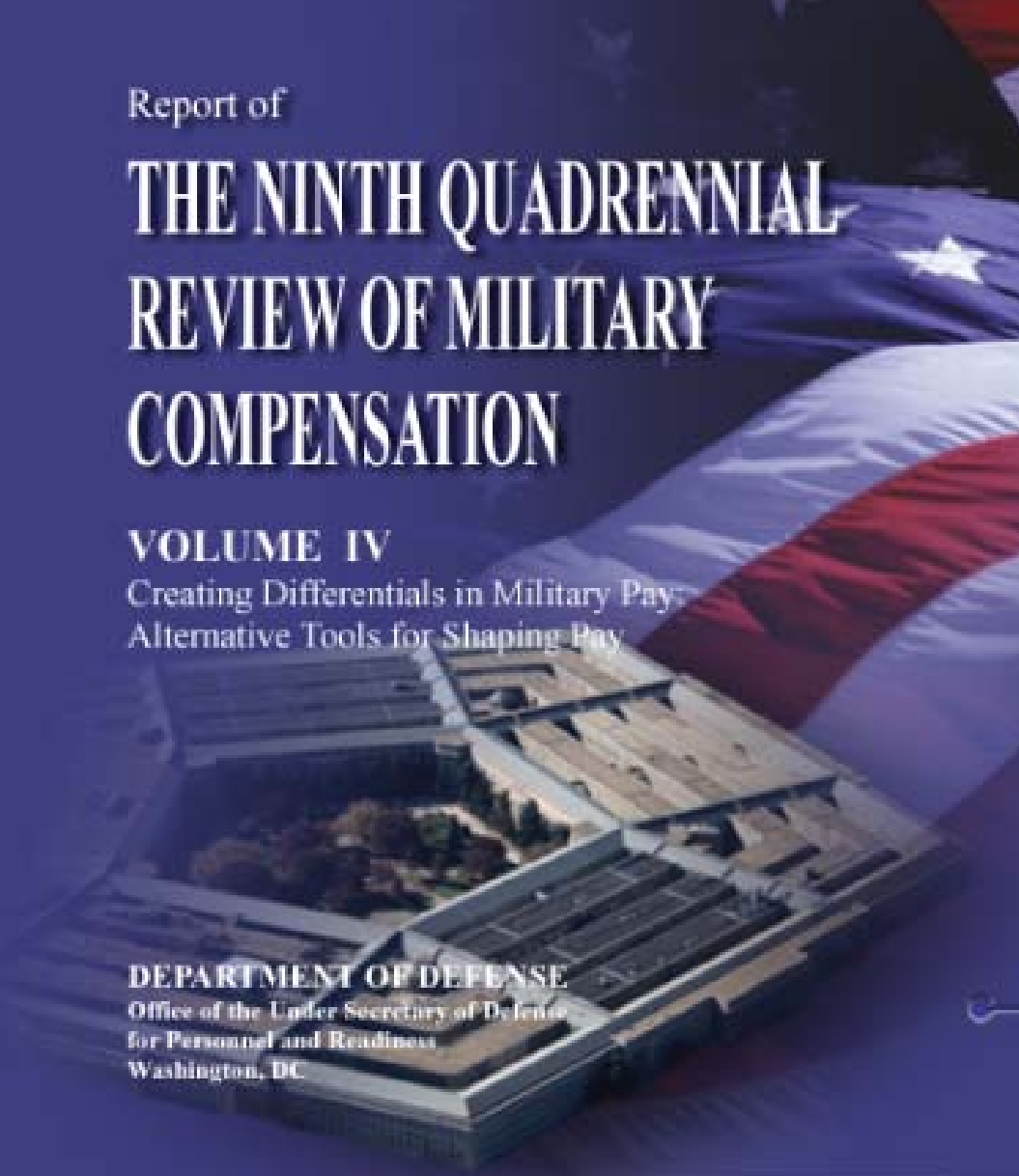
Report of

THE NINTH QUADRENNIAL REVIEW OF MILITARY COMPENSATION

VOLUME IV

Creating Differentials in Military Pay:
Alternative Tools for Shaping Pay



DEPARTMENT OF DEFENSE
Office of the Under Secretary of Defense
for Personnel and Readiness
Washington, DC

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PREFACE

The Ninth Quadrennial Review of Military Compensation (9th QRMC) assesses the effectiveness of current military compensation policies in recruiting and retaining a high-quality force. The review takes place at a time of increasing pressure on military recruiting and retention—the result of both external and internal pressures on the Department of Defense. A sustained strong economy and changing private-sector compensation practices along with changing missions and operational requirements create a complex environment for sustaining the All-Volunteer Force.

Overall, special and incentive pays and bonuses have been effective in recruiting and retaining the force required to meet current and past missions of the Department. In the long run, however, these existing pays may not be enough. New missions and operational patterns have already placed new demands on personnel and, in turn, on the military compensation system. Thus, the Department may find a need for new compensation tools, the subject of the research papers in this document—the fourth of five volumes of the 9th QRMC report. With the intent of providing as much flexibility for the Services as possible, these might include:

- More use by the Services of the recently authorized Critical Skills Retention Bonus for both officers and enlisted members.
- Expanding use of the provision of the Federal Thrift Savings Plan—in which service members are now authorized to participate—that permits the Service Secretaries to match contributions made by members in critical specialties.
- Skill and capability pays that could be more effective (than existing special pays) in dealing with persistent and large differences between military and civilian pay in certain skill areas and in encouraging higher performing members to stay in service.
- An Aviation Career Savings Fund to increase pilot retention and shape aviation career paths through earlier vesting of benefits.

The research papers included in this volume were written in support of the 9th Quadrennial Review of Military Compensation. The views expressed in these papers represent those of the authors and are not necessarily those of the Department of Defense.

CHAPTER I

THRIFT SAVINGS PLANS:

EFFECT ON SAVINGS AND TAX REVENUES

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

INTRODUCTION AND SUMMARY

The 9th Quadrennial Review of Military Compensation (QRMC) is reviewing ways to structure military compensation to improve military recruiting, retention, and manning. Retirement pay is a significant component of the current compensation package, and there is concern that the structure of these benefits is not competitive with that offered by the private sector. The current military retirement system is a defined benefit program, with some limited ability to participate in a thrift savings plan (TSP). In contrast, the private sector increasingly uses defined contribution plans, which give the employee an opportunity to manage at least part of the retirement plan benefits.

Expansion of the TSP component of military retirement benefits would potentially increase the attractiveness of military compensation. Given the sheer size of the military, however, several concerns have been raised about the implications of such a dramatic shift in compensation. At least four major questions have been asked—questions surrounding the level of service member participation, potential effects on total saving, implications for federal tax revenues, and the administrative costs associated with such a program.

In light of these concerns, this research memorandum summarizes both the theoretical and empirical literature devoted to these issues. The evidence suggests that participation and contribution rates are strongly related to the size of matching contributions made by the employer. In addition, surveys show that military personnel would increase participation in TSP if the government were willing to make matching contributions. Given the financial risk associated with these plans relative to insured, defined benefit plans, there is also evidence that financial education (preferably provided by the employer) increases employee saving and improves contribution allocation.

Although these savings incentive plans are designed to encourage increased retirement savings, the impact of these programs on total savings is unclear. The empirical evidence is split; estimates range from no substantive increases to nearly a 100-percent increase in total savings. Overviews of this literature conclude that total savings does rise, but by less than the amount contributed to these savings plans.

One essential characteristic of these savings incentive plans is the ability of employees to make tax-deductible contributions. An obvious drawback, from the perspective of the Federal Government, is the potential loss in tax revenue. We find conflicting evidence, however, on the effect of these programs on national (both private and public) saving. Some research shows the potential for this immediate tax revenue loss to be made up over time by increases in corporate tax revenue; the magnitude and timing of these long-term increases depend strongly on the assumptions that are made. Regardless, the Federal Government has continued to offer these tax advantages to encourage private saving for retirement, and one can infer that the government views this potential loss in revenue as an acceptable cost in promoting less reliance on Social Security for retirement benefits.

Finally, the evidence suggests that the administrative costs for defined contribution plans are a small fraction of those associated with defined benefit plans. The primary differences in administrative costs are the high investment advisory and management fees of the defined benefit plan, as well as larger actuarial fees. However, it is not clear whether these high administrative costs apply to the defined benefit plan offered by the military. If the employer provides investor education for its employees, the costs of the defined contribution plan do increase, but with clear benefits for the employee.

The paper is organized into six sections. We begin with a description of the types of retirement benefits available in the private sector and note a trend away from the type of benefits offered by the military. The second section discusses the general characteristics of the thrift savings plans available in the private sector, and addresses the question of whether service members will participate in TSP. We review the literature on the effect of these savings incentives on overall private savings in the third section. The fourth section examines the literature on the impact of these incentive plans on national (private plus public) savings, and section five considers the administrative costs of these retirement savings programs. The last section presents conclusions.

RETIREMENT BENEFITS IN THE PRIVATE SECTOR

Private employer pension funds combined with Social Security represent the primary sources of retirement income in the private sector.

According to a 1997 survey of medium and large establishments in private industry [1], about 80 percent of all full-time workers participated in at least one employer-sponsored pension plan. These plans typically can be categorized as either "defined benefit" or "defined contribution" plans.

Under a defined benefit plan, employers provide the employee some prespecified level of retirement benefits. A majority of these plans base pension benefits on the amount of service years and/or the employee's wage or salary. "Integrated" defined benefit plans also consider the employee's Social Security benefit when determining pension benefits. Private pension benefits are guaranteed or insured in part through the Pension Benefit Guarantee Corporation. The primary military retirement system is a defined benefit plan.

In contrast, under a defined contribution plan, employees and, in most cases, employers contribute to a fund that is then invested in some financial instrument. The level of the retirement benefit, then, is not prespecified, but depends on the rate of return of the financial instrument. These contributions are invested in a variety of financial instruments, including stocks, bonds, and money market funds. The distribution of contributions over the various instruments is at least in part under the control of the employee. Unlike the pension benefits from defined benefit plans, benefits from defined contribution plans are not insured.

A notable characteristic of defined contribution plans is that contributions are made from pretax earnings and placed into an individual's retirement account. These funds are then invested and are taxed only at distribution.

Examples of defined contribution plans include savings and thrift plans, profit sharing, employee stock ownership plans, and 401(k) plans. The characteristics of these plans vary by the provisions of the employee/employer matching contributions, the investment decisions, benefit distribution, vesting, and the ability to take early withdrawals or loans from the employer's contributions. Some provisions can be viewed as savings incentives that also affect employee turnover, work effort, and the timing of retirement. The greatest incentives for program participation are found in the plan vesting rules, employer matching rates, and retirement age rules.

According to [1], the private sector has made a general shift away from defined benefit to defined contribution plans. In particular, growth in 401(k) program participation in the 1990s was extraordinary. One can infer that this shift reflects the preferences of private-sector employees. While the uncertainty associated with financial markets increases the riskiness of the defined contribution plan, private-sector employees appear

to prefer the potential for tremendous growth in retirement benefits over a defined benefit that is "safe." This trend in the private sector has caused many to question whether the military's defined retirement benefits are competitive with those offered in the private sector and reflect the preferences of military personnel.

CHARACTERISTICS OF THRIFT SAVINGS PLANS (TSPs)

A large and increasing percentage of private-sector employees participate in some form of a thrift savings plan (TSP). Under TSP, employees contribute a portion of earnings to a pension account that is, in most cases, matched by the employer. These contributions are then invested in a variety of financial instruments, including stocks, bonds, and money market funds. TSPs vary in the size of the employee contribution rates, employer matching contributions, and the available investment alternatives. Because TSP is currently available to military personnel, we describe some of these private-sector characteristics in more detail.

EMPLOYEE CONTRIBUTIONS

Employees contribute some predetermined portion of pretax income into an account, up to a specified maximum amount. These contributions usually range between 5 and 20 percent of an individual's earnings. The most common maximum percentage contribution is 10, 12, 15, or 16 percent. Because these contributions are taken from pretax earnings, employees are restricted from early withdrawal without substantial tax penalties.

EMPLOYER MATCHING CONTRIBUTIONS

Nearly 80 percent of participants in private-sector TSPs have employers that match all or part of the employee contribution. The modal employer match is 6 percent of employee pay, with most contributions at 6 percent or less. Reference [2] notes that employer matching contributions are typically less than employee contributions and that the size of the employer match has fallen over time.

There is strong evidence that suggests that employer matching rates affect both employee plan participation and contribution rates. Reference [3] uses panel data from the Internal Revenue Service to examine the impact of the employer matching rate on employee plan participation and contributions.

The author finds that increases in the employer match rate are related to the plan participation rate. She calculates that employee contributions increase by more than 27 percent when the employer contribution increases from 0 to 50 percent of the employee contribution. However, she finds statistically significant decreases in employee contributions at higher employer contributions. She concludes that these results are consistent with "target saving" behavior by employees.

Reference [4] examines the participation of employees in 401(k) plans from 19 firms ranging in size from 700 to 10,000 employees. Plan characteristics varied considerably across the 19 firms. The authors find a statistically strong relationship between the employer's matching rate and both employee participation and contribution. Specifically, they estimate that an employee in a plan with a 100 percent match rate was 47 percent more likely to participate than an employee in a plan with a 25-percent matching rate.[1] Employee contribution rates were also strongly related to the employer's matching rate.

Reference [5] examines records on about 12,000 employees from a single medium-sized manufacturing firm between 1988 and 1991. During that time, the employer matching rate in the 401(k) plan exhibited extreme variation, changing from over 100 percent to zero. These changes were announced well before they took effect, so employees had time to make adjustments in their plan contributions. Contrary to the results in [3] and [4], [5] concludes that employee contributions were largely unchanged despite these fluctuations in the size of the employer match.

INVESTMENTS

Both employee and employer contributions are invested in various financial instruments, such as stocks, bonds, and money market funds. Depending on the provisions of the plan, the employee has some control over the distribution of the contributions over these instruments. Seventy-four percent of employees participating in savings and thrift plans can choose how to invest the employee contribution. Most plans have more than one choice of financial instrument, with the number of choices

[1] None of the firms studied had a 0-percent matching rate.

ranging from two to more than ten. The greatest percentage of employees face four choices. The most common are a common stock fund, long-term interest-bearing securities, company stock, and a diversified stock and bond fund. The employee generally has less control over the employer's contribution. Just over half (58 percent) of the employees are able to choose how to invest the employer portion of the pension contribution. Once again, most employees who can choose how to invest the employer contribution face four choices, with the largest percentage choosing common stock funds.

It is obvious that financial choices can involve a great deal of risk and, unlike those from a defined benefit plan, the benefits from these defined contribution plans are not insured. After reviewing the unusual allocation of their 401(k) contributions made by the employees of a medium-sized manufacturing firm, the authors of [5] and [6] question the financial judgment of employees. Reference [7] examines data from an annual household survey of about 1,000 individuals between the ages of 29 and 47 administered by Merrill Lynch, Inc., beginning in 1993. The author considers the decisions made by employees over contribution rates as well as the distribution of these contributions over the various financial instruments. Using the responses in the survey, he finds that households generally lack any strong financial skills and that they do not compensate for this lack of knowledge by obtaining professional financial advice.

The statistical analysis of reference [7] suggests that personal savings is associated with being more financially knowledgeable. In a regression that holds constant the person's marriage status, number of children, age, earnings, and formal education, the person's financial knowledge increases savings. Moreover, the availability of financial information *in the workplace* increases the person's savings rate and improves his/her financial decisions. Reference [7] concludes that most Americans are "unaware of their financial vulnerabilities, and they lack the knowledge, sophistication, and/or authoritative guidance required to set them on the right track." This conclusion confirms the findings from previous studies suggesting the lack of financial sophistication of the American general population. Greater financial education, often offered in the workplace, helps to improve the savings rate as well as the portfolio decisions of the employees.

WILL SERVICE MEMBERS PARTICIPATE?

The 1999 *Survey of Active Duty Personnel* provides evidence of the relationship between the willingness of the government to match contributions and the service member's willingness to participate. Service members were asked about the likelihood (very likely, likely, neither likely or unlikely, unlikely, very unlikely) of their participation in TSP under three scenarios—no government matching, matching up to 5 percent of the service member's pay, and the ability to invest reenlistment or continuation bonus into the tax-deferred TSP fund.[2]

Figure 1 summarizes the service members' responses. As the figure indicates, only 7 percent of all service members were "very likely" to participate in TSP without some sort of government matching.[3] About 28 percent of service members, however, were "likely" or "very likely" to participate in this scenario. This is close to the degree of participation assumed by the Department of Defense, and is slightly larger than the actual participation rate in the Civil Service Retirement System (CSRS).

The survey evidence clearly indicates that the generosity of the TSP program affects the degree of program participation. If the government were to match the service member's contribution up to 5 percent of pay, the proportion who are "very likely" to participate rises from 7 to 35 percent. Similarly, if service members were allowed to invest reenlistment/continuation bonuses into TSP, almost 32 percent would be "very likely" to participate. In both of these scenarios, almost two-thirds of all service members would be "likely" or "very likely" to participate.

Figure 2 reflects the homogeneity of responses across the five services when asked about participation in an unmatched TSP. There is some variation from one service to the next, but these differences are minor. Similarly, there are only small differences by service when asked about participation if the government were to make matching contributions (not shown).

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[2] The FY00 National Defense Authorization Act did not provide for any government matching. In FY01, the law was amended to allow the secretaries of each of the services to designate "critical military specialties" for matching contributions. Individuals in these specialties who agree to serve for at least 6 years become eligible for this government match.

[3] Because respondents to the Active Duty Survey are not a random sample, all results are weighted using Defense Manpower Data Center (DMDC) weights.

Figure 1. Likelihood of Participation in TSP

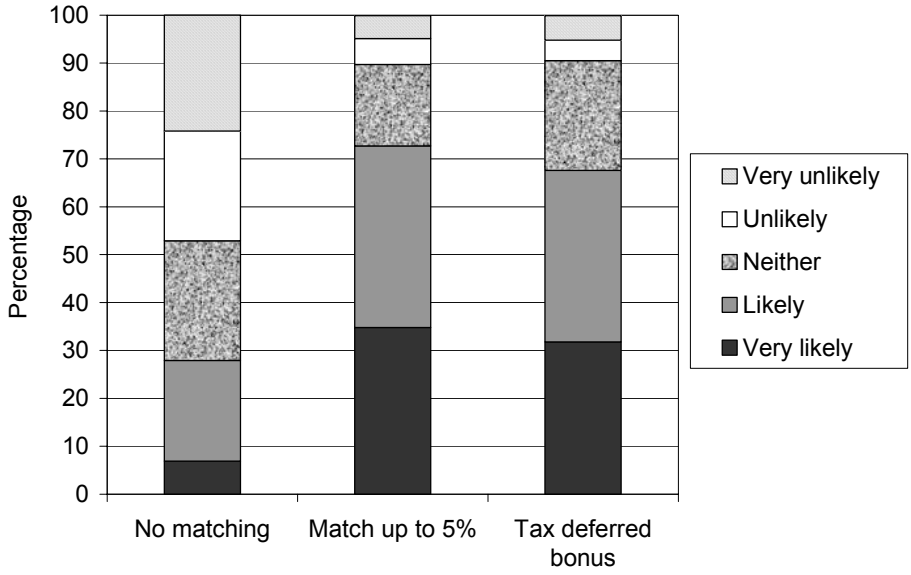
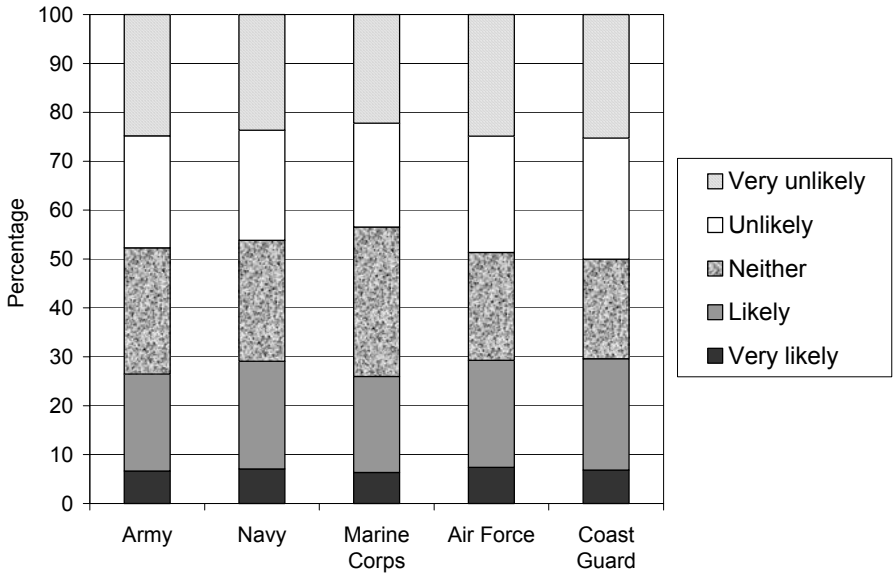


Figure 2. Likelihood of Participation in Unmatched TSP by Service



In general, the survey evidence for military personnel is consistent with the empirical evidence for private-sector employees. People are likely to participate in a defined contribution plan, such as TSP. The likelihood of participation, however, is strongly related to the willingness of the government to provide matching contributions, or even to the ability of the individual to invest earnings other than basic pay.

It is also likely that participation is directly related to the performance of financial markets. The active duty survey was fielded at a time when financial markets were performing exceptionally well, and rates of growth in the value of financial assets were extraordinary. As these markets slow down, or even decline, we hypothesize that participation rates will be lower than those indicated at the time of this particular survey.

EFFECT OF SAVING INCENTIVES ON TOTAL SAVING

In response to the chronically low level of saving in the United States, Individual Retirement Accounts (IRAs) and 401(k)s were developed as a way to encourage people to save for retirement. Both programs became widely available during the early part of the 1980s. IRAs and 401(k) plans are similar in that plan contributions are tax deductible, accumulated interest is not taxable, and withdrawal restrictions apply. Where the programs differ is that 401(k) plans are available only to employees of plan-sponsoring firms and most often involve employer matching contributions. IRA contributions, on the other hand, are independent of place of employment and, therefore, do not involve employer contributions.

Although they are intended to increase the savings rate, personal saving will increase if current-period consumption is reduced to pay for contributions to these savings plans. Aggregate data appear to indicate that savings incentive plans, such as IRAs and 401(k)s, have increased personal saving. As described in [8], annual IRA contributions went up by $33 billion between 1981 and 1986, but then declined to $7.7 billion by 1994 as a consequence of provisions in the Tax Reform Act of 1986 that limited the tax deductibility of contributions. Likewise, 401(k) plan contributions increased from nearly zero in the early 1980s to over $62 billion in 1992. Combined contributions to these retirement plans have exceeded contributions to the more “traditional” employer-provided

defined benefit and contribution plans (e.g., savings and thrift plans, profit sharing, employee stock ownership plans) since 1986.

There are caveats associated with drawing the conclusion that these programs have increased national (public plus private) saving. First, because contributions to these programs are usually tax deductible, current-period public saving will fall as a result of lower tax revenues, thereby raising the public debt. That would not necessarily be a problem if private saving increased by enough to offset the increase in public debt, but do these programs increase private saving? There is the possibility that previous savings from taxed accounts have been shifted into these relatively more generous tax-deductible instruments or that individuals have borrowed to finance the contributions. Moreover, the taste for saving may have changed; perhaps these funds would have been saved even without the incentives. If so, the increase in net savings may not be the result of these tax incentive savings plans.

Because of the ambiguous theoretical relationship, the effect of savings incentive programs on personal savings is an empirical question. The debate over the impact of such plans as the IRA and 401(k) on personal savings is unresolved. References [8, 9, 10, 11, and 12] argue that IRA and 401(k) plans have had a large positive effect on savings. This conclusion is based on three types of evidence.

The first type of evidence follows the same households over time and looks at the difference in savings as these savings-incentives become available. Although it would be rational for the saver to shift savings from taxed funds to untaxed funds, such as an IRA, when the authors looked at individuals in 1984 and 1985, they found that non-IRA assets fell rather insignificantly after contributions were made to an IRA account. These findings were consistent with similar studies using different data sets.

A second piece of evidence considers the degree of substitutability (or lack thereof) between taxable savings funds and tax-free pension funds. Even though they are tax deductible, a good argument could be made that IRA contributions are not close substitutes for taxable assets. This is because of the illiquidity of IRA balances—the fact that contributions cannot be withdrawn without penalty until the person reaches age 59½. The implication of this lack of substitutability is that IRA contributions are financed by new saving. However, IRAs are probably substitutable for people close to or over age 59½ or for those with large savings balances who can afford to tie up long-term contributions to an IRA. Indeed, reference [13] shows that, between 1983 and 1985, households with heads older than 59 or those individuals with non-IRA assets greater than $20,000 accounted for nearly 70 percent of IRA contributions. The authors

conclude that IRAs have had no effect on savings. Reference [8], however, uses the same data and finds that this conclusion is fragile and, under minor changes in the model, the positive effect on savings is restored. One additional problem with examining the behavior of one person over time is that it is difficult to hold constant his or her taste for saving. For example, if the person becomes more thrifty over time, the IRA contributions may have been saved in an alternative account and no additional savings would have resulted from the IRA.

Comparisons of the behavior of different groups of savers represent the third type of evidence. For example, the employees who participate in a 401(k) plan at work represent a different cross section of people than those who contribute to IRAs. Participation in 401(k)s is broader and participants are more likely to be younger and poorer. References [11 and 12] compare the savings activities of two groups of savers with similar propensities to save, but one group is eligible for a 401(k) plan and the other is not eligible. The authors observe that both groups had similar levels of financial assets other than IRAs and 401(k)s. Between 1984 and 1991, they find that these assets did not decline (in fact, they increased) as the assets grew in the savings incentive programs for the group eligible for the 401(k) program. Because they have tried to make sure that the people in these groups had similar tastes for saving, they conclude that contributions to the 401(k) plan represent entirely new saving.

This research might be overstating the effect of the 401(k) plan on saving for several reasons. Eligibility for programs like 401(k)s may be correlated with the individual's taste for saving. Reference [12] argues that the implementation of the 401(k) plan is exogenous to the employees; however, employers probably respond to current workers' desires for these pension benefit programs, and new workers with a taste for saving might seek out employers who have these programs as part of the employee compensation package. Because of this self-selection problem, if employees who participate in 401(k) plans have a higher taste for saving, too much new saving will be attributed to the incentive program. If this is the case, a mitigating factor is the expansion of the eligibility of 401(k) plans over time. As more employees become eligible for these savings incentive plans, the fraction of people who are just "casual savers" will grow in the 401(k) plan participants. This means that a finding of a decline in taxable financial assets for the group of 401(k) contributors does not imply a shifting of resources from taxable assets, but probably means that the group has been diluted by these previously casual savers.

In addition, studies that find a positive saving effect do not usually consider a broader set of alternative sources of funds for 401(k) contributions. References [14 and 15] are critical of the use of a narrow

definition of wealth in the studies that have found a strong effect on savings. For example, contributions to IRAs and 401(k)s are available if people do not buy a larger home or if they do not accelerate their mortgage payments. When one considers a broader measure of wealth that includes home equity, some studies find that 401(k) programs have not increased wealth.

Reference [16] considers the savings behavior of two different cohorts of savers reaching retirement age in 1984 and 1991. The authors find that those reaching retirement age in 1991 had a larger mean level of financial assets than the group of people reaching retirement age in 1984. Furthermore, they observe that this difference is almost entirely the result of higher personal savings. They find similar results when they narrow the analysis to groups that participated in savings programs. As with the previous two types of studies, they conclude that there is little or no substitution of personal savings for other types of financial assets.

Engen, Gale, and Scholz [14, 15] caution against making any conclusions from this type of evidence. They observe that analysis on different cohorts means that significant age, time, and cohort effects are often difficult to identify. They note that the stock market boom between 1984 and 1991 and the higher real interest rates could explain the difference in financial assets observed by Venti and Wise [16]. They also point to the changes in other financial assets during the 1980s that could have accounted for the appearance of greater saving by the later retiring cohort. These changes include a shift away from housing, an increase in mortgage and household debt, and a decrease in the real value of social security benefits after the 1983 reforms. Finally, they note two potentially important data problems that would cause one to overstate the savings effects. Venti and Wise do not consider the tax due on these balances upon withdrawal, and they omit data on 401(k) account balances before 1984.

In summary, there is no conclusive empirical evidence of the impact of savings incentive programs on total savings. A conservative reading of the literature suggests that total savings does rise, but by less than the amount contributed to these savings plans. In their overview of the empirical evidence, the authors of [17] estimate that the impact of IRAs on saving is probably greater than 26 cents per dollar of contribution. In other words, for every dollar invested in an IRA, only 26 cents represents “new” saving; the remainder is a substitution of existing financial assets for investment in an IRA. They conclude, however, that the substitution of existing financial assets into 401(k)s is smaller, which translates into a larger net increase in total savings.

EFFECT ON TAX REVENUE

An additional question arises regarding the effect of these programs on national (private plus public) saving. To encourage participation, one of the characteristics of pension plans like a thrift savings plan (or a 401(k)) is the ability of employees to make tax-deductible contributions. Obviously, this contribution will immediately reduce tax revenue, which is particularly a problem if funds have been shifted from taxable savings accounts. Of course, future tax revenues increase as these retirement funds are eventually withdrawn, but they are usually subject to taxation at a lower marginal tax rate. Considered in isolation, these savings incentive programs create the possibility of a tax revenue loss caused by the tax benefits of the savings plan contributions and withdrawals. One possible mitigating factor is that, if saving goes up in response to these incentive programs, domestic investment funding by this saving is expected to increase. This increased investment will ultimately raise corporate tax revenues. The possibility that tax revenue might increase as result of the increased saving that is transformed into investment is not often considered.

Given this theoretical ambiguity, the relationship between savings incentive plans and tax revenue is an empirical question. Reference [18] uses a simulation model to calculate the total tax revenue effects resulting from a tax incentive savings program. The author considers the behavior of a hypothetical 45-year-old who contributes $2,000 a year to an IRA for 20 years and then withdraws an annuity for 15 years. He attempts to estimate the change in personal and corporate tax revenue as a result of this type of IRA. The revenue effects clearly depend on the assumptions of the simulation regarding tax rates and savings effects.

One key assumption in the Feldstein model [18] is that saving is positively affected by these incentive programs. Under Feldstein's most optimistic scenario—high corporate and post-retirement tax rates and only 20 percent of the IRA contribution taken from other savings—the corporate tax revenue eventually exceeds the lower personal income tax revenue after 9 years. The national debt associated with any tax losses is reduced (i.e., the increased corporate tax revenue exceeds the lower personal income tax receipts plus the interest on the national debt) after 15 years. Even under his weakest scenario—only 50 percent of the IRA contribution represents new saving combined with low corporate and personal tax rates at retirement—corporate tax revenue exceeds the loss of personal tax revenue in 21 years, and 5 years of surpluses will be enough

to pay the accumulated debt. Although they do not deny that positive revenue effects are possible, Engen, Gale, and Scholz [14, 15] argue that the strong revenue gains found by Feldstein are not realized "under more plausible conditions."

Despite these potential decreases in tax revenue, both immediate and in the long-term, the Federal Government has continued to offer these tax advantages to individuals to encourage private saving for retirement. We conclude, then, that the government has historically viewed this potential loss in revenue as an "acceptable cost" in promoting lower reliance on Social Security for retirement benefits. Furthermore, there is no reason to expect the Federal Government's desire for private saving for retirement to be any different for military personnel than for private-sector employees.

ADMINISTRATIVE COSTS

We examined several studies of administrative costs of public and private pension fund programs. According to data taken from the U.S. Department of Labor, the primary expenses for private defined contribution programs include salaries, accounting fees, actuarial fees, contract administrator fees, and investment advisory and management fees. Overall, the Department of Labor statistics indicate that annual expenses as a percentage of contributions are only about 1.5 percent. The expenses associated with a defined contribution plan are a small fraction of defined benefit plan expenses. Annual expenses as a percentage of contributions for a defined benefit plan are about 11 percent. The primary difference between these two plans is the high investment advisory and management fees of the defined benefit plan as well as higher actuarial fees. In contrast, the military's defined benefit retirement system does not have these investment/actuarial costs.

If the employer sets up some type of investor education class, the costs of the defined contribution plan do rise [19]. For example, 401(k)s provide a great deal of data to participants, including quarterly statements and investor information. As a comparison, administrative costs for private pension plans are often considerably greater than those managed directly by the government. Reference [20] cites a U.S. Social Security report that annual administrative costs of the U.S. Social Security Program are lower than those reported by the Department of Labor for private pension plans.

Reference [19] also concludes that administrative costs are a function of the number of plan participants, the magnitude of the plan's assets, the percentage of plan members who are actually retired, and the percentage of assets held in a pooled fund. Empirical estimates of administrative costs identify statistically significant scale economies. Specifically, one estimate of plan size showed that increasing the number of participants by 1 percent raised administrative costs by eight-tenths of 1 percent. Similarly, raising the asset size by 1 percent raised costs by just over one-quarter of 1 percent. Consequently, the large size of the military thrift savings plan is expected to keep administrative costs lower, not higher as many have feared. In general, there is no evidence to suggest that the administrative costs of TSP for military personnel would be prohibitively expensive.

CONCLUSION

The private sector has made increasing use of defined contribution plans to provide retirement benefits to its employees. The military retirement system is principally a defined benefit plan, but military personnel have recently been given the opportunity to participate in a thrift savings plan. Many have expressed concerns about the implications of such a dramatic shift in compensation. The major issues that have emerged are questions regarding (a) the level of service member participation, (b) potential effects on total saving, (c) implications for federal tax revenues, and (d) the administrative costs associated with such a program.

The evidence suggests that participation and contribution rates are strongly related to the size of matching contributions made by the employer. In addition, survey evidence shows that military personnel would increase participation in TSP if the government were willing to make matching contributions. It is also likely, however, that participation will be strongly related to the performance of financial markets, and that the recent economic downturn will negatively affect participation rates.

Even though these savings incentive plans are designed to encourage increased retirement savings, the impact of these programs on total savings is unclear. The empirical evidence is split, with estimates ranging from no substantive increases to nearly a 100-percent increase in total savings. The literature concludes that total savings does rise, but by less than the amount contributed to these savings plans.

There is conflicting evidence on the effect of these programs on national (both private and public) saving. Some research shows the

potential for this immediate tax revenue loss to be made up over time by increases in corporate tax revenue; the magnitude and timing of these long-term increases depend strongly on the assumptions that are made. Regardless, the Federal Government has continued to offer these tax advantages to encourage private saving for retirement, and it is likely that any loss in revenue is viewed as an "acceptable cost" in promoting less reliance on Social Security for retirement benefits.

Finally, the evidence suggests that the administrative costs for defined contribution plans are a small fraction of those associated with defined benefit plans. The primary differences in administrative costs are the high investment advisory and management fees of the defined benefit plan, as well as larger actuarial fees. It is not clear, however, whether these high administrative costs are associated with the defined benefit plan offered by the military. If the employer provides investor education for its employees, the costs of the defined contribution plan do increase, but with clear benefits for the employee.

We conclude that the availability of a thrift savings plan to military personnel represents an attractive component of the compensation package. It provides military personnel with a benefit that is enjoyed and used by many of their private-sector counterparts, and it allows the service member to take an active role in saving for retirement. In addition, the ability to selectively match contributions gives the Department of Defense the flexibility to use compensation as a force management tool.

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CHAPTER II

THE THRIFT SAVINGS PLAN

WILL RESERVISTS PARTICIPATE?

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

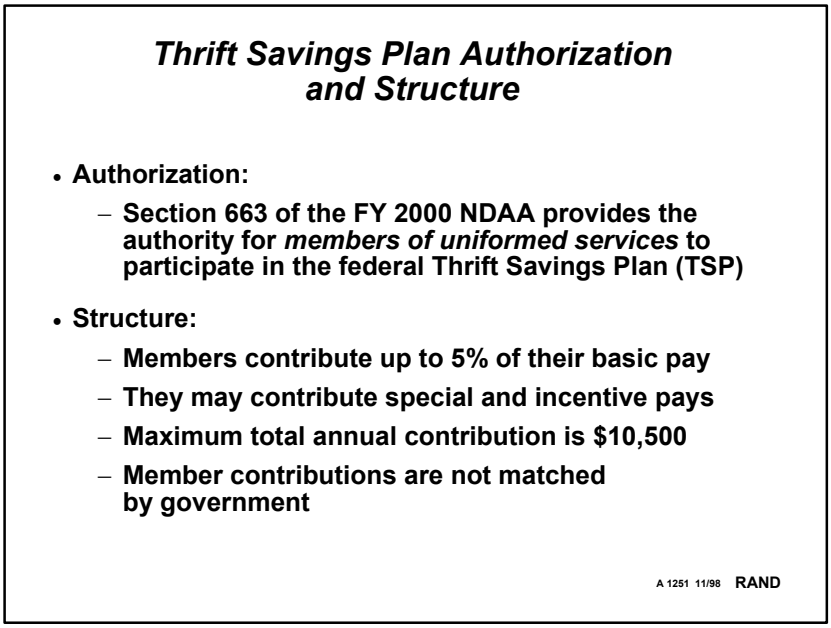
PREFACE

The FY2000 National Defense Authorization Act provided authority to members of the armed services to participate in the federal thrift savings plan (TSP). The structure of the TSP for service members would be similar to the one that covers civil service personnel who participate in the Civil Service Retirement System. Members would be able to contribute up to 5 percent of their basic pay, but there would be no government contributions. The one difference from the TSP that covers civil service personnel is that military members would be able to contribute their special and incentive pays.

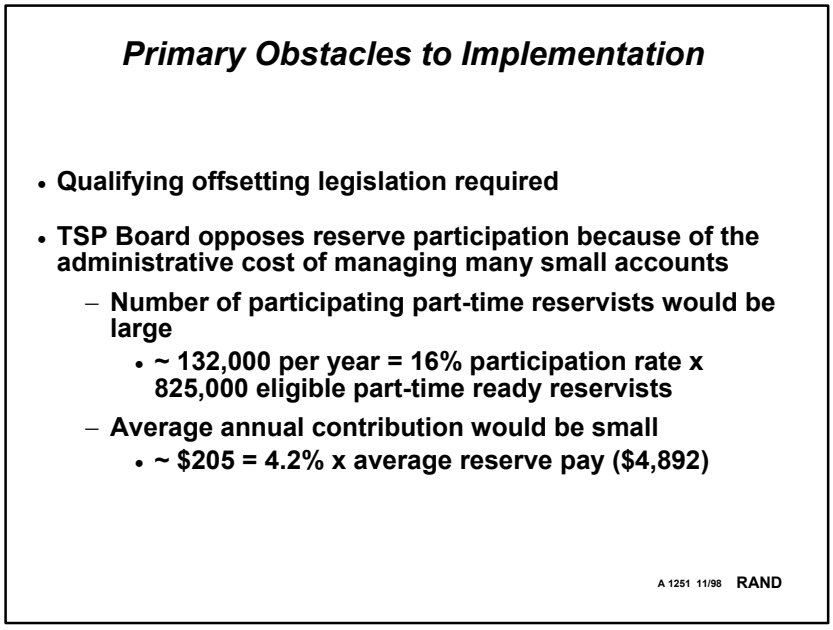
The Federal Thrift Retirement Investment Board conducted a cost analysis and concluded that extending TSP participation to members of the part-time Ready Reserve would be wasteful and a bad idea because the cost of administering a large number of small accounts would be extraordinarily high. The Board recommended that part-time reservists be excluded from participation.

The Office of the Secretary of Defense (Reserve Affairs and Compensation, jointly) requested that the analysts working as part of the 9th Quadrennial Review of Military Compensation (QRMC) study this issue. This briefing summarizes our analysis in response to that request. The analysis was conducted within a short time-frame and uses available data sources to estimate the number of part-time reserve participants and their annual expected account contribution. The briefing concludes by offering several policy options.

This research was conducted in part under the sponsorship of the Office of Special Studies, Office of the Under Secretary of Defense for Personnel and Readiness. It was also partly conducted under the sponsorship of the 9th Quadrennial Review of Military Compensation. It was performed within the Forces and Resource Policy Center of RAND's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the unified commands, and the defense agencies.



The FY2000 National Defense Authorization Act provides the authority for members of the uniformed services to participate in the federal TSP. The structure of the TSP for service members would be similar to the structure of the TSP that covers those personnel in the federal civil service who participate in the Civil Service Retirement System (CSRS). Members could contribute up to 5 percent of their basic pay. Unlike participants in CSRS, those in the armed forces could contribute their special and incentive pays as well. However, the maximum annual contribution is $10,500. As with the CSRS participants, the members' contributions would not be matched by the government.



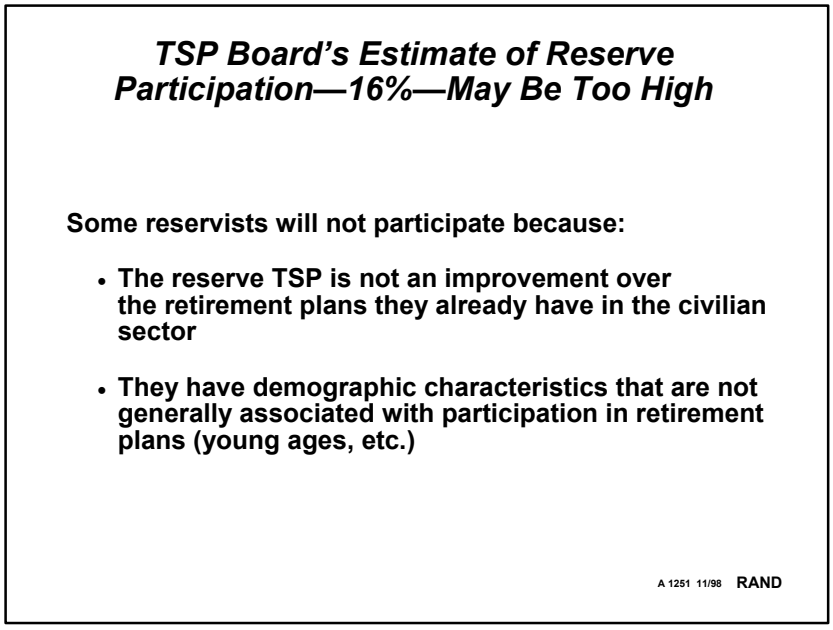
There are two main obstacles to implementing the TSP for members of the uniformed services. The first obstacle involves finding the funds to cover the cost of covering military personnel. A qualifying offset must be found to fund this program. This obstacle is not addressed in our analysis.

The other primary obstacle is that the Federal Thrift Retirement Investment Board, which we call the TSP Board, opposes the participation of part-time ready reservists in the TSP because the cost of administering their accounts would be prohibitively high. According to their calculations (Roger Mehle, letter to Rudy deLeon, December 1999), participation by part-time ready reservists would involve many accounts that would be small in terms of their annual dollar contributions. Since it would not be fair to burden the federal civil service members with this cost, the cost would have to be borne by military personnel. The board estimates that the administrative costs associated with managing so many small accounts would require a 8.4 percent charge on the part-time reservists' account balances.

The administrative cost is based on the number of accounts and their average size. The board estimates that the number of accounts would be 132,000, equal to the number of eligible part-time ready reservists (825,000) times a participation rate of 16 percent. The 16 percent figure is based on the observed annual TSP contribution rate of CSRS participants; that rate is 20 percent. To account for the lower (or "service") earnings of

the reserve population, the TSP Board normalized the rate for part-time reservists to 16 percent.

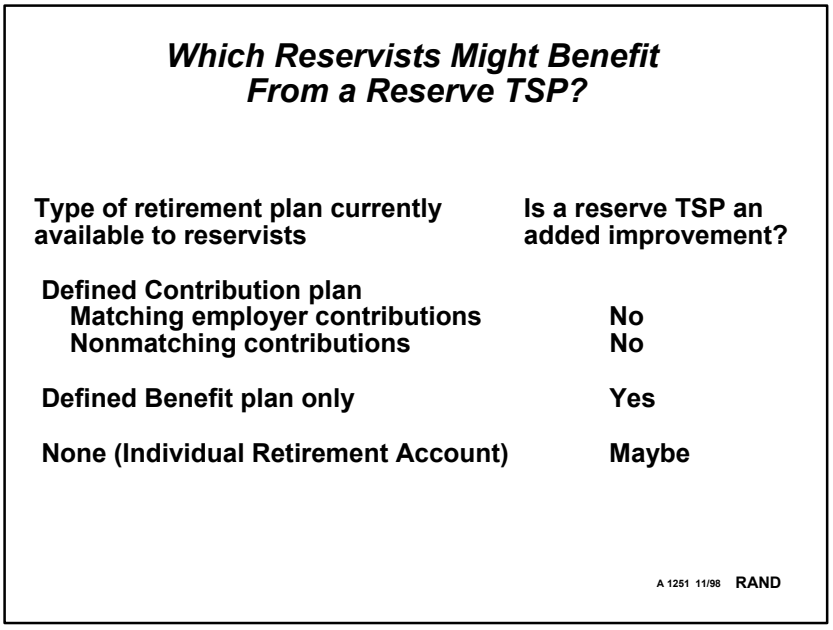
The board also estimates that the average annual contribution of a part-time reservist would be just above $200. Roughly, this figure is based on average reserve basic pay ($4892) times an assumed annual contribution rate of 4.2 percent.



The TSP Board's estimate of the reserve participation rate—16 percent—may be too high, for two main reasons.

First, part-time reservists are civilians, and many of them work for employers that not only already offer a retirement plan like the TSP but whose plans provide an employer match to the employee's contributions. That is, those plans are better in terms of their expected benefit levels than the TSP. For those reservists, the TSP would not be an improvement over what they could get in their civilian jobs.

Second, some reservists have characteristics that are not associated with participation in retirement plans. For example, they are more likely to be young males. This could cause the participation rate to be lower than what the TSP Board estimates.



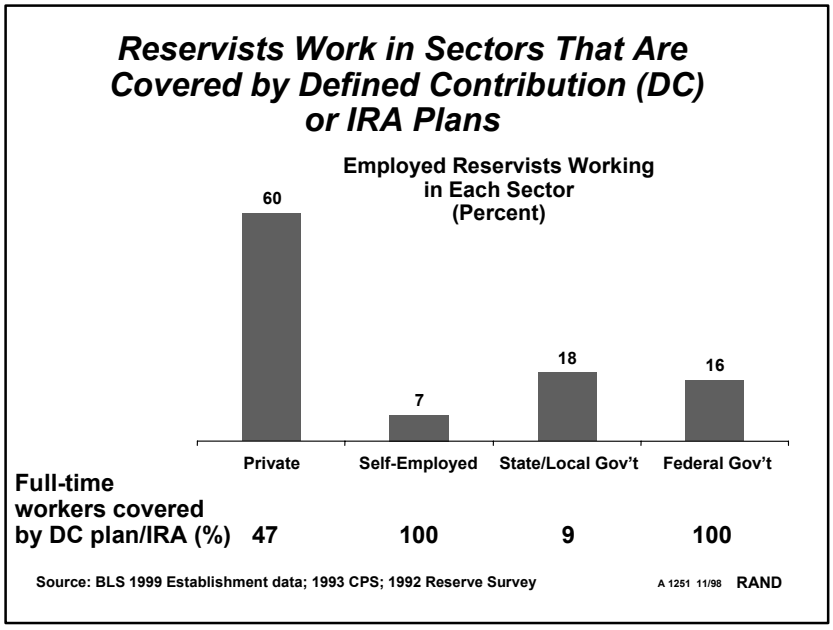
This chart shows conceptually which reservists might be made better off by the reserve TSP option and which are no worse off. The left-hand column lists the various types of retirement plans available to part-time reservists in the civilian sector. The right-hand column indicates whether the reserve TSP option is an improvement over each type of civilian retirement plan.

The first type of retirement plan is known as a defined contribution (DC) plan. The TSP belongs to this class of plans. Under a DC plan, contributions are made to a fund and the individual has various choices for how that fund is invested. The value of one's retirement benefit depends on the level and pattern of contributions and on the fund's performance over time. DC plans have become quite pervasive in the civilian labor market. Under some DC plans, the employers match the employee contributions; under others, they do not. Clearly, the reserve TSP is less attractive than a civilian plan where the employer matches the worker's contributions.

The other primary type of plan is a defined benefit (DB) plan. Under a DB plan, the retirement benefit is based on a formula. Many civilian employers cover workers with both a DB and a DC plan. The Federal Employees Retirement System (FERS) is an example of such a plan. Most state and local workers are covered by a DB plan only. Active-duty personnel are also only covered by a DB plan, the military retirement plan. The reserve TSP is an improvement over a DB plan only because it offers a retirement option that is not available to them under their DB plan, an

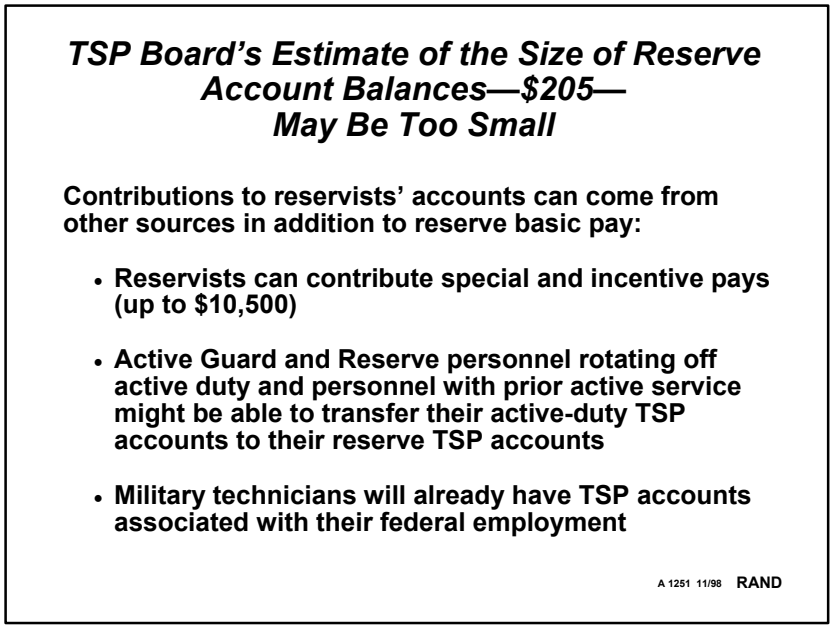
opportunity to put pre-tax dollars into an investment fund that can be rolled over to an individual retirement account (IRA) if the individual separates from the employer before he or she is eligible for retirement.

The final type of plan that covers part-time reservists is no plan. Those without a retirement plan can open an IRA that allows them to save pre-tax dollars in a retirement fund. Since the reserve TSP may offer the same opportunity, whether the reserve TSP is an improvement depends on a member's reserve earnings, civilian earnings, and marital status. The reserve TSP has a 5 percent cap on contributions from earnings. The IRA cap is $2000. If the reserve cap is binding such that members who want to contribute as much as $2000 cannot do so because their reserve earnings are too small, the IRA could be better. On the other hand, if the reserve cap is not binding and members want to contribute more than $2000, the reserve TSP is better because members can contribute up to $10,500. Also, whether IRA contributions can be tax-deferred depends on income level and marital status. Since all TSP contributions would be tax-deferred regardless of income and marital status, the TSP might be better for some individuals.

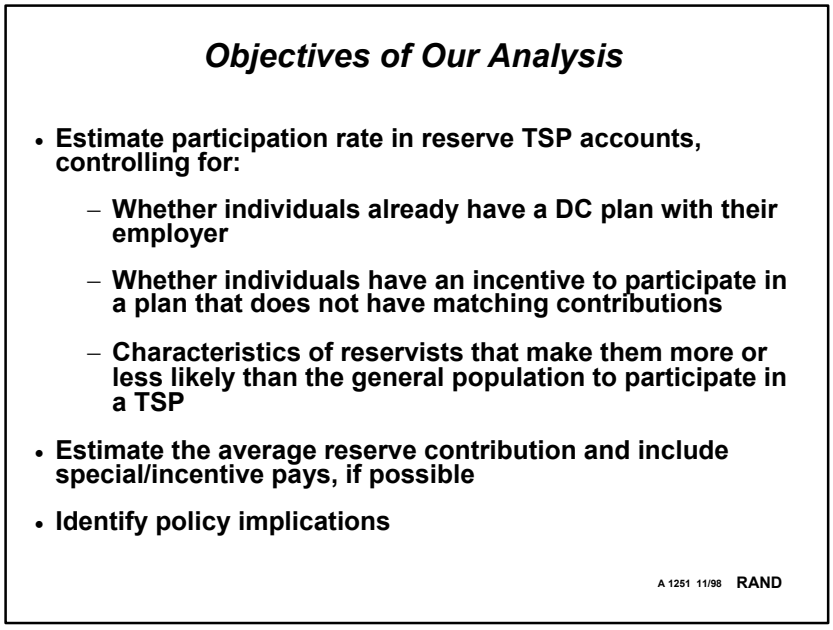


The previous chart showed that part-time reservists who have DC plans, especially those that provide an employer match, are unlikely to be better off with a reserve TSP. This chart shows how part-time reservists are distributed across sectors, and what fraction of full-time workers in these sectors have DC plans. Because of the distribution of reservists across jobs covered by a DC plan, some reservists are likely to be covered by a DC plan and therefore, are not likely to view the reserve TSP option as an improvement.

Most part-time reservists work for private-sector employers. Almost half (47 percent) of full-time private sector workers are covered by a DC plan. A large proportion of reservists, larger than the civilian population as a whole, work for the federal government. Because the TSP is offered to all full-time civil service employees, even those participating in CSRS, 100 percent of full-time federal government employees are covered by a DC plan. Similarly, because all self-employed workers have the opportunity to open an IRA, all self-employed workers are covered by a DC plan. Only the state and local sector has few jobs covered by a DC plan. This sector usually only has a DB plan. About 20 percent of part-time reservists work in this sector.



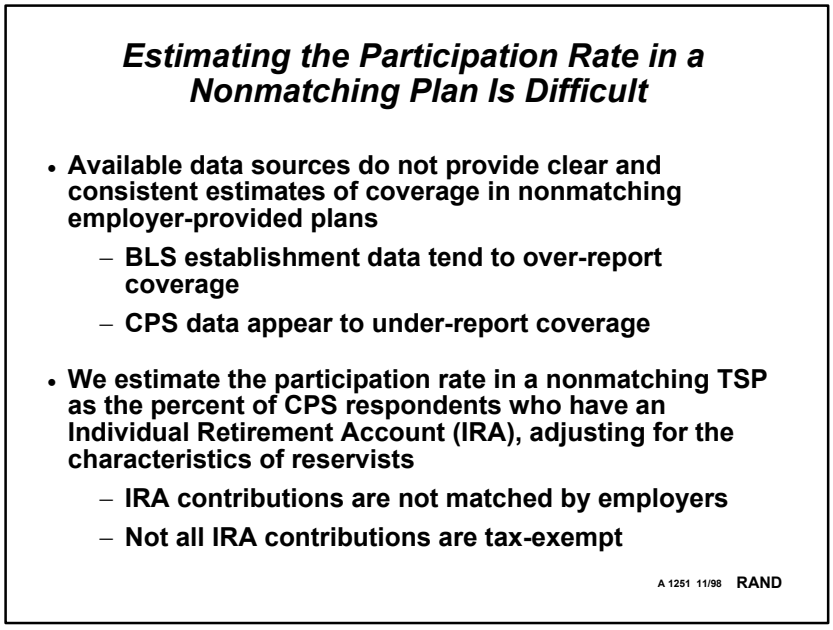
While the TSP Board's estimate of the reserve participation rate might be too high, its estimate of the average account contribution might be too low. Account contributions might be higher because part-time reservists would be allowed to contribute their special and incentive pays, a factor not incorporated by the board's estimate of the average account balance. Also, if prior-service personnel were allowed to transfer their active account balances to their reserve accounts, the size of reserve account balances would obviously be higher. Furthermore, because military technicians are federal workers, they already maintain accounts associated with their federal employment. If personnel could consolidate their federal and reserve account balances, the average reserve account size would be larger. Whether it is feasible to permit consolidation of accounts is an open question and needs further investigation.



The objective of our analysis is to use available data sources to derive our own estimate of the part-time reserve participation rate and the average reserve account balance.

As we describe in the rest of briefing, we estimate the reserve participation rate in the TSP while attempting to control for several key factors. First, we attempt to control for whether the individual might already have a DC plan with his or her civilian employer and, therefore, have little incentive to participate in the reserve TSP. Second, we attempt to control for the extent to which reservists would have an incentive to participate in a nonmatching contribution plan; individuals might respond differently to the incentive to shelter income from taxes, the main economic incentive for having a nonmatching plan. Finally, we attempt to control for the characteristics of the reserve population and how they differ from the civilian population as a whole. These characteristics may make reservists more or less likely than the civilian population to participate in a TSP. The data are from the early 1990s and display occasional shortcomings in consistency and quality; we discuss these data issues later.

We also attempt to estimate the average reserve account contribution and try to include special and incentive pays where possible. Finally, we highlight some of the policy implications of our findings.



One of the factors we attempt to incorporate into the analysis—whether an individual will participate in a nonmatching plan—is difficult to estimate because of the quality of the data available.

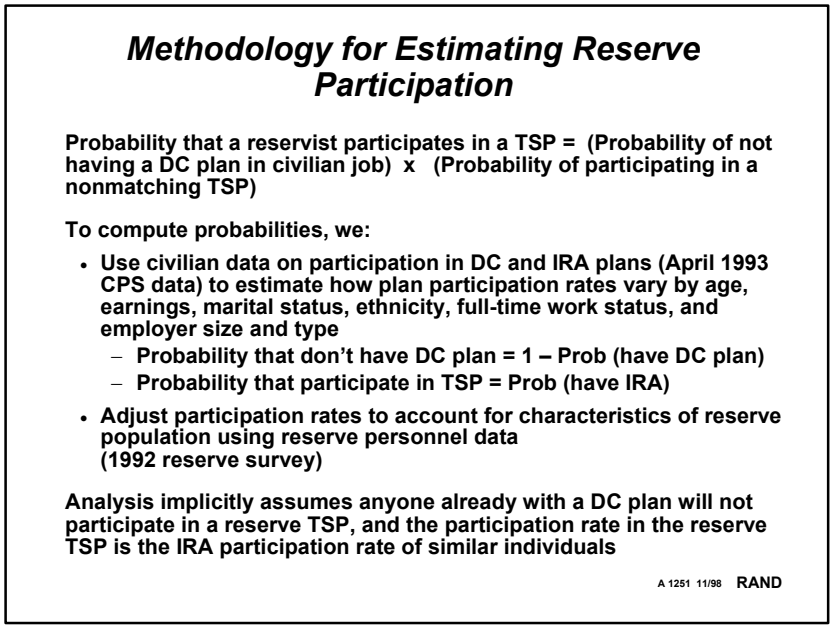
Two data sources are publicly available to address this issue: the Bureau of Labor Statistics (BLS) establishment data, which surveys employers about their retirement plans, and the Current Population Survey (CPS) April 1993 Supplement, which surveys individuals in the civilian population about their retirement plans. The BLS data tend to overestimate the coverage of workers in nonmatching plans because they query employers about the retirement plans for the "eligible" workforce, and not the entire workforce. The eligible workforce is usually smaller than the entire workforce, implying that the coverage rate is higher.

In some instances, the BLS data indicate coverage rates for the entire workforce. These published rates allow us to compare the rates found in the BLS data with those found using the CPS data. The CPS rates are invariably smaller. Some workers in the CPS appear to be unsure about their own pension plan coverage. Since employers are better informed about their retirement plans, the rates in the BLS data are higher. (The appendix describes the discrepancy between the BLS and CPS.) We use the CPS data to estimate the reserve participation rate. To address the problem of under-reporting in the CPS data, we weight the CPS data to produce the pension coverage rates reported by the BLS for the entire workforce.

To estimate the reserve participation rate in a nonmatching TSP, we use the fraction of CPS respondents who have an IRA in the civilian sector, adjusted for age and other characteristics of reservists. IRA coverage is a good proxy of TSP participation because, like the reserve TSP, IRA contributions are not matched by the employer.

Furthermore, like the TSP, contributions may be tax-exempt. However, unlike the TSP option, under some circumstances IRA contributions cannot be sheltered from taxation. Those who are already covered by an employer plan and who earn less than $35,000 (rising to $60,000 by the year 2008) can contribute tax-exempt dollars. However, those who earn more than these limits cannot. Because some workers cannot contribute tax-exempt dollars to an IRA while all reservists would be able to contribute tax-exempt dollars to the TSP, it is possible that the IRA coverage rate might underestimate the participation rate in a nonmatching TSP. As discussed later, we conduct sensitivity analyses and discover that even if the estimated rate were considerably higher than what we find, our general conclusions about the level of participation would largely be unchanged.

While using IRA coverage as a proxy of TSP participation has several advantages, one disadvantage is that some individuals who have an IRA do not contribute to it annually. Furthermore, some who have an IRA also have a matching DC plan with their employer. The CPS data do not provide reliable information on IRA contributions or DC plan coverage among those with an IRA. We attempt to address these problems by adjusting the IRA participation rate in the CPS by the probability of having a DC plan with one's employer.



This chart indicates in more detail how we estimate the part-time reserve TSP participation rate. The participation rate is assumed to be the product of two probabilities. The first is the probability that an individual is not already covered by a DC plan, and therefore has no reason to participate in the reserve TSP. The second is the probability that an individual would participate in a nonmatching plan to shelter some income from taxes. Both probabilities are relevant because some reservists who might want to shelter income from taxation will already have an incentive to do so with their civilian employer.

We compute these probabilities using the 1993 CPS April Supplement data on the civilian population. We estimated probit models for the probability that an individual will have a DC plan and the probability that he or she will have an IRA. The results provide estimates of how the probabilities would vary among individuals with different characteristics such as age, marital status, earnings, ethnicity, full-time work status, and employer size and type (private, federal, state, and local). The probability of not having a DC plan is set equal to 1 minus the probability of having a DC plan. The probability of participating in a nonmatching plan is estimated to be the probability of having an IRA. (The probit results are reported in the appendix.)

Note that we compute the probability of *having* an IRA, not the probability of *contributing* to it. About 25 percent of the civilian population has an IRA, according to the Employee Benefits Research Institute (EBRI, 1999), but only 5 percent contributes to it. Ideally, we

would like to compute the probability of contributing to an IRA rather than having an IRA, since the former measure more closely estimates the probability of contributing to a reserve TSP. Furthermore, if we could estimate the probability of contributing to an IRA, it would not be necessary to adjust it by multiplying it by the probability of having a DC plan, since those who contribute to an IRA would have already incorporated their DC plan coverage in their decision to contribute to an IRA. Unfortunately, the CPS data do not provide a reliable measure of IRA contributions; therefore, we compute the probability of having an IRA. Since some of those who have an IRA may also have a DC plan to which they contribute, we multiply this probability by the probability of having a DC plan, as described above.

Once we estimate the probit equations, we then apply the probit results from the CPS to a random sample of part-time (i.e., non-Active Guard and Reserve) ready reservists, provided by the 1992 reserve personnel survey. Specifically, we predict the probabilities for each reservist in the sample, multiply them, and take the mean value. The mean gives us an estimate of the average TSP participation rate adjusting for the characteristics of reservists.

This methodology embeds some key assumptions. First, it assumes that those already covered by a DC plan will not choose to participate in the reserve TSP. This assumption is probably safe, although a few individuals might participate in a reserve TSP despite their already being covered by a DC plan. Second, it assumes that the rate of participation in the TSP equals the rate of participation in an IRA for similar individuals. As discussed in the previous chart, not all IRA contributions may be tax-exempt, and we may underestimate TSP participation on this count. However, as discussed later, our general conclusions are not sensitive to variations in this rate.

Reservists Have Characteristics That Raise the Probability of Already Having a DC Plan

Characteristic	Effect on probability of having DC plan*	Reserve relative to civilian population**
Age	+	Lower
Earnings	+	Higher
Male	–	Higher
White	+	Lower
Married	+	Higher
Works for large private employer	+	Lower
Works full-time	+	Lower
Federal worker or self-employed	+	Much higher

* Source: April 1993 CPS data
** Source: April 1992 CPS data and 1992 reserve survey

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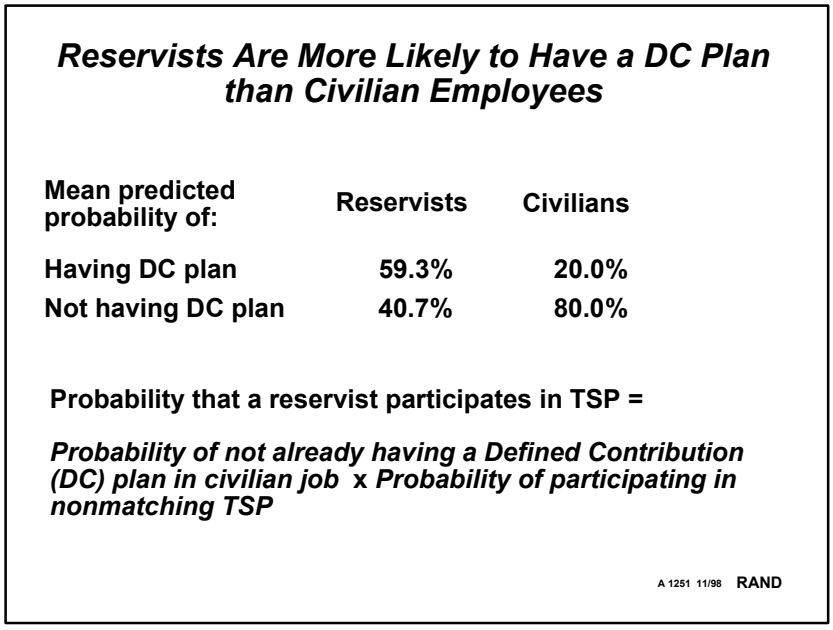
The probit results relating to how the probability of contributing to a DC plan varies with individual characteristics are shown in the middle column of this chart. These results are obtained using the CPS 1993 April Supplement data. The right-hand column indicates how the reserve sample differs from the civilian sample in terms of the mean values of the characteristic. A more detailed description of the probit results, and the means characteristics of the two samples, are provided in the appendix.

Age and earnings are both positively related to having a DC plan in the CPS data, as is size of employer. Those working for the federal government obviously are more likely to have a DC plan because all federal full-time workers are covered. Reservists differ from the general population in these characteristics; for example, they are younger. Since they tend to be better educated, they earn more than civilians do. Furthermore, because their earnings are higher on average, this characteristic makes them more likely than civilians to have a DC plan.



We apply the probit results to the 1992 reserve survey data and compute a predicted probability of having a DC plan, and of not having a DC plan, for each part-time reservist in the survey. We then compute the mean probability in the sample. This chart shows the results and compares them to the rates found in the CPS data for the civilian population. (As discussed earlier, the CPS data are weighted to produce the mean pension coverage rates found in the BLS data.)

We estimate that 59.3 percent of reservists would already have a DC plan with their civilian employer, based on their characteristics and based on how those characteristics map into plan coverage in the civilian population. Since 1 – 59.3 percent is 40.7 percent, we estimate that 40.7 percent of reservists do not already have a DC plan with their civilian employer. This figure is the first of the two probabilities that we need to compute.

Reservists Have Characteristics That Lower Probability of Having a Nonmatching IRA

Characteristic	Effect on probability of having an IRA*	Reserve relative to civilian population
Age	+	Lower
Earnings	+	Higher
Male	–	Higher
Black	–	Higher
Married	+	Higher
Works for large private employer	–	Lower
Works full-time	–	Lower

*Estimated from civilian data

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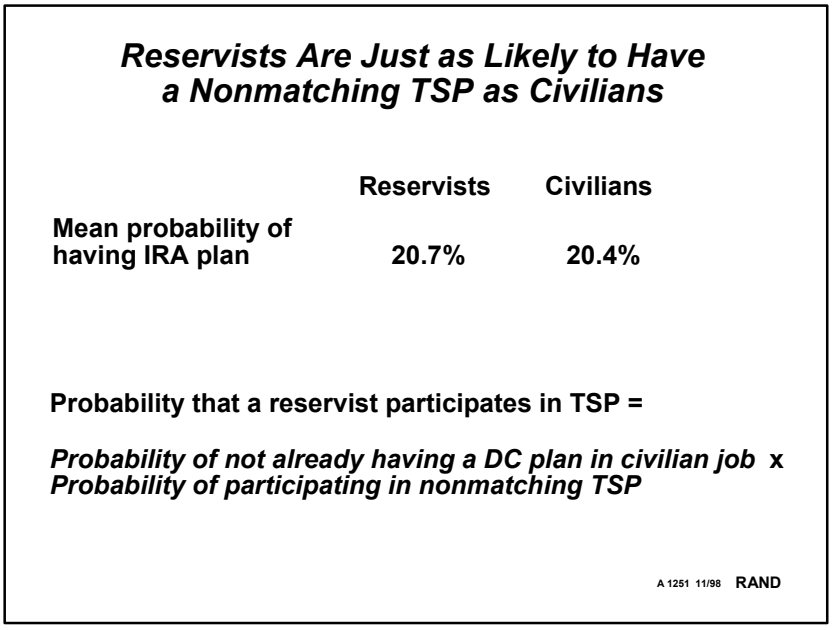
The second probability we need to compute is the probability that a part-time reservist would participate in a nonmatching TSP. The first step is to estimate a probit model of having an IRA plan using the CPS data. The middle column summarizes the estimated effect of each characteristic on the probability of having an IRA. The probit results are shown in the appendix. As the chart indicates, both age and earnings are positively associated with having an IRA in the CPS data, as is being married. The last column indicates how the reserve mean characteristic compares with the civilian population mean. Reservists have characteristics that both lower and raise the probability of having an IRA. For example, they are younger than the general population; those who are younger are less likely to have an IRA.



We use the probit results to predict the probability of having an IRA for each part-time reservist in the reserve survey. Taking the mean, we estimate that 20.7 percent of reservists would have an IRA. The same proportions of civilians—20.4 percent—also have an IRA. The 20.7 percent figure forms the basis of the second probability that we need to compute the reserve participation rate.

To compute the overall reserve participation rate, we predict the probability of not having a DC plan and the probability of having an IRA for each individual in the reserve personnel survey data, and we take the product of these probabilities for each individual. We then compute the mean of this product across all reservists.

Estimated Rate of Reserve TSP Participation Is Low and Varies with Job Attribute

	Mean Participation Rate (%)
All reserve personnel	6.8
Component	
ARNG	6.0
USAR	7.3
USNR	8.5
USMCR	5.9
ANG	5.7
USAFR	7.4
USCGR	11.5
Officer	9.4
Enlisted	5.7
Prior-service personnel	7.3
Nonprior-service personnel	5.6

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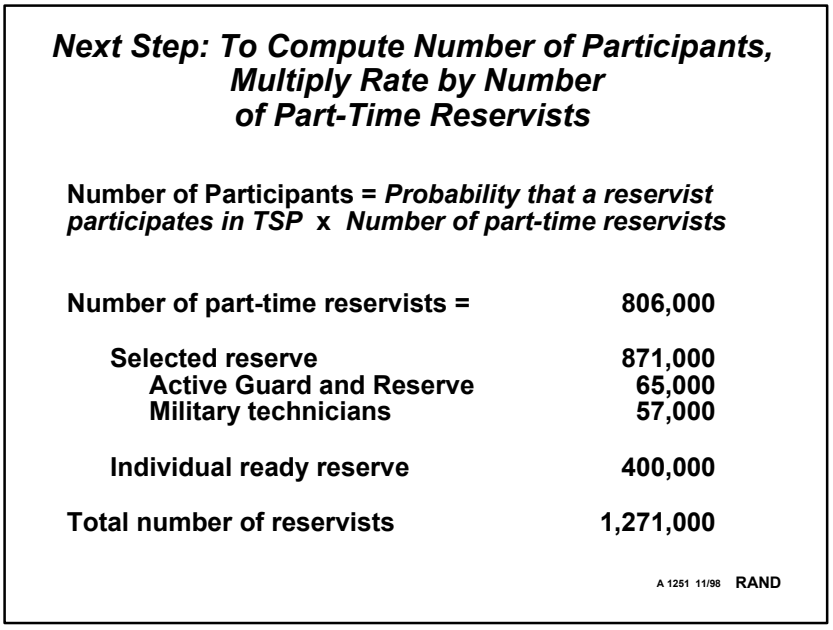
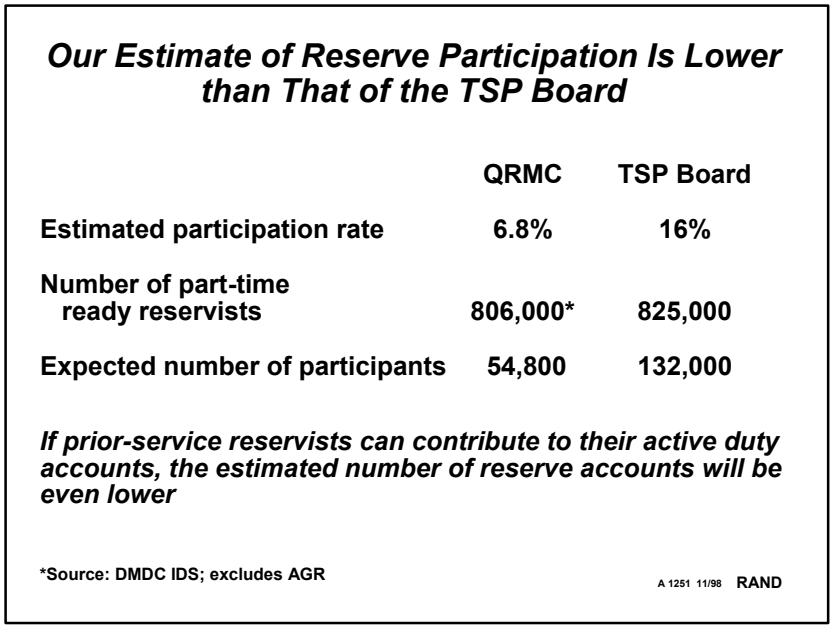
We estimate that, overall, 6.8 percent of part-time reservists would participate in the reserve TSP option. We can compute the mean rate for different subgroups of reservists, such as by component. For example, given the age and other characteristics of Navy reservists and those in the Coast Guard reserve, individuals in these components are found to be more likely to participate than those in the Marine Corps reserve and Army National Guard. Similarly, officers and prior-service personnel are more likely to participate than enlisted personnel and nonprior-service personnel. Still, none of the rates that we predict for the various subgroups is large. Therefore, we predict that relatively few part-time reservists are likely to participate in a reserve TSP option.



To estimate the number of participants, we need to multiply the participation rate by the number of part-time ready reservists. Since the TSP Board's objections concerned only the accounts of those reservists who serve in the military part-time, we only need to include those reservists who drill part-time.

Although the reserve components consist of 1,271,000 reservists, only 871,000 are in the Selected Reserves. Of these, only 806,000 are part-time reservists who are not serving on active duty full-time. This 806,000 includes the 57,000 military technicians who are federal civil service employees who work for the reserve components. Since military technicians drill on a part-time basis, they are included in our count. However, because they are also civil service employees, and therefore already have a DC plan, they are excluded from our estimate of the number of participants (see the computation in next chart).

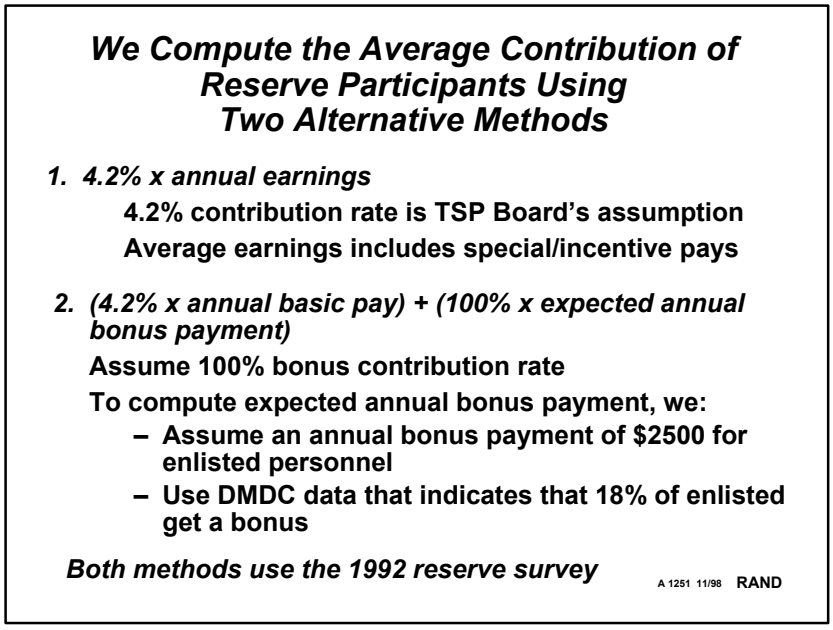
The figures in this chart are based on the FY99 reserve components inventory, provided by the Defense Manpower Data Center's Information Delivery Service.



Our 6.8 percent estimated reserve participation rate is less than the TSP Board's 16 percent figure, and our figure of 806,000 part-time reservists is less than the 825,000 figure used by the TSP Board. Given these differences, we estimate fewer participants.

To estimate the number of part-time reserve participants, we apply the 6.8 percent figure to the 806,000 part-time reservists figure. We estimate the total number of participants to be 54,800, a figure that is considerably smaller than the 132,000 participants estimated by the TSP Board.

The estimated number of participants might be even smaller, depending on what types of account transfers and account contributions would be allowed. If prior-service reserve personnel could contribute to accounts that they created while they were on active duty, they would not need to contribute to a reserve account, and the estimated number of reserve accounts would be even smaller that what is estimated here. Estimating how much smaller is beyond the scope of our analysis, because it would involve estimating the participation rate and separation rate of active-duty personnel as well as the reserve affiliation rate of active-duty participants.



The next part of our analysis focuses on estimating the average dollar amount that a part-time reservist would contribute annually, given that he or she contributes at all. Because of uncertainty about whether special and incentive pays should be treated differently from basic pay, we use two alternative methods to make this computation.

The first method assumes that reservists would contribute to their TSP from their special and incentive pays at the same rate as they would contribute from their basic pay. That is, we can simply consider total reserve earnings and apply an assumed contribution rate. If we use the same contribution rate as the one assumed by the TSP Board—4.2 percent—the first method involves multiplying 4.2 percent with the reserve earnings of each member in the reserve survey sample, and taking the average.

The second method assumes that reservists would contribute a higher percent of their special and incentive pays than they would contribute of their basic pay. Such might be the case if reservists receive lump-sum bonuses for serving in the reserve components. If their existing retirement plans only allow paycheck deductions and preclude lump-sum payments to the plans, individuals may find it easier and less costly to deposit their lump-sum bonus in a reserve TSP. Since we have no data to compare at what rate individuals might contribute a lump-sum payment versus the rate that they might contribute from their monthly pay, we assume that individuals contribute 100 percent of their bonus payments. While 100 percent is clearly too high, it provides us with an upper-bound estimate of

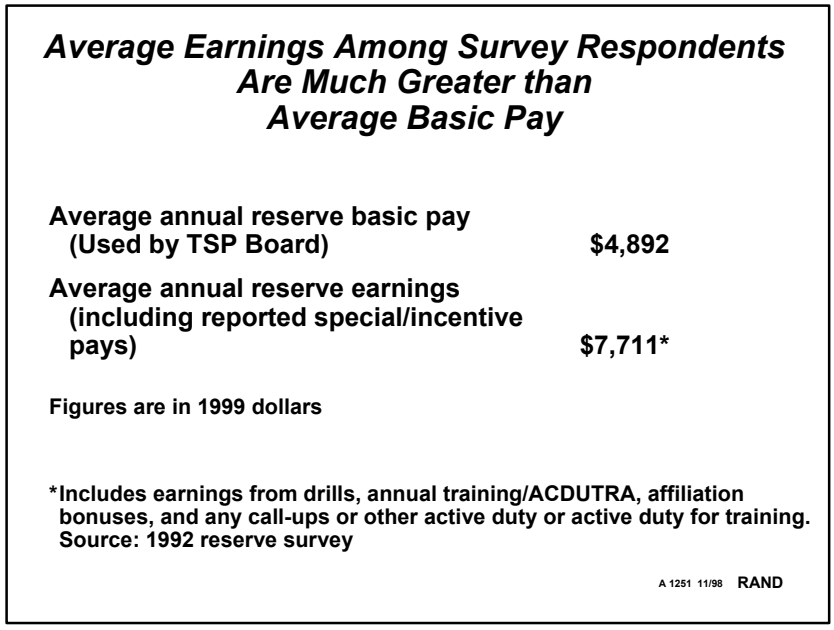
what the average TSP contribution is likely to be under this computational method. Since not everyone in the reserves gets a bonus, and bonuses are usually paid in installments, we must compute the expected annual bonus for reservists. We do that as follows.

First, we randomly assign a bonus to 18 percent of enlisted reservists in the reserve survey. DMDC data on reserve personnel from FY98 indicate that 18 percent of enlisted personnel received incentive bonuses, and less than 1 percent of officers received a bonus that was not a health professional loan repayment.

Next, we must assume a dollar amount for the bonus payment. The reserve components offer an array of bonus types that include reserve enlistment bonuses, reenlistment bonuses, and reserve affiliation bonuses. These bonus types differ in both their maximum annual payment and in their pay-out schedule. Some bonuses are paid out over several years in annual lump-sum installments, while others, especially if the dollar amount is small, are paid in one year. Few bonus types pay more than the maximum of $2500 in a given year, and not all individuals are eligible to receive those that do.

Of those individuals awarded a bonus in the reserve sample, we assume that the annual bonus installment payment is $2500, regardless of bonus type. If anything, the $2500 figure is probably too large, given that few reservists are likely to be eligible for an installment payment that high. We chose this larger figure because we prefer to overestimate—rather than underestimate—the average contribution of a reserve TSP participant. As will be seen in the following charts, even when we choose to overestimate the average annual contribution, we find that the average is relatively small, as the TSP Board contends.

We then compute for each reservist the expected contribution, equal to (4.2 percent x basic pay) + (100 percent x expected annual bonus payment). To compute the average contribution, we compute the mean value of the expected contribution of each member. All dollar figures are adjusted for inflation and placed in 1999 dollars.



To compute the average contribution under method 1, we require an estimate of reserve earnings. The 1992 reserve survey asked sample respondents about their total reserve earnings, before taxes and deductions, for all of 1991. The earnings figure included earnings from drills, annual training, bonuses, and pay from any call-ups or other active-duty service.

Clearly, this earnings figure includes some special and incentive pays. However, reserve earnings for 1991 are likely to be unduly large because of Operation Desert Storm and the large and relatively long call-up of part-time reservists. On the other hand, reservists today are often called to participate in peace-time operations. Still, reserve earnings today are likely to be less than the 1991 figure, adjusting for inflation. Thus, the estimate we use is likely to produce an overestimate of the average contribution to the TSP.

Because the TSP Board used average basic pay in its computation of the average contribution, its figure is considerably less than our estimate. Its estimate of average basic pay is $4892, while our earnings estimate from the 1992 survey is $7711.

Using Method 1, the Average Contribution Is Small, Though Larger than the TSP Estimate

	Method 1	TSP Board
Average annual earnings (1999 $)	$7,711*	$4,892**
Annual contribution rate	4.2%	4.2%
Expected annual contribution	$324	$205

* Includes earnings from drills, annual training/ACDUTRA, affiliation bonuses, and any call-ups or other active duty or active duty for training

** Average basic pay computed by TSP Board

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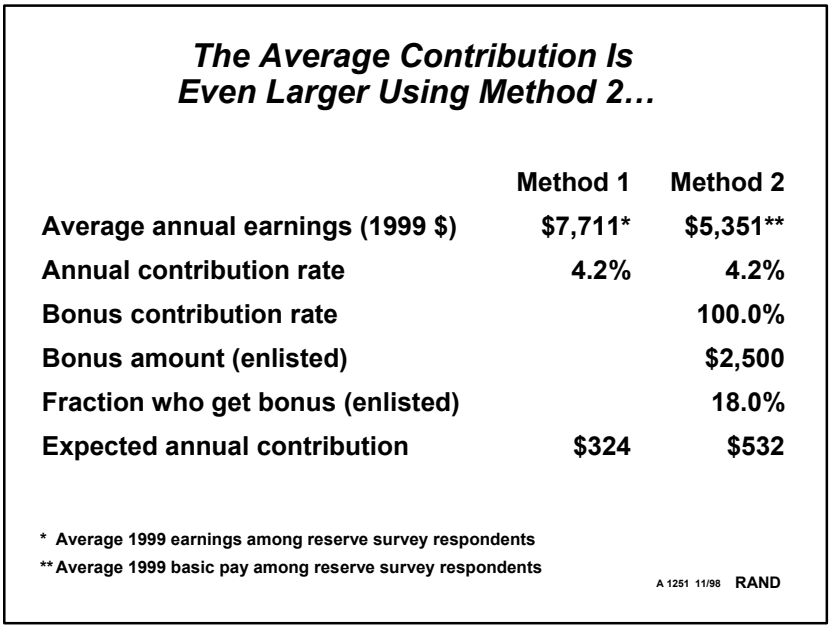
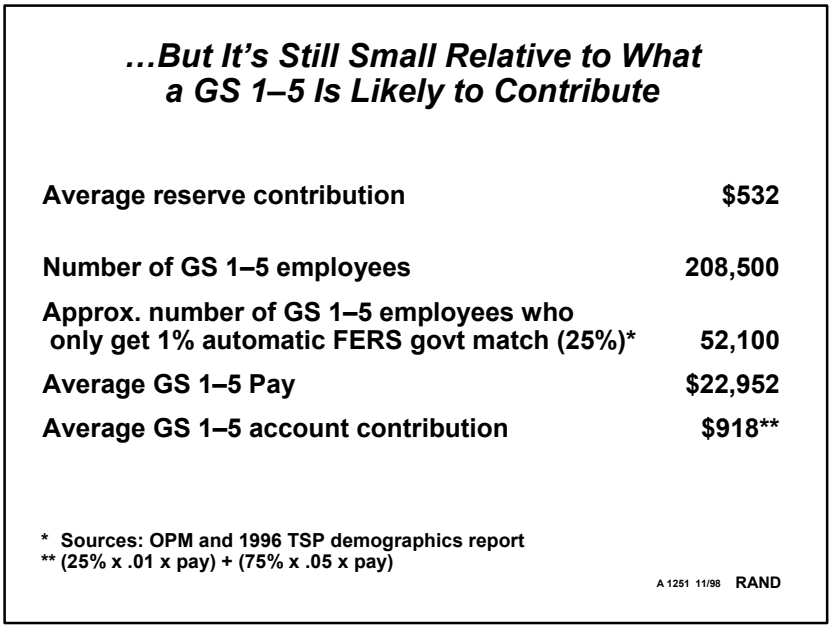
Yet, even using the higher $7711 figure and applying the 4.2 percent contribution rate, the estimated average annual reserve contribution is only $324. Although larger than the $200 figure roughly estimated by the TSP Board, this figure is small.



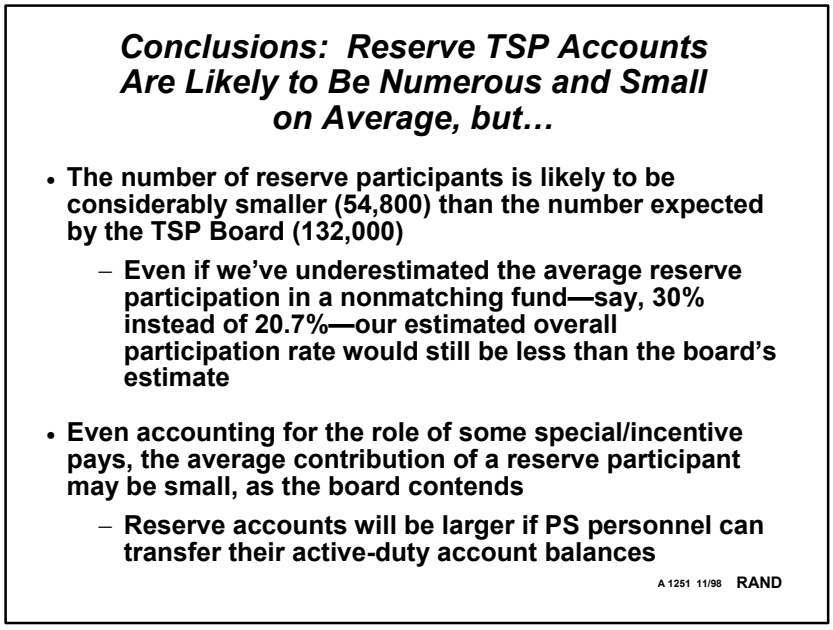
Method 2 produces a larger estimate of the average annual part-time reserve TSP contribution. Average basic pay among the 1992 reserve survey respondents, adjusted to 1999 dollars, was $5351, a figure that is somewhat higher than the TSP Board's estimate. Like the board, we assume that reservists would contribute 4.2 percent of basic pay to the TSP. As discussed earlier, we assume that the 18 percent of enlisted reservists who receive bonuses would contribute the full amount (100 percent) to the TSP, and we assume that the annual bonus payment for all reservists who get one to be $2500. We compute the expected contribution for each reserve survey sample respondent and take the mean. We find that the average expected annual contribution is $532, a figure that far exceeds the $200 figure that the TSP Board estimates or the $324 we estimate under Method 1.



Nonetheless, the $532 figure is still relatively small compared with what a low-grade GS federal civil service employee would contribute annually. We make a rough estimate and find that the average contribution of a GS 1–5 civil service employee is $918, almost double the figure we estimate for the reserve participants.

To arrive at the $918 estimate, we use available information (the 1996 TSP Board Demographics Report) that indicates that about 25 percent of individuals who earn about $23,000 do not contribute to the TSP and only receive the automatic 1 percent government match that the Federal Employees Retirement System provides for employees hired after 1983.

We assume that the 75 percent who do contribute are contributing 5 percent of their pay. Using information on the number of workers in each grade from the Office of Personnel Management, using the FY99 federal civil service GS pay table, and assuming that individuals are at step 5 in their grade, we estimate the average pay of GS 1–5 workers to be about $23,000. Putting these figures together, we estimate an annual contribution of $918.



To summarize our main findings, we estimate that the number of part-time reserve accounts will be large, equal to 54,800, but fewer than the number of accounts estimated by the TSP Board.

As noted earlier, it is possible that we underestimate the participation rate because we base the rate on an estimate of participation in an IRA, and contributions to an IRA may be treated differently for tax purposes than contributions to the TSP. We conducted a sensitivity analysis and found that even if 30 percent, rather than 20 percent, participated in a nonmatching fund, the estimated reserve TSP participation rate would be at most 12 percent, and therefore still less than what the TSP Board estimates. Therefore, our overall conclusions are not affected by this potential problem.

We attempted to account for the reservists' being able to contribute their special and incentive pays to their TSP accounts, and therefore being likely to have larger account balances than what the board estimates. We used two alternative methods to estimate the average expected reserve contribution amount from those who participate and found the average to be $324 under the first method and $532 under the second. Both figures are considerably larger than the roughly $200 average that the board estimates. Nonetheless, these averages are still quite small, even when compared to low-grade personnel in the civil service for whom we estimate an average expected contribution of about $900.

Of course, if prior-service reservists could contribute to the accounts that they created while active-duty personnel, the number of accounts

would be even fewer. Estimating how few was beyond the scope of our analysis. Alternatively, if prior-service reservists could roll over their active account balance to a reserve TSP account, the number of reserve accounts would not be fewer, but the average balance would be even larger than what we estimate here. Again, determining how much larger was beyond the scope of our study.

Reserve Participation Will Only Increase the Total Number of TSP Accounts by 2.5%

TSP Participation Among:		Percentage increase due to reserve participation
Federal civil service	2,000,000*	
Active-duty personnel	148,000**	
Reserve personnel	54,800	
Total	2,202,800	2.5%

* Source: 1996 TSP demographics report, TSP Board
**Estimated as 10% participation rate x 1,480,000 active-duty personnel

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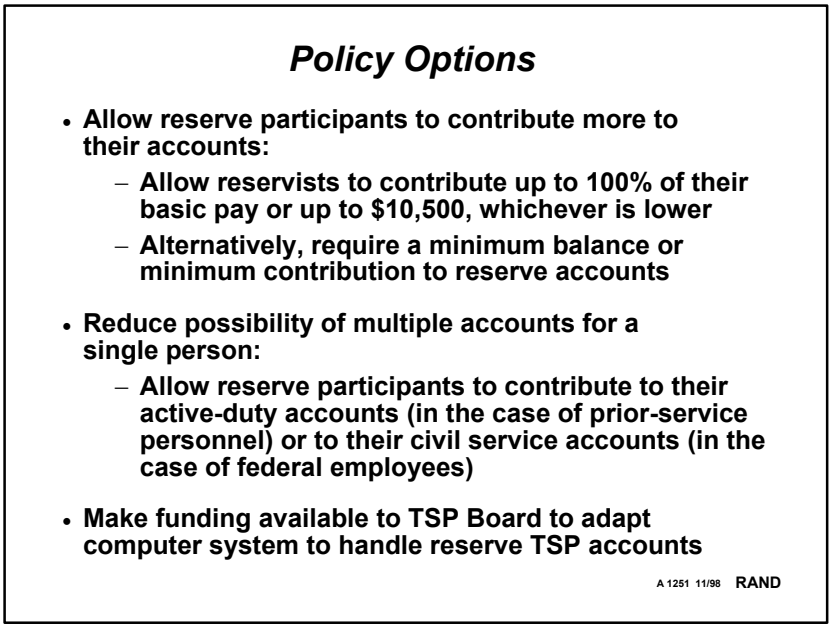
While 54,800 is a substantial number of accounts, it is only a small fraction of the number of accounts that the TSP manages overall.

According to the 1996 TSP Demographics Report, there are about 2 million federal civil service TSP accounts. If, as a rough estimate, we assume that 10 percent of the 1,480,000 active-duty personnel would participate in the TSP, the total number of accounts would be about 2,202,800. The 54,800 accounts associated with part-time reserve participation are only 2.5 percent of this total. The participation rate for active-duty personnel may be even lower than 10 percent, given their relatively young ages. However, even if fewer active-duty personnel participated, the fraction of total accounts that were due to reserve participation would still be less than 5 percent of the total.

The TSP Board contends that the cost of administering the reserve accounts could not be spread over all of the accounts that it manages, which would include the civil service accounts. However, if there are economies of scale associated with managing a large number of accounts, the additional cost at the margin—that is, the marginal cost rather than the average cost—of managing reserve accounts might be relatively small.



The policy options we suggest focus on ways to increase the average part-time reserve contribution and on ways to reduce the number of part-time reserve account holders.

An obvious approach to increasing account contributions among part-time reservists is simply to allow them to contribute more of their basic pay to their TSP accounts. One way to do this is to eliminate the 5-percent ceiling. However, because they only work part-time in their military jobs, reservists do not, on average, earn much basic pay annually. The low annual pay levels limit the potential for large account balances being produced by eliminating the 5-percent ceiling. Another way to increase reserve account balances is to mandate a minimum contribution or account balance for all personnel. Establishing a minimum annual contribution of, say, $1000 would reduce the number of accounts as well as increase their average size.

Because many reservists are prior-service personnel and many are federal employees, it is possible that a single individual could maintain more than one TSP account. As shown earlier, the reserve survey indicates that 16 percent of respondents worked for the federal government. A large number of reservists are prior service. Theoretically, some individuals could maintain as many as three accounts: one for their active duty, one for their federal civil service, and one for the reserve duty. Clearly, if individuals were allowed to consolidate their TSP accounts, the overall number of TSP accounts is likely to be fewer. The feasibility of

allowing individuals to consolidate accounts should be investigated further.

Finally, insofar as adding part-time reservists to the TSP system would place an additional burden on the TSP Board's computer system, additional funding should be provided to the board to upgrade its systems to handle these accounts.

APPENDIX

CPS PROBIT RESULTS FOR PROBABILITIES OF HAVING A DC PLAN AND AN IRA

This appendix contains probit equations for the probability of having a defined contribution plan and the probability of participating in a non-employer matched savings plan. They were estimated using data from the Benefits Supplement of the April 1993 Current Population Survey. The advantage of this dataset is that it can be used to estimate how these probabilities vary with personal characteristics such as age, race, sex, and income, which cannot be done with data based on employer surveys. The Benefits Supplement was administered to a subset of the individuals in the April 1993 CPS (about 23,000 valid responses). In addition to responses to the Benefits Supplement, the data contain the individual-level information based on the basic CPS for April 1993 and the March 1993 Annual Demographic Survey (ADS). The latter contains retrospective questions about each individual's activities and earnings during 1992. We extracted the subset of individuals in the Benefits Supplement who (1) were 20+ years old, (2) gave a valid response to the question of "how many employees are employed by your employer" (based on the March 1993 ADS), (3) were employed at the time of the April 1993 survey, and (4) had some earnings in 1992. The sample contained 18,024 individuals meeting these criteria.

54.3 percent of those in our sample worked for an organization providing a retirement plan for at least some employees. 88.8 percent of those working for a firm with a retirement plan said that they were eligible to participate in the plan. Only 20 percent were participating in a defined contribution plan (about 41 percent of those eligible to participate in an employer-provided plan). This participation rate is lower than the participation rates reported in the BLS Establishment Surveys.

We believe there are three reasons for this difference. First, the Establishment Surveys are more recent and participation in defined contribution plans has been on the rise in the 1990s. Second, employers may be in a better position than employees themselves to report the kind of retirement plan in which employees are participating (many individuals might not understand the distinction between defined contribution and defined benefit systems). Third, the CPS does not actually survey

individuals, but household heads, and household heads might not be fully informed about other household members' participation in retirement systems or the type of plan in which they are participating.

We handled the apparent underreporting of participation in a defined contribution plan by weighting the observations in the probit model for DC plan participation so that the model produced a mean participation rate of 39 percent (so weighted because BLS Establishment data indicates that 39 percent is roughly the economy-wide participation in DC plans among those employed).

Data on the likelihood of participating in a nonemployer matched savings plan are not readily available. The TSB used the participation of CSRS employees in FERS TSP as a proxy for participation in a nonmatched plan (overall 20 percent; adjusted downward to 16 percent to account for the lower earnings of reservists). We used the CPS respondents' participation in an IRA as a proxy for participation in a nonmatched IRA. 20.5 percent of respondents said they had an IRA. This rate is close to the rate assumed by the TSP and is also close to data from tax returns reported by the IRS.

Probit models are models for discrete events and are based on the cumulative normal distribution. Letting P represent the probability of an event (e.g., participation in a DC plan), X represent a set of variables, and b represent a coefficient vector, the probability of an event is $P = F(Xb)$, where F denotes the cumulative normal distribution evaluated at Xb. Let DP represent the change in the probability of the event due to a change in one of the variables in X. It may be shown that $DP = bf$ where f is a factor that converts the coefficients to probability changes.

Results are displayed in Table 1. The first column for each model shows the probit coefficients (the b's). The second column shows the t-statistics associated with the coefficients. The third column shows the significance level associated with each estimate. The fourth column shows the effect of a change in each variable on the relevant probability. It should be emphasized that these coefficient estimates and probability changes show the effects of the variable in question, holding other factors constant. Although the two probit equations were estimated with the same data, the sample sizes differ because of differences in the number of missing values of the dependent variable across equations.

To interpret the results, consider the effect of working for an organization with more than 100 employees (Large Org). The coefficient (0.467) has a t-statistic of 18.08 and is significant at the 0.0001 level, meaning that there is only one chance in ten thousand that the effect of firm size actually has no effect on the probability of having a DC plan.

The probability change of 0.180 says that individuals working in an organization with more than 100 employees are 18 percentage points more likely to have a DC plan than individuals working for an organization with fewer than 100 employees. Similarly, full-time workers are significantly more likely to have a DC plan than part-time workers (with a probability difference of 0.106). Interestingly, employees of large organizations and full-time workers are less likely to have an IRA than employees of small organizations or part-time workers, probably because these workers are more likely to have employer-provided retirement plans.

The probability of having a DC plan or an IRA generally rises with income and age, although the effects are not linear (see table). Males are less likely than females to have either a DC plan or an IRA. Racial differences also exist, with whites more likely, and blacks less likely, to have either a DC plan or an IRA than individuals of all other races.

Table 2 provides the average values of the variables in the probit models and the average values of the same variables from the 1992 Reserve Survey.

Table 1

	Equations 1: Have DC Plan? (1=Yes; 0=No)				Equation 2: Have IRA? (1=Yes; 0=No)			
Variable	**Estimate**	**T-Stat**	**Sign.**	**ΔP**	**Estimate**	**T-Stat**	**Sign.**	**ΔP**
Intercept	-2.707	25.42	0.0010		-1.740	16.09	0.0001	
Income range in $1000 (omitted = less than $10,000):								
10-19	0.435	9.63	0.0001	0.167	0.205	4.57	0.0001	0.071
20-29	0.612	12.92	0.0001	0.235	0.554	11.87	0.0001	0.193
30-39	0.806	15.91	0.0001	0.310	0.749	14.85	0.0001	0.260
40-49	0.829	14.65	0.0001	0.319	0.993	17.69	0.0001	0.345
50-59	0.974	14.61	0.0001	0.375	1.044	15.69	0.0001	0.363
60-69	1.075	12.99	0.0001	0.413	1.313	16.07	0.0001	0.457
70-79	0.881	8.40	0.0001	0.339	1.279	12.55	0.0001	0.445
80-89	1.203	9.91	0.0001	0.463	1.445	12.09	0.0001	0.502
90-99	1.175	12.14	0.0001	0.452	1.545	16.22	0.0001	0.537
100+	1.051	5.02	0.0001	0.404	1.827	8.46	0.0001	0.635
Age Range (omitted = less than age 25):								
25-29	0.164	2.92	0.0036	0.063	0.232	3.03	0.0025	0.080
30-34	0.283	5.11	0.0001	0.109	0.524	7.12	0.0001	0.182
35-39	0.291	5.19	0.0001	0.112	0.702	9.56	0.0001	0.244
40-44	0.214	3.70	0.0002	0.082	0.788	10.58	0.0001	0.274
45-49	0.215	3.64	0.0003	0.083	0.970	12.93	0.0001	0.337
50-54	0.269	4.37	0.0001	0.104	1.156	15.12	0.0001	0.402
55-59	0.232	3.62	0.0003	0.089	1.290	16.58	0.0001	0.449
Class of Worker:								
Private	1.122	17.45	0.0010	-0.432	-0.416	8.74	0.0001	-0.145
Federal	0.453	5.49	0.0001	-0.174	0.543	7.23	0.0001	-0.189
State & Local	0.428	6.13	0.0001	-0.164	0.407	7.25	0.0001	-0.142
Work Characteristics:								
Work Full-time	0.275	7.75	0.0001	0.106	-0.141	3.99	0.0001	-0.049
Large Org	0.467	18.08	0.0001	0.180	-0.086	3.27	0.0011	-0.030
Demographic Characteristics:								
Male	-0.087	3.63	0.0003	-0.033	-0.185	7.22	0.001	-0.064
White	0.149	2.55	0.0108	0.057	0.110	1.80	0.0718	0.038
Black	-0.054	0.76	0.4449	-0.021	-0.491	5.95	0.0001	-0.171
Married	0.072	2.22	0.0264	0.028	0.224	6.47	0.0001	0.078
Single	0.015	0.35	0.7259	0.006	0.262	5.65	0.0001	0.091
Sample Size	18024				17790			
Dep Var Mean	0.39				0.205			
Log-likelihood	-9004.1				-7736.7			

Table 2

	CPS		Reserve Survey	
	Mean	Std. Dev.	Mean	Std. Dev.
Income Range in $1,000 (omitted = less than $10,000):				
10-19	0.267	0.443	0.158	0.364
20-29	0.234	0.424	0.213	0.409
30-39	0.151	0.358	0.176	0.381
40-49	0.080	0.272	0.101	0.301
50-59	0.039	0.193	0.056	0.229
60-69	0.019	0.138	0.026	0.158
70-79	0.011	0.104	0.014	0.119
80-89	0.007	0.086	0.008	0.088
90-99	0.014	0.116	0.003	0.053
100+	0.002	0.048	0.021	0.143
Age Range (omitted = less than age 25):				
25-29	0.138	0.345	0.137	0.344
30-34	0.167	0.373	0.160	0.367
35-39	0.169	0.374	0.167	0.373
40-44	0.149	0.356	0.185	0.388
45-49	0.129	0.335	0.158	0.365
50-54	0.093	0.291	0.069	0.254
55-59	0.076	0.265	0.031	0.174
Class of Worker:				
Private	0.756	0.430	0.504	0.500
Federal	0.039	0.192	0.254	0.435
State & Local	0.150	0.357	0.180	0.384
Work Characteristics:				
Work Full-time	0.7763	0.4167	0.688	0.463
Large Org.	0.6323	0.4822	0.357	0.479
Demographic Characteristics:				
Male	0.535	0.499	0.786	0.410
White	0.885	0.319	0.816	0.388
Black	0.076	0.266	0.107	0.309
Married	0.668	0.471	0.666	0.472
Single	0.187	0.390	0.197	0.398

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CHAPTER III

PRIVATE-SECTOR BENEFIT OFFERINGS IN THE COMPETITION FOR HIGH-SKILL RECRUITS

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The views expressed in this paper represent those of the author and are not necessarily those of the Department of Defense.

SUMMARY

Over the past several years, the military has faced mounting recruiting, reenlistment, and manning difficulties. One perceived reason for these difficulties is increased competition for skilled personnel from the private sector, particularly through its incentive pay and benefit offerings. Although the recent softening of the economy may help to ease some of these competitive pressures, other less cyclical trends—such as a smaller high-school graduate recruiting pool and lower propensity to enlist in the military—persist. These trends suggest that a careful survey of the private-sector incentive pay and benefits landscape is needed.

In what follows, we compare and contrast the incentive pay and benefit offerings of large, private-sector firms to those of the military. In doing so, we assess whether these offerings differ significantly in their provision, scope, or structure. We also consider whether these offerings have played a role in the military's recent recruiting, reenlistment, and manning difficulties. Finally, we describe the offerings of several private-sector companies that are likely to compete with the military for skilled personnel.

We find significant differences in military and private-sector incentive pay and benefit provision of incentive-based pay, health care and retirement benefits, education and training services, child care, workforce flexibility measures, and Morale, Welfare, and Recreation (MWR)/other quality-of-life programs. In most cases, military benefits are broader in scope, differ in structure, and involve less choice than those offered by the private sector.

Taken together, these trends suggest several recommendations that could help the military in its recruiting, retention, and manning efforts. These include:

- Introducing cash and choice into compensation
- Introducing some form of incentive-based pay
- Providing assignment and work schedule flexibility
- Increasing the "costs" of separation from the military
- Publicizing benefits and improving information access.

Policy-makers should carefully consider these recommendations because they have the potential to improve the military's standing relative to the private sector, while contributing to the continued development of a strong and capable future force.

INTRODUCTION

Over the course of the recent economic expansion, the U.S. military began to face significant obstacles to the recruitment of able personnel. Falling unemployment—which reached a 30-year low at the height of the expansion—created new private-sector employment opportunities, even for those lacking college degrees. Although the recent softening of this strong economic environment may begin to limit the extent of these outside opportunities, other less cyclical trends persist. High school graduates—who traditionally constituted the overwhelming majority of the military's enlisted manpower—are increasingly pursuing the substantial payoffs associated with postsecondary education. College attendance has risen to an all-time high. Many high school graduates who in the past would have joined the workforce or the military now are enrolling in vocational schools or community colleges. Increased college attendance has not improved officer recruiting and retention, perhaps because propensity to join the military hovers near a record low. In fact, total applications to the service academies have fallen by 34 percent since 1992 [1][1].

MILITARY FACES RECRUITING SHORTFALLS

These trends have put increased pressure on military recruiting. The armed services must recruit more than 200,000 officers and enlisted members for active service annually—a goal that has become increasingly difficult to achieve. The Navy experienced an enlisted recruiting shortfall of almost 7,000 Sailors in FY98, and the Army and the Air Force missed recruiting targets by 6,300 and 1,700, respectively, in FY99 [2] (see table 1). The forces have since recovered to meet their FY00 accession goals, but the number of future recruits—as measured by participation in the Delayed Entry Program (DEP)—still falls significantly below target levels [3]. Recruitment has been particularly difficult in several of the military's

[1] Unpublished Navy Recruiting Command data.

more technical occupational fields. For example, the Navy has experienced manning shortfalls in its ET, FC, and AT ratings [4]. There have also been accession shortfalls in some officer classifications. For example, the Navy was not able to meet its FY99 goals for naval submarine, pilot, and flight officers.[2]

Table 1. Services' Experience with Recruiting Difficulties[a]

Service	Percentage of Annual Goal for Recruiting New Active-duty Enlistees	
	FY98	FY99
Army	99	92
Navy	88	100
Air Force	105	95
Marines	100	100

a. Source: Department of Defense data as cited in [5].

Finding quality recruits has also become increasingly costly. On the enlisted side, costs per new recruit have risen in all the services over the last several years. For example, Navy recruiting costs have almost doubled since FY93.[3] Costs per recruit averaged $9,677 in FY99 across all the services: the Army spent more than $11,000 per new soldier, the Navy spent $8,835 per Sailor, the Air Force spent $5,403 per Airman, and the Marines spent $6,006 per Marine [6].

These escalating recruiting costs have not contributed to the development of a higher quality force. In fact, the share of enlisted recruits with above-average entrance test scores across all services has fallen by over 8 percent since 1994 [2]. Furthermore, average recruit quality has declined as accession caps have been increased. For example, the Navy raised its cap on dropout accessions from 5 to 10 percent in FY99 and an Office of the Secretary of Defense (OSD) experiment also in that year allowed home-schoolers to count as tier I rather than tier II accessions.

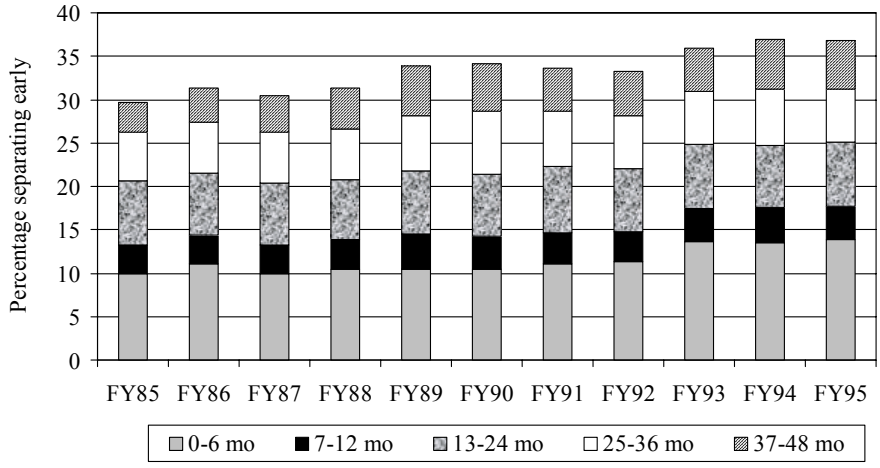
2 "NHRBOD Metrics Master Package," prepared by the Naval Human Resource Board of Directors, 2000.

3 Unpublished Navy Recruiting Command data.

MILITARY ALSO FACES FALLING RETENTION AND INCREASING ATTRITION

Compounding the military's recruitment difficulties are flagging retention rates. Although the concerted military drawdown ended in 1995, first-term reenlistment rates across all services since have fallen by 13 percent [2]. In FY99, both the Navy and Air Force fell short of their first-term reenlistment goals. Increased attrition has contributed to lower retention rates across the services.[4] Over a third of recruits leave the military before completion of their first term and, as figure 1 shows, the trend over time has been toward a greater share of enlistees leaving during the first 6 months of their first term.

Figure 1. Increasing First-Term Enlisted Attrition[a]



a. Source: Tabulations of Defense Manpower Data Center data as cited in [5].

Early separations can be very costly, resulting in average replacement costs of more than $35,000 per recruit [7]. As Navy Vice Admiral N. R. Ryan, Jr., noted before a Senate subcommittee last year [8]:

> Today's recruiting and retention atmosphere can be best described as a war…a sustained engagement to recruit and retain the very best men and women this nation has to offer.

[4] Attrition's effect on retention rates will change shortly when the military revises its retention definition.

The U.S. military is not alone in its struggle to attract and retain skilled personnel. One survey found that 65 percent of private-sector human resource (HR) executives listed recruitment, selection, and placement among their top three priorities in 2000, up from 55 percent in 1998 [9]. Another survey reported that 72 percent of HR professionals were concerned about recruitment and retention. Over 70 percent have trouble attracting and retaining IT workers, and 30 percent report recruitment and retention difficulties in the engineering field [10]. Although softening economic conditions may help ease these shortages in the future, they are unlikely to completely alleviate them, particularly in the case of an economic upswing.

There is some evidence that private-sector companies are recruiting former military personnel more actively than ever before. A number of recruiting companies with web presence are targeting former military members (see table 2). Several target junior military officers—a group that the services are trying hard to retain. Many of these sites have online resume posting, the ability to search national job databases, or readily available "success" story postings. Anecdotally, interviewed Navy detailers recount instances of government contracting company representatives recruiting Sailors while doing onboard maintenance.

Table 2. Private Sector Actively Recruits Military Members

Recruiting Company and Website	Target
Military Recruiting Institute http://www.jrofficer.com	Junior Officers
Cameron Brooks, Inc. http://www.cameron- brooks.com	Junior Officers
Midwest Military http://midwestmilitary.com	Junior Officers, Enlisted, and Academy Grads
Leaders, Inc. http://www.leadersinc.com	Junior Officers, Enlisted, and Academy Grads
Military Transition Group, Inc. http://www.careercommandpost.com	Junior Officers, Enlisted, and Academy Grads
Bradley-Morris, Inc. http://www.bradley-morris.com	Junior Officers, Enlisted, and Academy Grads

Private-Sector Responses to Tightening Labor Markets

In response to such staunch competition, many large companies are initiating or bolstering pay and benefit programs in an effort to better compete (table 3). The most popular way to compete is to increase base

salaries—a strategy recently reported by over 60 percent of surveyed companies.[5] Because this issue is analyzed in great detail in other portions of this report, we do not examine it here [11].

Table 3. Private-Sector Responses to Tightening Labor Markets[a]

Recent Action Taken	Percentage of Surveyed Companies Implementing/ Revising Their Programs[b]
Market adjustment/base salary increase	62.3
Sign-on/hiring bonus	59.6
Changes to the work environment	47.8
Retention/stay-on bonus	28.2
Promotional/career development opportunities	27.1
Paying above market	23.7
Special training/educational opportunities	22.0
Spot bonus	21.7
Stock programs	19.1
Project milestone/completion bonus	15.2
Separate salary structures	14.8
Special cash bonus (by group)	14.3

a. Source [10].
b. Note: Respondents could choose multiple responses.

Many companies are also changing their incentive pay or benefit programs in response to tightening labor markets. Incentive pay program changes, such as the introduction or increase of hiring or retention bonuses, or changes to benefit programs, such as improvements in the work environment or promotion/career opportunities, are particularly popular. Private-sector companies are initiating changes in benefit programs because nearly 80 percent of surveyed workers say that benefits are very important in their decision to accept or reject a job [12].

In fact, some observers have suggested that the military's recruitment and retention woes stem from its inability to compete, particularly in critical technical fields, with the incentive pay and benefit offerings of private-sector companies. The goal of this study is to evaluate incentive pay and benefit offerings in the private sector and compare these offerings with those available in the military. We will first examine private-sector incentive pay and benefit programs that would relate to all personnel, both

[5] Obviously, a sustained downturn in the economy could potentially reverse this trend.

officer and enlisted. We will then focus our attention on the incentive pay and benefit offerings of several specific private-sector companies that attract former military members. Emphasis will be on incentive pay and benefit offerings to technical workers—a group in which the military is experiencing severe manning shortfalls.

DO PAY AND BENEFITS MATTER?

A key assumption in this analysis is that personnel leave the military, at least in part, because of the attractiveness of compensation packages in the private sector. If this is indeed the case, changes in military pay and benefits could do much to boost recruitment and retention and to stem attrition. If, however, exits are the result of perceived shortcomings in the quality of military life, effective solutions to the problem could be very different. For example, although Sailors can be paid a premium to accept food of poor quality, it may be more cost-effective to improve the quality.

Unfortunately, information on personnel separating from the military is limited. Exit surveys have historically had low response rates, and data on personnel's reasons for separation have been inconclusive.[6] There is, however, some evidence that the private sector is an important factor. A 1999 Air Force survey found that pilots cited the availability of comparable civilian jobs as the top reason they might leave the service [14]. In addition, CNA research finds that attrition rates are higher among Navy recruits from states with relatively low unemployment rates than for those from states with relatively higher unemployment rates [15], and Navy Vice Admiral Patricia Tracey recently called competition from the private sector "a major factor in retention" [16]. Indeed, the declining importance of traditional combat-oriented military positions and the increasing importance of new technology-oriented positions has opened military labor markets to private-sector competition—a trend that is expected to accelerate in the future [17]. Using data from a recent survey combined with information from detailer interviews, we will try to shed light on this issue.

METHODOLOGY AND DATA SOURCES

Despite its many unique qualities, the U.S. military can be thought of on some levels as another large employer—subject to the same labor market constraints facing large private-sector companies. For example, the

[6] For example, see [13] for a description of Navy surveys that have been administered to date and their shortcomings.

Navy's enlisted ranks roughly approximate the size of IBM's global workforce.[7] Viewed in this context, it is important for the U.S. military to be familiar with the incentive pay and benefit offerings of large, private-sector companies. Compiling information from several available surveys of large, private-sector companies, we review the current scope of corporate incentive pay and benefit programs and compare these offerings with those available to military personnel.

To this end, we first review information available from several recent surveys examining the incentive pay and benefit offerings of large, private-sector firms.[8] We choose this approach over an analysis of "best practices" or an examination of government data on employees' access to various benefits for several reasons.

Best practices can be problematic in several respects. First, the term has lost its meaning over time, and now often refers to any seemingly good thing that any firm or organization does. In fact, practices that are perceived to be "innovative" or "cutting-edge" can be ineffective or overly costly, or can introduce unintended incentives. For example, there is some evidence that the provision of generous paid leave can increase absenteeism [18]. Also, best practices are often perceived as offering "magic bullet" solutions to complex problems. In fact, the feasibility of offering a particular benefit program can be highly dependent on conditions that are unique to the individual firm.

These limitations do not imply, however, that best practices cannot be useful in an analysis of private-sector incentive pay and benefit offerings. However, the practices are best analyzed after identifying areas of interest and concerns about their current operation or structure. Furthermore, best practice information is most useful when coupled with information regarding program effectiveness.

Government data available from the Employee Benefits Survey and other sample surveys offer another possible research approach. But large, private-sector survey data have an advantage over government data on employees' access to various benefits because government data do not

[7] As of September 1999, the Navy had 315,995 enlisted Sailors, compared to 307,401 global IBM employees.

[8] The majority of the analysis that follows was completed in December 2000. Many of the data were purchased from commercial vendors, so we do not attempt to update them here. However, it is unlikely that corporate benefit offerings have changed significantly—even in light of the recent economic downturn—because companies are more likely to reduce the scope of pay and benefit increases than to cut benefit levels. One compensation element that is likely to have been affected by changing economic conditions, however, is variable pay.

provide information on large company behavior and provide only limited qualitative information about benefit offerings.

By examining survey information on the prevalence of various benefit programs in large, private-sector firms, we are able to infer their effectiveness; a more widely adopted benefit program is likely to be one that is cost-effective and has the intended effect on worker behavior. Driven by the profit motive, private-sector firms are quick to emulate successful strategies and to abandon ineffective ones. The data also allow us to compare the availability of various civilian and military benefits and highlight areas where they differ.

The surveys primarily used in the analysis are as follows:

- Buck Consultants, *2000/2001 Compensation Budget and Planning Survey* [19]—responses of representatives from 305 Fortune 1000 companies.
- HayGroup, *2000 Hay Benefits Report* [20]—responses of representatives from 1,008 medium and large employers.
- Hewitt Associates LLC, *The Hewitt Work/Life Survey* [21]—responses of representatives from 1,020 "major" corporations, including 85 percent of the Fortune 100 and 57 percent of the Fortune 500.
- Society for Human Resource Management (SHRM), *2000 Benefits Survey* [22]—606 responses of representatives from member companies, results are tabulated for firms of 2,500 or more employees.
- Watson Wyatt Worldwide, *ECS Survey Report on Employee Benefits 2000/2001* [23]—650 responses of representatives from companies of all sizes, results are tabulated for private-sector firms with 2,500 or more employees.

These surveys were chosen because they were conducted by nationally recognized consulting and research firms and can be interpreted as broadly representative of the pay and benefit offerings of large, private-sector firms. In some cases, data from these surveys have been supplemented with information from other available private-sector employer surveys.

These surveys, however, are not without their own shortcomings. Most reported surveys are not based on representative samples, meaning they may be subject to some statistical bias. In a few cases, data from different surveys conflict, which may result from differences in sample selection,

question forms, or definitions. For this reason, we present results from several different surveys to obtain a range of estimates.

CAVEATS

Differences in the provision or structure of military and civilian incentive pay and benefit programs do not necessarily mean that changes are necessary. The military differs fundamentally from the private sector in several ways, including its unique organizational goals of maintaining equity in pay and providing subsistence. As such, some of the compensation strategies and programs adopted by the private sector may not be transferable to the military, and vice versa. But if differences exist, it is important to recognize why they exist and whether they should persist. Thus, the feasibility of alternative compensation approaches must be assessed carefully. Research findings can provide the basis for further analysis and, by highlighting differences between military and civilian benefits, could also be used to design more effective recruiting materials.

It should also be noted that information on the actual receipt of benefits, particularly among military personnel, is not the focus of this analysis. Future research should examine this important issue, as the offering of a program or benefit does not necessarily mean that it is readily available to all. For example, although the military offers some sabbatical-like leave, its receipt is relatively rare.

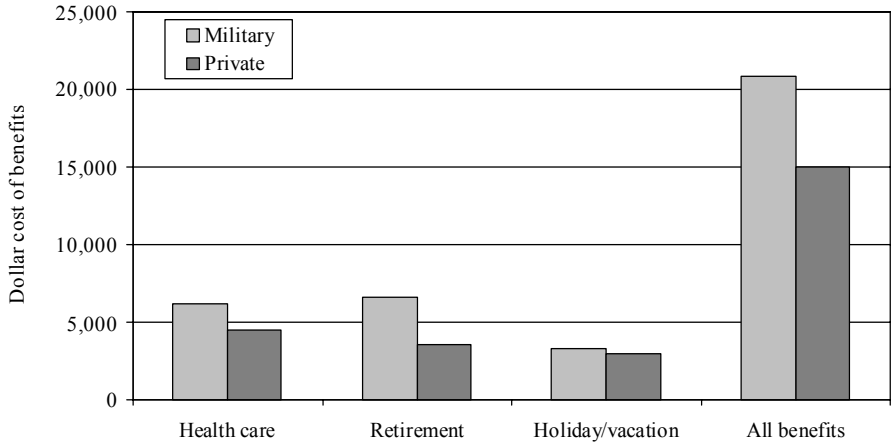
It is naïve to deduce from what follows that the solution to the military's recruiting and retention woes lies in the introduction of a host of new benefit programs or rapid expansion of existing programs. In fact, recent CNA research finds that the military spends more than the private sector on benefits today—particularly in the areas of retirement and health care [24] (figure 2). Rather, the analysis may spur a reexamination of military benefits and how changes in the provision or the mix of benefit and incentive pay programs could make military service more attractive.

EXAMINATION OF SEVERAL LARGE, PRIVATE-SECTOR COMPANIES

After comparing the provision of various incentive pay and benefit programs in both the private sector and the military, we turn our attention to an analysis of several companies that employ workers with skills similar to those needed by the military in critical technical ratings. Using selected enlisted Navy occupations as a test case from which to extrapolate results for the entire military, we combine information derived

from a crosswalk between Navy and civilian occupations first developed in [4] with new information obtained from a survey and a series of Navy personnel interviews to identify large, private-sector companies that compete directly with the Navy for people with critical technical skills. We then compare the characteristics of these companies' incentive pay and benefit programs to the characteristics of those available in the Navy. Although strict comparability will be difficult, this analysis will shed some light on the choices facing potential military recruits. The final step of the analysis is to draw conclusions and make recommendations for future military employment policy.

Figure 2. Military Spends More, But Mix May Matter[a]



a. Source: [24].

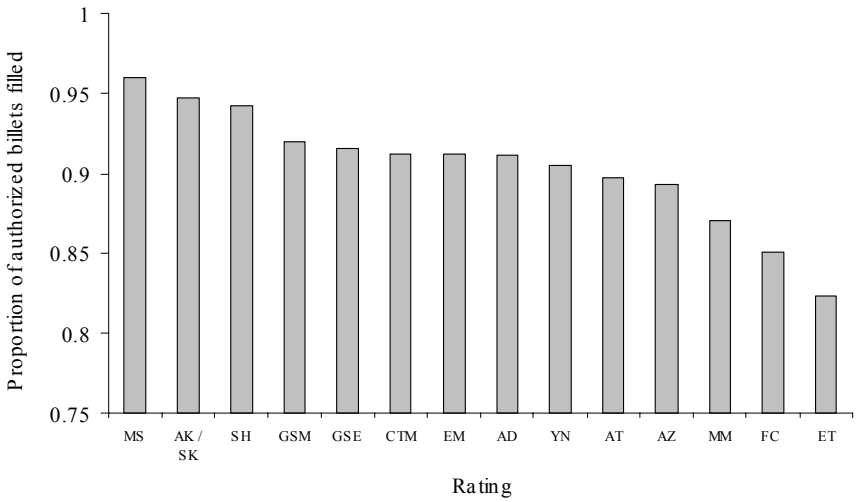
SURVEY EVIDENCE ON THE PRIVATE SECTOR'S ROLE IN RECRUITING AND RETENTION SHORTFALLS

In today's competitive labor market environment, the military is experiencing severe manning shortfalls in some officer and enlisted communities. Using data on the proportion of authorized billets filled for paygrades E-4 through E-6 as a measure of manning shortfalls, [4] identified shortfalls in several technically oriented Navy enlisted ratings in FY98 (figure 3). Although this shows a strong negative correlation between manning levels and earnings in comparable civilian occupations,

the role of the private sector in falling military recruitment and retention is not completely understood.

To better understand this relationship, CNA conducted an informal survey on the role of private-sector opportunities in both fleet attrition and reenlistment decisions (see the appendix). In addition, we spoke with detailers in several technically oriented enlisted Navy ratings about the role of the private sector in reenlistment decisions.

Figure 3. Enlisted Accession Shortfalls in Technical Navy Ratings (manning levels of E4-E6 billets)



a. Source: [4].

Survey data suggest that private-sector job opportunities do play a role in both the fleet attrition and reenlistment decisions of Sailors (see table 4). Almost 65 percent of survey respondents agreed or strongly agreed that private-sector opportunities played a significant role in a Sailor's decision to leave the Navy at the end of his/her contract, also known as the Expiration of Active Obligated Service (EAOS).[9] Almost half (48 percent) of respondents agreed or strongly agreed that private-sector opportunities were the primary reason for the Sailor's failure to reenlist at EAOS.

These sentiments were echoed in detailer interviews. Although virtually all interviewed detailers agreed that private-sector opportunities

[9] The survey asked respondents to recall a Sailor who had recently left the Navy at EAOS.

played a role in Sailors' decisions to leave the Navy at EAOS, fewer agreed that the private sector was the primary reason for losses.[10]

Table 4. Role of the Private Sector in Separation Decisions

Extent of Role	Percentage	
	Agree	Strongly Agree
A Significant Role		
EAOS Losses	24	41
Attrites	26	31
The Primary Reason		
EAOS losses	29	19
Attrites	31	5

Not surprisingly, the private sector seemed less important—but still significant—in Sailors' fleet attrition decisions. The survey found that 57 percent of respondents agreed or strongly agreed that private-sector opportunities played a role in a Sailor's decision to attrite, whereas over one-third (36 percent) said that they agreed or strongly agreed that such opportunities were the *primary* reason for the Sailor's decision to attrite from the Navy.[11]

Information on EAOS losses' private-sector opportunities was observable in data on the timing of a Sailor's post-service employment offer. Forty-three percent of respondents said that the Sailor leaving at EAOS had a job before leaving the Navy. Similarly, of those reporting that the Sailor had not obtained a job before separation, 60 percent of EAOS losses obtained a job after separation.

Survey respondents were also asked to provide information regarding the Navy rating of the described EAOS loss or attrite. Using information regarding technical and nontechnical ratings, responses were grouped into

[10] The fact that virtually all detailers agreed that private-sector opportunities played a role in Sailors' decisions to leave at EAOS may reflect the fact that only detailers in technical ratings were interviewed. Detailers had little information regarding Navy attrites.

[11] Although Navy attrites are technically separated from the Navy for a variety of medical and misconduct circumstances (termed "loss codes"), anecdotal and focus group evidence suggests that some may exaggerate circumstances to avoid completion of their periods of obligated service.

these two categories.[12] For all EAOS losses and attrites, 60 percent of EAOS losses were Sailors in technical ratings, compared with 69 percent of attrites.

The survey also asked respondents to report whether Sailors got jobs before or after separation. This information, combined with information on the rating of the separating Sailor, was used to assess whether Sailors in technical ratings were more likely than Sailors in other ratings to obtain a job before separation. Although sample sizes are small, the share of technically rated Sailors who obtained jobs before separation was about the same as or greater than their representation in the sample populations. Technically rated Sailors were also more likely than their nontechnically rated counterparts to obtain a job after separation.

Respondents were also asked to indicate the occupation subsequently entered by the EAOS loss. Almost half (47 percent) of EAOS losses subsequently entered a technical occupation.[13]

Finally, the survey asked respondents to identify a separating Sailor's top three reasons for leaving the Navy. Not surprisingly, pay was the most often cited reason for those separating at EAOS.[14] Perhaps indicative of societal changes and the importance of work and family, location/schedule of work was the second most often cited reason for EAOS losses and the most often cited reason for attrites. This reason was also often mentioned in our discussions with Navy detailers. Working conditions was the third most often cited reason for both loss groups. Respondents cited other reasons, including benefits, training/educational opportunities, compatibility with spouse's career/job, and job security, less often. The top "other" reason cited by respondents was family separation.

Although pay seemed to be an important factor in servicemembers' decisions to seek private-sector employment, benefits figured less prominently into their decisions. Benefits ranked low as a reason for seeking private-sector employment among both described EAOS losses and attrites. Keep in mind, however, that many cited reasons—such as location/schedule of work, training/educational opportunities, and compatibility with a spouse's career—can be influenced or improved on by offered incentive pay and benefit programs. Thus, while benefits may not be explicitly cited as the reason that servicemembers choose to pursue

[12] Sailors who were not rated when they left the Navy were omitted from the analysis. Technical and nontechnical groupings were determined based on CNA analysis of data relating to the length of the requisite training pipeline.

[13] "Technical" in this context refers to those entering the "technical" or the "mechanics, installers, and repairers" occupational categories.

[14] This was the second most often cited reason among respondents describing attrites.

private-sector opportunities, they may be useful in easing the hardship of other cited reasons.

A COMPARISON OF CIVILIAN AND MILITARY COMPENSATION

STRUCTURAL DIFFERENCES

Before comparing various components of civilian and military compensation packages, it is first important to recognize the inherent structural differences between civilian and military compensation. Compensation in the private sector is composed of several elements, including base pay, incentive-based variable pays (e.g., bonuses, profit sharing, gainsharing, and equity-based compensation), privately provided benefits (e.g., health insurance, paid leave, retirement, life insurance, accidental death and disability insurance, educational programs, and work/life programs), and publicly mandated benefits[15] (e.g., social security, unemployment compensation, and workers' compensation). Except for a few notable exceptions,[16] pay and benefit offerings are determined at the discretion of the firm's management. Market wage information, coupled with internal job evaluation systems, helps to determine pay and benefit offerings. The benefit share of civilian compensation has been growing over time, and now accounts for over one-quarter of total employer compensation costs [25].

The resulting mix of pay and benefits can vary considerably across private-sector firms competing in the same market because of variation in their organization goals or their individual workforce needs. For example, one firm may choose to offer above-market wages to cultivate a skilled workforce capable of producing high-quality products; another may choose to pay low wages to develop a workforce able to produce lower-quality products more cheaply. Firms can also use the pay/benefit mix to cultivate a particular type of workforce. For example, a firm that has difficulty keeping young, entry-level workers may choose to offer a compensation package that is more heavily weighted toward wages and salaries, whereas a firm trying to retain older, more experienced workers

[15] Because publicly mandated benefits are available across all covered companies, they will be omitted from the analysis that follows.

[16] For example, the government mandates certain employee benefits, minimum wage levels, and work conditions.

might offer a larger share of compensation in benefits preferred by older workers.

The structure of military compensation, while similar to that of civilian compensation in some respects, also has several distinct differences. Basic pay, which is determined by rank and length of service, is the largest component of military pay. Congress sets separate pay tables for officers, warrant officers, and enlisted Sailors. Basic allowances for housing and subsistence make up the second largest component of military pay. These allowances, which are not subject to federal taxes, vary depending on rank, length of service, marital status, and location. Retirement pay is the third component of military pay.[17] This pay, which is available only after 20 years of service, provides a retiree with a substantial share of his or her previous basic pay upon retirement—regardless of age. A variety of special and incentive pays, including accession and continuation pays, duty and condition-based pays, uniform allowances, cost-of-living allowances, and moving cost reimbursements, constitute the final component of military pay. These special pays make up an estimated 14 percent of total military pay. About half of this portion—7 percent of military pay—is in discretionary categories and the amount of discretion allowed is fairly limited [26]. Allowances, retirement pay, and special and incentive pays are set through the budgetary process and must receive congressional approval. However, the services have some discretion in the determination of certain types of military pay. For example, law sets restrictions on Selective Reenlistment Bonuses, but the individual services can determine bonus amounts within these parameters.

Military benefits, which include health care, child-care programs, annual leave, voluntary education and training programs, commissaries, and recreation programs, are set at the same level for all servicemembers and do not significantly vary with tenure.

Although much research to date compares pay in the civilian sector to regular military compensation (base pay plus allowances) in the military, benefits are usually omitted from the analysis [11]. This stems in part from the inherent difficulty of comparing civilian and military benefit packages. Despite these difficulties, it is important to assess the prevalence of various types of private-sector incentive pay and benefit offerings and compare these offerings with those available to military personnel. Viewed as a competitor in the market for skilled labor, the military can then draw inferences based on this information as to the extent to which differences in military and civilian benefit packages may be influencing

[17] This refers to the annuity payment that is paid upon retirement.

recruiting and retention rates—particularly in ratings with severe manning shortfalls.

Differences in Civilian and Military Pay and Benefit Offerings

It is generally recognized that differences in civilian and military pay, benefits, management structures, and work/life offerings exist and may be a factor in individuals' decisions to enlist or reenlist in the military. Despite this supposition, little effort has been made to compare the offerings of large, private-sector companies with those of the military. In what follows, the various elements of civilian and military compensation offerings will be examined in turn.

Pay

Empirical comparisons of military and civilian pay described elsewhere in this report show that, although Regular Military Compensation (RMC) for enlisted personnel compares favorably with the earnings of civilian high school graduates, the earnings of enlisted personnel with some college tend to fall short of their civilian counterparts' earnings [11].[18] One possible explanation for this discrepancy is that it results partly from the availability of more generous benefits in the military sector—a proposition that we will examine in more detail. But differences in the *composition* of military and civilian pay are often overlooked. In the civilian sector, variable pay has become increasingly popular in recent years.

Private-Sector Variable Pay

Variable pay in the private sector can include a variety of different programs, such as bonus and award programs, equity participation programs, gainsharing plans, and team-based incentives. Over time, the use of variable pay has been rising. A recent survey by Hewitt Associates LLC found that 78 percent of surveyed companies have at least one type of variable pay in place for salaried, exempt employees, up from 47 percent in 1990 [27].[19] WorldatWork finds that 61 percent of all companies offer some form of variable pay, and a Mercer survey reports

[18] RMC is defined as basic pay, federal tax advantage, and allowances for housing and subsistence.

[19] "Exempt" employees are those who are exempt from the Fair Labor Standard Act's overtime pay requirements.

that 56 percent of all companies have incentive pay plans below the managerial level [27, 28]. Evidence suggests that variable pay may be more prevalent among large companies. A 1999 Federal Reserve Bank survey found that 96.7 percent of companies with more than 1,000 employees offer some type of variable pay [29].

Most variable pay programs in the private sector are based on incentives. They put a portion of employees' compensation "at risk," allowing companies to attempt to link performance and pay at the individual, team, or organization-wide level. When effectively designed, incentive-based pay can motivate employees to work to the best of their abilities, resulting in productivity increases and higher quality outputs. Economic theory suggests that incentive-based variable pay can also allow a firm to cultivate a more highly productive workforce [30].

Private-sector variable pays can also suffer from shortcomings. Variable pays that are poorly structured may result in unintended adverse outcomes. For example, a gainsharing program (described below) that places more value on quantity than on quality may result in low-quality production. In some cases, variable pays can become viewed as entitlements, thus undermining morale if conditions do not warrant payouts. As [26] notes, unmeasurable or unobservable aspects of performance or poorly specified goals can result in the misallocation of workers' effort. Individuals seeking to meet performance targets also may undermine team cooperation. In addition, programs that base payouts on factors that are outside the workers' control may actually create disincentives for effective work. Because of these challenges, variable pays must be carefully targeted and highly transparent. Workers must be fully aware of the basis on which variable compensation will be determined, and these factors should be either directly or indirectly under the individual's or team's control.

Types of Private-Sector Incentive-Based Variable Pay

Private-sector employers currently offer a variety of incentive-based variable pay programs, and the popularity of these programs has been steadily growing over time. A recent William M. Mercer survey finds that 37 percent of all firms currently use individual nonmanagement incentive-based variable pay, up from 31 percent in 1994 [28].

Bonus and Award Programs

Most firms offer bonus and award programs, which can include cash profit sharing, incentive or performance bonuses, retention and hiring/signing bonuses, and other nonmonetary recognition awards.

Cash profit-sharing programs share a portion of firm profits with employees according to a predetermined formula and are typically awarded on an organization-wide basis. William M. Mercer reports that 20 percent of all companies currently offer such programs [28]. Among large companies, 28 percent offer cash profit-sharing awards [31]. Cash profit-sharing programs are usually considered less effective than gainsharing programs (described below) because profits can vary considerably as a result of factors beyond workers' control, thus loosening the link between individual performance and the cash profit-sharing payout.

Incentive and performance bonuses are used quite frequently today. Half of all surveyed firms now offer spot cash awards, up from 48 percent in 1999 [28]. Among large companies, a Federal Reserve Bank study finds that 75 percent of large companies offered incentive or performance bonuses in 1998, and the Society for Human Resource Management (SHRM) puts the share at around 70 percent today [22, 29].

Many companies are also using hiring/signing, referral, and retention bonuses to attract and retain employees. A Federal Reserve Bank study finds that 32 percent of interviewed firms used hiring bonuses, 30 percent used referral bonuses, and 24 percent used retention bonuses in 1998 [29]. There is some evidence that use of these practices has escalated in recent years as labor markets have tightened; a William M. Mercer survey finds that 66 percent of all companies are using signing/hiring bonuses [32]. Use of such incentives is higher among larger companies. Data from SHRM and Buck Consultants show that between 68 and 77 percent of large companies currently use hiring/signing bonuses [19, 22]. In addition, about 45 percent of the Fortune 1000 currently use retention bonuses [19].

Finally, noncash awards are used in most private-sector firms. Over 70 percent of all firms have noncash incentive awards, up from 68 percent in 1999 [28]. And the Center for Effective Organizations (CEO) reports that 96 percent of large companies offered nonmonetary recognition awards for performance to at least some of their employees in 1999 [33].

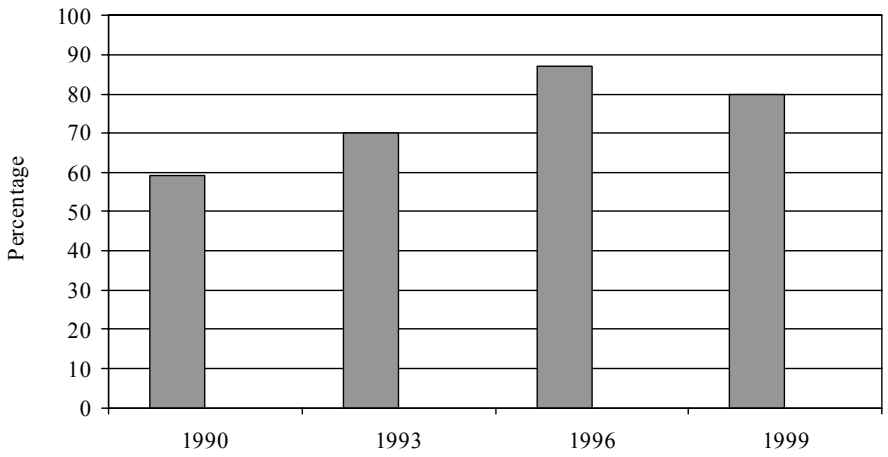
Group Performance Awards

Group performance awards, such as team-based incentives and gainsharing programs, also offer employers a way to better link pay to performance. Team-based incentives offer additional compensation to

employees based on the performance of their workplace team. Gainsharing programs reward employees at the work-unit level for measured improvements in productivity. Typically used in conjunction with workplace teams, these programs share measured gains with employees through frequent bonus payments based on a predetermined formula.[20]

Team-based incentives have become more pervasive in private-sector companies over time. A recent William M. Mercer survey finds that 27 percent of all companies use team/small group incentives, up from 12 percent in 1993 [28]. Work-group or team incentives are much more prevalent among larger companies. CEO data show that 81 percent of Fortune 1000 companies offered work-group or team incentives in 1999, up from 59 percent in 1990 (figure 4) [33].

Figure 4. Team-Based Incentive Pay is Prevalent[a]



a. Source: [33].

Gainsharing programs have also become more prevalent. About 12 percent of all surveyed companies currently have such programs in place [28]. Gainsharing is much more common among larger companies. Reference [27] finds that 20 percent of large companies use these programs for all of their employees and the CEO reports that 53 percent of Fortune 1000 companies had gainsharing programs for at least some employees in 1999, up from under 40 percent in 1990 [33].

[20] For a more detailed description of the structure of gainsharing programs and their effects on productivity and wages, see [34].

Equity Participation Programs

Equity participation programs allow companies to offer incentive-based variable pay on an organization-wide basis. These programs can take several forms, including stock options, stock bonuses or grants, employee stock purchase programs, restricted stock, or stock appreciation rights.

Stock option programs give employees a one-time or annual right to purchase shares of stock in their company for a fixed price, known as the grant price, for a specified number of years into the future. Options are granted based on a percentage of pay, a merit formula, or on an equal basis. Employees typically must wait a set period (usually 3, 5, or 7 years) until their right to purchase shares vests and they can exercise granted options. Stock bonus or grant programs allow employees to directly receive employer stock. If employer stock is not publicly traded, the employee has the right to require the employer to repurchase stock under a fair market value formula.

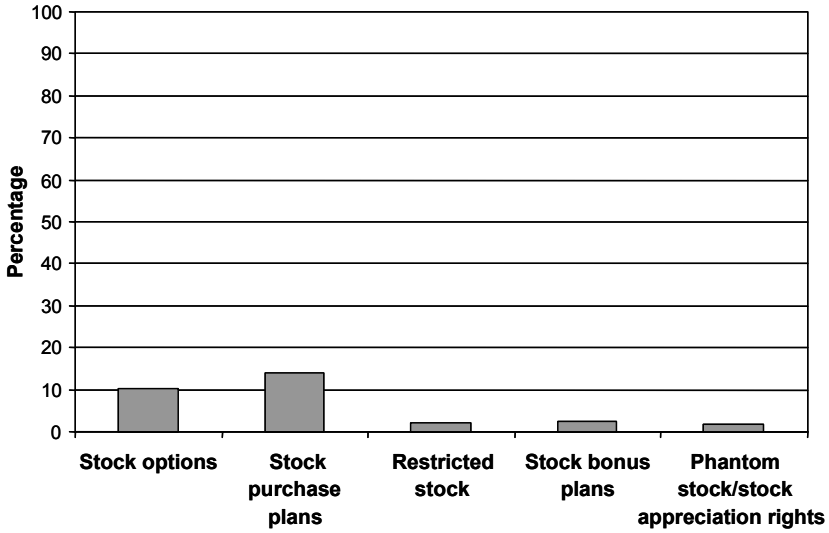
Employee Stock Purchase Programs (ESPPs) allow employees to purchase stock, either at a market or discounted price, with after-tax payroll contributions. Restricted stock is stock that is given or sold at a discount to an employee, who is restricted from selling or transferring it for a specified amount of time. The employee receives dividends but must forfeit the stock if employment ends before the restricted period. Finally, stock appreciation rights, sometimes called "phantom stock," are like stock options, except no actual transaction takes place. Employees accrue value based on changes in the value of stock since the rights were granted. In this form, the employee receives the benefits associated with stock ownership without the attendant cost and risk.

New data from the Bureau of Labor Statistics examine the prevalence of various equity participation programs in establishments with 100 or more employees. The survey finds that about 10 percent of establishments of this size granted stock options in 1999, about 14 percent offered stock purchase plans, and a relatively small share offered such things as restricted stock, stock bonus plans, or phantom stock. Among publicly held companies of this size, 30.5 percent granted stock options in 1999 [35] (see figure 5).

These data have generated considerable controversy because data from other sources show that many large firms offer equity participation

programs to their employees.[21] One reason for the discrepancy could be that the BLS data only account for establishments that made grants in calendar year 1999. Establishments that had stock option plans in place but did not make grants in that year were excluded. Another potential source of bias is that all companies were included, not just publicly held ones. In fact, the data show that, when the sample is limited in that way, 30.5 percent of publicly held companies with 100 or more employees offer stock options in 1999 [35]. A final source of possible bias could be the fact that data from other sources are typically not based on representative sample surveys.[22] As such, data may be subject to some statistical biases.

Figure 5. Equity Participation Programs are Relatively Rare [a,b]



a. Note: Data for private – sector establishments with 100 or more employees.
b. Source: [35].

We have evidence that equity participation programs are more prevalent among larger companies. For example, in the case of stock purchase plans, a recent HayGroup survey finds that over one-quarter of medium to large companies offer such programs to their employees [20].

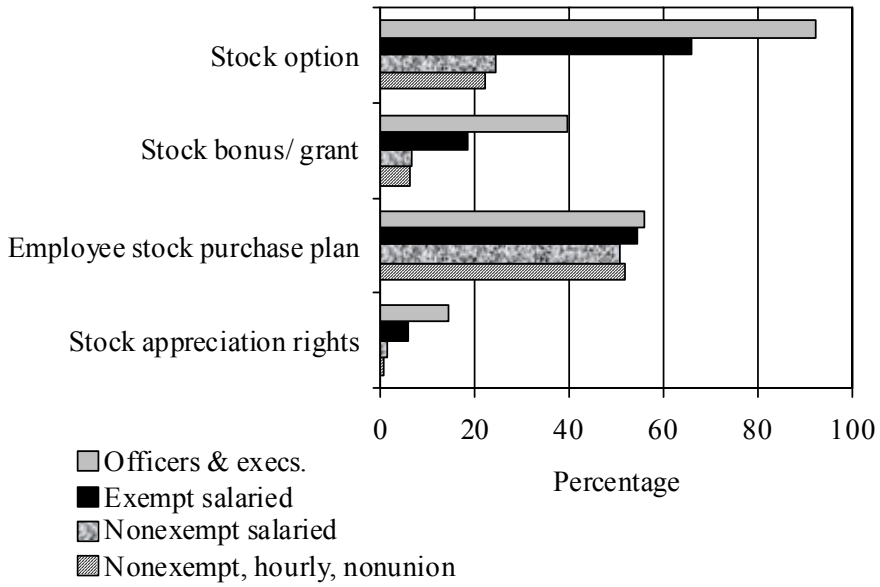
[21] For example, a recent WorldatWork survey found that 56.1 percent of for-profit company respondents report using some type of stock program for compensation purposes. See [10].

[22] For example, a 1999 Federal Reserve study that reported that almost 60 percent of companies with 1,000 or more employees offer stock options to at least some of their employees used data from private interviews with bank contacts. See [29].

And over half of Fortune 200 companies offered such plans to their employees in 1998 [36].

Access to equity participation programs varies considerably by professional status. Data from a WorldatWork survey show that officers and executives are the most likely to participate in such programs, with exempt (workers exempt from the Fair Labor Standard Act's overtime requirements) salaried workers, nonexempt salaried workers, and nonexempt, hourly, nonunion workers less likely to be included in stock-based programs (figure 6).

Figure 6. Availability of Equity Participation Programs Varies by Professional Status[a]



a. Note: Data based on survey of companies of all sizes offering stock-based plans. Source: [10].

Although traditionally reserved for executives, surveys show that equity participation programs are slowly making their way down the corporate ladder. In the case of stock options, a William M. Mercer analysis of large company proxy statements found that nearly 50 percent had broad-based stock option plans in 2000 and 18 percent of those companies made grants.[23] This was considerably higher than in 1993,

[23] Broad-based stock option plans are typically defined as those that are offered to at least half of a firm's workforce.

when only 18 percent of large companies had broad-based stock option plans, and 6 percent made grants [28].

Other surveys show considerable use of broad-based stock options among large companies. A recent HayGroup survey finds that 15 percent of medium and large firms offer broad-based stock options [20]. A 1998 survey by Hewitt Associates LLC found that almost 30 percent of all surveyed large companies offered broad-based options [36]. Finally, Fortune 1000 surveys by the CEO and Buck Consultants report that between 31 and 37 percent offer broad-based stock options [19, 33].

By granting workers a stake in the firm, equity participation programs give workers additional incentives to work effectively and to improve firm performance. A survey from the early 1980s found that the more stock shares an employee owned, the more committed they were to their jobs, and the less likely they were to leave.[24] More recent research finds that combining equity participation programs with teams and performance pay improves measured productivity, worker-satisfaction, and management-employee relations [37].

A Comparison of Private-Sector and Military Variable Pay

In the military, variable pays generally fall into three (sometimes overlapping) categories: those used for recruitment and retention purposes, those used to compensate individuals for adverse conditions or arduous duties, and those used to provide subsistence. Only the first two pay categories can potentially be viewed as "incentive-based" variable pays.

Accession and Continuation Pays

Like its private-sector counterparts, the military uses an array of variable pays to attract and retain personnel with critical skills and to allocate these individuals across jobs. Like private-sector signing/hiring bonuses, Enlistment Bonuses (EBs) are taxable monetary awards that the military uses to entice recruits to enlist in certain critical specialty areas or—in the case of the Army—to attract individuals into the infantry. These may be paid partially as a lump sum (usually about 50 percent) with the remainder paid in annual installments, and cannot exceed $20,000. Selective Reenlistment Bonuses (SRBs), which are similar to private-sector retention bonuses, are monetary awards designed to entice personnel to reenlist in critical specialty areas or to encourage other servicemembers to enter those fields. Based on a formula using length of

[24] National Center for Employee Ownership, "An Overview of ESOPs, Stock Options, and Employee Ownership," http://www.nceo.org/library/overview.html.

reenlistment and the need for critical skills, these bonuses cannot be larger then $60,000 annually. Those failing to complete the period of obligated service may be subject to recoupment of the bonus for the unserved portion of the enlistment.

In addition to EBs and SRBs, there are a host of variable pays available for enlistment or reenlistment in various specialty fields. Officers in the Nuclear, Aviation, Engineering, Science, Medical, and Dental fields, Veterinarians and Optometrists, Navy Commanders, individuals performing special duties, and those with proficiency in critical languages are all eligible for special bonuses in addition to basic pay.

Accession and continuation pays provide some flexibility in military compensation by allowing the creation of occupational pay differentials. The military can determine the critical skill areas to target and the award amounts, subject to broad eligibility and award limitations determined by Congress and the DoD. However, unlike similar private-sector pays, there is no variation by individual.

Adverse Conditions/Arduous Duties Pays

Other military "incentive-based" variable pays are designed to compensate personnel for adverse conditions or arduous duties and to allocate individuals across jobs. These condition-based pays include Sea Pay, Diving Pay, Flight Pay, Submarine Duty Pay, Hazardous Duty Pay, Hardship Duty Pay, and Imminent Danger or Hostile Fire Pay. A Family Separation Allowance is also available for military personnel who are assigned to a location where other family members are not authorized to go. These pays roughly equate to what are termed "compensating differentials" in the economic literature. Although such differentials are typically included in private-sector base salaries and wages, the military's reliance on a uniform pay structure results in the separate addition of these pays.

Although they do provide some flexibility, military incentive-based variable pays represent a relatively minor share of total compensation. Taken together, discretionary variable pays amount to a relatively small share of military compensation. For example, only 7 percent of the Navy's personnel budget in FY99 was in discretionary categories [26]. As Paul Hogan notes in other sections of the QRMC, the tight link between occupation, rank, and pay created by the pay table structure further restricts flexibility in military compensation.

Perhaps the most striking difference in military and private-sector compensation is that there are virtually no military variable pays that are

designed to attract and retain high-quality personnel and to motivate effective work by linking pay and performance, particularly at the individual or team level [26]. As such, no military equivalents exist for cash profit-sharing, spot cash awards, performance or incentive bonuses, equity participation programs, gainsharing plans, or team-based incentives.

Alternatively, the military often uses promotions as a means of rewarding good performance. Because rank and pay are linked and there is substantial variation in promotion rates, promotions do help to link performance and pay. This mechanism, however, has a shortcoming: because leadership authority is linked to rank, a promotion may not always be appropriate. For example, it may be the case that an individual with outstanding technical expertise may require a pay premium, but may not necessarily have the skills and/or experience to warrant additional leadership authority.

There may be several legitimate reasons why the military offers less pay variability than the private sector. First, unlike in many private-sector firms, there is no military "production" to measure. As a result, gainsharing and profit-sharing programs may prove impractical in a military context. Individual and team contributions to "readiness" are not easily defined or measured, making it more difficult to assess the performance of individual military personnel.[25] Many variable pays, such as performance or incentive bonuses, spot cash awards, and team-based incentives, require individual performance appraisals. Second, many private-sector variable pays, such as stock options, stock grants, stock appreciation rights, and ESPPs, are equity-based. Obviously, no "equity" is available in the military context to motivate effective work. Finally, many fear that variability in military pay may undermine the military's unique equity goals.

Despite these concerns, there are several reasons why the military may want to consider introducing more variability into its pay system. Increased competition with the private sector, particularly in critical skill areas, may warrant more comparable compensation structures. Military allowances and other variable pays are often complicated and confusing, and many servicemembers do not view them as a significant component of total compensation. Conversely, many variable pays in the private sector are more visible (i.e., stock options) and workers view the returns as roughly equivalent to cash. Finally, changing external conditions may be

[25] This does not mean, however, that such assessments are impossible. In fact, evaluations of servicemembers' performance are routinely made through fitness reports, selection boards, and other means.

transforming the requirements of military compensation. The military's institutional goals of "youth and vigor" and pay equity may be less relevant today than in the past, particularly as technological progress changes the military's skill needs.

Introducing More Variability Into Military Pay

A variety of reforms could be instituted to help make military variable pays more effective. Skill-based pay—not in the form of bonuses that occur in a lump sum or in installments, but as a regular component of a servicemember's pay—could provide the military with some additional flexibility in compensation and the ability to vary pay among individuals across skill groups. Implementing this type of pay, however, would require the separation of pay and rank—a controversial move recommended in prior CNA research [26]. This notion has received more attention in recent years because it has been recognized that personnel with technical skills may command a pay premium. This idea has also gained some support within military circles. As General Michael Ryan, the Air Force's Chief of Staff, recently commented, "I think legislation will be needed in the future…to try and pay for capability in our armed forces rather than paying for rank" [38].

Other less expansive steps could be taken to make military pays more effective. For example, bonuses that are contingent on completion of the first enlistment period could be introduced to reduce attrition.[26] These may be most effective if they are distributed in lump sums to military personnel upon the attainment of specified milestones through a series of smaller payments that precede the final larger payment. Consolidation of several special and incentive pays into one lump sum could also help to alleviate confusion associated with many of these pays today. Finally, the wider use of nonmonetary awards—such as a phone call to the family of an outstanding servicemember or noncharged leave awards—could also serve as a useful performance incentive at the individual level. The military already makes strong use of such awards, through events like promotion and retirement ceremonies, but awarding other nonmonetary rewards could also be effective. For example, Marines on leave who recruit acceptable candidates for enlistment are recommended for a 5-day leave extension or a 4-day special liberty per accepted recruit, up to two recruits annually.

[26] As noted previously, over a third of recruits leave the military before completion of their first term. Such a bonus could be relatively expensive because it would be payable to individuals who would have completed their contract, even without the monetary incentive.

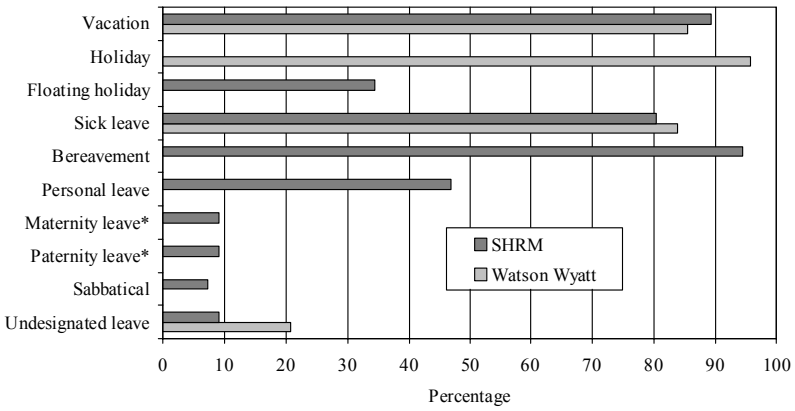
Finally, the penalties associated with noncompletion of a military contract should also be binding. Instead of only recouping the enlistment or reenlistment bonus associated with the unserved portion of a contract, the military may want to consider requiring repayment of an entire bonus if attrition occurs.

LEAVE

Paid Leave in the Private Sector

As figure 7 shows, most large companies offer traditional forms of paid leave, such as vacation, holiday, sick, and bereavement leave.[27] Personal leave—leave to cover situations not included in traditional leave policies—is less prevalent, offered by about half of large firms. Other forms of paid leave, including paid maternity and paternity leave and sabbaticals, are relatively rare.[28] Finally, in a relatively new phenomenon, between 9 and 21 percent companies offer employees undesignated leave that can be used for any purpose.

Figure 7. Private-Sector Paid Leave Offerings[a]



Sources: [22] and [23].

**Paid maternity and paternity leave figures exclude firms providing pay through short-term disability policies.*

[27] Bereavement leave usually is only a few days in duration and is typically limited to the death of a family member.

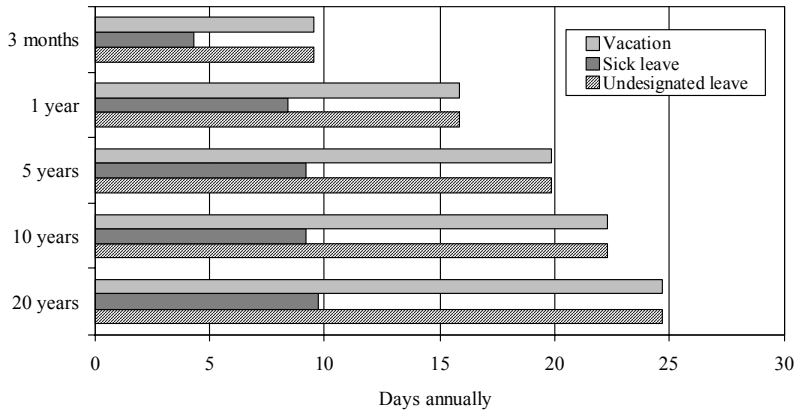
[28] Maternity and paternity paid leave figures exclude pay that the firm may provide through a short-term disability policy. If this pay is included, one survey finds that 53 percent of all firms provide some pay for women on maternity leave and 13 percent provide some pay for men on paternity leave [39].

Some private-sector leaves are not necessarily set in policy, but are granted "as needed." For example, the Families and Work Institute finds that most firms offer some flexibility for child care and school activities. Almost 88 percent of surveyed companies allowed their employees informally arranged paid time off for school/child-care functions, and 49 percent of surveyed companies granted paid time off for the care of mildly ill children [39].

Duration of Leave

The amount of leave available to private-sector workers typically depends on its type. Some forms of leave—bereavement and holiday leave, for example—are fixed and each employee is offered the same leave allotment. Watson Wyatt finds that large, for-profit firms offer an average of 8.3 fixed holidays and 2.1 floating holidays annually. Other types of leave, such as vacation, sick, and undesignated leave, vary with length of service (figure 8).

Figure 8. Length of Large, Private-Sector Company Paid Leave Offerings[a]



a. Source: [23].

Some large, private-sector employers allow employees to carry over or cash in some or all unused leave at the end of the year. Although data on the share of such firms offering carryover or cash-in options are not available, the Employee Benefit Research Institute reports that 29 percent of full-time employees in medium and large private establishments had only a carryover option for unused vacation leave in 1993. In addition, about 10 percent had only a cash-in option for unused leave, and 8 percent

could choose either option. Half of all full-time employees in medium and large private establishments lost unused vacation leave [40].

Short-Term Disability Leave

In addition to leave available through sick leave policies, workers in large, private-sector firms may also receive up to 26 weeks of leave for illness or injury under a firm's voluntary short-term disability policy. Survey data indicate that 78 to 90 percent of large, private-sector companies offer short-term disability insurance to employees, and policies usually replace about 50 to 67 percent of an employee's income. Five states (California, Hawaii, New Jersey, New York, and Rhode Island) have laws mandating that employers provide short-term disability benefits to employees.[29] However, many private and mandated policies are subject to initial waiting periods.

Long-Term Disability Leave

Most large, private-sector firms also offer long-term disability insurance. An estimated 86 to 99 percent of firms with 2,500 or more employees offer long-term disability insurance to their workers today. These policies generally provide benefits from the end of the short-term disability period to the end of the duration of the disability or to retirement, whichever is sooner. Income replacement rates are typically set at 50 to 60 percent of the worker's basic compensation before the disability and are subject to weekly or monthly caps.

Unpaid Leave in the Private Sector

Finally, large, private-sector companies also offer unpaid leave under certain circumstances defined in federal law. The Family and Medical Leave Act (FMLA) mandates that firms with 50 or more employees provide unpaid leave periods for workers meeting specified criteria. The law requires the provision of 12 weeks of unpaid, job-protected leave with continued health insurance coverage for disability relating to pregnancy, the care of a newborn or a newly adopted or newly fostered child, recuperation from a serious illness or injury, or for the care of a seriously ill parent, child, or spouse. Some pay during this leave period may be provided either voluntarily by firms, through mandatory or voluntarily provided short-term disability insurance policies, or through the substitution of other paid leave for the unpaid FMLA leave. Note that the

[29] The Pregnancy Discrimination Act requires that firms with short-term disability coverage treat pregnancy and related conditions the same as nonpregnancy conditions.

employee can request or the employer can require that FMLA leave run concurrently with accrued leave. As such, the leave may be counted as part of the worker's annual leave entitlement. Some large, private-sector firms offer additional forms of unpaid leave to their employees. For example, about one-quarter of large, private-sector firms offer their employees unpaid sabbaticals and 73 percent offer unpaid leave of absences (for education or sabbatical purposes) not covered by the FMLA[30] [22, 23].

A Comparison of Military and Private-Sector Leave

A comparison of private-sector and military leave offerings shows both similarities and differences. Members of the armed forces accumulate 2.5 days of paid vacation leave per month of active military service (30 paid vacation days per fiscal year) and servicemembers receive an additional 10 federal holidays annually. During paid leave periods, military personnel receive full pay and allowances.

One notable difference between military and private-sector vacation leave is in the timing of the leave offering. Although the average private-sector worker and military member will accrue roughly the same number of vacation days after 5 years of service, the rate of accrual differs significantly.[31] All military members accrue vacation leave at the same rate, regardless of their time in service, whereas leave in the private sector typically increases with tenure (figure 8). By offering equal leave entitlements to all personnel, military leave policy could serve as a less effective retention incentive than private-sector policies because servicemembers do not have to "earn" additional leave through increased tenure. As such, a reexamination of this policy and the reasons for its current structure may be warranted.

Private-sector and military leave policies also differ in the way in which they record the use of leave. Because the services operate on a 365-day calendar year, leave extending over a weekend must count Saturday and Sunday. Unlike common practice in the private sector, holidays and nonduty days are charged as leave if they fall within a leave period. This policy, which is likely to be misunderstood by new military personnel, results in fewer leave days for those taking leave around a holiday, and the services should take care to make this clear to all personnel.

[30] Sabbatical leaves are usually defined as those granted for rest, travel, or research.
[31] We equate 30 days of military leave to 4 weeks of private-sector leave because military leave counts weekends as leave days.

Heightened operational concerns in the military make the timing of leave-taking subject to restrictions. As might be the case in private-sector manufacturing environments, leave must be coordinated to avoid the disruption of critical functions. Ultimately, both private-sector and military leaves are subject to the approval of management.[32]

To ease these operational constraints, the military encourages personnel to use accrued leave at certain times—upon reenlistment or during a Permanent Change of Station (PCS) move, for example. Furthermore, military policy allows personnel to carry over up to 60 leave days into the next fiscal year.[33] If servicemembers meeting certain eligibility criteria have unused accrued leave remaining at the end of their service period, they may opt to receive payment for up to 60 days of the leave. This is limited to one sellback over the servicemember's entire career and is paid out at the rate of basic pay.

One area in which military leave policy seems more generous than private-sector leave policies is in case of illness. Whereas private-sector sick leave policies typically grant 4 to 10 days (varying with length of service) of such leave annually, the military grants generous leave periods for recovery from illness and for convalescence. Sick-in-quarters leave is granted for minor illnesses that do not require hospitalization. This leave is usually no greater than 72 hours, but can be extended to 14 days. Convalescence leave can be for a period of up to 30 days per period of hospitalization, with longer leaves controlled at the command level. In both cases, the military places no formal restrictions on the amount of sick-in-quarters or convalescence leave provided annually (although certification of each illness is usually required). Leave is granted based on the presence of a qualifying condition. In addition, if a servicemember falls ill while on leave and the illness is certified by a physician, the time will not be charged against the member's annual leave account.

As in the private sector, military personnel also have access to both short-term and long-term disability coverage. Servicemembers incurring short-term disabilities are placed on the temporary disability retired list and are subject to a physical examination every 18 months. While on the temporary disability retired list, servicemembers receive a minimum

[32] In the case of the military, authority is delegated to the unit commander.

[33] In some cases where operations preclude use of the leave allotment, the carryover limit has been eased. Recently, a special leave accrual was authorized permitting Sailors and officers, who might otherwise have lost annual leave on October 1, 2001, to carry over as many as 90 days of leave into the next fiscal year. The authorization was made based on emergency operational commitments resulting from the September 11 attacks, and enables affected personnel to use excess leave until the end of FY2004. See, for example, SecNav Instruction 1050.5C and MILPERSMAN 1050-070.

benefit of 50 percent of basic pay. For long-term disabilities, the military disability system awards retirement benefits. A servicemember who can no longer perform his or her duties because of a permanent disability may be eligible for disability severance pay for up to 2 years. Servicemembers must meet specified criteria related to service status, circumstances of the disabling event, and length of service in order to qualify for payments. In addition to military disability payments, an injured or sick servicemember may also be eligible to receive Veterans' Disability Compensation and Social Security disability benefits.

Bereavement leave and leave for the care of a seriously ill family member typically fall under the military's emergency leave policy. This policy grants personnel emergency leave and extensions in case of a family emergency involving members of servicemembers' households, their immediate families, or sole surviving blood relatives. Emergency situations can include death of a family member, serious illness that requires the servicemember's presence, or severe hardship resulting in the need for the servicemember's presence. In some cases, the need for leave is verified by the Military Service activity nearest to the emergency or the Red Cross.

Unlike bereavement leave in the private sector, military bereavement leave is charged against the servicemember's leave account. Consequently, its advantages stem from the fact that permission for the leave is expedited and the servicemember receives first priority in travel arrangements. The government will sometimes pay for emergency leave travel expenses and travel time will not be charged to the servicemember's leave account.

In emergency leave situations, personnel may be advanced as much as 30 to 45 days of leave. Excess leave—during which the servicemember is not entitled to pay and allowances—may also be authorized in emergencies, but only after all regular and advance leave has been used.[34] The sum of all leaves must not exceed 60 days. If the emergency situation persists beyond this period, the servicemember may be considered for humanitarian reassignment or a hardship discharge.

Military policies regarding leave for maternity and paternity differ considerably from those in the private sector. Military maternity leave is provided under stated sick/convalescence policies. As such, it is usually more generous than leave available in the private sector. For example, the Navy offers 42 days of paid maternity leave following the birth of a child.

[34] This leave can be roughly equated to the unpaid leave available in the private sector under the FMLA.

In the private sector, workers not covered by short-term temporary disability policies may only receive unpaid leave through the Family and Medical Leave Act. If FMLA leave is taken, however, the unpaid leave period can extend to 12 weeks—longer than the paid maternity leave available to military members. Unlike military policies, the FMLA mandates that women receive unpaid leave even in the case of a newly adopted or newly fostered child.

Military paternity leave policy, however, seems less generous than policies in the private sector. The Army, Navy, and Air Force offer no explicit paternity leave entitlement to military personnel.[35] The Marines offer 10 days of Permissive Temporary Additional Duty to married new fathers, but this leave is charged to their leave accounts. Such leave is also available in case of an adoption. In the private sector, unpaid paternity leave of up to 12 weeks is granted under the FMLA, and 13 percent of firms offer some pay during the paternity leave period. As noted above, however, the employer can require that this leave run concurrently with the worker's accrued paid leave.

Although a relatively small share of private-sector companies offer paid sabbaticals (which could be used for education and professional development, for example), the military offers very generous leave of this type. Military members may be granted leave in addition to their annual leave entitlement for a specified set of defined activities, including attendance at nonfederal society and organization meetings that enhance the servicemember's professional background or primary military duties.[36]

Eligible servicemembers may also receive up to 2 years of leave if pursuing an educational program. These individuals continue to receive basic pay and to accrue leave but may not receive other pay, allowances, or assistance in-kind. Although the time does not count toward the completion of the term of enlistment, it does count toward the computation of servicemembers' basic pay, eligibility for retired pay, and time-in-grade for promotional purposes. Servicemembers must commit in writing to a specified length of service following the leave.

Finally, servicemembers may be granted leave for a variety of special circumstances. For example, special liberties of up to 3 or 4 days are granted as compensation for long hours, arduous deployment, duty where normal liberty is inappropriate, ship duty while in overhaul away from homeport, or as recognition for exceptional performance. Special rest and

[35] Confirmed by Lt Col Lynda C. Jackson, USAF, Assistant Director of Transition Benefits and Leave Policy.

[36] These absences, generally referred to as administrative leaves, are granted with full pay and benefits and are not chargeable against a servicemember's leave account.

recuperative absences of 15 to 30 days that are not chargeable to a servicemember's account are offered under certain conditions, usually as an incentive to extend tour length at certain overseas locations, and may even include government-paid transportation. Administrative leave in addition to a servicemember's annual leave entitlement can be granted for some activities, such as competitive sports events, PCS family moves, or house-hunting to a PCS where government quarters are not immediately available.

PRIVATE-SECTOR HEALTH INSURANCE

Basic Health Insurance

Health insurance is a very prevalent benefit in the private sector, with virtually all firms offering some form of health insurance to employees. Surveys by the Families and Work Institute and the Society for Human Resource Management find that 97 to 99 percent of all surveyed companies offer their employees health insurance [22, 39]. Company surveys by the Kaiser Family Foundation and Watson Wyatt report that 99 to 100 percent of large firms offer health insurance today [23, 41].[37]

Types of Health Insurance Provided

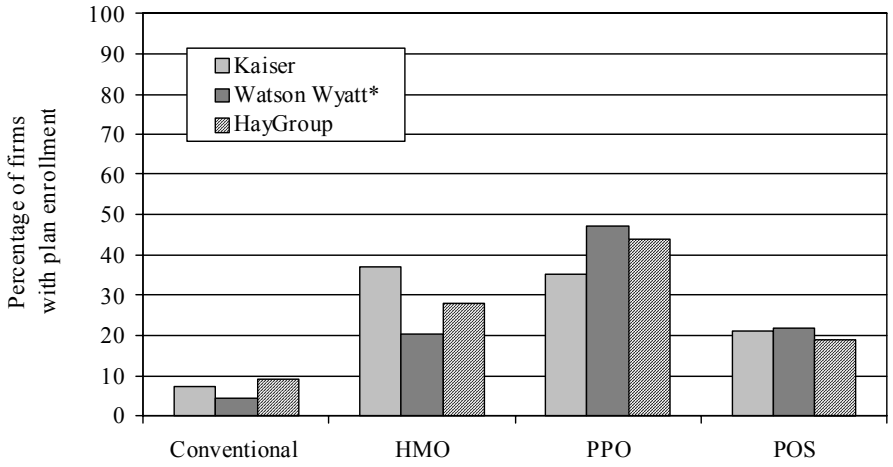
Over the last several years, cost management concerns in the private sector have brought about a shift away from provision of conventional fee-for-service plans toward the provision of Health Maintenance Organizations (HMOs), Preferred Provider Organizations (PPOs), and Point-of-Service plans (POSs).[38] As recently as 1990, most medium and large companies offered fee-for-service plans. As figure 9 shows, today between 4 and 9 percent of large firms offer conventional health care

[37] Reported Kaiser data are for firms with 5,000 or more employees; Watson Wyatt data are for for-profit private-sector companies with 2,500 or more employees.

[38] Fee-for-service plans are those in which authorized providers are paid a specific amount for each service performed. In HMO plans, the health care provider receives a fixed premium each month on behalf of each participating employee and is then obligated to provide a comprehensive range of health care services through primary care physicians or appropriate referrals. PPOs combine fee-for-service with some of the utilization controls found in HMOs by encouraging employees to seek care from preferred providers, who generally furnish health care services at contractually discounted rates. POS plans also mix features of fee-for-service and HMO plans. Employees pay a small copayment per visit to in-network physicians, but have the option of receiving care from out-of-network providers, typically subject to higher deductibles and copayments. See [42].

plans, whereas 28 to 37 percent offer HMOs, 35 to 44 percent offer PPOs, and 19 to 22 percent offer POS plans. Reported data indicate the structure of a firm's primary health care plan. But most firms offer employees a choice among several plans. Data from the Kaiser Family Foundation show that 16 percent of employers with 5,000 or more employees offer only one health care plan, 17 percent offer a choice between two plans, and 67 percent offer employees a choice between three or more health care plans [41]. Most health care is offered off site, with only 17 percent of large companies offering onsite health clinics [23].

Figure 9. Conventional Health Insurance No Longer the Norm in the Private Sector[a]



a. Source: [20], [23], and [41].

** Employee Provider Organizations, offered to 7 percent of employees, are an amitted category.*

Cost of Health Insurance

In the private sector, employees typically share the costs of health care through direct contributions, copayments, and deductibles. Watson Wyatt reports that 92 percent of for-profit employers with 2,500 or more employees require an employee contribution. The majority of large firms require the same employee contribution from all workers, whereas about 11 percent vary the contribution on the basis of pay level, position, or length of service [23]. Kaiser survey data show that average monthly employee premiums for single coverage in firms with 5,000 or more

employees were between $26 and $39, depending on the plan.[39] On average, large employers pay about 86 percent of required health care premiums for single coverage. Among the Fortune 1000, about two-thirds of surveyed companies pay 76 to 100 percent of their employees' health care costs [43].

In addition to employee premiums, most health care offerings require a copayment (members pay a specified charge per service), and about 54 percent of large for-profit firms have in-network deductibles (members must pay a specified amount before insurance begins). Copayments for in-network office visits averaged around $12 in for-profit firms with 2,500 or more employees, and the average deductible was $163 in firms of this size.

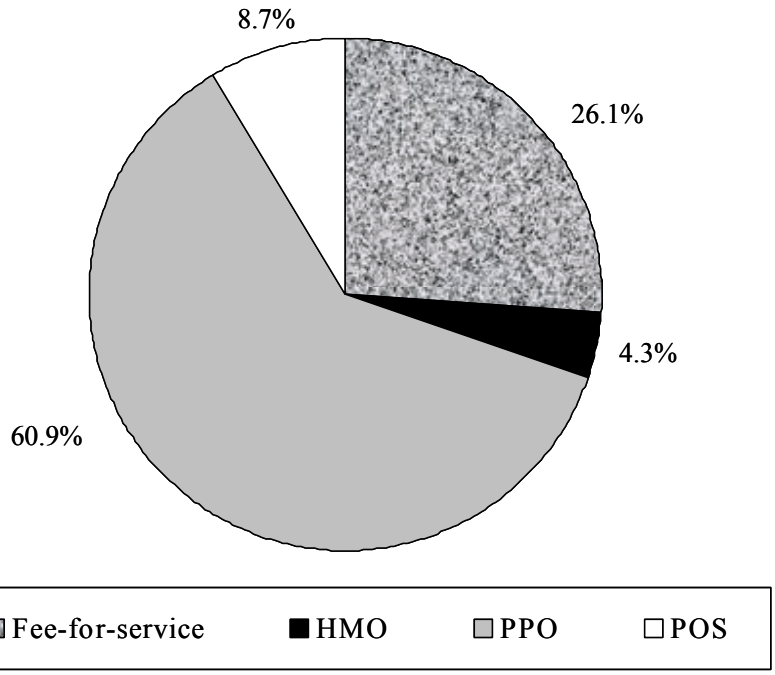
Retiree Health Insurance

Retiree health insurance is less prevalent than employee health insurance in the private sector, and its prevalence has been decreasing over time. The Kaiser Family Foundation reports that about 52 percent of firms with 5,000 or more employees offer retiree health benefits today, down from 73 percent in 1988. Of firms of this size offering retiree health benefits, 98 percent offer them to early retirees and 79 percent offer them to Medicare-eligible retirees [41]. SHRM reports that 56.6 percent of firms with 2,500 or more employees offer retiree health benefits [22]. Finally, data from Watson Wyatt show that 53 percent of for-profit firms with 2,500 or more employees provided retiree medical benefits for retirees under age 65, and 41.7 percent provided such benefits for retirees over age 65 in 2000. About 89 percent of offered plans provided some prescription drug coverage for individuals age 65 and over. As figure 10 shows, PPO plans were the most popular primary retiree medical plan offered [23].

Most retiree health plans require retiree contributions. In contributory plans, the average monthly contribution for retiree medical coverage in large firms was $137 for retirees under age 65 and $79 for retirees over age 65. Among firms with 2,500 or more employees offering retiree health benefits, 65.6 percent had in-network deductibles that were $239 on average. Eighty-two percent had out-of-network deductibles that averaged $359. In-network copayments averaged $10.98 per office visit and $13.33 per brand name prescription [23].

[39] Average monthly premiums were $39 in conventional plans, $26 in HMO plans, $31 in PPO plans, and $31 in POS plans.

Figure 10. Primary Private-Sector Health Care Plan Offered to Retirees[a]



a. Source: [23].

Other Health Insurance Programs

Large, private-sector firms also offer a range of other health insurance programs (figure 11).

Examples of these other health insurance programs follow:

- *Prescription drug programs* - 94 to 99 percent of companies with 2,500 or more employees offer prescription drug programs. In addition, 82 to 91 percent of companies of this size offer mail-order prescription drug services.
- *Dental programs* - Virtually all large companies offer dental programs to their employees. Data from SHRM and Watson Wyatt show that 99 to 100 percent of companies with 2,500 or more employees offer these programs to their employees.
- *Vision programs* - Among companies of all sizes, about 46 percent offer vision programs [44]. But as figure 11 shows, data suggest that large companies offer these programs

more frequently—81 to 84 percent of firms with 2,500 employees or more offer vision programs.

- *Wellness programs* - Surveys show that 51 to 61 percent of all companies offer these types of programs. Wellness programs have become increasingly popular among large, private-sector companies over time. Data from Hewitt Associates report that 93 percent of large companies offer health promotion programs, up from 88 percent in 1994. A HayGroup survey finds that 76 percent of medium and large companies offer such programs today. Figure 12 shows the prevalence of various types of wellness programs.
- *Long-term-care insurance* - Data from William M. Mercer and the International Foundation of Employee Benefit Plans show that long-term care insurance is offered by 15 to 16 percent of companies of all sizes [44, 45]. Watson Wyatt reports that about 31 percent of companies with 2,500 or more employees offer this kind of insurance benefit.
- *Health screening services* - About 55 percent of large firms offer health screening services [22] (figure 11).
- *Flexible spending accounts* - An increasingly popular health benefit is the provision of flexible spending accounts for health-related expenses. HayGroup data show that 86 percent of medium and large companies offer flexible spending accounts today, up from 57 percent in 1990 [20]. William M. Mercer reports that 60 percent of all companies offer these accounts and, as shown in figure 11, data from SHRM and Watson Wyatt find that about three-quarters of firms with 2,500 or more employees offer these accounts.

Figure 11. Other Health Insurance Programs[a]

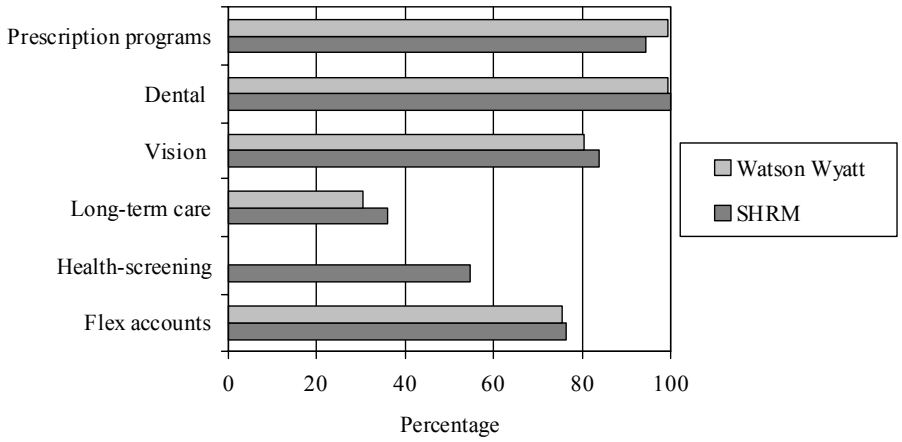
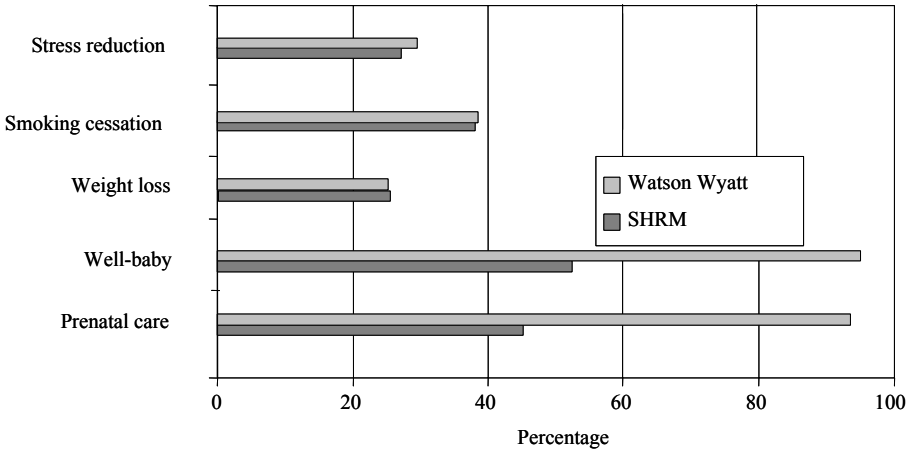


Figure 12. Private-Sector Wellness Programs[a]



a. Sources: [22, 23].

A Comparison of Private-Sector and Military Health Insurance

Basic Health Insurance for Active Duty Personnel and Their Dependents

In the military, health insurance is provided through TRICARE, a regionally managed, comprehensive health care insurance and delivery system. Military personnel, family members and survivors of active duty

personnel, and retirees and their family members receive this care through a combination of military hospitals, clinics, and civilian providers.

Three TRICARE plans are available: TRICARE Prime (an HMO plan), TRICARE Standard (a fee-for-service plan), and TRICARE Extra (a PPO plan). Although other TRICARE-eligible beneficiaries may choose among these three plans, active duty personnel are automatically enrolled in TRICARE Prime. As data reported above show, most large, private-sector companies offer employees a choice of three or more plans—usually each with a different structure. Although the inclusion of a POS option in TRICARE Prime has introduced some choice to servicemembers, access to multiple plans would let servicemembers choose a plan that best suits their individual needs.

Another significant difference between private-sector and military health care offerings is the cost incurred by enrollees. Unlike in the private sector, military personnel and their family members do not typically contribute directly toward their health care premium expenses. And while most private-sector plans require copayments and about half also have deductibles that must be met before coverage begins, active duty families enrolled in TRICARE Prime pay no deductibles or copayments. Outpatient and inpatient treatment at a military treatment facility is free under TRICARE Prime. Costs are considerably higher under the POS option, which sets a $300 outpatient deductible ($600 per family), 50 percent cost-shares for outpatient and inpatient claims, and liability for excess charges up to 15 percent over the allowed amount.[40]

The two other health care programs available to TRICARE-eligible beneficiaries also entail low costs but require copayments and deductibles. TRICARE Standard requires no enrollment fee, but eligible beneficiaries (other than retirees) make copayments of 20 percent of allowable charges for civilian doctor visits and prescription drugs. Deductibles range from $50 to $150 for individuals and $100 to $300 for families. Inpatient civilian care costs about $11 a day or $25 a stay, whichever is higher. Additional discounts are available if TRICARE Standard members use doctors in the TRICARE Extra network. TRICARE Extra, which also does not require enrollment or charge premiums, requires that users pay deductibles ranging from $50 to $300 prior to coverage and offers reduced cost sharing (15 percent versus the 20 percent under TRICARE Standard). The amount of cost sharing varies. For example, active duty families pay 15 percent of allowable costs for civilian doctor visits [46].

[40] www.tricare.osd.mil/tricare/beneficiary/tricareprime.html#pos

Although the absence of copayments and deductibles for active duty members and limited charges for other beneficiaries make military health benefits extremely generous, they do not create incentives for the prudent use of services. In fact, Watson Wyatt data show that 41.6 percent of large, private-sector firms either raised their copayments in 1999 or were planning to raise them in 2000. Similarly, almost 19 percent had either recently raised their copayments or were planning to raise them in 2000. In contrast, recently passed legislation will make active duty family members exempt from copayments for care from civilian providers effective April 30, 2001 [47]. Ultimate decisions as to the presence and level of copayments and deductibles may require efficiency and equity tradeoffs.

Retiree Health Insurance

Only about half of large, private-sector companies offer retiree health insurance, whereas the military offers extensive medical and prescription drug benefits to retirees under 65 as well as Medicare-eligible retirees. Retirees may receive space-available inpatient and outpatient care at military facilities for little or no cost. TRICARE PRIME is available to all retirees under age 65 for an annual enrollment fee of $230 for single members and $460 for a family plan. Retirees may also use TRICARE Standard or TRICARE Extra, which do not require enrollment fees. Retirees in TRICARE Prime pay copayments for inpatient and outpatient civilian care ranging between $12 and $25 and some retail and mail order prescription costs. Retirees under age 65 pay 20 percent of the negotiated rate under TRICARE Extra and 25 percent of allowable charges under TRICARE Standard for civilian outpatient visits and retail prescription drugs. Retirees under age 65 pay a considerable share of their inpatient civilian care fees under TRICARE Standard and TRICARE Extra.[41] Military retirees both over and under age 65 and their families may also purchase a family dental plan.

Less than half of large, private-sector companies (about 42 percent) offer retirees over 65 health care benefits, but recent changes in federal law have extended military health care benefits to retirees over age 65. Under the FY 2001 National Defense Authorization Act, Medicare-eligible military retirees age 65 and over who are enrolled in Medicare

[41] Under TRICARE Extra, costs are the lesser of $401 per day or 25 percent of institutional charges, plus 20 percent of professional fees. Under TRICARE Standard, costs are the lesser of $401 per day or 25 percent of institutional charges, plus 25 percent of professional fees. See [48].

Part B now have TRICARE as a second payer to Medicare.[42] TRICARE pays out-of-pocket costs for services covered under Medicare, and beneficiaries may be eligible for additional TRICARE benefits not covered by Medicare [49]. Eligible beneficiaries also receive full prescription drug benefits, including access to the National Mail Order Pharmacy program and retail pharmacies. These new beneficiaries do not pay enrollment fees or premiums for pharmacy benefits, but they do pay some modest copayments. According to DoD estimates, these recent changes affect approximately 1.4 million people [50].

It is perhaps surprising that Congress recently extended such generous benefits to retirees at a time when cost pressures are intense. In the private sector, the trend has been toward a contraction of such offerings and most large firms agree that future increases to retiree health benefits are unlikely. In the Kaiser Family Foundation survey, 91 percent of firms with 2,500 or more employees said that it was unlikely or very unlikely that they would increase the generosity of retiree benefits over the next several years. In addition, of those providing retiree health benefits, the share of these firms providing such benefits to Medicare-eligible retirees has fallen from 93 percent in 1999 to 79 percent in 2000 [41].

Although the provision of generous retiree health care benefits is in keeping with the military's desire to take care of its members, these benefits will entail significant costs and place additional burdens on the military health care system. It is also unlikely that the program will contribute much toward the military's recruiting and retention goals. Because retiree health care benefits are relatively generous, compared with private-sector programs, it may encourage even those with existing private-sector health insurance or Medigap coverage to use military health care benefits, putting further strain on the system. Finally, providing these benefits to retirees over age 65 while leaving programs for retirees under age 65 relatively unchanged is also likely to create new tensions.[43]

Other Health Insurance Programs

Like most large, private-sector firms, the military offers prescription drug, vision, and dental care benefits:

[42] This program has been named "TRICARE for life." Retirees over age 65 can either use TRICARE Standard as a second payer to Medicare or they can enroll in TRICARE Prime, which will act as a Medicare HMO.

[43] For example, retirees over age 65 will not have to pay TRICARE Prime enrollment fees, which will still be collected from retirees under age 65. And by making TRICARE a second payer to Medicare, out-of-pocket costs for retirees age 65 and over will be considerably below those incurred by retirees under age 65.

- *Prescription drug programs* - The military prescription drug program is very generous. Through the TRICARE system, all prescriptions filled at military treatment facilities (MTFs) are free. All TRICARE-eligible beneficiaries may use the DoD National Mail Order Pharmacy Program to have prescriptions delivered for a $3 to $9 charge if a medication is not available at the local MTF pharmacy, or if they prefer to receive prescriptions via mail.
- *Vision programs* - Vision care (including the provision of military-issue eyeglasses and contacts) is also available at no charge to military personnel through military eye clinics. Periodic eye exams are also covered under the TRICARE health benefit.
- *Dental programs* - All active-duty servicemembers may also receive free dental care at military dental clinics and facilities. Dental services for active-duty families at these facilities are offered on a space-available basis and are extremely limited. Alternatively, family members can obtain dental health insurance through the TRICARE Family Member Dental Plan (TFMDP). The program provides basic, specialty, and preventive care, and requires some premium payments and copayments.

Services offered less frequently by large, private-sector companies, including long-term health care and health screening services, are also available through the military health care program:

- *Long-term care* - TRICARE Prime covers noncustodial, skilled long-term health care as well as hospice care for the terminally ill. Because these services are rarely offered in the private sector, it is likely that many retirees over age 65 will switch to TRICARE coverage following the recent expansion of military medical benefits described above—a move that will entail considerable costs.
- *Health screening services* - TRICARE also offers a range of health screening services, including mammograms, cholesterol screenings, and health risk assessment appraisals. And all of the services have launched aggressive antismoking and unit level smoking cessation programs, education on the risk of smoking, and counseling services.

- *Flexible spending accounts* - One prevalent private-sector health benefit not currently offered to military members is access to flexible spending accounts. It may be instructive to consider the benefits and costs associated with the future extension of such accounts to military personnel and the degree to which personnel would value the benefit.

Other Private-Sector and Military Insurance

Most large, private-sector companies offer life insurance and Accidental Death and Dismemberment Insurance (AD&D) to their employees. SHRM reports that all companies with over 2,500 workers offer life insurance; Watson Wyatt sets the share offering life insurance at 98.6 percent. In addition, 85.9 percent of large, private-sector companies offer some supplemental life insurance coverage. Approximately 92 percent of large, for-profit companies offer AD&D, which pays full or partial benefits to designated beneficiaries if an employee dies or loses a limb in an accident.

In the military, Servicemembers' Group Life Insurance provides active duty military personnel with $250,000 worth of term life insurance coverage for $20 a month. Enrollment is automatic, and premiums are paid through an automatic paycheck deduction. Those choosing to refuse or reduce coverage must do so in writing. Upon the death of a servicemember, beneficiaries can receive payouts in one lump sum or in a series of 36 installments.

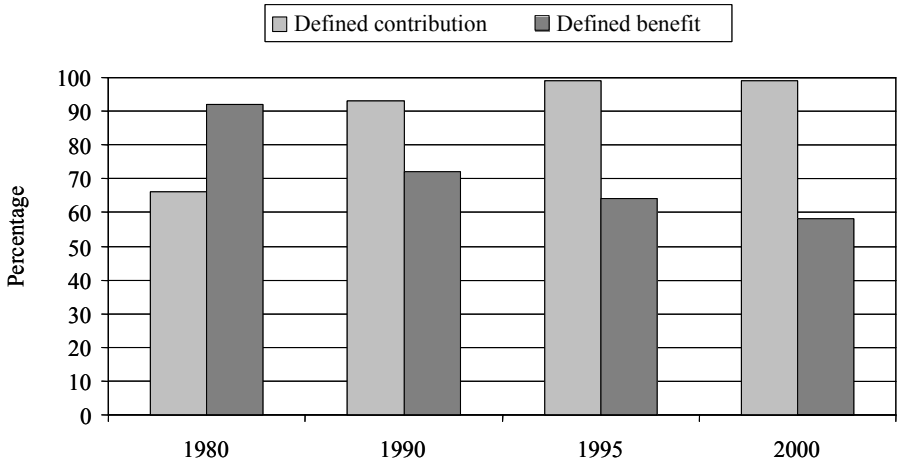
A direct equivalent to AD&D is not available in the military, but similar types of compensation are available. For example, Dependency and Indemnity Compensation, which compensates survivors for a death related to a service-connected disability or while on active duty, and a death gratuity—a $6,000 payment payable for the death of an active servicemember or for retirees who die within 120 days of retirement as a result of a service-connected injury or illness—may be available. Dismemberment compensation is usually included as part of military or Veterans' Administration disability policies. Finally, servicemembers can purchase a Survivor Benefit Plan. Through this program, servicemembers purchase a low-cost annuity that grants taxable benefits to dependents of military personnel who die in retirement. Enrollment is automatic after 20 years of service and paycheck deductions begin after retirement unless coverage is discontinued. Payments may be subject to a social security offset, and supplemental coverage is available.

RETIREMENT

Private-Sector Retirement

Most large, private-sector firms offer retirement benefits. As with health insurance, the interesting trend in retirement offerings over time is changes in their structure. Since 1980, the share of medium and large companies with defined benefit plans has been steadily falling as the share with defined contribution plans has been rising (figure 13).[44] As figure 13 shows, today almost all medium and large companies offer defined contribution plans, and about 58 percent offer defined benefit retirement plans.[45] A recent Hewitt survey sets the share of large, private-sector companies offering defined benefit retirement plans slightly higher, at 65 percent [21].

Figure 13. Most Firms Offer Defined Contribution Retirement Benefits[a]



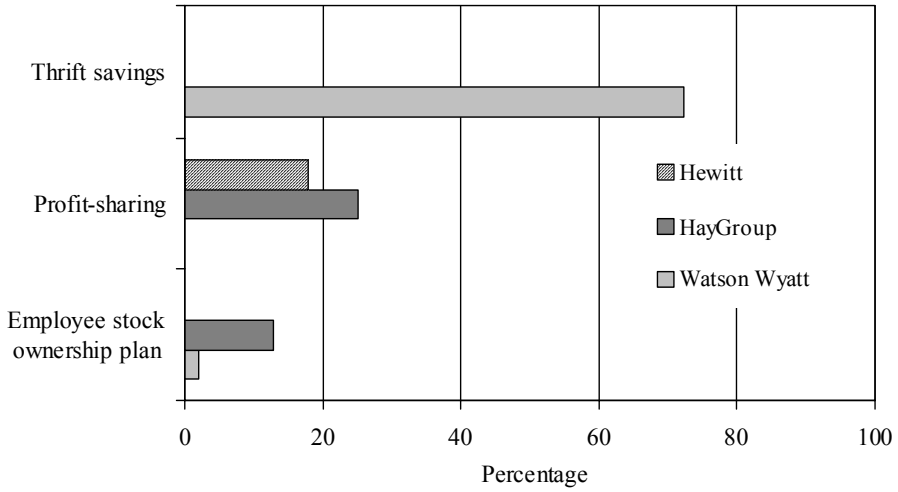
a. Source: [20] Note: bars sum to over 100 percent due to some firms' dual offerings.

[44] A defined contribution plan consists of individual accounts for participating employees. Employer contributions are allocated among employees' accounts according to a plan formula. Participants are entitled to their vested account balance. The account can contain both employer and employee contributions, depending on the plan's terms. A defined benefit plan specifies participants' benefit entitlements. The benefit is usually determined by a formula based on a percentage of compensation times years of service. See [42].

[45] Many companies offer both defined benefit and defined contribution retirement plans.

Large employers offer several different types of defined contribution plans today. Thrift or savings plans are essentially employee savings accounts, which are often matched by employer contributions. These are the most prevalent type of defined contribution plan offered in the private sector today (see figure 14). The Profit Sharing/401(k) Council of America (PSCA) estimates that 340,000 U.S. companies offered 401(k) plans last year, up from 175,000 5 years earlier.[46] The plans covered some 41 million workers, up from fewer than 28 million in 1994, and the assets in their accounts totaled $1.7 trillion, according to the PSCA [49]. Combining data from Watson Wyatt, Hewitt Associates, and HayGroup, we estimate that 72 to 79 percent of large companies currently have such plans. This estimate is supported by data from the PSCA showing that 78.3 percent of firms with 500 or more employees offered 401(k) plans in 1998 [51].

Figure 14. Types of Private-Sector Defined Contribution Plans[a]



a. Sources: [20], [21], and [23].

Most large, private-sector companies provide matches to their employees' 401(k) accounts. A 1999 Hewitt survey found that 92 percent of large companies matched employees' before-tax contributions to their 401(k) accounts. Of those companies making matches, 19 percent matched dollar for dollar and 32 percent offered 50-cent- per-dollar matches [52].

[46] 401(k) plans are thrift savings plans that allow employees to defer part of their compensation on a pre-tax basis into the plan.

Profit-sharing plans, which distribute a portion of company profits, offer employees another type of defined contribution account. Contributions can be purely discretionary or based on a predetermined formula. Hewitt Associates estimates that 18 percent of large companies have such programs [21]. HayGroup estimates that 25 percent of medium and large companies have profit-sharing programs today, up from 21 percent in 1996 [20].

In an employee stock ownership plan (ESOP), employers contribute shares of company stock to employee accounts. Employee distributions are taxable unless rolled into an IRA or other qualified retirement account and distributions before retirement age are also taxed. ESOPs, popularized by a 1976-1986 federal income tax law that gave contributing companies a tax deduction, have become less prevalent in recent years. Watson Wyatt estimates that 2.1 percent of large employers currently offer ESOPs [23]. HayGroup finds that 13 percent of medium and large firms have ESOPs today, up from 11 percent in 1996 [20].

A Comparison of Private-Sector and Military Retirement

Although much has been written on the advantages and shortcomings of the military retirement system, it differs most obviously from retirement plans offered by most large, private-sector companies because it is structured as a defined benefit plan that can be drawn on after as few as 20 years of service. After 20 years of service, servicemembers can receive retirement pay, which is based on their previous basic pay (not including bonuses or special and incentive pays). Because many enlisted military members join between the ages of 18 to 20, this means they may retire as young as age 38 to 40.

The formula for computing retirement pay differs depending on the date on which the servicemember entered the military. Those entering before September 8, 1980, receive 50 percent of their basic pay at the time of retirement if they retire with 20 years of service, and receive an additional 2.5 percent of basic pay for each additional year of service between 20 and 30 years. For those who entered the military between September 8, 1980, and July 31, 1986, the payment is still 50 percent of basic pay, but is based on the average basic pay received during the 36 months that it was highest (High-3 formula), multiplied by 2.5 percent for each year of active duty service [46]. Finally, servicemembers who first became members after July 31, 1986, can choose between the High-3 retirement system or another system, called REDUX. Through REDUX, servicemembers accept a mid-career bonus of $30,000 at the 15-year service point, but must agree to remain on active duty for at least 20 years.

This program offers retirees 40 percent of the average of the highest 3 years' basic pay after 20 years of service and 3.5 percent for each additional year served up to 30 years. When the retiree turns 62, annuities increase to match the High-3 formula of 2.5 percent for each year served. Retirement pay increases annually to offset inflation in the first two cases, but only partially offsets inflation in the last case. Payments are made irrespective of age, and the system requires no direct servicemember contribution.

In a 1997 Department of Labor report, the Working Group on the Merits of Defined Contribution Vs. Defined Benefit Plans noted several perceived advantages to both employers and employees of offering defined contribution rather than defined benefit plans [53]. Employers like defined contribution retirement plans because they are easier to administer and administration can be done at a lower cost. In addition, such plans do not leave companies as vulnerable to large liabilities for future expenses.

The group also reported that defined contribution plans, which express balances as lump sums, are easier for employees to understand than defined benefit plans. And employees may prefer the ability to capitalize on a rising stock market to the knowledge of a guaranteed monthly retirement income. Defined contribution plans also have some features not available through defined benefit plans—for example, the ability to make before tax contributions and to withdraw or borrow funds before retirement.

One of the biggest perceived advantages to private-sector retirement plans is their vesting structure and associated portability. In the private sector, the Employee Retirement Income Security Act (ERISA) requires employers to vest employees in their retirement system within 5 to 7 years. Once employees are vested, they may take their account balances with them when they leave their current employer. Many view this portability as a positive feature of defined contribution plans, particularly as job mobility has increased over time.[47] In contrast, the military's defined benefit retirement system offers only cliff-vesting—those leaving the services before completing 20 years of active duty service receive no payments.

As Asch and Warner have noted, the reasons for this structure stem from several features that are unique to the military environment. The military retirement benefit has typically served both as a deferred compensation incentive to encourage retention and as a separation device.

[47] While some defined benefit plans allow employees to cash out their traditional pension benefits, most do not—making benefits nonportable.

Both functions are needed, particularly since the military personnel system allows for no lateral entry. As such, they recommend an old-age benefit vested after 10 years that is either defined benefit or defined contribution in structure, coupled with a system of separation bonuses that could vary by occupation [54].

In fact, there are good reasons to believe that the military's retirement benefit as currently structured does not contribute toward the recruitment and retention of able young military personnel. Only about 30 to 40 percent of officer entrants and ten to 15 percent of enlisted entrants stay for a full 20-year career—a statistic that is likely to have worsened given the currently robust economic environment [54]. The military retirement system may have little to no value to a young person without dependents who does not anticipate a military career. A portable and vested defined contribution retirement plan may be more attractive to these individuals.

Active duty military members recently gained access to a defined contribution retirement plan through the extension of the Federal Employees' Thrift Savings Plan (TSP) to active duty military members. TSP is a retirement savings and investment plan that offers tax benefits similar to those available to private-sector workers in 401(k) plans. Under the authorization, servicemembers can contribute up to 7 percent of their basic pay and all special and incentive pays and bonuses on a pre-tax basis to the plan, up to an annual limit of $11,000 [55].

Unlike federal employees, however, most servicemembers will receive no matching funds. Some servicemembers in certain critical specialties may receive some matches to their basic pay contributions, which will be determined by the secretaries of each service, but such contributions will require an additional service obligation. As noted earlier, most large, private-sector thrift savings plans match employee contributions. By not offering this feature, participation in the military's new defined contribution program will be less advantageous to servicemembers [56].

EDUCATIONAL AND TRAINING PROGRAMS

Private-Sector Educational and Training Programs

Educational programs offered by large, private-sector companies primarily take the form of tuition assistance or formal on-site or off-site training.

Private-Sector Tuition Assistance

Data show that most large employers offer tuition reimbursement to their employees. According to Watson Wyatt, 92 percent of for-profit companies with 2,500 or more employees offer tuition reimbursement or remission to their employees today [23]. SHRM reports that 76 percent of firms with 2,500 or more employees offer educational assistance [22]. Finally, Hewitt Associates finds that 74 percent of large employers offer educational reimbursement [21].

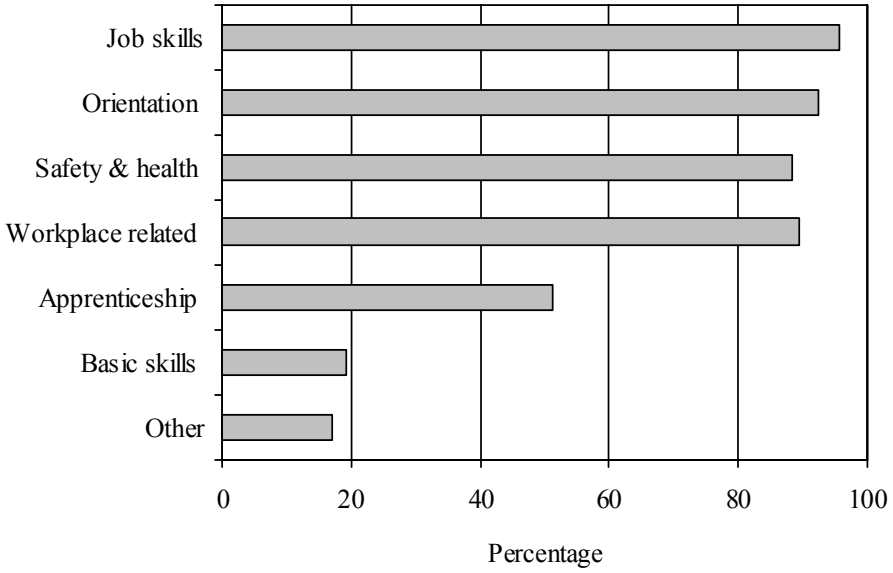
Private-Sector Formal Training

In addition to tuition assistance, many large, private-sector firms also offer formal training or professional development opportunities. Data from SHRM show that 90 percent of large firms pay for professional development [22]. A Hewitt survey finds that 75 percent of large companies offer some form of educational assistance or professional growth opportunities to their employees [21]. Finally, government data show that 99 percent of employers with 250 or more employees provided some form of formal training in 1993. As figure 15 shows, 96 percent of these employers provided job skills training, such as training in management or computer skills. A little over half of these employers offered apprenticeship training [57]. [48]

Although most large, private-sector companies offer educational programs like tuition assistance and formal training, these programs may be quite narrowly focused or limited by restrictions. For example, most large firms impose restrictions on their reimbursement programs. A 1998 study by Hewitt Associates found that, of medium and large firms offering tuition reimbursement, 20 percent limited reimbursements to job-related courses (as defined by the IRS), and 23 percent limited reimbursements to tuition expenses. Forty-five percent of companies placed a dollar limit on reimbursements, and the median limit was $3,000 annually. Finally, most employers require a minimum service requirement before program eligibility, and a little over one-quarter of firms require that reimbursements be repaid if postreimbursement service periods are too short.

[48] These data are from the last year for which this type of information was available.

Figure 15. Formal Employer-Provided Training[a]



a. Source: [57].

A Comparison of Private-Sector and Military Educational and Training Programs

The military offers a wide array of educational programs. Some programs, such as tuition assistance and programs that provide basic and job skills training and training for professional advancement, are similar to—albeit more expansive than—programs offered by large, private-sector firms. Other programs, such as financial assistance for full-time college or graduate school study, college and graduate school credits, classes, and instruction, and a host of other voluntary education programs, are unique to the military.

Tuition Assistance

Like most large, private-sector companies, the military offers servicemembers tuition assistance benefits. Under the program, which was made uniform across all the services in 1999, the military pays up to 75 percent of an active duty servicemember's tuition expenses for accredited college or university courses taken during off-duty hours. Reimbursements are capped at $187.50 per semester-hour credit, or $3,500 per fiscal year, which is comparable to private-sector programs' average reimbursement

maximum.[49] Nearly 650,000 individuals enrolled in undergraduate and graduate programs in FY00, and nearly 27,000 degrees were awarded.

The military tuition assistance program differs from private-sector programs in several ways. In some aspects, the military program's restrictions are less stringent. Unlike most private-sector tuition assistance programs, servicemembers do not have to meet a minimum service requirement before enrollment in the program. Furthermore, military tuition assistance is not limited to job-related coursework—funds can be used on all coursework that is not recreational in nature and is not toward completion of a degree at the same level as one already held.

The military tuition assistance program is more stringent than private-sector programs in other ways. Although only 23 percent of large, private-sector companies offering tuition assistance limited coverage to tuition only, the military program is limited in this way and does not include books, materials, and transcripts or lab, registration, or graduation fees. Servicemembers who do not successfully complete a course (earn a D or higher for undergraduate coursework, or a C or higher for graduate coursework) may have to reimburse the military for incurred expenses. Finally, some servicemembers are subject to postreimbursement service requirements. For example, Air Force officers must remain in active duty for 2 years beyond the course completion date or they are responsible for incurred tuition expenses.

Orientation and Job Skills Training

Like most large, private-sector companies, the military offers servicemembers orientation and job skills training. However, military training is much more extensive than that typically available in the private sector. All military personnel receive orientation training in military culture and norms (for example, protocol) and skills (for example, firefighting) upon entry into the services. For enlisted personnel, this takes place in basic training (boot camp), whereas officers receive this training at Officer Candidate School or during NROTC or USNA college degree programs. Upon completion, individuals receive job skills or technical training. The amount of training depends on the eventual field of entry. For example, in the case of Navy enlisted personnel, Gendets receive apprenticeship training in general duties before going to the fleet, while those in other ratings attend "A" school to learn job-related skills. Some

[49] In the case of servicemembers assigned to a contingency operation identified by the Secretary of Defense and defined in Section 101(a)(13), title 10 of the United States Code, the responsible service pays all tuition or expenses up to a maximum of $187.50 per semester- hour credit.

individuals may follow this training with "C" school training in specialty job skills.

Officers also receive job skills training, followed by additional training for those pursuing particular specialties. Navy surface warfare officers, for example, must complete surface warfare officer school, which is sometimes followed by a specialty school, such as antisubmarine warfare school. Servicemembers may also have the opportunity to receive credit for "apprenticeship" training. Through the United Services Military Apprenticeship Program, Navy and Marine Corps training and experience can be certified in a way that is similar to the certification of private-sector training and experience.

Professional Development Opportunities

The military also offers personnel considerable opportunities for professional development. After completion of their training pipelines, individuals may have opportunities to pursue future training to further their chances of advancement. The College of Aerospace Doctrine, Research and Education, which prepares general officers from all military services for joint-warfighting leadership positions, and the Navy Senior Enlisted Academy, which trains senior enlisted personnel in management and leadership, are examples of programs affording opportunities to those seeking advancement and professional development. The services also grant opportunities for continuing education in job skills. For example, the Navy may send some personnel to Navy safety school to train them for additional or needed duties. Finally, there are programs that offer skilled enlisted personnel the chance to become officers. For example, the services offer programs that enable selected enlisted personnel the opportunity to earn a Bachelor's degree and an officer commission.

Basic or Remedial Skills Training

Contrary to common practice in the private sector, the services offer several high school completion programs and testing services. For example, many Navy installations offer free high school completion courses both on and off base, and tuition assistance pays 100 percent of associated costs for high school completion. Navy College Learning Centers provide refresher courses in basic and higher level English, math, and reading as well as test preparation services. In addition, the Defense Activity for Non-Traditional Education Support (DANTES) provides educational testing services—including high school level and college admission examinations, GED tests, aptitude tests and interest inventories, and national certification tests—to military members.

Other Private-Sector and Military Training Differences

One obvious difference between private-sector and military training is in the type of training offered. Most private-sector companies offer formal training, but training occurs primarily in areas related directly to the work environment, such as orientation training, safety and health training, and workplace-related training. For example, less than 20 percent of workers in establishments with 250 or more employees received basic skills training in 1993 (figure 15).

The delivery of training in the private sector and in the military also differs considerably. In the military, virtually all job training takes place in-house—a structure that evolved at a time when skills needed for military service were unique and had little overlap with skills typically developed for private-sector employment. Although the military has begun to use civilian training services in some areas, the majority of military job training still occurs within the organization. In contrast, much private-sector job training is outsourced. *Training Magazine's* 2000 Industry Report estimates that 36 percent of dollars budgeted for formal training by U.S. organizations went to outside providers in 2000 [58]. Similarly, the American Society for Training and Development found that 24 percent of firms' training expenditures went to outside companies in 1998 [59].

In addition to being provided by in-house instructors, most military training takes place in a schoolhouse or classroom setting. This differs considerably from training offered in the private sector, the majority of which is delivered through on-the-job training. In fact, over 80 percent of surveyed medium and large employers say they do not offer formal training because offered on-the-job training is sufficient [60].

Another notable difference between the training that takes place in the military and in large, private-sector companies is in its availability. Government data show that access to training varies considerably among private-sector workers. Although 70 percent of employees in establishments with 50 or more workers had received some formal training in the previous 12 months, college graduates were more likely than high school graduates to receive formal training. Ninety percent of employees with a B.A. or higher degree received formal training in the prescribed period, compared with only 60 percent of those with a high school degree or no degree [60]. In contrast, the military offers both orientation and job skills training to all members. This structure, however, may be associated in part with constraints on the military personnel system that limit lateral entry, creating a completely internal labor market.

Finally, the military education and training system is much more extensive than private-sector education and training programs. For

example, the Navy spends an estimated $4 billion annually on training and up to 15 percent of military personnel, at any one time, may be involved in training as students, instructors, or support staff [61]. In the private sector, however, only about 2 percent of payroll is devoted to training [59].

Educational and Training Programs Unique to the Military

In addition to educational and training programs that are similar to those offered in the private sector, the military offers a host of other educational programs that have no civilian counterparts, such as financial assistance for full-time college or graduate school study, or the provision of college credits, classes, and instruction.

Financial Assistance for Full-time College or Graduate School Study

The types of financial assistance available to servicemembers for full-time college or graduate study can be grouped into three categories: programs that pay for servicemembers' education after they leave active duty, programs that pay educational expenses before servicemembers go on active duty, and programs that pay educational expenses while servicemembers are on active duty.

Initiated in 1985, the Montgomery GI Bill - Active Duty (MGIB) offers former military servicemembers up to 36 months of educational benefits for attendance at a higher learning institution, participation in a non-college-degree or apprenticeship/on-the-job training program, correspondence training, flight training, or cooperative education courses. Servicemembers in the program incur a pay deduction of $100 monthly during the first 12 months of active duty. Individuals are automatically enrolled in the program unless they specify in writing that they do not wish to participate. In some services, withdrawal must occur within the first 3 working days in uniform; in others, withdrawal must take place within the first 2 weeks. The Department of Veterans Affairs estimates that only half of all servicemembers who are in the program actually use the benefits [62].

In return for these contributions, servicemembers can accrue upwards of $20,000 toward their college educations upon the completion of active duty. Those who serve on active duty for 3 years or more, or 2 years' active duty plus 4 years in the Selected Reserve or National Guard, will receive $650 a month in basic benefits for 36 months. Those who enlist and serve for less than 3 years will receive $528 monthly.[50] Individuals

[50] www.gibill.va.gov/education/News/ch30Rates110100.htm.

must receive an "honorable" discharge to maintain program eligibility. In addition, each service may provide additional funds for future education. For example, when combined with the MGIB, the Navy College Fund can offer more than $50,000 to those interested in pursuing mission-critical positions. The Army has a similar college fund program.

Other educational programs and services are also available to former servicemembers. For example, military members and their families may also be eligible for an array of educational scholarships offered by a variety of public and private organizations following active duty.

One perceived shortcoming of these educational programs is that they pay for education after the individual leaves the service, meaning that the military does not reap the rewards associated with higher level skills. As Asch, Kilburn, and Klerman have noted, nearly 90 percent of servicemembers enlisting in FY90 used their MGIB benefits after leaving the service [63]. Even an attrite with an honorable discharge can take advantage of the MGIB—acting as an incentive, rather than a disincentive for early separation. As such, the MGIB may create an incentive to leave the military—particularly in today's strong economy where the payoffs associated with higher levels of educational attainment are large. In contrast, most private-sector programs are designed so that firms are able to reap the rewards of educational investments.

In addition to programs that pay educational costs incurred after serving on active duty, some military programs offer pay or tuition before individuals serve. For example, the Navy College Assistance/Student Headstart Program (CASH) allows qualified individuals to get paid Navy compensation while attending college full-time. Similarly, the Health Services Collegiate Program (HSCP) offers military compensation to those attending dental school full-time and completing a period of obligated service. Under the Navy's Health Professions Scholarship Program (HPSP), individuals attending medical or dental school can receive full tuition plus payment of school fees and expenses, and the cost of books and equipment for several years in exchange for a minimum service commitment. The Financial Assistance program offers medical and dental residents pay in addition to their residency pay in return for a specified Navy service commitment. Some programs, like the Army's Student Loan Repayment Program, will even help qualified individuals repay outstanding college loans.

Finally, some programs allow individuals to attend school full-time while still on active duty. For example, the Air Force's Airman Education Commissioning Program (AECP) and the Navy's Enlisted Commissioning Program offer full-time, active duty enlisted personnel the opportunity to

earn Bachelor's degrees in specified "hard-to-fill" fields, thus making them eligible for officer commissions.

College and Graduate School Credits, Classes, and Instruction

The military also offers servicemembers the opportunity to pursue a college education through college and graduate school credits, classes, and instruction. Across all the services, the Military Evaluations Program of the American Council on Education allows servicemembers to receive college credit for service school courses and most enlisted occupations. In the Navy and Marine Corps, the Sailor/Marine American Council on Education Registry Transcript (SMART) gives Sailors a transcript that can allow them to get college credit for military occupational experience and training. All active duty Sailors and Marines are eligible for the free program. DANTES also provides credit-by-examination testing services.

Undergraduate and graduate class work is available to servicemembers through several military programs. Started in 1972, the Servicemembers' Opportunity Colleges (SOCs) make up a consortium of over 1,400 colleges and universities that provides educational opportunities to servicemembers and their families. Designed so that servicemembers who frequently move can complete college degrees, it allows for the easy transfer of credits, recognizes nontraditional learning, and minimizes residency requirements. Classes are taught worldwide through local or distance learning. The SOC consortium coordinates Associate and Bachelor's degrees in a variety of curriculum areas for the Army (SOCAD), Navy (SOCNAV), and Marine Corps (SOCMAR).[51] DANTES also runs a DOD-wide Distance Learning Program, which provides nontraditional education programs to servicemembers when classroom courses are unavailable or prohibitively inconvenient.[52]

For servicemembers at sea, the Navy College Program for Afloat College Education (NCPACE) provides academic skills and college (undergraduate and graduate) courses through regionally accredited colleges and universities to Sailors. Courses are taught either remotely via computer-based technology, satellite, or the Internet, or by an onboard instructor. The program is free, except for the cost of textbooks. All courses are from institutions with SOCNAV affiliation so that members can transfer credits toward degree completion. Currently the NCPACE also allows Marines to participate if space is available. The Marines offer a similar program called Marine Corps Afloat.

[51] See www.soc.aascu.org for more information.
[52] For more information, see voled.doded.mil.

The services may also contract with local colleges and universities for the provision of onbase classes. For example, the Navy allows outside colleges and universities to offer accelerated vocational and technical, Associate, Bachelor, and graduate level education to onbase personnel during evenings and weekends.

In addition to offered class work, the services also offer military members undergraduate and graduate instruction through an array of undergraduate and graduate institutions. For example, the Community College of the Air Force (CCAF) is an accredited, degree-granting college that allows enlisted airmen and NCOs to earn Associate degrees in Applied Science. Through the Air Force Institute of Technology, students can learn advanced aerospace technology and engineering skills. Similarly, the Uniformed Services University of the Health Sciences provides graduate instruction in medicine, nursing, and the biomedical sciences.

PRIVATE-SECTOR WORK/LIFE PROGRAMS

Work/life programs, such as child care, elder care, adoption benefits, employee assistance and wellness programs, and workplace flexibility measures, are a growing part of today's private-sector compensation packages.

Private-Sector Child Care

Coincident with increasing levels of educational attainment, women—particularly those with children—have increased their work effort dramatically. Labor force participation rates for married women with children have jumped from 28 percent in 1960 to over 70 percent today. These trends have made child care an increasingly popular component of private-sector compensation packages.

The HayGroup reports that 84 percent of medium and large companies offer child care services, up from 55 percent in 1990 [20]. Hewitt Associates finds that 90 percent of large companies offer some type of child care assistance today, up from 84 percent in 1994 [21].

Although a majority of firms offer some form of child care assistance, only a small share offer on- or near-site care. The National Business Work-Life Study (BWLS) found that only 9 percent of companies with 100 or more employees offered child care services at or near the worksite in 1998 [39]. A recent Hewitt Associates survey finds that about 9 percent of large companies offer on- or near-site child care today [21].

Few firms offer vacation, holiday, camp, or before- or after-school care. A 1998 survey found that only 6 percent of firms with 100 or more employees offered care for school-age children on vacation [39]. Data from Hewitt Associates show that 3 percent of large, private-sector firms offer vacation care, 3 percent offer school holiday care, and 3 percent offer camp programs. Finally, only about 4 percent of large, private-sector firms offer onsite or community-based before- or after-school care [21].

Similarly, relatively few firms provide child care for unanticipated circumstances. The BWLS reported that 4 percent of all firms offered backup or emergency child care and 5 percent offered sick child care in 1998 [39]. Hewitt Associates finds that 12 percent of large companies offer sick or emergency child care programs today [21].

Instead of direct provision, most private-sector firms offer resource and referral services or financial offsets. The BWLS found that 36 percent of companies with 100 or more employees offered access to child-care information in 1998, and Hewitt Associates reports that 38 percent of large companies currently provide such information services [21, 39]. Most companies providing this service contracted with an outside provider, whereas only 17 percent provided referral services in-house [21]. Half of all companies with 100 or more employees provided dependent care assistance plans that allowed employees to pay for child care with pretax dollars in 1998, and an additional 5 percent offered vouchers or subsidies for child care [39]. Among large companies, 79 percent have created dependent care spending accounts to help employees cover child care expenses, 9 percent have arranged discounts with local child care providers, 2 percent offer voucher programs, and 2 percent provide direct financial support to outside child care facilities [21].

Private-Sector Elder Care

In addition to balancing the dual demands of work and parenthood, many private-sector workers are also charged with caring for elderly relatives. Better health care and the less manual nature of work have increased life expectancies considerably over time, resulting in a larger elderly population. The Department of Labor estimates that 30 percent of the workforce has some responsibility for an elderly relative and 54 percent of Americans believe that they will have to care for an elderly relative over the next 10 years [64]. Time spent on such activities can be considerable; a 1997 survey estimated that people providing informal care to elderly friends or family members spent an average of almost 18 hours a week on such activities. Furthermore, more than half of employed

caregivers had to make changes at work to better accommodate their elder care responsibilities [65].

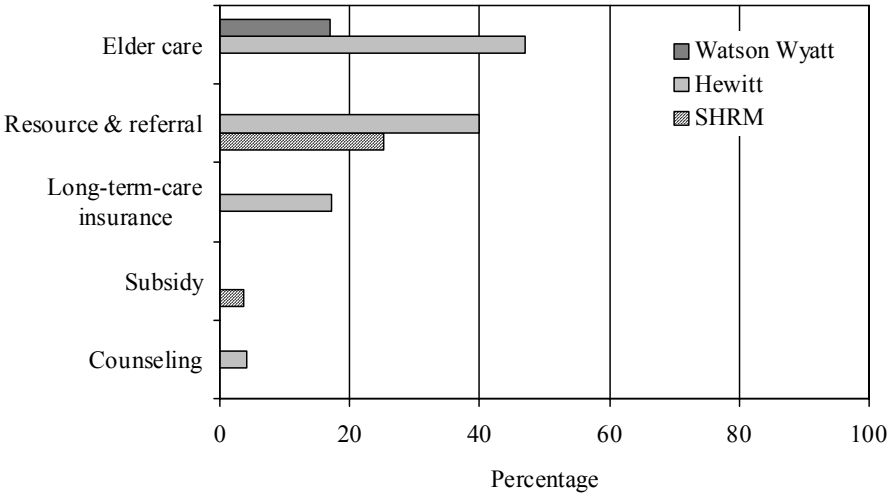
In response to these changes, more private-sector companies are offering elder care services. A 1998 survey found that 23 percent of companies with 100 or more employees offered elder care resource and referral services, 5 percent offered direct financial support for local elder care programs, and 9 percent offered long-term-care insurance for family members [39]. Hewitt Associates found that 47 percent of large, private-sector companies now offer elder care programs, up from 24 percent in 1994 [21]. Watson Wyatt reports that 16.9 percent of for-profit firms with over 2,500 employees offer such programs [23].[53] Resource and referral services for elder care were offered by 25 to 40 percent of all large companies. Long-term-care insurance for dependent family members was offered by 17 percent of all large companies, 4 percent offered elder care subsidies, and another 4 percent offered elder care counseling services (figure 16).

Private-Sector Adoption Benefits

Adoption benefits—which usually include financial offsets for incurred expenses—are rarely offered in the private sector, but their availability has been increasing over time. A recent HayGroup survey finds that 17 percent of medium to large firms offer adoption benefits today, up from 8 percent in 1990. According to SHRM, 11 percent of employers of all sizes offer these benefits today. As figure 17 shows, there is some evidence that these benefits are more prevalent among larger firms. Data from SHRM and Hewitt Associates show that 30 to 31 percent of large companies offer adoption benefits today. The average maximum reimbursement for adoption costs is $3,100, but dollar maximums vary considerably (figure 18).

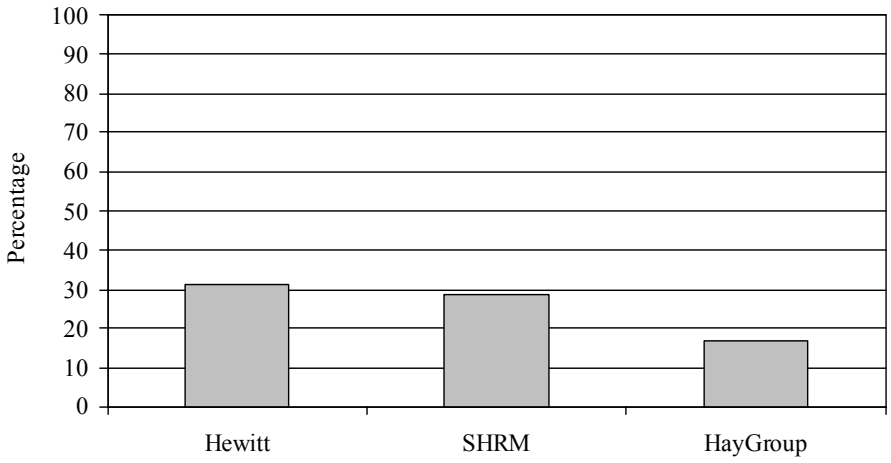
[53] Differences in Watson Wyatt and Hewitt Associates estimates may stem from differences in sample selection, question forms, or definitions.

Figure 16. Private-Sector Elder Care Programs[a]



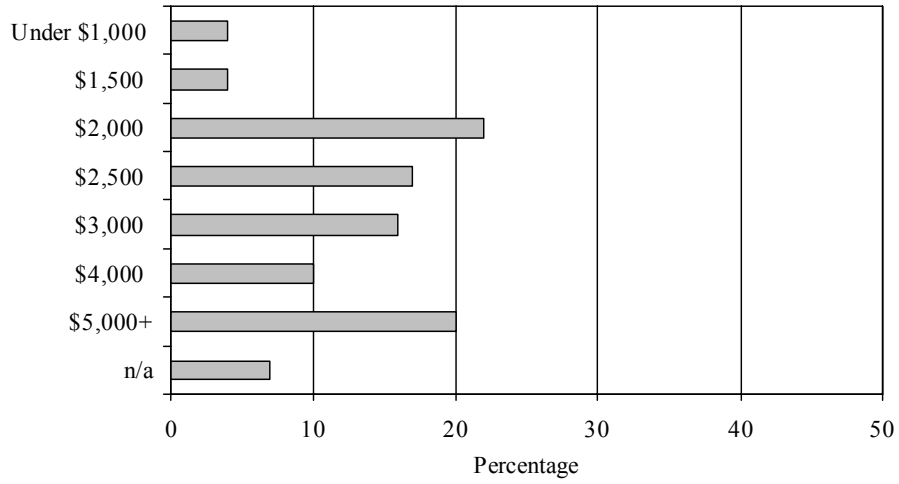
Sources: [21, 22, and 23].

Figure 17. Private-Sector Adoption Benefits[a]



a. Sources: [20, 21, and 22].

Figure 18. Private-Sector Adoption Assistance Dollar Maximums[a]



a. Source: [21].

Private-Sector Employee Assistance Programs

An outgrowth of alcohol abuse programs begun in the 1940s, private-sector Employee Assistance Programs (EAPs) are designed to help workers cope with a variety of human relations problems, including substance abuse, mental or emotional health problems, work family conflicts, financial or legal problems, or other personal concerns that affect job performance. They provide confidential assessment, referral, counseling, and training services to employees and their families at no or low cost. Treatment of substance abuse or mental health problems usually occurs through employer health insurance programs.

A 1998 survey found that 56 percent of companies with 100 or more employees offered EAPs [39]. Among large, private-sector companies, a recent Watson Wyatt survey reports that 80.3 percent of for-profit companies with 2,500 or more employees offer such programs today [23]. Finally, a HayGroup survey finds that 78 percent of medium and large companies offer EAPs today, up from 61 percent in 1990 [20].

If not part of a firm's EAP, some types of services—like financial and legal services—are relatively rare. An estimated 27 percent of large, private-sector firms offer legal assistance, and 17 to 37 percent offer financial planning services [21, 22, 23]. SHRM reports that 28.8 percent of large, private-sector companies also may offer loans and/or emergency assistance to employees in some circumstances [22].

Private-Sector Flexible Work Arrangements

The last type of work/life program that is particularly popular in the private sector today is the availability of flexible work arrangements, including flexible work schedules, telecommuting, job sharing, compressed work schedules, and various other flexibility programs.

This trend has been prompted in part by changes in women's work hours over time. For example, work hours for women in married-couple families with children increased by 93 percent between 1969 and 1996. Women with children under age 5 increased their work hours by 129 percent over this period [66]. Over half of all prime-age women today work year-round, full-time. And almost one-third of women with children under age 3 work year-round, full-time today, up from only 7 percent in 1969 [67].

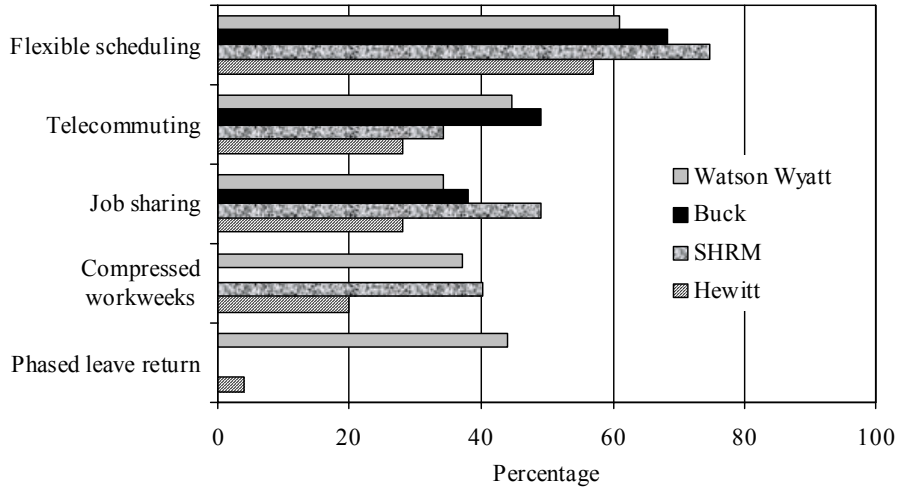
As a result, flexible scheduling, which allows workers to vary the distribution of work hours, has become increasingly prevalent among private-sector companies in recent years. Survey data show that 66 percent of all companies have flexible work schedules today, up from 22 percent in 1989 [28]. Among large, private-sector companies, flexible scheduling is now offered by 57 to 75 percent of large companies (figure 19).

Telecommuting, which has been greatly facilitated by technological advances, is also on the rise. William M. Mercer reports that 39 percent of all companies offer telecommuting today, up from 14 percent in 1995 [28].

As figure 19 shows, telecommuting offerings range between 28 and 49 percent among large, private-sector companies.

Other flexible work arrangements, such as job sharing, compressed work schedules, and phased return from leave, are less common. A William M. Mercer survey finds that 33 percent of all companies have job sharing, and the Families and Work Institute sets that share at 37 percent [28, 39]. As figure 19 shows, among large, private-sector companies, job share offerings range between 28 and 49 percent. Compressed work schedules—schedules that give workers the option to work more hours per day but fewer days within a 1- or 2-week period—are currently used by 20 to 40 percent of large, private-sector companies. Finally, estimates on employees' access to phased return from leave vary considerably. The Families and Work Institute finds that 81 percent of all firms allow workers to gradually return to work following childbirth or adoption [39]. Estimates of the share of large, private-sector companies offering phased return from leave range between 4 and 44 percent.

Figure 19. Private-Sector Flexible Work Arrangements[a]



a. Sources: [19, 21, 22 and 23].

A Comparison of Private-Sector and Military Work/Life Programs

Private-Sector and Military Child Care

Greater workforce participation has also increased work and family demands on military personnel. Although women made up only about 14 percent of the active military force in 1999, more than 630,000 servicemembers—46 percent of the active duty force—had children. In addition, more servicemembers today have two working spouses, and there is a growing share of single-parent servicemembers. Over 6 percent of military members are single parents today, up from 3.7 percent in 1989. DoD estimates that about half of all military families today have one or more children below school age and both parents are working in 60 percent of these families [68].

Unlike most large, private-sector firms, the military has an extensive child care system that cares for about 200,000 children between the ages of 6 weeks and 12 years on a daily basis [69]. The Office of Children and Youth within OSD develops policy for military child development programs. Current programs have four components:

- Child Development Centers (CDCs)
- In-Home Family Child Care Homes (FCCs)
- School-Age Care Programs (SACs)
- Resource and Referral Programs (R&Rs).

About $352 million in appropriated funds was obligated in FY 2000 for DoD's child development program. Approximately 73 percent of this amount went to CDCs, 12 percent to FCCs, 11 percent to SACs, and 4 percent to R&Rs [70].

Private-sector and military child care programs differ most significantly in terms of their provision of on- or near-site care. Although only about 10 percent of large, private-sector companies offer on- or near-site child care, the military currently operates about 800 CDCs. The Military Child Care Act of 1989 determines funding for CDCs, fees that are based on both family income and government matches, and child care subsidies [71]. Of children participating in the military child care program, 37 percent are in CDCs [70].

Not only does the military provide extensive child care services, it also heavily subsidizes the associated costs. Servicemembers' child care costs currently range from $40 to $116 per child per week, depending on total family income [72]. Because the government shares in 50 percent of the costs, officials estimate that the average weekly fee paid by military families is 25 percent lower than that paid by civilian families for comparable center-based care [69].

Although the Clinton Administration and others have heralded the military child care system for its quality and scope, care through CDCs is quite costly to provide. In fact, a 1999 GAO report found that DoD-provided child care cost 20 percent more per child than comparable civilian center-based care—7 percent more after adjusting for demographic differences in the served population. Higher costs were attributed primarily to higher staff wages and benefits [73]. Because military spouses staff most military child care operations, higher military child care wages amount to a considerable spousal employment subsidy.[54]

In fact, the correct basis for child care cost comparisons may not be between civilian and military child care centers, but between child care centers and care provided through other means. For example, DoD officials estimate that the annual appropriated-fund share of infant care costs in CDCs is about $7,000 per child, compared to about $2,400 for

[54] According to a 1995 Department of Defense report, 75 percent of the child care workforce and all FCC providers are military spouses. See [74].

subsidized home-based care [68]. Because of this and other considerations, there have been some recent efforts within the services to shift infant care from CDCs to FCCs.

Certified providers living in government-owned or leased housing make up the FCC network of over 9,700 providers, serving 32 percent of children participating in the military child care program [70]. Unlike most private-sector child care programs, FCC carers provide night, weekend, and unusual hours care, as well as care for sick children or those with special needs. Providers are subject to the same inspection, background check, and training requirements as CDC workers, but are independent contractors who set their own fees directly with parents.[55]

Direct cash subsidies can be used to make up the difference between CDC and FCC costs.[56] The use of direct cash subsidies, which has been increasing over time, is typically at the discretion of the installation commander [70]. As Bernard Rostker has noted, the lack of subsidies for all FCCs has created long waiting lists for CDCs, all of which are subsidized. Greater use of direct cash FCC subsidies would help to meet servicemembers' needs at a lower cost [68].

It may be appropriate to question whether the military should directly provide center-based child care at all. In addition to their higher costs, military CDCs are more restrictive than FCCs in their hours of operation. Contrary to what one might assume, most CDCs are open from 6 a.m. to 6:30 p.m. Monday through Friday—not unlike the hours of civilian providers [73]. Although many parents historically believed that CDCs offered children more learning opportunities than FCCs, recent advertising campaigns have attempted to counter that belief.[57] Although these characteristics would seem to indicate the need for a move away from CDCs, 208 new CDCs were constructed between 1985 and 1998 [70].

The military also differs from the private sector in its use of outside child care services. Although child care resource and referral services are used extensively within large, private-sector companies, only about 6 percent of military child care need is served through R&Rs [70]. Greater use of outside provision may be worth considering.

The military child care system also differs from common practice in the private sector because it does not offer servicemembers direct financial offsets for child care expenses. Almost 80 percent of large, private-sector

[55] Those receiving cash subsidies face some restrictions on negotiated rates.
[56] The Air Force does not authorize subsidies. See [75].
[57] For example, the Navy renamed FCCs "Navy Child Development Homes" and has worked to create a professional image of these providers. See [68].

companies currently offer dependent care spending accounts to help employees pay for child care with pretax dollars. In the military, offsets are in the form of subsidies to and cost shares with CDC and FCC providers, not dollars that can be used for any provider. As Linda K. Smith, director of DoD's Office of Family Policy, once noted, "We give money to programs rather than to parents." Although this design was originally intended to ensure the quality of care and boost wages for child care providers, it may be worth reconsidering in today's strong economic environment where more child care options are available [69].

Unlike most large, private-sector firms, the military provides extensive before- and after-school, holiday, and vacation care, as well as youth programs. SACs care for children age 6 to 12 before and after school, during holidays, and during summer vacations. Services can be provided in CDCs, in youth centers, or in offbase institutions. Military youth programs are provided at 474 youth facilities. Offered programs, which are targeted toward teens, include before- and after-school programs, summer camps, sports, recreation activities, classes, teen centers, and youth sponsorship. Of children participating in the military child care program, about one-quarter are in SACs or youth programs [70].

Private-Sector and Military Elder Care

Servicemembers in today's military often must care for elderly relatives. Some estimate that servicemembers currently provide some level of care or support for almost 14,000 elderly relatives. In 1992, 6.5 percent of military families reported claiming an elderly relative as a dependent, and 8.2 percent reported having some responsibility for an elderly relative [76].

Like most large, private-sector companies providing elder care services, the military provides servicemembers with elder care information resource and referral services through its family centers (described below.) These centers may also offer elder care workshops. Unlike in most large, private-sector firms, military chaplains can offer counseling services to those dealing with the care of an elderly family member. Although the military offers no subsidies or direct support for elder care programs, long-term care for family members may be available through TRICARE.

Private-Sector and Military Adoption Benefits

Although financial offsets for adoption expenses are relatively rare among large, private-sector companies, the military offers adoption reimbursements. Established by the National Defense Authorization Act

for Fiscal Years 1992 and 1993, the military reimburses servicemembers for qualified infant, intercountry, or special-needs adoption expenses. Similar to the average maximum reimbursement in the private sector, expenses are capped at $2,000 per child (or a maximum amount of $5,000 per year). Qualified expenses can include agency, placement, legal, and counseling fees, some pre-adoptive child care expenses, and some medical expenses. Children must be under 18 and not the biological offspring of the servicemember. Both married and single servicemembers can use the program, but all members must have served at least 180 days of active duty to be eligible. Disabled adopted children also may receive up to $1,000 a month through the military's Program for Persons with Disabilities.[58]

Private-Sector and Military Employee Assistance Programs

In the military, most EAP services are offered through family centers, which are located on military installations with 500 or more military members.[59] Like private-sector EAPs, these centers assist military personnel and their families by providing a variety of support services. Some offered services are similar to those found in private-sector EAPs, including information and referral services on such issues as elder care, child care, and adoption. Also available through the centers are personal financial management services, and counseling and support group services, including stress management, crisis assistance, domestic violence prevention and education, sexual assault intervention, and parenting workshops. Other offered services differ from those available in the private sector. Military family centers also provide relocation assistance, life-skills education, career development and employment assistance, transition assistance programs, and pre-deployment advice services. In addition, the Army and Marine family centers offer Family Team Building programs that help to train spouses about military life. Family centers can also serve as a liaison between servicemembers and local, state, or federal assistance programs, schools, churches, law enforcement, and recreation organizations.

Some EAP services are located off base, for the convenience of military personnel in alternative locations. For example, each Navy command has a Drug and Alcohol Program Advisor (DAPA) who

[58] www.pueblo.gsa.gov/cic_text/children/adoption/helpf.html

[59] Each service has a different name for its family centers. The Army has 95 Community Service Centers, the Air Force has 84 Family Support Centers, and the Navy and Marine Corps have 65 and 18 Family Service Centers, respectively. (Source: unpublished data from the Military Family Resource Center as of year end of FY00.)

manages drug and alcohol abuse prevention programs and can provide counseling, advice, and referral services. As is typically the case in the private sector, treatment for substance abuse and mental illness is provided through the military's TRICARE health benefit. Those successfully completing treatment can be returned to duty.[60] Similarly, the Navy has recently launched a $6 million Personal Financial Management program that will begin training boot camp graduates, academy graduates, junior Sailors, spouses, and command financial specialists in personal financial management in late FY01. These services will be in addition to the financial services currently available to military personnel through the family centers [77]. Finally, the Navy Ombudsman and Marine Corps Key Volunteers programs counsel servicemembers and provide resource and information resources at the unit level [46].

Outside Work/Family Services

Unlike in the private sector, military members have access to an array of outside private organizations that offer assistance and services to military personnel. The Navy-Marine Corps Relief Society (NMCRS), Army Emergency Relief (AER), and Air Force Aid Society (AFAS) are private, nonprofit, charitable organizations that provide emergency interest-free loans and grants, interest-free loans and needs-based scholarships for education, and other needed assistance to active-duty and retired servicemembers and their families. Organization representatives are usually available in the family centers. The scope of the relief societies' activities can be quite extensive. For example, NMCRS provided $36.5 million in loans and grants and $6.6 million in educational programs in 1999.[61] The AER—which has helped more than 2.7 million soldiers and their families since 1942—issued $33.7 million in loans, gave $3.2 million in grants, and approved $1.8 million in scholarships in 1999.[62] AFAS reports that over 22,000 Air Force members and their families were provided with more than $13 million in emergency assistance in 1999.[63] All organizations are funded through individual donations.

In addition to loans, grants, and scholarships, several of these organizations offer some addition services. For example, the NMCRS, which operates nearly 250 offices ashore and afloat, sponsors such relief services as visiting nurse programs, thrift shops, budget counseling and

[60] Although drug abuse treatment is technically also covered under these benefits, the military's zero tolerance policy has been interpreted as requiring the immediate separation of those military members who abuse drugs.
[61] www.nmcrs.org/ar-atglance.html
[62] www.aerhq.org/snapshot.htm
[63] www.afas.org/q&a.htm#1

caseworker services, food lockers, and the provision of infant layettes.[64] The AFAS Funeral Grant program grants active-duty members up to $3,500 to defray the costs of burying a dependent.[65] Other special AFAS programs include the "Give Parents a Break" program, Child Care for Volunteers, Respite Care, Nursing Mom's Program, Youth Employment Skills Program, Car Care Because We Care Program, Bundles for Babies, Child Care for PCS Program, and the Phone Home Program.[66]

The Navy Mutual Aid Association (NMAA) and the Army and Air Force Mutual Aid Association (AAFMAA) are mutual, nonprofit, tax-exempt voluntary membership associations serving current and former sea service Navy and Marine Corps personnel, active-duty and retired Army and Air Force personnel, and their families. The associations provide low-cost life insurance, information on and assistance with obtaining available federal benefits, representation to assist in appeals or the settlement of an insurance claim, financial services, and financial planning. Since 1880, NMAA has provided more the $400 million in benefits. With the exception of life insurance, all services are free to association members.[67]

In addition to the services provided by these organizations, armed forces personnel and their families also have access to a wide array of other formal and informal groups and organizations designed to support military families.[68] For example, the Navy Wives Club of America has worldwide chapters open to the spouses of enlisted personnel and awards scholarships to children of enlisted servicemembers every year. Similarly, the Fleet Reserve Association (FRA) assists members with their careers and offers such programs as health care supplements, life and auto insurance, college scholarships, student loans, discounts, and disaster relief. Organizations like the American Red Cross also assist servicemembers and their families by providing emergency financial assistance, information and referral services, and health, safety, and lifestyle courses.

Private-Sector and Military Legal Assistance

Although legal assistance outside an EAP is relatively rare among large, private-sector companies, each of the military services offers confidential legal assistance to active duty military members. When

[64] www.nmcrs.org/about.html
[65] www.afas.org/q&a.htm#1
[66] www.afas.org/community.htm
[67] www.nmaa.org/
[68] See www.militarywives.com, www.navywives.com, www.armywives.com, www.airforcewives.com, and www.militaryhusbands.com to name a few.

resources are available, services are also offered to dependents, retirees and their dependents, eligible survivors, and eligible reservists. Legal services, which include will preparation, power of attorney preparation, notary public services, and legal advice on domestic relations, contract, civil rights, or tax problems, are provided on base by military judge advocates at no cost.[69] Dispute-resolution programs, such as arbitration and mediation, and the Expanded Legal Assistance Program, which provides in-court representation on civil and minor criminal charges to some active servicemembers who cannot afford legal representation, have recently been added to some legal assistance offices.

Access to these services could be improved in two ways. Unlike legal services offered through private-sector EAPs, most legal assistance offices are located separately from the family centers. For example, Navy legal assistance offices are located at naval legal service offices and detachments. If a military installation is too small to provide onsite legal services, servicemembers can use the facilities at another nearby installation. Similar to the "one-stop shopping" approach that has shaped government-provided job training and placement services, the military's EAP services could prove more convenient through the collocation of services. If collocation is not feasible, family centers could be used more broadly as clearinghouses for all types of practical information pertinent to the well-being of military members and their families.[70]

Military legal assistance services also are subject to binding financial constraints. While programs have been legislatively authorized, they are not directly funded.[71] As a result, access to such services is often unavailable.

Private-Sector and Military Flexible Work Arrangements

Although civilian and military DoD employees have access to many flexible work arrangements, such as flexible and compressed work schedules, job sharing, and telecommuting, flexibility for active duty servicemembers usually is at the discretion of the command. As such, it may be more feasible in some environments (shore duty assignments, for example) than in others (sea duty assignments). The military is also investigating ways to reduce PERSTEMPO—the length of time that military personnel spend away from home on deployments. Military jobs should be evaluated to determine the potential to use existing technologies

[69] The Marines do not have a JAG corps but may use the services of Navy lawyers.
[70] The Military Family Resource Center maintains research materials on military family and quality-of-life programs.
[71] www.lifelines4qol.org/services/legal/default.asp

to introduce flexibility into operations or move some functions from ship to shore, for example. Because of the prevalence of flexible work arrangements in the private sector and the demographic changes affecting both workers and servicemembers today, measures to add additional flexibility to servicemember's work schedules without compromising readiness should be investigated and implemented whenever possible.

Other Private-Sector and Military Offerings

In addition to the incentive pay and benefit offerings described thus far, both large, private-sector companies and the military offer an array of other benefits. The value of these offerings can, in many cases, be quite significant.

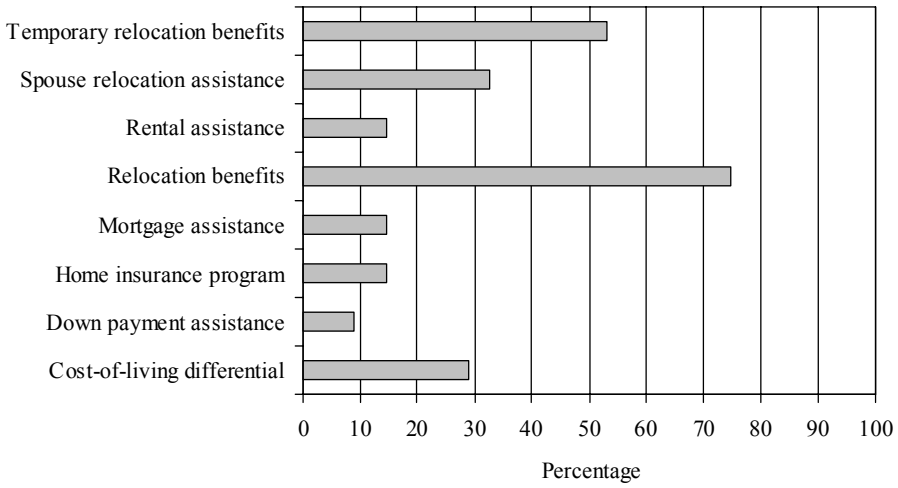
Housing

Some large, private-sector firms offer housing benefits, but virtually all of these benefits are in the form of financial offsets or loans, not the direct provision of housing. As figure 20 shows, the most prevalent forms of housing benefit among firms with 2,500 or more employees are temporary and permanent relocation benefits. About 32 percent of large firms offer spouse relocation assistance, and 30 percent offer cost-of-living differentials. Finally, a relatively small share of large companies offer housing benefits, such as rental assistance, mortgage assistance, down payment assistance, or home insurance.

In the military, housing and relocation benefits are universal. Servicemembers receive either military housing or basic allowances for housing (BAH) that are not subject to federal taxation.[72] BAH amounts vary depending on rank, length of service, dependency status, and location. This puts the military in the unique position of having a significant portion of pay dependent on dependency status. Unlike in the private sector, the military also provides some housing directly. Individuals in barracks housing receive a partial BAH ranging from $6.90 to $50.70 per month. DoD estimates that the typical servicemember now pays about 18.8 percent of housing costs, and it plans to eliminate out-of-pocket housing costs completely by 2005 [46].

[72] In 1999, 56 percent of all active-duty military members living in CONUS locations lived off base and 44 percent lived on base [76].

Figure 20. Private-Sector Housing Benefits[a]



a. Source: [22].

Servicemembers may also be eligible for home loan guarantees offered by the Department of Veterans' Affairs, which can be used to purchase a house, townhouse, condominium, or mobile home, to refinance an existing mortgage, or to improve, repair, or alter a home. Required down payments are minimal, but members may be required to pay additional funding fees.

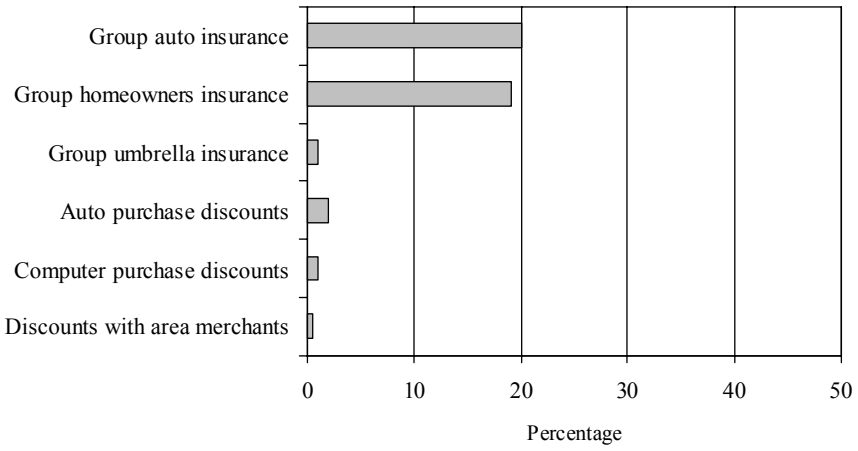
Finally, servicemembers can get relocation assistance, including education and training, information resources, and counseling services, and spousal employment assistance, through military family centers. Transportation is provided to individuals and their household items making a PCS move, either directly or through a monetary allowance. The Temporary Lodging Allowance and the Temporary Lodging Expense offset the costs of temporary lodging and meals. There are also a variety of allowances and advances available to servicemembers to help offset moving costs. For example, the Dislocation Allowance, a tax-free allowance that offsets miscellaneous moving costs, is paid once per PCS move and per diem allowances are available. Servicemembers can also receive interest-free advances on their basic pay, BAH, or overseas housing allowance to assist them in meeting expenses.

Discount Programs

In large, private-sector companies, discount programs are relatively rare. According to Hewitt Associates, 34 percent of large, private-sector firms offer group-purchasing or group discounted purchase options to

employees. As figure 21 shows, these offerings range from group auto insurance to computer purchase discounts. Employees may also be offered discounts on company services, a practice followed by almost half of surveyed large companies [21].

Figure 21. Private-Sector Group Purchasing Programs[a]



a. Source: [21].

In contrast, the military has a network of military exchanges and commissaries to serve military members. Military exchanges sell discounted and tax-free department store items. Army and Air Force exchanges (referred to as PXs or BXs) are run by the Army and Air Force Exchange System (AAFES), which currently operates 10,878 facilities worldwide including 1,423 retail facilities and 218 military clothing stores.[73] Navy Exchanges (Ships' stores and NEXs) are operated by the Navy Exchange Service Command. There are currently 191 stores on commissioned ships and 113 stores on naval installations.[74] Finally, Marine Corps Exchanges are currently in 16 locations and generate over $500 million in annual sales.[75] Exchanges not only benefit military personnel through discounts, but the profits generally are used to finance MWR programs. For example, 70 percent of the profits generated within the Navy Exchange system go toward MWR programs.[76]

[73] www.aafes.com/pa/history_page.htm
[74] www.navy-nex.com/site_map/index.html
[75] www.usmc-mccs.org/
[76] www.navy-nex.com/exchange/index.html

Military commissaries are discounted supermarkets, with over 290 locations of service installations worldwide. In FY99, sales topped $4.9 billion. Purchases, which are priced 25 to 30 percent below retail, are not subject to sales tax, but are subject to some surcharges [46].

Food and Clothing Programs

Few private-sector firms offer food or clothing benefit programs. When provided, such services typically entail some cost to employees. Data on the prevalence of such programs is fairly limited; SHRM finds that 4 percent of large firms offer already prepared take-home meals, and Hewitt Associates sets this figure at 6 percent [21, 22]. In addition, 57 percent of large firms offer food services/subsidized cafeterias [22].

In addition to discounts on food and clothing purchases offered by commissaries and exchanges, the military also offers allowances for or the direct provision of food and clothing—a practice virtually nonexistent in the private sector. The military's basic allowance for subsistence (BAS) essentially gives servicemembers tax-free money for food. The amount available is not based on rank, but on location and facilities available. For servicemembers who are married, live off base, or are on leave, the BAS amount ranges between $158.83 and $339.60 per month. Enlisted members typically receive larger BAS than do officers. Servicemembers living in barracks with government dining halls can receive a partial BAS of $25.50 per month [46].

Although most private-sector workers must furnish their own work clothes, the military grants initial clothing allowances and annual allowances to enlisted personnel to cover replacement costs. Servicemembers may also receive a one-time allowance for the purchase of civilian clothing when an assignment requires it.

Fitness and Recreation Programs

Fitness and recreation programs are fairly limited in the private sector. Data from SHRM show that 36 percent of large firms offer onsite fitness centers, 29 percent offer fitness/gym subsidies, and 42 percent have organization-sponsored sports teams [22]. Hewitt Associates reports that only 8 percent of large firms offer entertainment discounts and ticket purchases [21].

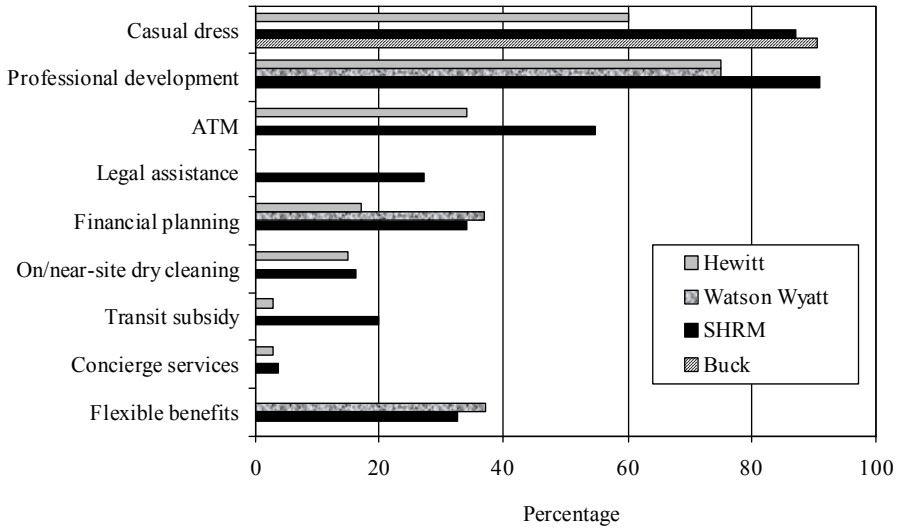
In the military, Morale, Welfare, and Recreation (MWR) programs that are designed to improve the quality of service life are quite extensive. MWR programs include fitness centers and gymnasiums, recreation centers, libraries, youth centers, sports, outdoor activities, arts and crafts,

and other programs and are funded through taxes. Many recreational programs also offer free or discounted tickets to theaters, sporting events, and historical and recreational locations. Most services are free, but commercial enterprises, such as golf courses, clubs, and bowling centers, impose their own fees and charges. [77]

Other Benefits and Services

Finally, both the private sector and the military offer a range of other miscellaneous benefits and services. Casual dress policies are most prevalent in large, private-sector companies today, offered by 60 to 91 percent of firms (figure 22). Hewitt Associates estimates that 52 percent of large companies offer some onsite personal services. Some services and conveniences are popular, whereas others are less prevalent. Although as much as 55 percent of large firms currently offer ATM services, under 20 percent offer such things as on- or near- site dry cleaning, transit subsidies, or concierge services. Lastly, between 33 and 37 percent of large firms now offer "flexible benefits"—allowing workers to pick and choose from an array of health, retirement, and leave benefits to design a benefits package that best suits their individual needs.

Figure 22. Other Private-Sector Benefits[a]



a. Sources: [19, 21, 22 and 23].

[77] dticaw.dtic.mil/prhome/commprog.html

The military offers servicemembers several unique perquisites in the form of transportation benefits and tax advantage. Servicemembers and their families can fly at little or no cost on government or commercial aircraft if space is available. There are no reservations, and access is prioritized based on the circumstances of the travel. Military members also receive some benefits through special tax advantage. For example, military allowances are generally tax-exempt and servicemembers only have to pay personal property taxes to their state of legal residence. Because servicemembers do not have to reside where they are stationed, many choose to reside in low-tax states [46].

AN EXAMINATION OF SPECIFIC PRIVATE-SECTOR COMPANIES' INCENTIVE PAY AND BENEFIT OFFERINGS

The information presented thus far can be used to assess the prevalence of various incentive pay and benefit programs within large, private-sector companies. Yet there is also considerable interest in the offerings of particular firms, specifically those firms in which former military personnel—particularly those in technical ratings—gain employment. After identifying these companies, it is useful to examine the incentive pay and benefit packages that they offer to nonexempt, hourly paid workers. This information can then be used as a benchmark against which military incentive pay and benefit offerings can be evaluated.

In the survey described above, respondents were asked to name private-sector companies at which servicemembers leaving the Navy found subsequent employment. Detailers in the IT and FC ratings were also asked to name private-sector companies in which servicemembers' choosing not to reenlist obtained employment. Generally speaking, named private-sector companies could be grouped into three broad categories (see table 5):

1. Government contracting firms
2. Technology-based firms
3. Service-sector firms.[78]

[78] Several respondents identified government agencies, but these responses were omitted because they did not qualify as private-sector organizations.

Because we are particularly interested in the behavior of personnel in technical fields, we used survey data to examine the occupations entered by technically rated Sailors who were leaving the Navy. Although sample sizes are small, the survey data lend support to the Navy rating/civilian occupation crosswalk developed in [4]. For example, Sailors in the AT, ET, and FC ratings generally entered occupations in the technical or mechanics, installers, and repairers occupational groupings. FC detailers confirmed this trend in one-on-one interviews.

Table 5. Companies Where Separating Sailors Obtained Employment[a]

Government Contracting Firms	Technology-Based Firms	Service-Sector Firms
Newport News Shipbuilding	Lucent Technologies	UPS
Logicon	IBM	McDonald's
Sikorsky	Microsoft	Applebee's
Unidyne	Intel	Rent-A-Center

a. Source: CNA survey described in the appendix.

We then chose to closely examine the incentive pay and benefit offerings of several specified firms to determine whether their offerings were atypical of other large, private-sector firms. We selected one company from each of the groupings specified above:

1. Newport News Shipbuilding
2. Lucent Technologies, Inc.
3. United Parcel Service.

Available information on these companies' incentive pay and benefit offerings follows.[79]

NEWPORT NEWS SHIPBUILDING

Newport News Shipbuilding (NNS), the second largest U.S. shipbuilding company, builds, maintains, refuels, and repairs nuclear

[79] The author acknowledges the generous assistance of NNS, Lucent, and UPS company representatives in providing information in this section. The majority of this analysis was completed in December 2000, so changes may have occurred to these companies' benefit offerings in the intervening time period. These data, therefore, should be viewed as snapshots of the companies' offerings, rather than as definitive sources of benefits information.

aircraft carriers and submarines. In FY00, the company reported $2.1 billion in sales and had a staff of 17,000 employees.[80]

NNS is a company of particular interest because it is a major Navy contractor, with the Navy accounting for approximately 98 percent of the company's 1999 revenues.[81] As such, it hires individuals with skills very similar to those required of Navy personnel. In fact, a review of the company's job listings found that several listed jobs required or recommended the types of skills and experience only obtainable through naval service (see table 6).

INCENTIVE PAY

NNS offers an Employee Stock Purchase Plan (ESPP) to employees. Through the plan, employees can purchase company stock at a 15-percent discount. The stock must be held for 2 years, and each employee's contributions are limited to $21,250 annually.

Table 6. Newport News Shipbuilding Job Listings

Job Title	Description
Associate Engineer, Nuclear Engineering	The candidate should possess a BS degree in Naval Architecture or higher. The candidate should have 3-5 years' engineering experience with weight engineering experience preferred. Military service is desired.
Engineer, Submarine Nuclear Engineering	Requires a BSEE degree with experience in the design of power distribution and/or instrumentation systems. Responsibilities will include technical reviews, resolution of engineering problems, and development of systems diagrams and work packages. Strong oral/written communications and computer skills are required. Navy nuclear experience a plus.
Engineer, Nuclear Engineering	The candidate should posses a BS degree in Mechanical Engineering with nuclear power plant or U.S. Navy propulsion plant experience. The candidate should have at least 3-5 years' engineering experience or have served that amount of time aboard a Navy Nuclear Ship. The candidate should be competent in performing fluid flow and heat transfer calculations.

Employees can also receive nonmonetary awards through the Long Service and Retirement Award Program. This program grants employees awards for 10, 20, 25, 30, 40, and 50 years of company service. Retirement awards are based on an employee's number of continuous years of service.

[80] www.hoovers.com/co/capsule/8/0,2163,52848,00.html
[81] media.corporate-ir.net/media_files/NYS/nns/AR99/nns/MD-A.html

LEAVE

NNS also offers employees several types of paid and unpaid leave. NNS employees receive ten paid holidays (nine set and one floating holiday) annually. In addition, the company closes the office for the week between Christmas and New Year's. Salaried employees begin to accrue paid vacation leave upon employment. The rate of leave accrual is based on length of service: those with less than 5 years of service earn 6.67 hours per month, those with 5 to 10 years of service earn 10 hours per month, and those with more than 10 years of service earn 13.34 hours per month. Up to 40 hours per year can be carried over, and leave can be taken in increments as small as 1 hour.

Paid leave is also available for bereavement. NNS offers paid bereavement leave of up to 5 days for a legal spouse, son, daughter or stepchild, and 3 days for a mother, father, mother-in-law, father-in-law, brother, sister, grandparent, great-grandparent, or grandchildren. Bereavement leave can also be granted for the death of a step-father, -mother, -child, -brother, or -sister if they have previously lived with the employee in a family relationship.

Informally arranged paid time off for school/child care functions or for the care of a mildly ill child is also available. Through its flextime policy (described later), NNS employees can rearrange their work schedule to fit their individual needs.

In addition to its paid leave offerings, NNS also offers some unpaid leave. Unpaid educational leaves of absence are granted to eligible workers after 1 year of service. Although the employee's job is not guaranteed, the company intends to place leave takers in an appropriate position within the company following the absence. Unpaid leave is also offered under the FMLA for qualifying conditions, and NNS typically does not require that an employee's FMLA leave run concurrently with his or her accrued leave.

Unlike most private-sector companies, NNS offers no sick or personal leave. However, qualifying absences due to illness are covered under the company's short-term disability coverage.

Short-Term Disability Insurance

NNS employees receive fully-paid short-term disability coverage after 3 months of service. Benefits are paid at 100 percent or 50 percent of daily base pay, depending on length of service. Coverage is provided for up to 26 weeks and benefits begin after the third consecutive missed workday

for nonexempt employees or on the first missed working day for exempt employees.

Long-Term Disability Insurance

NNS also offers fully paid long-term disability coverage to employees after 6 months of disability. The plan pays up to 60 percent of an employee's base monthly salary, with a maximum payment of $32,000 a month. Payments are reduced by other income, and basic and supplemental life insurance premiums are waived during the disability period.

HEALTH INSURANCE

Full-time NNS employees receive POS health insurance benefits for themselves and eligible dependents upon their first day of employment. Employee contributions for the coverage range from $26.60 to $235.30 depending on the employee's salary and number of covered dependents. As such, employees pay roughly 29 percent of the costs of coverage.

Under the POS plan, in-network services are not subject to deductibles; out-of-network services require a deductible. This deductible is equal to 1 percent of an individual's salary ($200 minimum) for an individual and 3 times this amount for a family.

Copayments and coinsurance rates also vary depending on whether services are received in- or out-of-network. In-network inpatient services require a 10 percent coinsurance payment, whereas in-network outpatient services require a $10 copayment. All out-of-network services require 30 percent coinsurance payments.

Out-of-pocket expenses are limited to $1,000 in network or 5 percent of an employee's salary (with a $2,000 minimum) out of network. In addition, there is no lifetime maximum on in-network benefits, but out-of-network benefits are subject to a $500,000 lifetime maximum.

Retiree Health Insurance

NNS employees retiring with at least 10 years of service after age 45 are eligible for retiree health insurance. Retirees under age 65 who live in-network receive a POS plan offering the same coverage available to active employees. Those over age 65 or those living out-of-network receive an indemnity plan that covers 80 percent of incurred expenses and is subject to a deductible. Retirees pay about 9.5 percent of the plan's cost through contributions. Employee contributions range from $54.80 to $137.60 for

those under age 65 (depending on the number of dependents covered) and $24.30 to $107.10 for those over age 65.

In addition to this coverage, NNS retirees and their spouses can be reimbursed $20 per month for Medicare Part B premiums through the company's Retiree Medicare Premium Reimbursement Program.

NNS retirees also receive prescription drug coverage. The company's basic plan requires a 30-percent copayment with a cap of $30 per prescription. An optional plan, offering the same coverage received by active employees, is also available.

Finally, NNS retirees also receive fully funded life insurance coverage. Retirees retain $10,000 of the coverage they had as an active employee at no additional cost.

Other Health Insurance Programs

Prescription Drug Coverage

NNS employees with health insurance also receive prescription drug coverage at no additional cost. There are no deductibles, and copayments range from $8 to $32 depending on the type of drug required. The plan also allows employees to mail order a 90-day supply of prescription drugs for $16 to $64, depending on the type of drug required.

Dental Program

Dental coverage is offered to full-time NNS employees upon the first day of employment. Coverage is also available for legal spouses and eligible children. Employees cover 23.1 percent of the costs of coverage and pay premiums ranging from $3.60 to $19.70, depending on the number of dependents covered. The Network plan requires no deductible, whereas the Indemnity plan requires a $50 deductible for one person and $150 for a family. Both plans cover $100 of the cost of preventive services. Other services, including oral surgery/restorative, prosthodontic, and orthodontic work require copayments under the Network plan and coinsurance payments under the Indemnity plan.

Vision Program

NNS employees pay 100 percent of the cost of vision insurance through premiums ranging from $8.49 to $22.92 (depending on the number of dependents covered). In-network services include the cost of an

eye exam and a set of glasses or contacts; out-of-network services are subject to a schedule of set reimbursements.

Wellness Programs

NNS offers a variety of wellness programs. Cholesterol and blood pressure education services are available through the NNS health plan, whereas alcohol awareness programs are offered through the Employee Assistance Program. Wellness programs, such as smoking cessation programs, weight loss programs, and onsite fitness centers, and health screening services are not currently available.

Long-Term-Care Insurance

Like most large, private-sector companies, NNS does not offer employees or their dependents access to long-term-care insurance.

Flexible Spending Accounts

NNS employees may contribute to a flexible spending account for incurred health care expenses. Contributions are limited to $1,800 annually.

OTHER INSURANCE PROGRAMS

In addition to health insurance, NNS also offers employees access to other types of insurance, including life insurance, AD&D insurance, and travel insurance.

Life Insurance and Accidental Death and Dismemberment Insurance (AD&D)

NNS employees receive 1½ times their annual salary in company-paid life insurance. The company also finances executive life insurance of 3 times the worker's annual salary. Employees can purchase supplemental coverage of 1 to 5 times their annual salary at a monthly price (which varies with age) ranging from $.05 to $1.87 per $1,000 of coverage. After initial eligibility, increases of more than one level require proof of good health.

In addition to their own supplemental coverage, employees can also purchase term life insurance for spouses and children. Coverage ranges from $5,000 to $50,000 for a spouse and $2,500 to $5,000 for children. The cost of coverage ranges from $.42 to $11.64 per month and, as with

employee life insurance, the provider requires proof of good health for increases of more than one level after the initial eligibility period.

NNS also provides workers with basic AD&D coverage of 1½ times a worker's annual salary. Supplemental coverage of $100,000 to $500,000 can be purchased for a monthly premium of $1.60 to $8.00 for an employee or $2.40 to $12.00 for family coverage.

Business Travel Insurance

NNS employees also receive fully paid business travel insurance. Benefits are set at 5 times the employee's annual salary, with a maximum benefit of $500,000.

RETIREMENT

NNS employees receive access to several retirement programs. NNS offers employees both a defined benefit pension plan and a defined contribution 401(k) plan. NNS employees are eligible to participate in its pension plan after 1 year of service. The plan pays benefits equal to 55 percent of a worker's final average pay (over the last 60 months) times years of plan participation (up to 35) divided by 35. Employees may seek early retirement at age 55 with 10 years of service, but will receive a reduced benefit. Workers become eligible for the company's 401(k) plan on the first of the month following employment. The plan, which offers eight different investments options, grants a 50-percent company stock match for the first 8 percent of employee contributions. In addition, the company provides employees with a 3-percent stock grant. The maximum pretax employee contribution is 12 percent and the company match is vested after 2 years of service.

EDUCATIONAL AND TRAINING PROGRAMS

NNS offers employees access to several educational and training programs, such as tuition reimbursement and in-house training programs.

Tuition Reimbursement

With the approval of their department heads, regular full-time NNS employees can participate in the company's tuition reimbursement program. The program, which includes job-related classes taken at trade schools as well as undergraduate and graduate institutions, pays a set percentage of tuition depending on the grade received. Those earning an A

or Pass in an ungraded class receive 100 percent reimbursement. Lower grades are subject to smaller reimbursement shares. There is no limit on the amount of reimbursement granted, and no pre- or post-service requirement required. The cost of books, materials, and fees is not reimbursable through the program.

In addition, NNS reimburses employees for the costs of Professional Certification Examinations. These reimbursements are also not subject to a maximum, but must be pre-approved.

In-House Training

NNS also provides employees with considerable opportunities for training. In addition to orientation, safety and health, and basic skills training, employees receive in-house training in 18 shipbuilding and repair trades through its apprenticeship school. In addition, its Craft Skills Training program provides ongoing training to employees through courses similar to those that may be offered in Navy "C" or "F" schools [61]. The company's Night School Program offers employees a broad range of shipbuilding and computer-related courses. Finally, NNS holds career fairs across the country and offers co-op opportunities to full-time, 4-year college students in technical engineering, design, and information technology fields.

WORK/LIFE PROGRAMS

Child/Elder Care

Fully paid child care referral services are available and NNS provides a list of area child care sources tailored to an individual's specific needs. Elder care resource and referral services are also available. In addition, NNS employees may contribute to a flexible spending account for incurred dependent day care expenses. Contributions are limited to $4,800 annually.

Adoption Benefits

Like most of its large, private-sector counterparts, NNS does not currently offer any adoption assistance benefits or services.

Employee Assistance Program (EAP)

NNS's EAP offers employees and eligible dependents free counseling services, including alcohol awareness programs. Counselors will make the

necessary arrangements for care through the company's health plan if needed. Mental health and substance abuse treatment, the costs of which are covered through a employee's medical plan contributions, requires a 10-percent coinsurance payment for in-network, inpatient care (subject to a $1,000 out-of-pocket maximum), a $25 copayment per visit for in-network, outpatient care, and a 50-percent coinsurance payment for out-of-network inpatient or outpatient care. In addition, out-of-network inpatient care requires a $400 deductible prior to coverage.

Financial Programs

NNS's Survivor Support Program offers free, personalized financial counseling to the spouse or designated family member of an active employee upon his/her death.

Legal Programs

NNS offers legal services, including advice and consultation services, will preparation services, and assistance with real estate purchases or sales, contracts, legal documents, adoptions, or traffic violations. Employees fully fund the program through a monthly contribution of $14.

Flexible Work Arrangements

As mentioned earlier, NNS offers employees a flextime work arrangement. This work arrangement allows employees to adjust the time they begin and end work. As such, employees are able to vary their schedules according to their individual needs. Other types of flexible work arrangements, such as telecommuting, job sharing, and compressed work schedules, are not currently offered.

Other Benefit Offerings

NNS offers a variety of relocation benefits based on an employee's level. Benefits can include assistance with house hunting, temporary living benefits, the packing, shipping, and storage of household goods, an incidental allowance of $1,000, reimbursement of travel expenses, destination services, lease cancellation services, the provision of relocation differentials, loss protection, and spousal assistance. The company also offers mortgage differentials and assistance with the purchase of a home.

Like most of its private-sector counterparts, NNS does not currently offer any purchasing or group discounted purchase options or provide uniforms and/or work clothes to its employees.

LUCENT TECHNOLOGIES

A spin-off of AT&T, Lucent Technologies, Inc., manufactures telecommunications equipment and software. In FY01, the company reported $21.3 billion in sales and had a staff of 126,000 employees.[82] It has previously ranked 10th in *Fortune* magazine's list of America's most admired companies, and 25th in the list of the 50 best companies for minorities.[83]

Lucent offers separate benefit packages to its managerial and technical employees. Because our interest is in benefits offered to technical workers, we limit our discussion primarily to benefits offered to Lucent's occupational employees.

INCENTIVE PAY AND PAID LEAVE

No information about Lucent's incentive pay and traditional paid leave offerings is currently available.

DISABILITY INSURANCE AND UNPAID LEAVE

Short-Term Disability Insurance

Lucent provides employees with free short-term disability benefits for both work-related and non-work-related illness and injury through its sickness and accidental disability benefit plan. Occupational employees are eligible for sickness coverage after 6 months of service. Accidental disability coverage (for work-related accidents) begins upon employment. Plan benefits are based on pay and length of credited service and are paid for up to 52 weeks. Accidental disability payments begin on first full day of absence; sickness payments begin on the eighth consecutive day of absence.

Long-Term Disability Insurance

Lucent's long-term disability plan offers continued benefits upon the expiration of the sickness benefit coverage period. Occupational employees must have completed 6 months of service to be eligible, and the disability cannot be work related. Coverage is free and, when combined with other sources of disability income, it can replace up to 60

[82] www.hoovers.com/co/capsule/6/0,2163,46656,00.html.
[83] www.fortune.com.

percent of a disabled employee's eligible base pay. Benefits end when the employee is no longer disabled, reaches the lifetime time limit on benefits (generally age 65 or later, depending on when the disability occurs), or dies.

Lucent also offers employees some unpaid leave. In addition to leave offered under the FMLA, Lucent employees can be granted a 12-month unpaid leave of absence within a 2-year period to care for a seriously ill family member or for a newborn or newly adopted child. The leave counts against the employee's unpaid FMLA allotment, but the employee is guaranteed reinstatement to the same job or one of like status and pay upon return.

BASIC HEALTH INSURANCE

Occupational employees and eligible dependents receive health benefits after 6 months of service. The Lucent health insurance plan offers a traditional indemnity (fee-for-service) option (which also has a PPO option), an HMO option, and a POS option. Unlike in the military's TRICARE system, dependents of Lucent employees must select the same health care plan as the employee.

The cost of health care coverage to Lucent employees varies depending on the plan selected. Under the POS or traditional indemnity plans, occupational employees generally do not pay any direct costs, unless they elect to obtain coverage within the first 6 months of employment. Those in the HMO option pay some direct costs, which vary by the HMO selected. Deductibles also vary depending on the plan. Those in the POS plan pay no deductibles in-network, but $400 per individual or $800 per family if services are received out of network. Those in the traditional indemnity plan pay deductibles of $200 to $600. Copayments are generally $10 per office visit for in-network POS and HMO services, but may be higher for services received out-of-network. Individuals in the traditional indemnity program do not pay copayments, but must pay coinsurance of 0 to 20 percent of the allowable amount.

Retiree Health Insurance

Former Lucent employees who are at least 50 years old with at least 15 years of service or those already receiving service or disability pensions are eligible for retiree health benefits. Depending on geographic location, retirement date, and Medicare eligibility status, employees may be eligible to choose from three different plans: an HMO, a POS, and a traditional

indemnity plan (which also has a PPO option).[84] The Lucent plan serves as the primary benefit plan for those under age 65; Medicare serves as the primary benefit plan for those age 65 and over.

Lucent retirees directly contribute to their health care premium expenses, but the amount varies depending on the option selected. Deductibles also vary by plan. Those in the POS plan pay no deductibles in-network, but $400 per individual or $800 per family deductibles are required for out-of-network services. Those in the traditional indemnity plan pay deductibles of $200 to $600 unless receiving a service or disability pension.[85] Copayments are generally $10 per office visit for in-network POS and HMO services, but may be higher for out-of-network services. Individuals in the traditional indemnity program do not pay copayments, but must pay coinsurance of 0 to 20 percent of the allowable amount.

Lucent retirees also receive prescription drug coverage. Retirees enrolled in the traditional indemnity or POS plans receive prescription drug benefits through a separately administered prescription drug plan, whereas those in the HMO receive benefits through their plan. Copayments apply in-network, and range from $5 to $15 for individuals enrolled in the Lucent HMO option. Mail-order services are also available.

Other Health Insurance Programs

Lucent also offers occupational employees a range of other health insurance programs. These include:

- *Prescription drug program* - Employees enrolled in the traditional indemnity or POS plans receive prescription drug benefits through a separately administered prescription drug plan, whereas those in the HMO receive benefits through their plan. Copayments vary depending on the plan, and services received out-of-network may be subject to coinsurance and deductible amounts.
- *Dental program* - Occupational employees with 6 months of service receive free dental coverage for themselves and their dependents. Employees have a choice between two options, which both pay 100 percent of the cost of basic

[84] For example, employees retiring after 3/1/90 residing in a POS area may not enroll in the traditional indemnity plan.

[85] In this case, retirees pay a deductible of $50 plus 1 percent of annual pension ($75 minimum and $200 maximum).

and routine services and a share of the cost of other services.

- *Vision program* - After 6 months of service, Lucent pays the cost of vision care coverage for employees and their dependents. The plan pays some costs for routine eye exams, glasses and contacts and can be used once every 24 months. Out-of-pocket expenses are lower if beneficiaries use in-network providers.
- *Wellness programs* - Several wellness programs, like well-baby, well-child, and well-woman programs, are offered through the Lucent POS and HMO health care plans.
- *Long-term-care insurance* - Lucent offers long-term-care insurance to both eligible occupational employees and their family members after 6 months of service. However, employees pay the full cost of coverage. Eligible individuals can choose between nursing home and comprehensive coverage, daily benefit limits, and the election of nonforfeiture coverage.[86] Benefits are subject to a lifetime maximum. Home health care services and hospice care are also covered under Lucent's health care plans.
- *Flexible spending accounts* - Lucent's Health Care Reimbursement Account program allows employees to set aside pretax dollars for health care expenses incurred by the employee, his or her lawful spouse, and all eligible dependents. Expenses include medical, dental, hearing, or vision-related expenses and are subject to a $3,000 annual maximum contribution. Occupational employees must complete 6 months of net credit service before becoming eligible for the program.

OTHER INSURANCE

Lucent offers occupational employees several other types of insurance coverage, including life insurance, AD&D coverage, and travel accident insurance.

[86] Nonforfeiture coverage means that after an employee pays premiums for at least 3 years, he or she may elect to stop making payments and will still be entitled to coverage equal to the full daily benefit, subject to a total lifetime benefit of either the total amount of premiums paid or 30 times the daily benefit—whichever is greater.

Life Insurance and Accidental Death and Dismemberment Insurance

Lucent offers free life insurance and AD&D coverage equal to one times the occupational employee's total annual pay after the completion of 6 months of service. Supplementary life or AD&D insurance coverage is available for an additional 1 to 5 times an employee's total annual pay, but the employee pays the full price of supplemental coverage. Coverage for dependents must be purchased separately at full cost.

Travel Accident Insurance

Lucent's Travel Accident Insurance Plan provides free coverage to eligible employees from their first day of active employment for accidental death or dismemberment incurred while on company-paid business travel. Spouses and children are also covered when they travel with the employee on company-paid and approved business or relocation trips. The plan provides accidental death and dismemberment coverage of up to 4 times the employee's basic annual pay, up to $3 million and up to $100,000 for a spouse and $50,000 for each eligible child. Coverage is reduced after age 70 and cannot be waived.

RETIREMENT

Lucent offers employees both a defined benefit pension plan and a defined contribution savings plan. Through the Pension Plan, eligible employees receive benefits if they are at least 21 years of age and have been credited with at least 1,000 hours in a year. Three kinds of pensions are available: a service pension for those meeting certain minimum age and service requirements, a disability pension if an employee is unable to work due to a disability, and a deferred vested pension, if employees leave after vesting and are not eligible for either of the other two pensions offered. Sickness and accidental death benefits under the plan begin with the first day of employment. The company pays the entire cost of the plan, and vesting occurs within 5 years of service.

Lucent also offers a Long-Term Savings and Security plan to occupational employees. Through the plan, employees can contribute up to 16 percent of their eligible salary in either pretax or after-tax dollars. Employees can choose to invest in up to 13 funds[87]. Although employees become eligible for the plan after 6 months of credited service, the company matching contributions (.66 2/3 for every $1) do not begin until

[87] Employer matching contributions are automatically invested in the Employer Shares Fund.

employees have completed 1 year of service and employees are not fully vested in the plan until they complete 5 years of service. Employees may borrow or withdraw from their accounts, subject to some restrictions.

Educational and Training Programs

Information on the education and training programs offered to Lucent's occupational employees currently is not available. However, we report information on several of Lucent's internship and co-op programs.

Lucent offers several "Early Career Identification" programs, including summer internships, internships, and co-ops, to eligible students in specified majors. Internships are offered to students ranging in level from college freshmen through PhD students and college faculty members and usually entail a 10-week assignment. Co-ops are limited to one semester and are offered to undergrad freshmen, sophomores, and juniors.

In addition to the "Early Career Identification" programs, Lucent offers special programs and scholarships to women and minorities. Through the Inroads program, the company sponsors students for a 2- to 4-year period, with the promise of full-time employment upon successful completion of the program. Students apply for the program as high school seniors or within their first 2 years of college. The GEM Fellowship Program offers those earning an M.S. in engineering, a Ph.D. in science, or a Ph.D. in engineering paid summer internships and financial assistance for graduate school. The Summer Research Program for Women gives women completing their second or third year of college the opportunity to work with researchers over a summer. The Graduate Research Program for Women makes grants and offers fellowships to women doing full-time work on a science or engineering Ph.D. Finally, the Cooperative Research Fellowship Program for Minorities offers tuition, fees, books, an annual stipend, and travel expenses to promising minority candidates.

Work/Life Programs

Lucent offers several different work/life programs. All services are free and may be used as frequently as needed, but employees may have to pay for treatment by referred providers and other related expenses. Services are delivered through an outside provider—DDC, Inc.—and are available 24 hours a day, year-round.

Child Care

At Lucent, the Family Resource Program offers resource and referral services for child care and advice on parenting issues. The program also assists parents with their children's educational issues. Although the company does not directly provide child care services, employees can defer up to $5,000 annually in pretax dollars for child and/or adult care expenses. Furthermore, Lucent's Family Care Development Fund offers grants of up to $40,000 each to eligible child and school-age care programs throughout the United States.

Elder Care

Lucent's Family Resource Program also offers employees elder care resource and referral services. These services help employees to locate, evaluate, and manage care and provide advice. Similar services are also available for employees with a family member with special needs. In addition, Lucent's Vital Aging Resource Program offers a website designed to help individuals better plan for the long-term care of an elder.

As mentioned above, Lucent occupational employees can defer up to $5,000 annually in pretax dollars for child and/or adult care expenses. And the Family Care Development Fund also makes grants of up to $40,000 each to eligible adult care programs. Finally, Lucent employees can purchase long-term-care insurance for their elder family members.

Adoption Benefits

Lucent's occupational employees become eligible for adoption benefits after 6 months of service. These benefits, which include consultations and referral services and the payment of court costs, agency expenses, legal fees, and temporary child care costs, are capped at $3,500 annually.

Employee Assistance Program (EAP)

Lucent also offers confidential assessment, counseling, referral, and follow-up services to employees and their immediate families. Services are administered through Health Services and assist those with emotional difficulties, substance abuse, marital, or family concerns, or other personal concerns.

Prepaid legal services are offered to employees, their spouses, and other family members after 6 months of service through a separate program. Services include consultations with attorneys, separation,

divorce, or annulment proceedings, wills, real estate sale, purchase, or refinancing of primary residence.

Finally, the Family Resource Program offers several other services, including career counseling and advice on maintaining a work/life balance, choosing a financial planner, or planning retirement.

Flexible Work Arrangements

Information on Lucent's flexible work arrangements is not currently available.

Other Benefits and Services

Information on other benefits and services, including housing and casual dress, is not currently available.

United Parcel Service

Headquartered in Atlanta, Georgia, United Parcel Service (UPS) realized sales of $29.8 billion in 2000 with a staff of 359,000 employees. Members of the founding families, managers, employees, and retirees primarily own the company, which was named "Company of the Year" by *Forbes* magazine in January 2000.

Although UPS does not specifically recruit workers with technical skills, we chose to examine its benefit offerings for several reasons. First, much of UPS's staff is part-time. Although military reservists have been omitted from the analysis thus far, their role in military operations has become more expansive over time. Coupled with the ability of active-duty servicemembers to move to reserve status, there is considerable interest in the characteristics of part-time opportunities available to servicemembers.

Incentive Pay

UPS offers a variety of incentive pay structures to its employees. All employees are eligible for the receipt of stock options, and all UPS employees can purchase company stock through a direct payroll deduction. Gainsharing payments and team-based incentive pay are available to employees in specific UPS operations. Signing and hiring bonuses are also used at the firm, particularly for Information Systems positions. Finally, the manager's incentive plan offers stock incentives based on company profits to select staff.

Employees can also receive nonmonetary awards for significant lengths of service, safe driving, safe work, community service, or individual contributions.

LEAVE

UPS offers employees several types of paid and unpaid leave. Employees receive 8 paid holidays annually. In addition, employees receive 2 to 6 weeks of paid vacation, depending on length of service. Although employees cannot carry over unused vacation days, nonexempt employees can cash out these days annually. Nine paid discretionary leave days, which can be used for any purpose, and paid bereavement leave are also available. UPS employees are typically allowed additional informally arranged paid time off for school/child care functions or the care of a mildly ill child.

In addition to unpaid leave required under the FMLA, unpaid personal leaves of absence of up to 1 year are available on a case-by-case basis.

Short-Term Disability Insurance

UPS employees receive short-term disability coverage after a waiting period of up to 4 days, varying based on the disability incurred. Management employees receive their regular salary during the disability period; nonmanagement employees receive regular pay for 13 weeks and 60 percent of regular pay for 14 to 26 weeks of disability.

Long-Term Disability Insurance

Long-term disability coverage for UPS employees begins after the 27th week of disability for a nonexempt employee and after the 53rd week of disability for an exempt employee. The coverage is provided at no cost to the employee, but employees have the option of purchasing a supplemental COLA benefit. For most conditions, coverage continues for as long as the disability persists.

HEALTH INSURANCE

UPS employees can choose between an HMO, POS, or PPO health plan and can select varying levels of coverage. Each employee is given an equal number of "credits"—irrespective of pay, position, or length of service—that can be expended on health insurance. If the costs of coverage exceed the value of the credits issued, the employee pays the

difference. On average, employees contribute approximately $60 per month for health insurance coverage.

The health plans that UPS offers typically do not require a deductible, but usually entail a copayment. On average, copayments range between $10 and $15 per office visit.

Retiree Health Insurance

UPS employees retiring with at least 10 years of service after age 55 are eligible for retiree health insurance, whether or not they are Medicare eligible. Retirees may choose between an HMO or POS health care plan. Company liability is capped in the defined dollar benefit plan, with the retiree responsible for all premiums above this cap. The required contribution varies with years of service. Only a small share of retirees currently must pay premium amounts, and those with 25 years or more of service make no contribution for health coverage. Finally, UPS also provides prescription drug coverage to both pre- and post-Medicare retirees.

Other Health Insurance Programs

UPS employees also receive a range of other health insurance programs. These programs include:

- *Prescription drug coverage* - UPS employees with health insurance receive prescription drug coverage at no additional cost. A 90-day supply of prescription drugs can be ordered via mail. Copayments and mail-order costs range from $5 to $30 (depending on plan).
- *Dental program* - UPS employees receive dental coverage. Unless a DMO option is chosen, deductibles ranging from $50 to $100 apply.
- *Vision program* - UPS employees receive vision insurance, which covers the cost of annual eye exams. Depending on the plan chosen, the cost of eyeglasses may also be covered (subject to certain restrictions).
- *Wellness programs* - UPS offers a variety of wellness programs to its employees. Prenatal care and well-baby programs are available at all locations, whereas weight loss, smoking cessation, stress reduction, and health screening programs are available only in certain locations. Alcohol

and drug treatment and referral programs are part of the Employee Assistance Program.

- *Long-term-care insurance and cancer insurance* - UPS employees can purchase long-term-care and cancer insurance, but must pay the costs of this coverage. Several different long-term-care options are available. Met Life provides long-term-care insurance; AFLAC provides cancer insurance coverage.
- *Flexible spending accounts* - UPS offers employees access to flexible spending accounts for incurred health-related expenses. Contributions must be at least $50 and can be as much as $3,500 annually.

OTHER INSURANCE PROGRAMS

Life Insurance and Accidental Death and Dismemberment Insurance

UPS employees receive 12 times their monthly salary (up to a $1 million) in company-paid life insurance. Employees' spouses and children receive $2,000 of life insurance at no additional cost. Employees can purchase supplemental life insurance coverage in $1,000 increments up to a maximum amount of $1 million. Cost varies based on age and smoking status.

UPS also provides workers with AD&D coverage. The company provides basic coverage of 12 times a worker's monthly salary (up to $1 million). As with life insurance, supplemental coverage can be purchased in $1,000 increments up to a maximum amount of $1 million and cost varies with age and smoking status.

Business Travel Accident Insurance

UPS offers $100,000 of business travel accident insurance to employees at no cost.

RETIREMENT

UPS offers employees both a defined benefit pension plan and a defined contribution 401(k) plan. UPS employees are eligible to participate in its defined benefit pension plan after 1 year of service. Workers become eligible for the company's defined contribution savings

plan after 6 months of service. The plan makes a 100 percent match on the first 3 percent of employee contributions.

EDUCATIONAL AND TRAINING PROGRAMS

UPS offers employees (and in some cases, their dependents) several educational and training programs.

Tuition Assistance Loans or Grants

Full-time UPS employees are eligible for up to $5,250 in tuition reimbursement annually for pre-approved job-related coursework. Up to $65 per class is available for the purchase of books and materials and no reimbursement requirements currently exist.

One UPS program that has received considerable attention is the "Earn and Learn" program, which offers employees up to $23,000 in forgivable loans and tuition. Available in 40 cities thus far, over 10,000 employees have enrolled nationwide and have received over $9 million in educational assistance. The program offers $3,000 annually ($15,000 limit) in tuition assistance to part-time employees upon employment. In addition, $65 per class is available for fees, textbooks, etc., and is payable over 4 years. Part-time employees can also receive up to $2,000 annually in student loans (limited to $8,000 over 4 years) that is repaid by UPS based on an employee's tenure. After 4 years, a full $8,000 can be repaid by the company, with the student only paying interest.

There are some indications that the "Earn and Learn" program has been successful. Since its initiation, retention is up 30 percent among enrolled employees.

In addition to the "Earn and Learn" program, UPS also offers several cooperative education programs. To maintain its rapidly growing airline operations based in Kentucky, UPS has launched a cooperative program called Metropolitan College in Louisville, Kentucky, that offers free tuition, housing, and books to part-time UPS workers based in that facility. The company also offers high school juniors and seniors a "School-to-Work" program to earn college credit while working part-time at UPS offices based in several large cities. Finally, UPS offers co-op opportunities through several colleges and technical schools and hires university interns from around the country.

UPS employees may also receive ConSern educational loans. These loans are available to UPS employees or their dependents for study at a private K-12 school, undergraduate or graduate institution, or at a

professional or vocational school. Up to $25,000 is available annually (with a $100,000 maximum) and can be used to finance tuition or living expenses.

Finally, the children of full-time UPS employees may receive academic or vocational/technical scholarships through the Dependent Children Scholarship program. Based on need, these 4-year scholarships can cover up to 100 percent of the costs of education.

In-House Training

UPS provides its employees with considerable in-house training opportunities. All employees receive orientation, safety and health, workplace-related, and apprenticeship training. In addition, basic skills training courses are offered at several UPS facilities either before or after work. Employees also have the opportunity to attend outside seminars and conferences related to job duties, and all job holders receive considerable on-the-job training.

WORK/LIFE PROGRAMS

UPS offers employees access to several different work/life programs. These programs include:

- *Child care* - UPS offers employees several child care services. Fully paid child care referral services and parenting education are available through the company's Work/Life Assistance program. Listed child care providers also offer employees discounts on services. In addition, UPS employees may contribute to a flexible spending account for incurred child care/elder care expenses. Contributions must exceed $50 and are limited to $5,000 annually.
- *Elder care* - Elder care referral, education, and counseling services are available through UPS's Work/Life Assistance program. UPS employees may also contribute to the child care/elder care flexible spending account described above.
- *Adoption benefits* - UPS offers adoption assistance benefits to employees. The maximum annual reimbursement is $3,500 per child, with an additional $1,500 available for the adoption of a child with special needs.
- *Employee Assistance Program (EAP)* - UPS's EAP offers employees financial assistance, alcohol and drug referral

and treatment services, and mental health services. Substance abuse and mental health treatment services are provided through employees' medical plans. In addition to its child and elder care counseling and referral services, the Work/Life Assistance program offers financial referral, education, and counseling services as well as assistance with virtually any everyday personal concern.

- *Legal programs* - UPS's legal services plan offers employees assistance with a variety of matters, including will preparation, adoptions, matrimonial cases, debt collection defense, defense in civil actions, divorce, real estate, and estate administration and closings. Employees using a nonparticipating attorney are required to pay fees in excess of the scheduled benefit amount.
- *Flexible work arrangements* - UPS offers employees several different flexible work arrangements. For example, UPS employees may telecommute if they make a request and their position warrants such an arrangement. Job sharing is available at some sites for some occupations, as are compressed workweek schedules. Although phased return from leave is not offered, those returning from an extended absence can be assigned temporary alternate work as needed.

Other Benefit Offerings

UPS offers employees several types of other benefits, including housing, relocation, discount, and cultural gift program benefits.

UPS offers several housing-related benefit programs. For example, through the Employee Mortgage program, select providers offer UPS employees discounted home loans. The Personal Lines Insurance Purchase program allows employees to make payroll deductions for the purchase of a home as well as for the purchase of auto insurance.

UPS also offers a variety of relocation benefits. Benefits can include assistance with the marketing, sale, and closing on a house, brokerage fees, home purchase (in some circumstances), temporary living expenses, the moving of household goods, househunting trips, spousal employment, and school placement for dependents.

The company also provides an employee discount program and uniforms to its employees. The corporate headquarters offers employees

access to a fitness center and cafeteria. Employees at other locations are offered discounts at local fitness facilities.

UPS's Cultural Gift Matching program matches employee gifts to cultural and educational organizations meeting specified guidelines. To be eligible for the program, employees must be employed full-time and have completed at least 1 year of service.

Finally, UPS offers its employees some flexibility in benefits. Through a Section 125 plan, UPS workers can choose among a variety of different benefits to tailor a package that suits their individual needs.

Assessing Select Companies' Incentive Pay and Benefit Programs

Taken together, the information presented above can be used to qualitatively assess select companies' incentive pay and benefit programs and compare these programs to the offerings of most large, private-sector employers.

Incentive Pay

Like most large, private-sector firms, each of the described companies offers some form of incentive pay.[88] These incentive pay programs vary from stock-based programs and cash bonuses to nonmonetary awards.

Leave

The described companies also offer several forms of paid and unpaid leave. Like most large, private-sector firms, the selected companies offer paid holiday, vacation, and bereavement leave. Vacation leave accrues and varies with length of service, but company policies regarding the carryover or cash-in of leave vary. The described companies' sick leave policies are somewhat atypical—with NNS offering no formal sick leave and UPS offering only discretionary leave. Finally, like most large, private-sector companies, NNS, Lucent, and UPS all offer FMLA leave, unpaid leaves of absence, and short- and long-term disability coverage. In addition, both NNS and UPS offer informally arranged paid time off for school/child care functions or the care of a mildly ill child.

[88] NNS has been omitted from the discussion of incentive pay and traditional leave offerings because no information on the company's programs is currently available.

HEALTH INSURANCE

The described companies also offer basic health insurance coverage, as do most large, private-sector companies. Lucent and UPS offer employees a choice among plan structures, whereas NNS employees only receive a POS option. Depending on the plan selected, employees may have to pay a share of the direct costs of health insurance provision. Not all company plans require deductibles, but all do require copayments.

RETIREE HEALTH INSURANCE

The companies examined all offered some retiree health insurance benefits, compared to about half of all large, private-sector firms. Years of service required for benefit receipt ranges from 10 to 15, with no company providing benefits before age 45. The described companies all offer retirees some plan choice, but typically require retiree contributions toward the cost of coverage. Deductibles and copayments vary across plans, but all plans offer prescription drug benefits. In addition to these benefits, NNS retirees also receive some life insurance coverage.

OTHER HEALTH INSURANCE PROGRAMS

The companies examined also offer employees access to some additional health insurance programs. An assessment of these offerings follows:

- *Prescription drug programs* - Like most large, private-sector firms, each offers employees prescription drug benefits at no additional cost and the ability to order prescriptions by mail. Deductibles and copayments vary by plan.
- *Dental programs* - All companies offer dental insurance, but NNS employees pay a share of the direct costs and deductibles, copayments, and coinsurance rates vary by plan.
- *Vision programs* - All described firms also offer vision insurance, although the degree to which the employer finances the direct cost of insurance varies from 100 percent at UPS to 0 percent at NNS.
- *Wellness programs* - Whereas only about half of all large, private-sector firms offer wellness programs, all companies examined offer programs, including services ranging from alcohol awareness and education to well-baby programs.

- *Health screening services* - Although survey data suggest that over half of all large, private-sector firms offer health screening services, UPS only offers these services in certain locations, and services are not offered by NNS or Lucent.
- *Long-term care insurance* - Like most large, private-sector firms, NNS offers no long-term care insurance. Coverage is available to Lucent and UPS employees, but they must fully absorb the coverage's cost.
- *Flexible spending accounts* - Like the majority of their counterparts, all three firms examine offer flexible spending accounts for health-related expenditures.

OTHER INSURANCE PROGRAMS

Like most large, private-sector firms, all described companies offer basic life and AD&D insurance to employees at no additional cost. Employees may purchase supplemental and dependent coverage for an additional cost.[89] Finally, all companies examined provide employees with free travel insurance.

RETIREMENT

Each company examined offers both a defined benefit and a defined contribution plan. Like most large, private-sector firms, the defined contribution (401(k)) plans offered by these companies grant an employer match, either in stock or in cash. Typical of other large, private-sector firms, other retirement-based plans are not offered, except that Lucent honors the preexisting ESOPs of current employees.

EDUCATIONAL AND TRAINING PROGRAMS

The companies examined all offer some educational and training programs. Tuition assistance is available at NNS and UPS, and—unlike in most large, private-sector companies—no preemployment period is required for eligibility. Additionally, UPS offers some reimbursement for the cost of books and fees and extends benefits to part-time employees. All three described companies offer co-ops, and Lucent and UPS also offer several scholarship opportunities. UPS also grants several

[89] UPS provides $2,000 of life insurance coverage to employees' spouses and children at no additional cost.

educational loans (including forgivable ones) that are atypical of most large, private-sector company offerings.

All described companies also offer some in-house training in orientation, safety and health, and job skills. Basic skills training is also offered at NNS and UPS.

WORK/LIFE PROGRAMS

The described companies offer several work/life programs. An assessment of these programs follows:

- *Child care* - Coincident with trends nationwide, none of the companies examined offered onsite or near-site child care. Rather, like only about one-third of their large, private-sector counterparts. they all offer resource and referral services. All companies examined also offer dependent care spending accounts. In addition, Lucent makes grants to qualifying child care programs and UPS offers child care discounts.
- *Elder care* - Atypical of most large, private-sector companies, all companies examined offer elder care research and referral services. All companies also allowed contributions to the dependent care spending accounts described above for elder care expenses. Unlike most large, private-sector companies, Lucent makes grants to qualifying elder care programs and also offers long-term care insurance to dependents.
- *Adoption benefits* - Unlike most of their large, private-sector counterparts, both Lucent and UPS offer adoption benefits. Both programs cap benefits at $3,500 annually, slightly higher than the average maximum reimbursement for adoption costs among all companies offering these programs.
- *Employee Assistance Programs* - Like most large, private-sector companies, all companies examined grant employees access to EAPs that include counseling, substance abuse assessment, and treatment services. In addition, unlike most counterparts, Lucent and UPS provide employees with some legal and financial services (either through the EAP or through a separate program).

- *Flexible work arrangements* - The companies examined varied in their provision of workplace flexibility measures.[90] Whereas NNS only offers employees a flexible scheduling (flextime) option, UPS offers employees access to telecommuting, job sharing, and compressed workweeks (subject to certain occupational and regional restrictions).

OTHER BENEFIT OFFERINGS

Described companies also offer employees several other benefits.[91] Like most large, private-sector companies, both NNS and UPS offer relocation benefits. These benefits can include such things as assistance with house hunting, home purchase, temporary living expenses, and the moving and storage of household goods. Unlike most of their counterparts, NNS and UPS also offer spousal relocation and mortgage assistance. Finally, they each offer several nontraditional relocation benefits, such as school placement for dependents and incidental allowances.

In addition to its offered relocation benefits, UPS also offers an employee discount program and provides uniforms to employees. Employees have some access to fitness centers, and—unlike in most large, private-sector firms—are able to tailor benefits to their individual needs. Finally, employees' charitable contributions can be matched through UPS's Cultural Gift Matching Program.

SUMMARY

Our examination of the three companies selected shows their incentive pay and benefit offerings—with the exception of UPS's generous educational benefits—to be fairly typical of the offerings of other large, private-sector firms. As such, there is little reason to believe that their appeal to individuals leaving the military arises from inherent differences in their offered incentive pay and benefit programs.

[90] Lucent is omitted from this discussion because no information on its flexible work arrangement programs is currently available.

[91] We omit Lucent from this discussion because no information on its other benefit programs is currently available.

CONCLUSIONS AND POLICY RECOMMENDATIONS

In this report, we examined the issue of whether private-sector incentive pay and benefit offerings differ significantly in their provision, scope, or structure from programs available to servicemembers and, if so, whether these differences have played a role in the military's recruiting and retention difficulties. We find that there are several key areas where military and private-sector incentive pay and benefit provision significantly differ:

- Incentive-based pay
- Health care
- Retirement
- Education and training
- Child care
- Workplace flexibility
- MWR and other quality-of-life programs.

In most cases, military benefits are broader in scope than those offered by the private sector—a proposition confirmed by recent CNA research showing that the relative cost to the military of benefits exceeds that in the private sector.[92] However, incentive-based pay and workplace flexibility measures are more prevalent in the private sector than in the military.

We also found that military and private-sector incentive pay and benefit programs often differ in structure. For example, the shift from defined benefit to defined contribution plans—particularly in the area of retirement—offers one striking structural difference in these offerings. In fact, some private-sector employers and employees have even expressed interest in shifting toward defined contribution rather than defined benefit health care plans.[93] Although matched defined contribution retirement plans are now the norm in the private sector, no such option is currently available to servicemembers. The new TSP program gives servicemembers a defined contribution retirement option but, because no match is offered, its appeal will be limited.

[92] Differences are most significant in the areas of retirement and health care [24].

[93] A 1999 survey of senior executives at Fortune 1000 companies and employees found that 46 percent of surveyed senior executives and 73 percent of surveyed employees were receptive to such a concept [43].

Finally, military and private-sector benefits differ in the degree of choice that they offer to employees and servicemembers. For example, servicemembers are allowed no choice in health care coverage or retirement programs. Although the military spends relatively more than the private sector on benefit programs, limited choice may mean that these programs do not necessarily have greater "value" to the servicemembers who receive them. In fact, changes in the "mix" of benefits that the military provides may better appeal to servicemembers the military hopes to retain.

RECOMMENDATIONS

Consider Introducing Cash and Choice Into Compensation

Because the military has considerable difficulties with first-term retention, compensation strategies that put relatively more compensation into cash and allow for more individual choice in benefits may help to retain younger individuals, who typically have a short time horizon because of frequent job changes and few dependents. In fact, BridgeGate reports that younger workers (age 18-24) are more likely to stay with an employer if given a raise than workers in older age groups. At the same time, workers with a high school degree or less place more value on benefits than wages [78]. Although these trends conflict, as more servicemembers with higher levels of education enter the services or receive educational benefits while in the services, the first of these first effects is likely to outweigh the other—resulting in a preference for cash-based compensation.[94]

Thus, even if the value of total compensation in the private sector and the military were equal, shifting compensation from programs requiring a long time horizon (e.g., defined benefit retirement benefits) to more short-term, visible programs (e.g., higher pay/bonuses or portable defined contribution retirement benefits) could make a compensation package with the same cost more attractive to younger servicemembers.

Shifting away from the direct provision of many services, including housing, child care, and food services, toward the use of financial offsets or incentives could also improve choice for servicemembers of all ages. As more private-sector companies move toward the provision of "flexible

[94] In fact, data suggest that temporary workers (who are typically younger than their counterparts in traditional employment) often opt out of private-sector health care and pension plans [79].

benefits" that allow individuals to tailor both benefits and the pay/benefit mix to suit their own needs, restricted choice may work to the military's disadvantage.

Introducing Incentive-Based Pay Could Improve Performance

Trends in the demographics of the military population suggest that the military may also want to consider ways in which private-sector incentive-based pay programs can be adapted to become part of military compensation. Despite cultural and methodological concerns about initiating incentive-based pay structures in the military, these pays have the potential to both improve military performance and increase compensation for military personnel—either at the individual or team level. Examination of private-sector incentive pay programs could also prove useful as the military looks for ways to introduce skill-based pay.

Assignment and Work Schedule Flexibility Could Improve Work/Family Balance

Workplace flexibility measures, which can be relatively inexpensive to implement, may also be useful in improving first-term retention. Because many survey respondents report that the location/schedule of work or the compatibility of the servicemember's job with his or her spouse's career/job played a role in decisions to leave the Navy, it is likely that measures that introduce additional flexibility in the location and timing of military work would help to ease these pressures and could potentially stem personnel losses. All military functions and positions should be evaluated to determine whether work could be better organized to suit servicemembers' needs without compromising military readiness. New technologies could facilitate additional workplace flexibility. Similarly, the uniform provision of some paternity leave may also improve satisfaction. As women continue to enter the workforce and pursue careers, measures that allow servicemembers to better balance work and family will be increasingly important.

Consider Increasing the "Costs" of Separation

In addition to taking steps that encourage individuals to enlist in the military, steps should also be taken to discourage servicemembers from separating. As survey information reveals, private-sector opportunities play a significant role in the separation decisions of both attrites and EAOS losses. Our research indicates that individuals may seek military technology-based training with the hope of subsequently leaving for a

lucrative private-sector job. Although it was historically the case that the stigma associated with attrition served as a significant deterrent to premature separations, this may no longer be the case. In a labor market so tight that employers are willing to overlook the transgressions of ex-convicts, former gang members, and recovering drug addicts, a broken military enlistment contract is unlikely to generate much concern [80].

As a result, the military should design policies and procedures that effectively "punish" those not completing their enlistment contracts and that reward those who do. Penalties could include the recoupment of the entire enlistment or reenlistment bonus granted (rather than just recoupment of the unserved portion) and the revocation of MGIB benefits.

Consider Publicizing Benefits and Improving Information Access

Finally, our research revealed another move that could potentially help military recruiting—the consolidation of information on the benefits associated with military service. A short pamphlet or easily accessible website could serve this purpose.[95] Currently, information about the various benefits offered to military personnel and their families is scattered among an array of websites and publications.[96] Most private-sector companies offer materials of this type, so such a move would facilitate comparison of offered private-sector and military compensation packages. Because we found that the military generally provides more generous benefits than its private-sector counterparts, a section that highlights these differences could also prove useful in recruiting.

The consolidation of information services would also be useful to those already in the services. Much as the "one-stop shopping" approach to government job training and placement services has improved access, a similar approach to military benefit programs could be taken. Although programs are managed by a variety of different offices and agencies, one website or publication that refers servicemembers to the relevant contact person or agency would be useful.

Finally, expanding the role of the services' career counselors could also support the dissemination of information about military benefit programs and could help to discourage servicemembers from seeking separation. The detailers we interviewed noted that they do not have the

[95] Lucent's "Benefit Answers" website is a prime example of how this information can be organized. See benefitanswers.web.lucent.com.

[96] Reference [46] provides one good summary, but this is unlikely to be available to new military recruits.

time or resources to contact or track servicemembers who choose to separate. If the services' career counselors were able to conduct something similar to a private-sector exit interview before a servicemember's separation (or even counsel the individual before the separation decision), useful information about the reasons for seeking separation and the characteristics of those separating potentially could be obtained.

Ultimately, changes in the military's incentive pay and benefit offerings alone are unlikely to completely solve the military's recruiting and retention problems. But they may represent a meaningful step in the right direction.

APPENDIX

ATTRITION AND REENLISTMENT SURVEY

To assess the role of private-sector opportunities in the attrition and reenlistment decisions of Sailors, we conducted an informal 23-question survey, which was distributed at the Navy Executive Panel on Attrition summit held in Millington, Tennessee, November 20-21, 2000 (see table 1 for sample information).

Table 1. Summary of Survey Data

Survey Statistics	Attrition Portion	EAOs Portion
Number of Respondents	42	42
Number Reporting Job Prior to Separation	N/A	17
Number Reporting Job After Separation	7	10

The survey asked for information on people who attrited from the Navy as well as those who left at their EAOS. Respondents included Fleet, Force Command Master Chiefs, and Career Counselors in attendance as well as people who later received e-mail versions of the survey from their commanders and/or senior enlisted personnel. Responses were returned onsite or via e-mail. In total, 42 persons responded to the survey.

The survey approach was viewed as a satisfactory alternative to conducting focus groups of the fleet—an undertaking that places a significant burden on military personnel. Because the survey was designed to elicit information similar to that available through conventional focus group techniques, little emphasis was placed on creating a representative sample survey. Rather, data are meant to convey qualitative information on the role of the private sector in individuals' separation decisions.

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CHAPTER IV

CHANGING AIR FORCE COMPENSATION:

A CONSIDERATION OF SOME OPTIONS

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

SUMMARY

This document considers two possible changes to the Air Force compensation system: skill pay and capability pay. Skill pay is pay for designated skills, and capability pay is pay based on individual capability. The Air Force asked RAND to consider these pay concepts and bring to bear information on whether the Air Force should adopt them and in what form. To learn more about what role these pays might play, we reviewed the Air Force's manpower situation, considered underlying causes of problems, tracked relevant trends in civilian wages, and examined data on the level and composition of military compensation. With this information in mind, we identified possible changes in the current compensation system and addressed the potential benefits and implementation issues of introducing skill pay and capability pay instead.

The Air Force personnel system appears to have been under considerable stress. The percentage of recruits who are of "high quality" declined during the 1990s, as did first- and second-term retention rates and mid-career officer continuation rates. First- and second-term retention rates improved from 1999 to 2000, however. In addition, the Air Force was less likely to keep its high first-term performers compared to its lower first-term performers during the latter 1990s. The same indications of personnel duress also occurred in the Army, but the Navy and Marine Corps showed either less adverse change or outright improvement during this period. The Navy and Marine Corps were also more likely to keep their high performers relative to their lower performers.

Air Force personnel are increasingly called upon to participate in peacetime operations. The increase in the percentage of personnel who had any episode of deployment involving hostile duty rose during the post-Gulf War 1990s, as did the expected number of such episodes. This increase contributed to a decline in first-term reenlistment among personnel with episodes involving hostile duty. However, reenlistment increased among personnel who had an initial experience of such duty. On net, the increase in duty episodes probably had little effect on first-term reenlistment, although reenlistment likely declined among personnel repeatedly called to participate in operations with hostile duty.

The supply of personnel to the Air Force, like that to the other services, was affected by cyclical and long-term factors. The strong civilian economy hurt recruiting and retention. Low unemployment rates meant plentiful civilian job opportunities, and civilian wages grew

steadily. The increase in civilian wages during the second half of the 1990s was faster than the increase in basic military pay. FY00 legislation called for basic pay raises half a percentage point larger than usual — i.e., larger than the increase in the Employment Cost Index. The scheduled raises, along with high enlistment and reenlistment bonus budgets, will help recruiting and retention, but the pay raises will not be fully implemented until 2006. In addition to the fact that the civilian economy was at the top of the business cycle in the late 1990s, recruiting was affected by the long-term upward trend in college enrollment. This reduced the relative size of the traditional recruiting market and increased pressure on the services to improve recruitment from the college market. Another long-term trend was the faster pace of wage growth for persons with four or more years of college. Wages for persons with four or more years of college grew unusually fast in the 1980s, and although this pace slowed in the 1990s, it was still faster than the wage growth of persons with only a high school diploma. The college wage trend encouraged college enrollment and created attractive civilian job opportunities for college graduates and people with a college degree, especially officers. Looking to the future, it seems likely that civilian wages will remain high for college graduates, although the year-to-year increase in their wages might slow even more as the economy absorbs the increase in the supply of college graduates. In addition, wage trends occurred in particular civilian labor markets. Wages rose rapidly for workers in information technology, and employment opportunities were abundant for aircraft pilots, for example.

Most of the difference in military pay among personnel at a given year of service is due to differences in rank and in pays and allowances related to location or circumstance, e.g., overseas cost of living allowance, Family Separation Allowance, and Hostile Fire Pay. When we compare the average pay over the career of Air Force personnel across broad occupational areas, the pay profiles are nearly identical. On average, the Air Force provides very similar career and pay opportunities within these occupational groupings. Within a grouping there is some variation in pay due to bonuses and special pays, yet these amounts are typically a small fraction of annual cash pay. This is not to overlook the large bonuses or special pays in certain occupational areas such as aviators, doctors, and nuclear-trained personnel that do in fact result in large pay differentials.

Given this background information, the Air Force may want to consider steps that could strengthen the current compensation system, in addition to considering skill pay and capability pay. We suggest four possible steps to strengthen the current system. First, the decline in Air Force recruiting and retention might have been lessened if more timely

and more accurate information about civilian wages had been available. This information might have been useful in formulating budget requests, seeking a reprogramming of funds already appropriated to the Air Force, and developing more precise information about the market forces that made recruiting and retention harder. We suggest the Air Force establish the capability to monitor civilian wages closely and with minimal lag. As part of this effort, it would be valuable to establish a capability to monitor the civilian wages of personnel who have left the Air Force. This should be done on a regular basis, e.g., as an annual survey of former members in their civilian jobs, with stratified sampling by specialty to assure sufficient sample sizes and with survey responses linked to members' service records.

Second, the basic pay table could be reshaped to make basic pay grow increasingly rapidly with respect to rank. Making the pay table more "skewed" toward higher pay for higher grades should cost-effectively increase retention, increase the incentive to exert effort and perform effectively, and encourage the retention of the most capable enlisted and officer personnel. Higher percentage pay increases for middle and high-ranking personnel than for junior personnel would be a step in this direction. Third, selective reenlistment bonuses could be restructured to make them worth more, with rewards more connected to skill level and grade level, and bonus budgets could be increased. In particular, anniversary bonus payments could depend on one's skill level and grade, which would create greater incentive to reach higher skill levels and be promoted faster. Tying bonuses to skill level requires a system that designates the particular "skills" and "skill levels" to be rewarded. The skill levels might or might not differ from the Air Force's skill level designator for enlisted personnel (i.e., "1", "3", "5", or "7"). Fourth, Hostile Fire Pay/Imminent Danger Pay could be revamped from its current form of $150/month for any hostile duty or exposure to imminent danger during a month. Because our analysis shows that first-term reenlistment declines as the number of episodes with hostile duty rises, the level of HFP could be made to depend on the number of hostile episodes. HFP for the current episode would be higher the greater the number of previous hostile episodes; personnel called on the most for hostile duty would be rewarded the most. This should help prevent lower reenlistment among those who are called upon more often to perform this duty.

While we think the changes just suggested merit attention, they do not obviate the need to consider skill pay and capability pay.

Skill pay is intended to provide higher pay for certain skills. Presumably, the emphasis is on skill, not occupation; personnel with designated skills would receive skill pay regardless of their duty

assignment and regardless of whether they used the skills in their assignment. It would be necessary to define "skills" and to establish a program to maintain skills and certify that they had been maintained. Skill pay would help conserve a *stock* of designated skills that are valuable for military capability and that might be costly and time-consuming to replace. These skills might also be in high demand in the private sector, although not necessarily. In contrast, bonuses help manage the *flow* of personnel in selected specialties in order to prevent current manning shortages due to temporary factors such as the business cycle. The personnel in those specialties might have varying levels of a skill. Compared with bonuses, skill pay has the advantage of being a more stable component of pay that would continue during the service career (or a designated portion of the career).

There are various ways to set skill pay. Skill pay might be a flat monthly amount, or a percentage of basic pay with the percentage rising with rank, year of service, and perhaps time in grade. The skill pay table might designate a start-point and an end-point for pay, such as a certain year of service. The information system to help manage skill pay would presumably include data sources relevant to the Air Force's requirements for the skill, short- and long-run cost of replacing the skill including the time to acquire the skill, and private-sector employment and earnings opportunities for the skill.

Special pays for aviators and physicians exemplify skill pay: the skill communities are well defined, have obvious civilian counterparts, and are costly to replace when shortages occur. In these cases, the occupational specialty and the notion of skill seem to overlap. In contrast, it seems less obvious which maintenance skills, administrative skills, or intelligence skills to include for skill pay. This suggests that each occupational specialty or skill area, however defined, would need to be handled on a case-by-case basis, with overarching criteria for the designation of skills that qualify for skill pay to emerge through practice. Stability in a skill pay table would be advantageous compared with year-to-year uncertainty in the skill pay. Special pays such as Sea Pay, Flight Pay, and Medical Officer Pay are revised infrequently and tend to be a fixed addition to basic pay. If skill pay were set high enough, it would avert retention difficulties. However, if skill pay were not regularly adjusted, it could become ineffective if too low or excessively costly if too high.

Capability pay is intended to provide compensation and incentives for superior individual capability, especially current and prospective future leadership potential. The leadership potential could be for becoming a general officer, for heading a community such as acquisition, logistics, or intelligence, or for both. Capability pay has two potential advantages

within the current compensation system. First, given the value associated with making military pay more skewed, capability pay could be designed to increase nonlinearly with rank. Personnel who qualified for capability pay would then face a pay table that in effect was more skewed. Second, the basic pay table and special or incentive pays are not presently designed to provide higher pay to more capable personnel, holding constant rank and year of service. Capability pay could do so. Skewed capability pay would therefore be expected to help retain the most capable personnel within a rank or year of service. It would encourage personnel to exert effort in order to qualify for capability pay and to reach higher levels of capability pay — which would not necessarily be tied to higher ranks. As a result, capability pay could help support a larger pool of highly capable candidates for the highest-ranking positions, compared with the current pay system. It would also provide personnel managers with more flexibility because they would have other ways to reward capability than through a promotion.

A capability pay system requires an accurate means of assessing performance to infer capability. A member's performance might be judged relative to the performance of peers, a set of standards, or both. To keep budget and administrative costs down, capability pay assessments of performance might not begin until, say, the eighth year of service for officers and until the rank of E-5 for enlisted members. The implementation of capability pay must be perceived as fair. By one interpretation, members should believe that the system gives all members an equal chance of being awarded capability pay, regardless of their assignment or occupational area. The award should be based on a member's performance as assessed by superiors.

If the system is perceived as fair, then capability pay can be paid to selected, high-performing members rather than to all members. For instance, supervisors could be told that only half the members under review could be recommended for capability pay. Even though the assessments would not be flawless, the repeated operation of the assessment process from year to year should work in favor of systematically identifying high performers. The current performance assessment system would presumably be used, but it would have to be adapted to map a given performance assessment to a capability pay award. Further, certification standards are being developed as part of the Development of Aerospace Leaders (DAL) program, and the attainment of certification could be a factor in awarding capability pay.

Capability pay might be implemented as a smaller increment in pay over the remaining years of service, or as a larger increment over a shorter period. The level of pay could rise with rank, year of service, the level of

capability pay already attained, or some combination. Including the level of capability pay already attained serves to multiply the rewards to high performance, thereby providing a strong incentive to excel at the beginning of a career.

Skill pay and capability pay may be helpful to the Air Force in both the short run and the long run, although more information and analysis are needed to determine the form, effects, and cost of these pays. Specific alternatives would need to be assessed in terms of the benefits and costs of alternative implementation strategies, their overall effects on recruiting and retention, their likely effects on pay levels relative to civilian pay, and their likely effects on incentives and on capability in different skill areas.

Alternative methods are available to analyze the proposals, including microsimulation modeling, experimentation, and survey methods. These approaches have been used successfully in the past to understand the effects on recruiting or retention of entirely new, "never-been-tried" personnel policies in the military.

In designing and considering alternative skill and capability pay proposals, it is important to recognize that long-term manning goals may be quite different from the goals of the past. The services are recognizing the advantages of more flexible career management across skill and occupational areas, and they are recognizing the advantages of new methods of managing personnel, including greater use of lateral entry and outsourcing. These potential future changes imply that alternative proposals such as skill pay and capability pay deserve further consideration, and the criteria for assessing them should recognize the range of future Air Force manning requirements.

1. INTRODUCTION

In the late 1990s, the Air Force struggled with manpower supply problems. Recruiting failed to meet its numerical goal in FY99, and the proportion of high-quality recruits (high school diploma graduates with AFQT scores of 50 or above) fell every year from 1995 to 2000. Overall reenlistment rates frequently fell below their target rates, and reenlistment rates remained low in certain specialties. A number of factors have been proposed to explain these decreases: a booming economy with low unemployment, high private-sector pay for technically trained AF enlisted personnel and officers, and more frequent military deployments and hazardous duty assignments associated with peacetime military operations.

The manpower supply situation improved after 1999. The Air Force increased its recruiting resources, Congress passed a multiyear increase in military pay in FY00, the economy softened, and an additional military pay increase took effect in FY02. Although the situation of the late 1990s is past, it nevertheless stimulated discussion about the adequacy of the current military compensation system.

The purpose of this report is to provide information relevant to two compensation system changes under consideration within the Air Force, namely, skill-based pay and capability-based pay. As will be discussed in greater detail later, skill pay is intended to provide higher pay for certain skills, whereas capability pay is intended to provide compensation and incentives for superior individual capability. We also consider changes that might be made to alter the current compensation system. Our approach is predicated on using empirical information about personnel outcomes to gain insight into the shortcomings of the current system. By appealing to empirical information, we can move from the abstract toward the concrete.

Our approach is not limited to empirical information. The manning challenges of the past few years do not necessarily reflect the manning challenges of the future. Furthermore, important aspects of the compensation system's performance are not well captured by available data. For these reasons, past empirical information cannot be expected to cover the full spectrum of compensation effectiveness, and it is useful to have a conceptual perspective to delineate at least some of the additional aspects that should be considered.

As defense manpower research has progressed and the role of compensation as a strategic management tool has become better understood, the measures of personnel outcomes have broadened. In addition to meeting recruiting and retention targets, a compensation system should be judged on whether it retains high-caliber personnel and induces them to exert effort. It should assist in sorting personnel into positions of responsibility in accordance with their capability and productivity, and it should separate them when they are in excess supply relative to the organization's requirements. This document attempts to address at least some of these broader measures.

The Air Force requires a compensation system that can be relied upon to serve its objectives of providing national security through air and space power. The compensation system must be able to deliver an adequate supply of personnel to meet its manning requirements. The personnel must be highly selected, well trained, and highly motivated. The compensation system must be dynamically responsive and sufficiently flexible to

respond rapidly and effectively when manpower shortages occur or loom on the horizon. Since the Air Force's capabilities in combat, combat support, peacetime operations, surveillance, mapping, intelligence, and so forth rely on its personnel, the compensation system must be viewed as a strategic management tool.

Yet the compensation system should support, not intrude upon, Air Force culture and the commitment of its personnel to accomplishing its objectives. It should operate automatically, be proactive rather than reactive, be predictable rather than uncertain, have low administrative cost, maintain cohesion (not promote divisive comparisons), be seen as fair, and be cost effective. It cannot, however, be all of these things at once.

Changes in something as fundamental as the structure of compensation can also affect an organization's culture. Although it is difficult to place a value on culture — and often risky to challenge the status quo — it is nevertheless in an organization's best long-run interest to be open to even radical change. But even when change is feasible and addresses certain problems, the prospective disruption to culture can be forbidding. While we recognize the importance of culture, we have decided to focus on the actual and desired performance of a compensation system. Cultural considerations might be more productively assessed after learning more about the improvements that might come from skill pay and capability pay.

A fact worth emphasizing: the military compensation system plays a critical role in determining the experience mix of the force. Compensation is naturally not the only factor that influences experience mix. In particular, each service constructs its own personnel management system and thereby specifies its own promotion policy. The Air Force differs from the other services in having higher reenlistment rates and slower promotions among the enlisted force. Air Force first-term reenlistment is several percentage points higher than that of the other services; for example, airmen reach E-5 about two years later than enlisted personnel in the other services. Still, given a service's promotion policy, the retention profile by year of service is strikingly similar across occupational specialties and fairly stable over time. Permanent changes in the level and rank/year of service structure of compensation can be expected to result in permanent changes to the retention profile, hence to the experience mix, other things equal. This fundamental fact makes it essential to know (or to question) whether today's experience mix is optimal, and further, whether it is optimal to have nearly identical retention profiles across all specialties. Whatever form it takes, the compensation system must be able to support the optimal mix of personnel. Additionally, if the Air Force

wants the flexibility to change the experience mix within or between specialty areas, the compensation system must also be able to support such diversity. This report addresses whether the changes in the compensation structure suggested for discussion by the Air Force would permit such force flexibility.

In the 1980s and 1990s, the civilian economy changed in a way that increasingly rewarded, through higher earnings, those workers who were better skilled or had a college degree. The vastly improved economic opportunities for civilians with high-tech skills or with a college degree placed a burden on each service's effort to meet its personnel requirements with high-quality personnel, especially in technical skills. The burden was particularly great for the Air Force, which relies heavily on personnel in information technology and knowledge-based skills. While the economic boom added to the burden, the competition for high-tech workers has also come from the information revolution and the value of knowledge (human capital) in economies that increasingly produce services rather than commodities and manufactured goods. The existence of better civilian opportunities for those with technical skill and higher education raises the question of whether there should be more differentiation in military pay to ensure that the best and brightest are retained, especially in key occupational areas and for future leadership positions. Skill pay and capability pay are ways of providing such differentiation.

Thus, at the conceptual level a host of issues must be considered. The most fundamental is the effectiveness of the compensation system in meeting recruiting and retention goals as the economy heats up and cools down. In addition, the compensation system must be able to attract, keep, and motivate high-quality personnel. It must induce them to sort themselves efficiently, so that the personnel most capable of leadership actually stay and become the leaders. Similarly, the compensation system should provide personnel with exceptional technical expertise the incentive to enter positions where they can apply that expertise — and not be driven from service by a lack of professional growth opportunities or inadequate compensation incentives. The sorting and incentive roles of compensation are important because, lacking lateral entry, the services must recruit capable junior personnel in sufficient numbers at the entry level and then identify, train, and advance them to the top of the organization to become the senior leaders and technical experts.

Another role of the compensation system is to assist in separating personnel in circumstances of excess supply, particularly at the end of their careers. These separations must be seen as fair even though they cut short promising and promised careers. The compensation system must adjust rapidly enough to keep pace with the private sector and have the

capacity to reward different skills differently on a temporary or more permanent basis. The compensation system must be able to scale up (accommodate a large increase in end strength) in wartime and scale down in peacetime. Finally, although we focus on active-duty personnel, the compensation system for the reserves must be able to meet reserve-manning goals and do so without adversely drawing personnel away from the active components.

We review recruiting and retention outcomes in Chapter 2 and private-sector wage trends in Chapter 3, also comparing military compensation across the services. This information documents the pattern of retention outcomes across occupations and the decline in the percentage of high-quality accessions. In addition, it helps identify underlying, causative factors such as civilian wage growth, low unemployment, college enrollment, and peacetime military operations — as well as the current structure of military compensation. Together, this information informs our discussion of the Air Force's late-1990s personnel situation and what steps might be taken to strengthen compensation and avoid future problems. In Chapter 4, we analyze a variety of options for improving the compensation system and consider the advantages and limitations of skill pay and capability pay in solving and preventing manning problems, relative to the current system. Chapter 5, the conclusion, discusses the importance of assuring sufficient flexibility in the compensation structure to meet alternative future manning requirements. It also recognizes the need for further assessment of skill pay and capability pay in regard to design (e.g., eligibility, amount, duration), effectiveness, and cost-effectiveness, if the Air Force or DoD decides to pursue these pay options.

2. RECRUITING AND RETENTION IN THE LATE 1990s

We examined late-1990s trends in enlisted recruitment, retention, and reenlistment and officer retention in the Air Force compared with the other services to determine whether the Air Force faces personnel issues that differ in type and magnitude from those of the other services. We focused on the late 1990s, because it is the period after the defense drawdown was completed and the end of Operation Desert Storm. Both the drawdown and the Gulf War caused aberrations in recruiting and retention trends (Asch, Hosek, Arkes, Fair, Sharp, and Totten, 2002). We also considered the effect of "perstempo" on reenlistment, where perstempo is defined as the involvement of personnel in long or hostile duty. This examination of

recent trends provides a backdrop for understanding the role that skill pay and capability pay might play in helping the Air Force achieve its manpower requirements and provides background into some of the reasons why these pays have been suggested as a means of improving manpower management.

Recruiting High-Quality Personnel

During the boom, private-sector employment and educational opportunities were highly attractive to prospective high-quality recruits.[1] From 1995 to 2000, the Air Force and the Army suffered drops of more than 10 percentage point in the proportion of their enlisted recruits who were of high quality (Table 1). The Air Force continued to lead the services in the percentage of recruits of high quality — 72 percent in 2000 — but this percentage had fallen from 82 percent in 1995. For all services, recruiting high-quality youth was more difficult than it had been a decade earlier. By the late 1990s, the increasing number of individuals who were college bound had depleted the high-quality recruiting population. In addition, private-sector wages had been rising steadily (Chapter 3) and unemployment was extraordinarily low.

Table 1. High-Quality Recruits as a Percentage of Non-Prior-Service Recruits

	1995	1996	1997	1998	1999	2000
Air Force	82	81	77	77	75	72
Army	64	61	58	58	53	52
Navy	60	58	61	60	55	54
Marine Corps	62	62	62	62	61	60

Source: Office of Accession Policy, OSD.

Within this broader context, additional reasons are needed to understand why the Navy and Marine Corps had less of a decline in high-quality accessions than the Air Force and Army. Air Force and Army recruiting efforts seemed to be less effective than those of the Navy and Marine Corps, whose percentage point declines in high-quality recruits were less than half as large as those of the Air Force and Army. One study

[1] High-quality recruits are those with a high school diploma and a score in the upper half of the Armed Forces Qualification Test score distribution as normed in 1980.

found that the effectiveness of Air Force recruiters declined in the 1990s relative to the 1980s (Murray and McDonald, 1999). Effectiveness is defined as the percentage increase in high-quality recruits associated with a 1 percent increase in recruiters, other factors held constant. Possible reasons for the decline in effectiveness include the following: less (or less-effective) advertising, an inability to penetrate the college market, a lack of sufficient recruiting resources (number of recruiters, recruiting stations, allocation of recruiters and stations to geographic areas), an inadequate level of enlistment bonuses and educational benefits, and less-than-fully-efficient recruiting operations, including recruiter management and recruiter performance incentives.

The Air Force and the other services generally had growing accession requirements in the late 1990s, whereas in the mid-1990s requirements were lower because of the defense drawdown. The Air Force's enlisted accession goals were 31,000 in FY95, 30,700 in FY96, 30,200 in FY97, 31,300 in FY98, 33,800 in FY99, 34,000 in FY00, and 34,600 in FY01.[2] It is possible that recruiting resources did not increase as fast as accession requirements. From 1995 to 1999, the Air Force had between 950 and 1050 production recruiters. This number increased to around 1100 in FY00 and over 1400 in FY01. The Air Force also made greater use of enlistment bonuses and spent more on recruit advertising in 1999 and later than in 1995-1998, but it may have taken a while for the advertising to have an effect on accessions.

External factors may have been equally responsible for the decreasing ability of the Air Force to attract high-quality recruits in the 1990s. The Air Force traditionally seeks recruits with strong technical aptitudes, but such prospective recruits were undoubtedly attracted by high-tech civilian job opportunities. Thus, even if Air Force recruiting had remained as effective as before, it might have been overpowered by the upsurge in high-tech civilian job opportunities. According to this hypothesis, which combines cyclical and secular elements, when the economy cools off, labor demand will decline and thereby ease recruiting for all services. However, if the demand for high-aptitude skilled workers continues to grow, although more slowly, the Air Force recruiting environment will continue to be challenging. Offsetting these trends, to some degree, will be growth in the youth population, ages 18 to 24, which is projected by the Bureau of the Census to increase until 2010.

[2] Statement of Lt. Gen. Donald L. Peterson, Deputy Chief of Staff, Personnel, United States Air Force, to the Senate Committee on Armed Services, Subcommittee on Personnel, April 24, 2001. This is the source for our statements on accession goals, the number of Air Force recruiters, Air Force advertising, and (later in the text) first- and second-term reenlistment goals.

RETENTION AND REENLISTMENT

The Air Force has been particularly concerned about retention declines at the first- and second-term reenlistment points. In what follows, we focus on retention and reenlistment, information that pertains to the continuation of personnel at reenlistment decision points. We do not have separate information on the reenlistment or retention goals (or targets) of the services, which together with continuation information would indicate whether the supply of personnel is adequate to meet the demands for personnel. However, the Air Force stated that it missed its first-term retention goal from the last quarter of FY98 until the second quarter of FY01, and second-term reenlistment still remained below goal at that point. Therefore, the downward trends in retention and reenlistment reported in the tables below appear to bear out that outcomes were below goal.

Retention rate is a commonly tracked indicator of enlisted retention. The Defense Manpower Data Center (DMDC) defines retention rate as the percentage of personnel who reenlist or extend, among those who reach a reenlistment or extension decision date within the 18-month period that begins at the start of the fiscal year. Extensions typically represent short obligations of additional service, often a year or less, whereas reenlistment reflects a longer commitment of service. We obtained first- and second-term retention rates from DMDC, and we also separately computed reenlistment rates for first-term personnel. We defined reenlistment rate as the percentage of personnel who make a new obligation of 25 months or more, relative to the population nearing the end of a service obligation and not extending. The service obligation could be either the end of a term of service or the end of a previous extension. Extensions are defined here as 1 to 24 months long. An Air Force reenlistment term is typically 48 months long.

From 1995 to 1999, the Air Force experienced the largest decline in first-term retention (Table 2) among the services: its retention rate fell by 5 percentage points (or 12 percent). The Marine Corps' retention rate held steady, the Army's fell by 2 percentage points, and the Navy's actually increased. The increase in Navy retention might have been related to its rising attrition rate, which would decrease the total pool of personnel who could choose to reenlist but increase the proportion who would be likely to reenlist. (Thus, in spite of its increased retention rate, the net effect on the total Navy enlisted force could be a decrease.) In 2000, perhaps as a result of the pay increases contained in the FY00 National Defense Authorization Act (NDAA), first-term retention improved for the Air

Force, Navy, and Marine Corps. The NDAA specified a 4.8 percent increase in basic pay, which was about half a percentage point above private-sector wage growth. The Act also committed to higher-than-usual pay increases through FY2006, namely, basic pay increases equal to the increase in the Employment Cost Index (the usual standard) plus 0.5 percentage point.[3] Service members followed the pay debate closely, judging from the many articles on pay in service newspapers such as the *Air Force Times*, and may have been well aware of the strength of the FY00 pay action.

Table 2. First-Term Retention Rates

	1995	1996	1997	1998	1999	2000
Air Force	41.5	39.6	37.5	36.8	36.9	41.9
Army	40.2	38.7	41.8	39.6	38.2	38.3
Navy	33.5	37.4	36.2	36.3	38.6	43.5
Marine Corps	21.9	21.3	21.5	21.6	21.3	25.2

Source: Tabulations provided by Defense Manpower Data Center.

Reenlistment rates in the latter 1990s also fell. As Table 3 shows, the Air Force first-term reenlistment rate fell by more than did the retention rate. The reenlistment rate dropped 17 percent, from 52 percent to 43 percent, between 1996 and 1999, with much of the change occurring in 1998-99. Thus, a growing segment of those who were still enlisted a year after the end of their service commitment had obtained extensions rather than reenlisting. Part of this change may be due to random variation from year to year; e.g., 1999 may have been an unexpectedly poor year. Nevertheless, the 17 percent drop represents a large decline in actual reenlistments. (We do not have data on reenlistment rates for 2000.[4])

[3] The Act also increased bonus ceilings, established a Thrift Savings Plan, and increased military retirement benefits for personnel entering service since August 1986, bringing their benefits to par with those of preceding entrants.

[4] Air Force data on reenlistment show a similar trend to that reported in Table 3. The Air Force excludes personnel deemed ineligible to reenlist, whereas the rates in Table 3 use data that do not indicate eligibility. The Air Force's first-term reenlistment rates declined steadily from about 63 percent in FY95 to about 50 percent in FY99, then rose to 52 percent in FY00. The Air Force's second-term reenlistment rates show a similar decline. Although our reenlistment rate is not defined the same as that of the Air Force, we find that the trends were nearly identical. Air Force rates are from Lt. Gen. Peterson's statement (footnote 2).

Table 3. First-Term Reenlistment Rates

	1995	1996	1997	1998	1999
Air Force		52	50	49	43
Army		41	48	45	43
Navy		32	31	35	33
Marine Corps		18	19	20	20

Source: Authors' tabulations.

The Air Force also had the largest decline in second-term retention, where presumably most stay/leave decisions do not involve extensions. Its second-term retention rate fell from 61.7 percent to 51.2 percent, or 16 percent (Table 4). By comparison, the Army's second-term retention rate declined 7 percent (from 54.5 to 50.9 percent), and the Navy and Marine Corps rates improved from 1995 to 1997, then declined to their 1995 levels. The rates for 2000 show some evidence of improvement from 1999 for the Air Force, Navy, and Marine Corps.

Table 4. Second-Term Retention Rates

	1995	1996	1997	1998	1999	2000
Air Force	61.7	58.9	54.5	50.7	51.2	52.0
Army	54.5	48.7	54.9	52.1	50.9	50.5
Navy	52.8	54.6	55.8	53.7	52.8	53.5
Marine Corps	41.4	46.1	45.3	44.9	42.8	44.6

Reenlistment of High-Aptitude High Performers

Table 5 shows the first-term reenlistment rates for high-aptitude high performers and the remainder of personnel ("others"). High-aptitude high performers consist of personnel in AFQT Category I or II who had fast promotion times to E-4. In the Army, Navy, and Marine Corps, about 20 percent of those at the point of making a first-term reenlistment decision were high-aptitude high performers. In the Air Force, the figures were a bit higher: 24 percent in 1995-96, declining to 20-21 percent in 1998-99.

In the 1980 survey used for the purpose of norming the Armed Service Vocational Aptitude Battery to the civilian youth population, 7 percent were Cat I and 28 percent were Cat II. Although the comparison group's AFQT distribution may have changed somewhat since then, AFQT Cat I-

II personnel score roughly in the top third of the youth population. Fast-to-E-4 personnel were in the fastest half of those who had reached E-4 by the time of their first-term reenlistment decision. They demonstrated their capability for high performance in training, duty assignments, and physical fitness, compared to their peers. Research under way at RAND suggests that high-aptitude high performers continue their high performance in subsequent terms of service, as witnessed by faster subsequent promotions. As a result, retaining such personnel is beneficial for military capability, the capacity to train following cohorts of junior personnel, and the supply of future leaders.

Table 5. First-Term Reenlistment Rates for AFQT I-II Personnel Who Were Fast to E-4, and Others

	1995	1996	1997	1998	1999
Air Force					
Others		55	51	50	44
AFQT I-II Fast to E-4		42	48	43	39
Army					
Others		43	51	47	43
AFQT I-II Fast to E-4		32	40	36	43
Navy					
Others		31	29	35	32
AFQT I-II Fast to E-4		37	35	34	36
Marine Corps					
Others		17	18	18	19
AFQT I-II Fast to E-4		25	26	26	24

Source: Authors' tabulations.

In the Air Force, the first-term reenlistment rate of high-aptitude high performers was persistently lower than the rate for others (Table 5). This is not the case in the Marine Corps, where high-aptitude high performers were *more* likely to reenlist than others are, although the gap between their reenlistment rate and that of others narrowed over time. The Marine Corps' comparatively higher reenlistment rate for high-aptitude high performers was probably supported by their low overall target reenlistment rate of around 20 percent: the low target rate allows the Corps to be highly selective, or rather enables the Corps to induce high selectivity among personnel volunteering to reenlist.

The Air Force is certainly selective with respect to the quality of its recruits. For instance, in 1998 about 44 percent of Air Force recruits were Cat II, compared to about 33 percent in the other services. Furthermore, over time, the Air Force reenlistment rate fell by a greater amount among lower-quality personnel than among Cat I-II fast trackers. Therefore, even with a lower reenlistment rate among Cat I-II fast-trackers, Air Force reenlistees overall still include a high proportion of high-quality personnel compared to earlier periods and compared to the other services.

Similar to the Marine Corps, the Navy had *higher* reenlistment rates for high-aptitude high performers than for lower-quality personnel in 1996, 1997, and 1999, and the Navy's rates for both were nearly the same in 1998. The Army was more like the Air Force. In fact, the Army's high-aptitude high performer reenlistment rate was about 10 percentage points lower than the rate for others in 1996, 1997, and 1998. However, in 1999 the rates were equal; the high-aptitude high performer rate rose while the rate for others fell. The Army's high-aptitude high performance reenlistment rate improved from 1998 to 1999, while that of the Air Force rate worsened.

If the definition of high-aptitude high performers is broadened to include AFQT Categories I-IIIA, a similar though less stark picture emerges. These data may be seen in Appendix A.

Increases in Military Pay Would Increase Reenlistment

Retention responds to changes in basic pay and other forms of compensation including reenlistment bonuses and retired pay. Estimates vary as to how a percentage change in relative military pay would affect first-term retention. A conservative range would be that a 1 percent increase in the military/civilian pay ratio increases first-term retention by 0.5 to 1.5 percent. Using this range, in recent work we estimated that declines in the military/civilian pay ratio and in the unemployment rate over the FY92 to FY99 period would have reduced retention by between 9 and 15 percent (Asch, Hosek, Warner, 2001). Using a range of forecasts about future civilian pay and unemployment, we estimated that the FY00 pay action would go a long way toward reversing the 1990s' decline in retention. The FY00 first-term retention increase shown above is consistent with this view.

Still, shortages and retention problems may continue to plague particular areas such as aviation, information technology, and knowledge-based occupations. Therefore, the FY00 pay action, while restructuring the

pay table to better reward promotion over longevity, did not necessarily address issues related to the need for pay differentiation across occupational areas. Neither did it address fundamental changes in the civilian opportunities that military personnel face. In the next chapter we discuss these fundamental changes and the current degree of pay differentiation in the Air Force and other services.

THE EFFECT OF PERSTEMPO ON REENLISTMENT

Has the higher tempo of personnel use for peacetime operations hurt Air Force reenlistment? As discussed below, we find that although non-hostile and hostile episodes of deployment have increased, the increase has not led to a reduction in Air Force reenlistment. Reductions in Air Force reenlistment that have occurred therefore do not appear to be the result of the increase in deployment. This finding is conditional on the kind of deployments that occurred in the 1990s and on the deployment-related pays that members received. Future deployments might differ in character from those of the 1990s; by the same token, deployment-related pays could be adjusted in the future to help offset the negative aspects of deployment such as combat danger, health risks, and separation from family and friends.

After the Cold War and Desert Shield/Desert Storm, military operations during peacetime emerged as a major component of national security strategy. The increase in peacetime operations has fundamentally changed the pace of activity for many military personnel, who must now support peacetime operations in addition to maintaining readiness for major theater war. The increase in peacetime operations was not initially recognized as a permanent change in the demands that would be placed upon the services — permanent in the sense that it would be a factor in defense planning in addition to major theater wars or large scale contingencies. Yet during the 1990s, peacetime operations became commonplace as the services deployed personnel to peace making, peace keeping, humanitarian, disaster relief, and nation building operations. In the late 1990s the Air Force decided to reconfigure itself into Air Expeditionary Forces (AEFs), one purpose of which was to make deployment more predictable for airmen. Although the number and kind of deployments would not be more predictable, airmen would know whether their AEF was at the top of the list in case of a call-up.

We expect the increase in predictability to have a positive effect on morale and reenlistment but cannot analyze this with the available data. We can analyze how episodes involving non-hostile or hostile duty affected reenlistment.[5]

Data on two special pays, Family Separation Allowance (FSA) and Hostile Fire Pay (HFP), allowed us to infer episodes of duty involving longer periods of separation and/or hostile duty. The receipt of HFP in a given month indicates hostile duty. The receipt of FSA in a given month indicates long duty (30 or more consecutive days) for personnel with dependents. Personnel without dependents are not eligible for FSA; we impute long duty to personnel without dependents by referring first to the receipt of HFP in consecutive months and then to whether a majority of the service member's unit members with dependents received FSA, which indicates that the unit was deployed. The data therefore accurately record episodes of duty involving hostile duty for all personnel, with or without dependents. The data accurately record episodes of long duty for personnel with dependents. Because imputation is used for personnel without dependents, the data undercount episodes of long, non-hostile duty for these personnel, although the undercount appears to be small. Further, FSA and HFP data are accurate and comparable across the services but not fully comprehensive. They do not count short trips from home station of less than 30 consecutive days, and they miss some longer episodes of non-hostile duty for personnel without dependents. (A more comprehensive database that captures "days away" is under development at the Defense Manpower Data Center.)

The involvement of personnel in long or hostile duty can be measured by counting the episodes of such duty over a period of time. Table 6 shows long or hostile duty rates for first-term personnel for a three-year window that covers the years before the date of a service member's decision to reenlist or leave.

[5] This section is based on research under way at RAND by James Hosek and Mark Totten.

Table 6. Percentage of First-Term Personnel with Any Long or Hostile Duty in Prior Three-Year Period

	1996	1997	1998	1999	% Chg. 1996-1999
Air Force	39	40	45	49	25
Army	47	55	58	60	28
Navy	69	62	60	61	-11
Marine Corps	73	77	77	76	5

Source: Authors' tabulations.

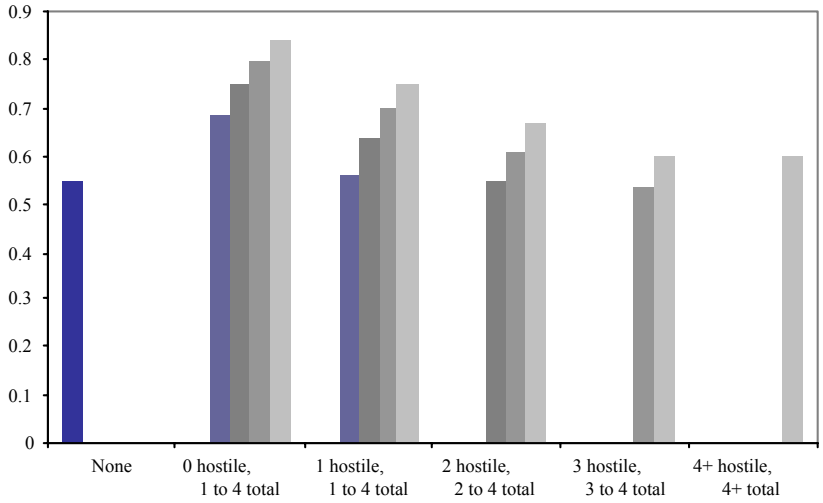
The table indicates that the percentage of personnel with long or hostile duty rose in the late 1990s for the Air Force and the Army. In the Air Force, 39 percent of the personnel making a first-term reenlistment decision in 1996 had one or more episodes of long or hostile duty in the prior three years. By 1999, that figure had risen to 49 percent, an increase of 25 percent. The increase for Army personnel was similar, growing from 47 percent in 1996 to 60 percent in 1999, a gain of 28 percent. However, the percentage of Navy personnel with long or hostile duty in the prior three years declined from 69 percent in 1996 to 62 percent in 1997, then held steady around 60 percent. For Marines, the percentage held fairly steady near 75 percent.

As the percentage of personnel with *any* long or hostile duty rises, we expect to find increases in the percentage of personnel with *multiple episodes* of long or hostile duty. The effect on reenlistment depends on the precise pattern of increase in episodes. Specifically, analysis of the relationship between long or hostile duty and Air Force first-term reenlistment implies that, compared to personnel without any episodes of long or hostile duty, personnel with long or hostile duty are in general *more likely* to reenlist.

We find that episodes involving no hostile duty have a positive effect on first-term reenlistment, and this effect is greater the greater the number of such episodes. Episodes involving hostile duty have little effect on first-term reenlistment regardless of their number. Figure 1 is based on a regression analysis of the relationship between episodes of long or hostile duty and first-term reenlistment. The height of the bars in the figure indicates the probability of reenlistment for a point-of-reference airman with given characteristics. The left-most bar is for an airman with no episodes, and the groups of bars to the right are for varying numbers of non-hostile episodes when there are zero, one, two, three, or four or more

hostile episodes. Within any hostile episode category, e.g., one hostile episode, reenlistment rises as the number of other, non-hostile episodes rises. Looking across the groups of bars, we see little difference in the reenlistment probability for zero, one, two, or three hostile episodes (and no non-hostile episodes), and a slight increase for four hostile episodes. Again, hostile episodes had little effect on first-term reenlistment.

Figure 1. Effect of Episodes of Long or Hostile Duty on Probability of First-Term Reenlistment



To quantify the effect of the change in episodes of duty between 1996 and 1999 on reenlistment, we used the regression results to make predictions at the individual level. For example, according to the data, an increase in the percentage of personnel with any episode of duty (Table 6) should increase the percentage reenlisting. But among personnel with a non-hostile episode of duty, an increase in the number of hostile episodes should decrease the percentage reenlisting.

As shown in Table 6, the percentage of Air Force personnel with episodes of long or hostile duty in the three years prior to their reenlistment point rose from 39 percent in 1996 to 49 percent in 1999. Table 7 shows how the distribution of episodes changed between those years among personnel with episodes of long or hostile duty. More personnel had multiple episodes, and the increase in multiple episodes was driven by an increase in episodes involving hostile duty. The average number of episodes per person rose from 1.49 in 1996 to 1.67 in 1999, or 12 percent, while the average number of hostile episodes per person rose

from .98 to 1.31, or 34 percent. Further, although not shown in the table, in 1996, 69 percent of personnel with positive episodes had had a hostile episode, and in 1999, this percentage had risen to 81 percent.

Table 7. Episodes of Long or Hostile Duty in Prior Three-Year Period Among First-Term Air Force Personnel with Any Such Duty

	0	1	2	3	4+	Average Episodes
1996 All episodes		.65	.24	.07	.04	1.49
1999 All episodes		.56	.26	.11	.06	1.67
1996 Hostile episodes	.31	.48	.14	.04	.02	.98
1999 Hostile episodes	.19	.49	.20	.08	.05	1.31

Source: Authors' tabulations.

Table 8 illustrates the effect of the increase in long or hostile duty on first-term reenlistment. The table reports the predicted reenlistment probabilities for airmen who are assumed to have a given set of characteristics and for a given point in time (1996). With those factors held constant, it is only the change in duty episodes that affects the reenlistment probability. In 1996, 61 percent of these airmen had no long or hostile duty, and their reenlistment probability was 55 percent. The other 39 percent of airmen had long or hostile duty, and, given the mix and amount of such duty, their reenlistment probability was 61 percent. The overall reenlistment probability was 57 percent. In 1999, 51 percent of the airmen had had no long or hostile duty, and their reenlistment probability was again 55 percent. For the 49 percent who had such duty, the mix and amount of such duty implied a reenlistment probability of 59 percent. Thus, their reenlistment probability was lower than that of their counterparts in 1996. This is consistent with Figure 1, which implies that *among members with episodes*, the average reenlistment rate will be lower the higher the fraction of those episodes that are hostile. But this will still be *higher* than the reenlistment rate among members with no episodes, whose fraction declines. Thus, it turns out that the overall reenlistment probability for 1999 was still 57 percent, the same as for 1996.

Table 8. Effect of Long or Hostile Duty on First-Term Reenlistment

	Prob. Zero Episodes	Prob. Reenlist Given Zero Episodes	Prob. Positive Episodes	Prob. Reenlist Given Positive Episodes	Overall Prob. Reenlist*
1996	.61	.55	.39	.61	.57
1999	.51	.55	.49	.59	.57

**(Column 1 x column 2) plus (column 3 x column 4).*

These findings imply that we could hear complaints from some personnel whose non-hostile episodes were in effect turned into hostile episodes but see little if any effect on overall reenlistment.

OFFICER CONTINUATION RATES

We next review recent data on Air Force officer continuation rates and compare them to the rates for officers in the other services. As with their enlisted counterparts, officer continuation rates in the Air Force have declined in recent years, especially for those in mid-career with 6 to 13 years of service, i.e., O-3s and O-4s. On the other hand, continuation rates among senior officers, those with over 20 years of service, increased from 1994 to 1995 and then held fairly steady.[6]

Table 9 shows annual officer continuation rates since FY94 by years of service groupings. The continuation rate is defined as the fraction of individuals who were Air Force officers at the beginning of the fiscal year and were still Air Force officers at the end of the year. Year of service is defined as of the beginning of the fiscal year for each individual.

The table shows that the annual continuation rate has declined by over 5 percent among those in mid-career. Although this decline may seem small, changes in the rates can accumulate over time if intervening actions are not taken. For example, based on the continuation rate of those in year of service (YOS) 0-5 in 1994 shown in Table 9, the likelihood that a new officer would still be in service by YOS 5 is .794 or (.955).[5] Based on the rate for FY00, which is 1.7 percent smaller, the likelihood that a new officer is still in service by YOS 5 is .73, a figure 8 percent smaller than the FY94 figure. Thus, small changes in continuation rates can have noticeable effects over time, and moderate declines, such as those shown

[6] This might be due to high year of tenure rules being relaxed in 1995 after having being tightened during the drawdown.

in Table 9 for those in YOS 6-13, can have important ramifications for meeting manning requirements.[7]

Table 9. Air Force Officer Continuation Rates, All Commissioning Sources, by Fiscal Year

Years of Service	1994	1995	1996	1997	1998	1999	2000	% Change '94 – '00
0 to 5	95.5	95.9	94.7	94.0	94.3	93.7	93.9	-1.7
6 to 9	95.2	92.6	92.6	91.6	90.8	90.1	90.2	-5.3
10 to 13	95.6	92.1	94.1	93.9	91.8	90.1	90.6	-5.2
14 to 19	93.6	91.6	94.2	94.8	94.9	96.3	95.9	1.2
20 and Above	69.7	77.3	77.6	76.7	78.2	80.1	77.5	11.1

Source: Defense Manpower Data Center.

To understand whether the drop in annual continuation rates for mid-career officers in the Air Force is similar to the experience of the other services, Table 10 shows the annual continuation rates for YOS 6 to 9 for the other services. Continuation rates dropped for all the services between FY94 and FY00. But the Air Force experienced the largest decline in annual continuation rates for officers in YOS 6 to 9. The Navy experienced an increase in its officer continuation rate between FY94 and FY96, but the rate had dropped 3.1 percentage points by FY00. The Marine Corps and Army also experienced increases in their officer continuation rates between FY94 and FY97, but they declined thereafter. Although the Air Force had the largest drop relative to FY94, it is useful to recognize that the rate for FY94 represented a high for the 1990s. Compared to the FY90 rate, the FY00 continuation rate actually represents an improvement over the decade.

[7] Continuation rates must be combined with information on the inventory of personnel in order to project the number of personnel on hand in the future. An example of how small declines in continuation rates can have large effects on the experience mix of personnel if sustained for five years may be found in Asch, Hosek, and Warner (2001).

Table 10. Officer Continuation Rates, YOS 6 to 9, by Fiscal Year

	1990	1994	1995	1996	1997	1998	1999	2000	% Change '94 – '00
Air Force	89.6	95.2	92.6	92.6	91.6	90.8	90.1	90.2	-5.3
Army	91.6	89.6	90	91.2	91.8	89.7	89.6	89	-0.7
Navy	86.5	85.8	85	89.3	88.7	86.8	86	86.5	0.8
Marine Corps	88.5	87.8	88.2	89.9	91.1	90.4	90.2	90.0	2.5

Source: Defense Manpower Data Center.

The figures in Table 9 combine the rates for Air Force officers from all commissioning sources. However, the trends differ somewhat for officers whose commissioning source was the Air Force Academy instead of other sources, such as ROTC, Officer Candidate Training (OCT) or direct appointment. Table 11 shows the trend in officer continuation rates for Air Force officers with YOS 0-5, YOS 6-9, and YOS 10-13, by commissioning source. The differences by commissioning source are important, as discussed below in the context of Table 12, because the occupational distribution differs by commissioning source. Consequently, differences in continuation rates by source can result in differences by occupational area.

During the initial commitment, from YOS 0 to 5, Academy graduates generally had the highest continuation rates, while direct appointments and those who entered through other sources had the lowest. A plausible reason for this is that the Academy group has a much higher percentage of pilots, who have a much longer initial service commitment. Thus, at any point in time we would expect Academy graduates to have a higher 0-5 year-of-service continuation rate than officers from other sources. Yet over time Academy graduates may be subject to the same external economic and internal force-shaping policies as officers from other sources. We see that continuation rates for those with 0-5 years of service declined regardless of source since FY94. For Academy graduates, continuation rates fell from a high of 98.7 percent in FY94 to a low of 96.3 in FY98. Continuation rates rebounded in FY98 and FY99, but did not regain the ground lost after FY94.

Table 11. Air Force Officer Continuation Rates, by Commissioning Sources, by Fiscal Year

Years of service	1994	1995	1996	1997	1998	1999	2000	% Change '94 – '00
0 to 5								
Academy	98.4	98.7	97.8	96.4	96.3	97.9	97.2	-1.2
ROTC	97.1	97.8	95.8	94.8	95.4	95	95.5	-1.6
OCT	97.7	98.5	98.2	96.4	96.1	96.9	96	1.7
Other	89.1	89	88.4	89.7	90	86.8	87.1	-2.2
6 to 9								
Academy	96.7	93.1	94.8	92.9	91.7	92.7	91.7	-5.2
ROTC	96.2	93.4	92.4	91.6	90.8	89.9	90.2	-6.2
OCT	96.7	93.9	93.9	94.2	90.5	91.8	93.0	-3.8
Other	89.8	88.6	89.3	88.2	89.9	86.3	86.8	-3.3
10 to 13								
Academy	97.4	93.7	96.1	94	88.5	85.3	85.8	-11.9
ROTC	95.4	91.1	93.2	94.2	93.2	91.1	91.4	-4.2
OCT	96.1	91.6	94.8	94.4	91	91.1	93.2	-3.0
Other	93.9	93.6	93	92.4	93.1	91.8	91.2	-2.9

Source: Defense Manpower Data Center.

The annual continuation rates for those in YOS 6 to 9 also dropped steadily since FY94, with the largest drop being among those who entered the Air Force through the ROTC program. In FY94, the annual continuation rate for those entering via the ROTC program was 96.7 percent for those with 6 to 9 YOS (primarily O-3s). It fell to 90.2 percent in FY00. In FY00, those who had entered from ROTC represented 42 percent of all Air Force officers.

Among those in YOS 10 to 13, primarily O-4s, there was a precipitous drop in 1998 in the annual continuation rates of individuals who entered from the Air Force Academy. This probably resulted from the Academy having a higher proportion of pilots and a decision made in the early 1990s to extend the service commitment for pilot training to eight years after initial training, or about ten years total. (For the same reason, the 0-5 and 6-9 year-of-service continuation rates for Academy graduates would be higher than they otherwise would have been.) Nevertheless, the annual continuation rate was 85.8 percent in FY00 versus 97.4 percent in FY94, a 12 percent drop. Because those entering from the Academy represent only

20 percent of all Air Force officers, the drop for all individuals in YOS 10 to 13 (Table 9) was smaller, 5.3 percent.

Table 12 shows the distribution of Air Force officers across 1-digit DoD occupational codes in FY99, by source of commissioning. Academy graduates are more likely to be General Officers and in Tactical Operations than are those who became officers through other programs. One reason for extending the initial pilot obligation was to keep pilots for longer periods while they were junior, which is where the bulk of the pilot force (tactical operations) are needed. Thus a 12 percent drop in the mid-career continuation rate for Academy graduates may impinge on the Air Force's ability to provide manpower to these areas.

Table 12. Percentage of Air Force Officers in 1-Digit DoD Occupational Areas, by Commissioning Sources, Fiscal Year 1999

Occupational Area	Academy	ROTC	Direct Appt/Other
1: General Officers	1.7	1.0	0.6
2: Tactical Operations	50.7	39.6	18.2
3: Intelligence	4.9	6.4	3.0
4: Engineering & Maintenance	12.6	18.6	11.2
5: Scientists & Professionals	5.0	5.3	8.6
6: Health Care	2.5	3.9	43.8
7: Administration	5.0	8.7	5.8
8. Supply/Procurement	7.8	11.0	26.8
9. Non-occupational	9.9	5.6	2.1
	100.0	100.0	100.0

DISCUSSION

The Air Force manpower system appears to have been stressed. Symptoms include the decline in recruit quality, the decline in first- and second-term reenlistment (improving only recently), the higher loss rate of high performers, the increase in peacetime operations, and declines in officer continuation rates, especially mid-career (YOS 6-13).

The probable causes include transitory and permanent factors. The economy had the longest period of expansion in the nation's history. The recruiting market changed fundamentally as a consequence of increased enrollment in two- and four-year colleges. For nearly two decades, the private sector sought and rewarded higher education, and the reality of

higher pay for highly educated, high-ability people is likely to continue into the future. Peacetime operations have become a fixture of national security strategy, and during the late 1990s airmen were increasingly called upon for hostile missions. Why do these changes matter, and what do the changes imply for the military compensation system?

The decline in high-quality recruits is troublesome for two reasons. Research on enlisted personnel[8] indicates that in relatively complex tasks, individual and team performance in the first term of service depends on cognitive ability. Such tasks include the operation of Patriot air defense systems (Orvis, Childress, Polich, 1992), multichannel communications equipment (Winkler, Fernandez, Polich, 1992), and tanks (Daula and Smith, 1992). High-ability personnel perform better in these mission-essential tasks than lower-ability personnel, and high-ability personnel raise the performance of their team. Also, data from enlisted cohorts entering service in the 1980s indicate that the average AFQT of a cohort changes little as it progresses through its military service life cycle. Both high-ability and low-ability personnel leave service, causing the average ability of those remaining in the cohort to stay about the same. Therefore, when cohorts of lower quality enter, they are likely to remain lower quality, and because they are lower quality their expected first-term performance is likely to be lower. Their later performance may also be lower, but we know of no research establishing that.

We identified a 17 percent decline in first-term reenlistment and second-term retention from 1995 to 1999. This was a serious loss of personnel for several reasons. The loss of early mid-career personnel after the second term reduces the capacity to train junior personnel and reduces the pool from which to draw future enlisted leaders. The loss of personnel after the first term exacerbates this problem because it means that the number of second-term personnel available for operations and training will remain relatively small over the next few years, and perhaps beyond. This makes it harder to arrange "work-arounds," in which less-than-fully ready personnel are advanced into positions otherwise filled by experienced second- or third-term personnel. The increase in first-term retention in 2000 is of course a welcome improvement.

The decline in first-term reenlistment was not neutral with respect to personnel quality. The Air Force tended to keep *relatively more* of its high-ability high performers compared to non high-ability high performers. However, high-ability high performers had a lower reenlistment rate throughout the period 1996-1999.

[8] We do not know of studies on officers.

We examined deployments and found large increases in the proportion of first-term personnel who had long or hostile duty at some point over a three-year period prior to their reenlistment decision date. The concern was that the increase in deployments would reduce reenlistment. We found a sizeable increase over the late 1990s in the number of episodes involving hostile duty among personnel who had long or hostile duty. Overall, we found that these changes appeared to result in little change in overall first-term reenlistment rates in 1999 vis-à-vis 1996. Reenlistment appears to increase as the number of non-hostile episodes increases, and tends to remain unchanged as the number of hostile episodes increases. If the pace of peacetime operations remained at its late-1990s level, airmen could have expected a continued higher incidence and greater number of hostile episodes, yet with little drop in overall reenlistment.

We also identified a roughly 5 percent decline in officer annual continuation rates among those in their mid-career. Although the amount seems small at first glance, even small declines in annual continuation rates can translate into dramatic declines in manpower over a several-year period. Therefore, this is a serious decline.[9] Like the decline in retention rates for the enlisted force, a decline in officer continuation in the mid-career represents a loss in the pool from which the Air Force draws its future leaders. We do not, however, have evidence indicating that the pool would become too small to satisfy the demand for future leaders. Further, "work-arounds" will involve promoting less experienced personnel or imposing more duties on more experienced leaders, thereby spreading them thinner across tasks. This could adversely affect Air Force capability.

3. A COMPARISON OF PRIVATE-SECTOR AND AIR FORCE PAY

From 1994 to 1999, civilian pay grew at a faster rate than did military basic pay. Although the year-to-year differences in military versus civilian pay growth over this period were not large, they accumulated, so that by 1999 enlisted pay had grown about 6 percent less than had civilian pay and officers' pay had grown 8 percent less. The relative decline in pay

[9] The extent of decline varies by area. According to Lt. Gen. Peterson's statement, the Air Force "has difficulty retaining officers with skills that are in high demand in the private sector" such as pilots, scientists, engineers, and communications-computer systems officers.

contributed to recruiting and retention difficulties (e.g., see Asch, Hosek, and Warner, 2001).

Comparisons of civilian pay with military pay should distinguish between pay levels and pay trends. It will always be possible to find people in jobs that pay more or less than the military pays, controlling for age and education. Therefore, differences in military/civilian pay levels, even large differences, do not necessarily imply problems with the military compensation system. This is because pay is not the only factor influencing enlistment and reenlistment decisions. Other factors include the value of military training and experience and the individual's taste for military service, a catch-all term for patriotism, pride, and other factors related to the preference for military service and the military life-style, such as a desire for new experiences, travel, and adventure. Further, narrow measures of military pay can be misleading because they do not capture health care benefits, retirement benefits, housing, and other quality-of-life aspects. Nevertheless, as military pay declines relative to civilian pay, more people are disinclined to enter or stay in the military. Ideally, military pay levels are set high enough to attract and keep the quantity and quality of personnel required. To ensure this, military pay should be monitored over time relative to civilian pay and other harder-to-track items such as the value of military training versus civilian training, the pressure or intensity of work effort, the quality of housing, the level of health benefits, and so forth.

TRENDS IN PRIVATE-SECTOR PAY AND IMPLICATIONS FOR MILITARY PAY

Effects of Age and Education

Among civilian jobs, there can be persistent differences in wages by occupation. Much of the difference in wages across occupations relates to differences in age and education. Occupation accounts for a minor part of the variation.

Figures 2 and 3 present wage trends from 1995 through 2000 by wage percentile for age groups 22-26 and 27-31. Wages trends for 32-37 year-olds are similar to those for 27-31 year-olds and are not shown. The wages are self-reported weekly wages from the monthly outgoing rotation of the Current Population Survey. The wages have been deflated by the Consumer Price Index minus 1.1 percent, an adjustment for the upward bias in the CPI. Over this short period, the wage trends are similar under other adjustments--or even unadjusted, for that matter.

These figures first focus on the wage distribution by age and education. Additional tabulations were done grouping workers into broad occupational categories (information technology, knowledge workers, and others). The range of pay variation across occupations, given age and education, is captured by the wage distribution shown below. This is the range that military pay must be able to accommodate, including benefits, bonuses, special and incentive pays, and possible new pays.

Also, the charts show wages for white males, which tend to be higher than those for women and minorities. Although analysis (Hosek and Sharp, 2000) finds some differences in wage growth by race/ethnic group, the white male wage distributions are indicative of the overall wage distributions.

During the second half of the 1990s, the economy grew roughly 50 percent faster than in the previous two decades — increasing about 3 percent per year instead of 2 percent per year — and the unemployment rate fell to a 30-year low. Despite the vigor of the economic expansion, overall price and wage inflation remained moderate, and real wages (wages adjusted for price inflation) grew steadily. This was also true of wage growth for workers in the same age and education range as military personnel, i.e., full-time civilian workers with high school, some college, or four or more years of college, and in their twenties and early thirties. As an inspection of Figures 2 and 3 shows, wages are a few percent higher for workers with "some college" than for workers with only a high school diploma for any given percentile — the earnings differences between these education groups are not large. However, the wage gap between those with some college versus four or more years of college is substantial. This reflects the rapid growth in college wages during the 1980s, gains sustained in the 1990s. Further, the wage differences by education widen with age, as seen by comparing Figure 2 with Figure 3.

Implications of Wage Trends for the Air Force

The three educational strata shown in Figures 2 and 3 are relevant to Air Force personnel. Virtually every Air Force recruit has a high school diploma, and a small percentage of recruits have some college. Since the Air Force is highly selective in recruiting, the upper half of the high school wage distribution is more relevant than the lower half. Also, since Air Force recruits often score in the upper half of the AFQT score distribution and high scorers are more likely to seek higher education, the some-college and full-college wage distributions are relevant. Most Air Force enlistees add to their education while in service, and by the end of the first term the majority of enlistees have some college. It is reasonable to

compare their military pay to the civilian pay of workers with some college. Also, most enlistees sign up for educational benefits, which can be understood as an expression of interest in keeping open the option for further higher education. The high wages received by workers with a baccalaureate degree are of course a stimulus for persons with high school or some college to complete four or more years of college.

The Air Force has been foremost among the services in emphasizing the value of education and facilitating its acquisition in service. The Air Force and its members realize the importance of education and training in building the skills needed for superior military capability. The Air Force has a reputation for providing excellent training, and the skills and knowledge learned are often highly transferable to the civilian world. Indeed, when comparing military and civilian pay, the value of training should not be overlooked. In cases where skills are transferable and the organization is paying the costs of training and education, pay can be lower during training years if it is anticipated to be higher later. After the training period, however, pay must be increased to keep more of these people. For instance, the Air Force trains aircraft mechanics and electronic equipment repairers. Air Force pay may be lower in the early career than private-sector pay for these occupations, yet during the formative years of training the lower pay is offset by the expectation of higher future earnings and better job opportunities in the Air Force, the private sector, or both.

During the economic expansion, employers may have been more willing to offer training, subsidize education, and pay higher wages to junior employees making their way up the learning curve. According to this hypothesis (as suggested in Chapter 2), the Air Force was simply out-competed in its tight labor market niche by civilian firms.

Figures 2 and 3 show the trends in wage percentiles since the mid-1990s, a period of unusually strong economic growth. But the growing gap between college wages and high-school wages has been a long-term trend, not a by-product of the strong economy. Given the Air Force emphasis on skill attainment and college education even among the enlisted force, this fundamental change in the civilian wage structure is highly relevant to the Air Force. As discussed in a paper for the 9th Quadrennial Review of Military Compensation, the change argues for a higher military pay increase for mid-career and senior members, many of whom had attained some college (Asch, Hosek, Warner, 2001).

Figure 2. Wage Percentiles for 22- to 26-Year-Old White Males with High School, Some College, and 4+ Years of College

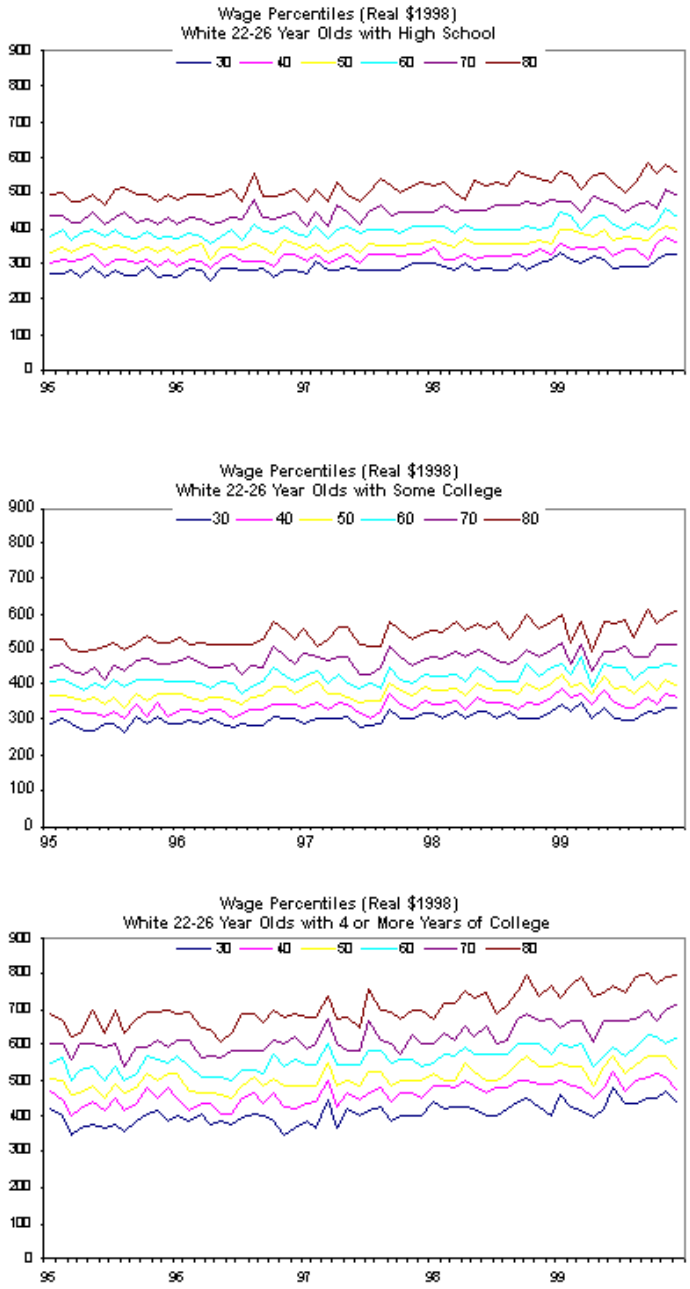
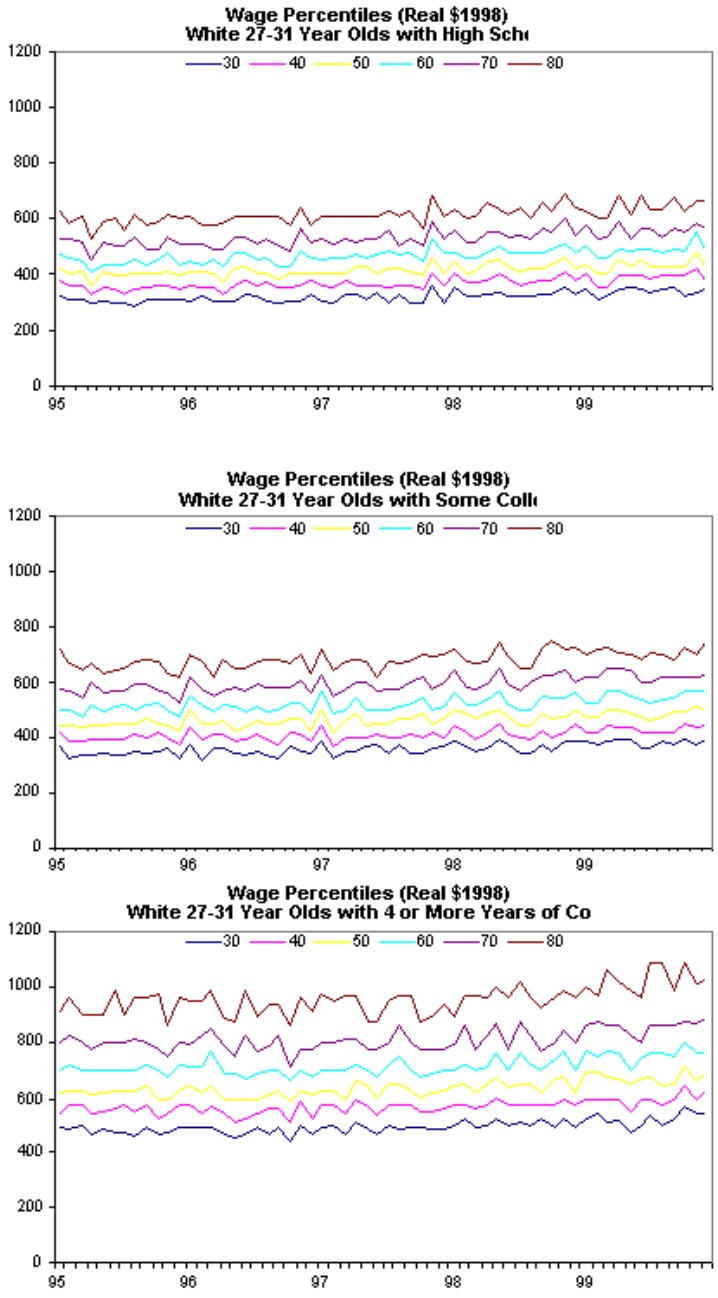


Figure 3. Wage Percentiles for 27- to 31-Year-Old White Males with High School, Some College, and 4+ Years of College



THE CURRENT AIR FORCE COMPENSATION SYSTEM

The current military compensation system provides authorities for many special and incentive pays and allowances to tailor compensation to the services' needs. Research under way at RAND suggests that the incidence and average amounts of these pays and allowances differ across the services and occupational areas. But the differences are overshadowed by similarities in the average amounts of the components of Regular Military Compensation (RMC), namely basic pay, subsistence allowance, housing allowance, and the tax advantage stemming from the non-taxability of these allowances.

Because RMC is so similar for a given YOS and the principal determinant of total pay, average pay is fairly similar for individuals at a given YOS, regardless of branch or service or broad occupational area. Put differently, pay differences at a given YOS are relatively small. In contrast, average pay for Air Force enlisted personnel is nonetheless about 5 percent less than it is for the other branches of service, reflecting the slower promotion rates to E5 and E6.[10] Average pay for Air Force officers whose commissioning source was ROTC or the Academy stands relatively comparable to the pay of officers in the other branches of service.

Table 13 shows the incidence and the average amount (among those who received it) of most components of current military pay for enlisted personnel in 1999. Table 14 shows a similar table for officers whose source of commissioning was either a military academy or ROTC. The averages are taken for those individuals who were on active duty for the full calendar year of 1999 and are based on actual monthly pay data for that year. Care is needed in interpreting the enlistment and selective reenlistment bonus figures because the averages in Tables 13 and 14 confound initial payment of the bonus, which may be large, with smaller anniversary payments. As these tables make clear, in 1999 the incidence and average amounts of special and incentive pays and of allowances varied considerably across the branches of service. As expected, Career Sea Pay is pervasive in the Navy. About 40 percent of Navy enlisted

[10] We mentioned earlier that promotions to E-5 occur at a later year of service and reenlistment rates are typically higher in the Air Force than in the other services. It is worth mentioning here that Congress places constraints on the percentage of personnel in grades E-5 through E-9. It is possible that these constraints are a factor in the slower promotion to E-5. If so, increasing the allowable E-5-to-E-9 percentage would permit faster promotion to E-5. We have not analyzed this possibility. Faster promotion would in effect increase military pay. Also, if more personnel were in E-5, the required personnel budget would increase.

personnel, and about 19 percent of Navy officers received either Career Sea Pay or Career Sea Pay Premiums. Among enlisted personnel, no other special and incentive pay is as dominant as Sea Pay. Among Air Force enlisted personnel, Foreign Duty Pay covered about a quarter of individuals in 1999, and Hostile Fire Pay covered about a fifth of the individuals. But these pays were also pervasive in the Army and to some extent in the Marine Corps. A few pays, e.g., Flying Pay, primarily benefit the Air Force much as Sea Pay benefits the Navy personnel, but relatively few enlisted personnel receive them. For instance, only 3.1 percent of enlisted personnel received Flying Pay in 1999.

Among officers whose commissioning source was an academy or ROTC, special and incentive pays and allowances varied across service branch as well (Table 14). The dollar amounts of special and incentive pays for medical officers were particularly high. For Air Force officers, Aviator Career Incentive Pay was among the most prevalent special and incentive (S&I) pays, covering about 42 percent of officers commissioned from ROTC or an Academy. This source of pay was also prevalent among Marine Corps and Navy officers. However, the average dollar amount was somewhat higher in the Air Force. The incidence and average dollar amount of aviation officer continuation pay was also higher in the Air Force, although only covering 7.6 percent of officers in 1999.

Enlistment Bonuses

Table 15 shows the incidence and average amounts of first payments and anniversary payments of enlistment and reenlistment bonuses by service. The Air Force has increased its use of enlistment and reenlistment bonuses in recent years. In FY00 the Selective Reenlistment Bonus (SRB) budget was doubled relative to FY99 — from $60 million to $120 million — and the percentage of occupational specialties covered by Selective Reenlistment Bonuses (SRB) rose from 57 to 73 percent. The figures in Tables 13 and 15 for enlisted personnel provide a baseline of how many individuals were covered by bonuses in 1999 and how the figures differ in the Air Force relative to the other services. About 10 percent of all Air Force enlisted personnel received an SRB payment in 1999. Since bonus payments may be spread out over several years, this figure includes both those receiving a bonus for the first time and those receiving an anniversary payment. Table 15 shows that among enlisted personnel in the Air Force, 4.3 percent received payments for the first time while 6.0 percent received anniversary payments (for a total of about 10 percent). The average dollar amount for first-time payments was $5,672, a figure less than the Navy's average first-time SRB payment, but more than the Army's. In the case of enlistment bonuses, Air Force personnel were less

likely to get a bonus, and the average dollar amount was smaller, relative to the Army or Navy.

Average Total Pay

Despite the differences across the services in S&I pays and allowances shown in the tables, average total pay is fairly similar across the branches of service, for a given year of service. Figure 4 shows average enlisted pay by year of service, broken out by category: basic pay, Basic Allowance for Housing (BAH), Basic Allowance for Subsistence (BAS), federal tax advantage, special and incentive pays, bonuses, miscellaneous allowances, and cost-of-living allowances (COLAs). Figure 5 shows the averages for officers whose source of commission was either ROTC or a military academy. Despite the similarities, the small differences that do exist in average total pay often favor the Navy, Army, and Marine Corps, and not the Air Force, especially in the case of enlisted pay.

When all categories of pay are included, average annual enlisted pay for a new recruit in YOS 1 is about $23,000, as shown in Figure 4. By YOS 10, average annual pay has grown to about $33,000. By YOS 20, average total enlisted pay is about $42,000. Average annual pay grows steeply after 20 YOS because enlisted personnel in lower grades retire at 20 YOS, and those who remain are a highly selected group of senior enlisted personnel who are in higher grades, particularly E-8 and E-9. Although average pay varies by YOS, it does not vary much across services for a given YOS for the Army, Navy, and Marine Corps. At YOS 10, average total pay is $35,007 for the Army, $35,675 for the Marine Corps and $35,863 for the Navy. But the Air Force's figure is $33,621, reflecting slower promotion and, therefore, lower enlisted basic pay for a member at a given year of service. In part, it also reflects the different incidence and use of S&I pay, shown in Tables 13 and 14.

Table 16 shows average years of service at promotion to E-4, E-5, and E-6 by service branch for 1999. For comparison, the table shows average years to promotion for the Air Force in previous years, specifically 1990 and 1997. Time to E-5 is about two years greater in the Air Force than in the other services.

Average total pay also rises by YOS for Air Force officers whose commissioning source is academy or ROTC, starting at around $35,500 at YOS 1 and growing to $102,000 at YOS 30. Air Force officers fare less well than Army and Navy officers initially but do better in terms of average total pay later in their careers. At YOS 6, average total pay is $56,000 for Air Force officers, and $58,000 for the Army and Navy. The figure is significantly lower for the Marine Corps, $44,400, no doubt

because the Marine Corps does not have medical officers in its ranks. At YOS 12, average total pay is $71,000 for Air Force officers, $75,600 for Navy officers, $67,000 for Marine Corps officers, and $68,800 for Army officers.

Air Force average total pay over a career varies little across broad occupational areas, as shown in Figure 6 for enlisted personnel and Figure 7 for officers. (We comment below on pay variation due to special pays and bonuses.) Although S&I pays may be targeted to specific occupational areas to ensure adequate flows of personnel to the more senior positions, the first-order effect of this targeting on average pay over a career appears to be small. In part, the similarity in the average pay profiles across occupational areas may reflect the broad definition of each area and the fact that each area includes some diversity in occupational specialties. However, the pay similarities remain even when we define occupations more narrowly. For example, Figure 8 shows the average enlisted pay profiles for information technology (IT) versus non-IT occupations in the Air Force, where IT occupations are as defined by an OSD commission on Information Technology/Information Assurance Personnel. Again, the profiles are nearly identical. Therefore, any S&I pay differences across these occupations are dominated by similarities in other pay components, owing primarily to similarities in the retention and grade mix at each YOS.

For broad occupational categories, Figure 9 shows the FY99 distribution of Air Force enlisted end strength across pay grades, and Figure 10 shows the distribution across YOS. The percentage of the force in each grade and the percentage in each YOS group are quite similar across occupational areas. These figures, together with the pay figures, point to a clear conclusion: differences *in pay and retention by broad occupational area are quite small in the Air Force*. They suggest that, although S&I pays are used, on the whole they do not create much differentiation in pay. Furthermore, the similarity in the YOS and grade mix across broad occupational areas suggests that the Air Force provides members with similar career and pay opportunities, regardless of occupational area. On the other hand, the large size of average special and incentive pays for some Air Force occupations, such as pilots and medical officers, suggests that the Air Force has been able to achieve increases in pay for some occupations, when necessary. Nonetheless, average total pay is dominated by average RMC and average RMC varies relatively little across occupational areas. Thus, the differences in average total pay across occupations are dwarfed by the similarities in average RMC.

It is worth noting that Figure 10 indicates a relatively large group of enlisted personnel with 16-20 years of service in 1999. When this group

flows through the 20-year point over the next few years, the Air Force can expect to have a noticeable drop in average experience.

Pay Variation

The similarity of average pay across occupational groups does not mean that there is no within-group variation. Similarly, the closeness of average pay across the services does not imply that pay variation is the same across the services.

In Asch, Hosek, and Martin (2002), we find that much of the variation in pay arises from bonuses and special and incentive pays. We have divided military cash compensation into four categories: regular military compensation (RMC), special and incentive pays (S&I), bonuses, and miscellaneous allowances and COLAs. We analyze pay variation first with RMC, then successively widen the definition to include S&I, then bonuses, then miscellaneous allowances and COLAs. Our analysis uses data from the Joint Uniform services Pay System (JUMPS) for 1999.

We find that the *range* of variation in annual military compensation for enlisted personnel in 1999 was about $10,000 at YOS 10. The range in part reflects the fact that personnel are at different ranks, hence at different pay grades. For instance, in the July 2001 basic pay table, the difference between an E-6 and an E-5 at 10 years of service is $2,174.10 - $1,962.90 = $211.20/month, or $2,534.40/year. After accounting for rank, most of the remaining difference in pay for personnel with 4-11 years of service comes from bonuses. As Table 15 shows, in 1999 about 10 percent of airmen received Selective Reenlistment Bonuses. The 10 percent was subdivided into 4 percent who received an initial award averaging $5,672 and 6 percent who received an anniversary payment averaging $1,293. In addition, 3 percent of enlisted personnel received proficiency pay, 3 percent received Flying Pay, and less than 1 percent received Toxic Fuels Duty Pay, Foreign Language, High Altitude Low Opening Pay, etc.

The range, however, is not a good measure of variation because it does not account for the underlying distribution (more observations are massed near the mean and fewer at the extremes). For this reason, the *standard deviation* is superior.

For airmen, the standard deviation of RMC rises from under $1,000 at YOS 1 to around $1,500 at YOS 12. From there it rises rapidly to $4,000 at YOS 20. At YOS 24 it begins a rapid descent toward zero, falling below $1,000 by YOS 28. The rapid decline reflects the increasing homogeneity in rank of senior enlisted personnel, i.e., they are all E-8 or E-9. Similarly, the increase in variation over YOS 12-20 reflects an increasing diversity in

pay grade as personnel are promoted at different speed and reach different ranks. When S&I pays are included, there is little additional variation. However, the inclusion of bonuses causes a substantial increase in variation during YOS 4-11. But from YOS 12 onward, additional pay variation comes from miscellaneous allowances and COLAs. These add about $750 to variation from YOS 12-27. As a rough gauge, the standard deviation of Air Force enlisted pay is in the $3,000-$5,000 range over most years of service, with about half due to bonuses during YOS 4-11, after which variation in RMC accounts for most of the variation.

Among officers, the standard deviation of RMC for the Air Force is near $8,000 in the first few years of commissioned service. It then declines to around $4,000 or less at YOS 3 and goes still lower in YOS 4-12. The amount of pay variation attributable to miscellaneous allowances and COLAs is minimal. However, the inclusion of S&I pays adds about $1,000 to the standard deviation of RMC alone, and the further addition of bonuses adds a great deal to pay variance. The major bonuses are Aviation Officer Continuation Pay, Medical Officer Retention Bonus, Additional Special Pay for Medical Officers, Incentive Specialty Pay for Medical Officers, Nuclear Officer Accession Bonus, Nuclear Officer Retention Bonus, Nuclear Career Annual Incentive Bonus, and Nuclear Qualified Officer Continuation Pay. Although only a small percentage of officers receive these bonuses, their large amounts significantly increase pay variation. Therefore, when examining the standard deviations of officer pay, it is worth remembering that much of the pay variation arises from bonuses that are received by a small proportion of officers. Around 3 percent of Army officers, 9 percent of Air Force officers, 7 percent of Marine Corps officers, and 13-14 percent of Navy officers receive these bonuses.

DISCUSSION

Civilian pay trends during the last five years showed slow, steady growth in real wages and little change in wage dispersion within age/education groups. For example, for 22- to 26-year-old white males the wage difference between the median wage (50th percentile) and the 80th percentile wage was about $175/week for those with high school only and those with some college. For 27- to 31-year-olds, the corresponding difference between the 50th and 80th percentile wages was about $200/week. These differences translate to $9,100 for 22- to 26-year-olds and $10,400 for 27- to 31-year-olds for a 52-week work year. Again, these differences remained about the same from 1995 to 2000. Comparisons using other percentiles confirm the same point: little change in wage

dispersion and steady wage growth, rather than an accelerating wage spike, in 1999-2000.

We found a standard deviation of $3,000-$5,000 for airmen for most years of service. Bonuses were a major source of variation, especially in years 4-11. However, only 10 percent of airmen received selective reenlistment bonuses, around 2 percent received an enlistment bonus, and several percent received proficiency pays of various kinds. Thus, skill- or proficiency-related pays play a role for a significant fraction of airmen especially in years 4-11, suggesting some Air Force flexibility under the current system in recognizing differences in skill and proficiency. Nonetheless, for most airmen much of the variation in pay comes from differences in pay grade at a year of service.

Generally speaking, variation in civilian pay can be attributed to individual ability, motivation, education, occupation, and job. There are geographic differences in wages: holding constant other factors, wages tend to be lower in the South, higher in Alaska, and higher in cities, for example. There are also risk-related differences in wages: some jobs entail a high risk of injury or impairment (e.g., police, fire fighting, construction) or a health risk (e.g., dental hygienist, mining, work involving toxic substances). Nonetheless, much variation in private-sector wages derives from knowledge, skill, and ability, with knowledge and skill being the products of education, training, and experience.

The private sector does not need to promote high performers in order to reward them, and it is not shy about paying different skills differently. Moreover, even though each firm has a compensation schedule that presumably provides some internal equity, there is wide variation across firms. In contrast, the services operate under a single basic pay table, and promotion is a major source of pay increase. It is reasonable to suppose that promotion depends on ability, motivation, education, training, effort, and performance, i.e., the same kind of factors that contribute to individual pay variation in the private sector. In addition, bonuses provide some "equalizing differences" by bringing military pay to a higher level relative to private-sector opportunities. Still, it is not surprising to find less pay variation in the military with its common pay table and limited use of bonuses and special pays. This is an "agnostic" finding. We cannot say whether the military compensation system provides too little pay variation.

Table 13. Incidence and Average Amounts of Enlisted Pay, 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount
Basic Pay	100.0%	$19,542	100.0%	$20,371	100.0%	$17,611	100.0%	$19,757
BAH (Green Book)	100.0%	$6,497	100.0%	$6,559	100.0%	$6,245	100.0%	$6,453
BAS (Green Book)	100.0%	$2,738	100.0%	$2,738	100.0%	$2,738	100.0%	$2,738
Tax Advantage (Grn Bk)	100.0%	$1,732	100.0%	$1,731	100.0%	$1,647	100.0%	$1,707
Average RMC		**$30,509**		**$31,398**		**$28,241**		**$30,655**
Foreign Duty Pay	28.1%	$73	25.2%	$65	10.3%	$35	5.3%	$90
Proficiency Pay	6.1%	$2,699	3.0%	$2,285	5.8%	$2,583	9.4%	$2,108
Oversea Extension Pay	0.4%	$696	0.1%	$434	1.5%	$1,212	0.4%	$675
Career Sea Pay	0.1%	$1,314	0.0%	$112	9.0%	$205	40.5%	$1,624
Career Sea Pay Premium	0.0%	$742	0.0%		0.0%	$734	5.1%	$684
Hostile Fire Pay	15.7%	$633	19.8%	$570	12.1%	$468	26.1%	$511
Diving Duty Pay	0.1%	$1,744	0.3%	$1,687	0.3%	$1,800	1.7%	$2,007
Submarine Duty Pay	0.0%		0.0%		0.0%		7.5%	$2,094
Foreign Lang. Pay (1)	1.5%	$675	1.5%	$806	0.7%	$620	0.5%	$715
Foreign Lang. Pay (2)	0.2%	$332	0.1%	$360	0.0%		0.0%	$373
Flying Pay (Crew Memb)	1.0%	$1,688	3.1%	$1,979	1.3%	$1,847	1.9%	$2,120
Flying Pay (Noncrew)	0.0%		0.0%		0.8%	$1,003	0.0%	
Parachute Duty Pay	10.1%	$1,471	0.2%	$1,078	0.7%	$1,095	0.3%	$1,417
Flight Deck Duty Pay	0.0%	$1,200	0.0%	$85	2.4%	$471	9.0%	$591
Demolition Duty Pay	0.4%	$1,567	0.4%	$1,641	0.3%	$1,475	0.5%	$1,406
Experiment Stress Duty	0.0%	$870	0.2%	$1,261	0.0%	$1,387	0.2%	$747
Toxic Fuels Duty Pay	0.0%	$261	0.3%	$1,507	0.0%		0.0%	$303
Toxic Pesticides Duty	0.0%	$532	0.0%	$1,166	0.0%		0.0%	$998
High Alt Low Opening	0.3%	$2,297	0.3%	$2,399	0.2%	$2,207	0.5%	$2,498
Chem Munitions Duty	0.1%	$927	0.0%	$813	0.0%		0.0%	$546
Average S & I Pay		**$482**		**$301**		**$317**		**$1,345**
Family Sep. Allow. I	1.4%	$181	0.7%	$308	0.0%		0.8%	$180
Family Sep. Allow. II	19.9%	$417	17.1%	$333	19.2%	$385	23.0%	$399
CONUS COLA	0.6%	$730	0.6%	$355	1.4%	$612	0.7%	$697
Oversea COLA	24.6%	$1,849	24.1%	$2,904	21.4%	$2,240	19.4%	$2,748
Clothing/Uniform Allow	87.2%	$329	90.8%	$281	97.9%	$229	99.7%	$336
Avg Misc Allow/COLAs		**$832**		**$1,015**		**$785**		**$967**
Enlistment Bonus	3.0%	$5,193	1.7%	$3,749	0.5%	$2,137	2.2%	$4,139
Sel Reenlistment Bonus	11.2%	$1,949	10.1%	$3,167	0.0%		15.4%	$4,452
Average Bonus		**$372**		**$381**		**$11**		**$777**
Average Annual Pay		**$32,195**		**$33,095**		**$29,355**		**$33,743**

Source: Asch, Hosek, and Martin (2002).

Table 14. Incidence and Average Amounts of Officer Pay (Commissioning Source Is ROTC or a Military Academy), 1999

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount
Basic Pay	100.0%	$45,322	100.0%	$45,127	100.0%	$42,675	100.0%	$43,558
BAH (Green Book)	100.0%	$10,584	100.0%	$10,683	100.0%	$10,522	100.0%	$10,376
BAS (Green Book)	100.0%	$1,887	100.0%	$1,887	100.0%	$1,887	100.0%	$1,887
Tax Advantage (Green Book)	100.0%	$3,896	100.0%	$3,902	100.0%	$3,623	100.0%	$3,939
Average RMC		**$61,689**		**$61,599**		**$58,707**		**$59,761**
Saved Pay	0.0%		0.0%		0.0%		0.0%	$4,248
Health Professional Saved Pay	0.0%		0.0%		0.0%		0.0%	
Variable Special Pay	0.3%	$8,141	0.1%	$8,517	0.0%		0.0%	$8,751
Board Certified Pay	1.8%	$3,236	1.0%	$3,435	0.0%		0.4%	$3,656
Aviation Career Incent. Pay	9.4%	$5,917	41.8%	$6,155	33.0%	$5,370	38.5%	$5,456
Responsibility Pay	0.0%		0.0%		0.0%		0.0%	
Career Sea Pay	0.0%		0.0%	$150	0.2%	$418	18.9%	$1,272
Career Sea Pay Premium	0.0%		0.0%	$67	0.0%		3.8%	$544
Hostile Fire Pay	17.6%	$621	21.8%	$576	15.5%	$474	24.8%	$525
Diving Duty Pay	0.1%	$1,599	0.1%	$1,682	0.5%	$1,650	2.8%	$2,249
Submarine Duty Pay	0.0%		0.0%		0.0%		9.9%	$5,004
Foreign Language Pay (1)	3.1%	$730	2.6%	$915	1.4%	$802	0.8%	$739
Foreign Language Pay (2)	0.4%	$349	0.1%	$321	0.0%		0.0%	$400
Flying Pay (Crew Member)	0.1%	$1,735	0.8%	$1,551	0.0%		0.1%	$1,722
Flying Pay (Noncrew Member)	0.1%	$1,047	0.1%	$604	0.1%	$774	0.1%	$728
Air Weapons Controller (Crew)	0.0%	$2,028	1.0%	$2,564	0.0%		0.0%	$2,400
Parachute Duty Pay	11.2%	$1,264	0.2%	$1,019	1.6%	$1,057	0.6%	$1,421
Flight Deck Duty Pay	0.0%		0.0%		0.2%	$558	4.8%	$485
Demolition Duty Pay	0.3%	$1,413	0.1%	$1,374	0.1%	$547	0.8%	$1,360
Experimental Stress Duty Pay	0.0%	$1,028	0.3%	$1,049	0.0%		0.1%	$785
Toxic Fuels Duty Pay	0.0%		0.1%	$1,438	0.0%		0.0%	
High Altitude Low Opening Pay	0.2%	$1,981	0.2%	$2,181	0.0%	$2,700	0.7%	$2,504

Source: Asch, Hosek, and Martin (2002).

Table 14. Incidence and Average Amounts of Officer Pay, 1999 (continued)

Type of Pay	Army		Air Force		Marine Corps		Navy	
	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount	Pct. Rec'g	Average Amount
Chemical Munitions Duty Pay	0.0%	$964	0.0%		0.0%		0.0%	
Average S&I Pay		**$927**		**$2,810**		**$1,889**		**$3,134**
FSA I	1.3%	$520	0.6%	$603	0.0%		0.7%	$189
FSA II	15.2%	$387	14.5%	$306	18.3%	$346	21.5%	$380
CONUS COLA	1.2%	$985	1.9%	$439	1.6%	$1,007	1.2%	$1,070
Overseas COLA	23.2%	$3,243	16.7%	$4,300	14.5%	$4,996	17.6%	$4,391
Clothing/Uniform Allowance	1.3%	$529	0.8%	$575	1.2%	$371	1.3%	$384
Personal Money Allowance	0.0%	$843	0.0%	$321	0.0%		0.0%	$497
Avg Misc Allowances/COLAs		**$837**		**$779**		**$810**		**$872**
Nuclear Off. Accession Bonus	0.0%		0.0%		0.0%		0.0%	$7,000
Medical Off. Retention Bonus	0.8%	$36,260	0.4%	$35,355	0.0%		0.2%	$36,576
Nuclear Career Access. Bonus	0.0%		0.0%		0.0%		1.2%	$2,039
Nuc. Car. Ann. Incent. Bonus	0.0%		0.0%		0.0%		2.5%	$7,402
Add'l Spec. Pay, Medical Off.	2.0%	$14,729	1.1%	$15,000	0.0%	$42	0.6%	$14,707
Incentive Spec. Pay, Med Off.	0.4%	$20,852	0.3%	$18,304	0.0%		0.1%	$22,195
Nuc. Qual. Off. Continuation	0.0%		0.0%		0.0%		5.5%	$17,435
Aviation Off. Continuation	0.0%		7.6%	$17,657	6.8%	$11,136	6.7%	$12,163
Average Bonuses		**$673**		**$1,695**		**$756**		**$2,172**
Average Annual Pay		**$64,125**		**$66,883**		**$62,161**		**$65,940**

Source: Asch, Hosek, and Martin (2002).

Table 15. Incidence and Average Amount of Enlistment and Selective Reenlistment Bonuses, 1999

Bonus Incidence and Amount	Army	Air Force	Marine Corps	Navy
Enlistment Bonuses				
Percent receiving first payment*	2.1%	1.7%	0.5%	1.9%
Average first payment	$5,249	$3,744	$2,137	$4,321
First payment as percentage of basic pay	40.1%	29.2%	16.5%	31.3%
Percent receiving anniversary payment*	1.7%	0.0%	0.0%	0.7%
Average anniversary payment	$2,312	$1,200	.	$982
Anniv. payment as percentage of basic pay	17.4%	9.3%	.	6.6%
Selective Reenlistment Bonuses				
Percent receiving first payment*	3.7%	4.3%	0.0%	4.0%
Average first payment	$3,424	$5,672	.	$8,973
First payment as percentage of basic pay	19.4%	32.8%	.	51.3%
Percent receiving anniversary payment*	7.8%	6.0%	0.0%	14.2%
Average anniversary payment	$1,060	$1,293	.	$2,388
Anniv. payment as percentage of basic pay	5.4%	6.7%	.	12.1%

* *Percentages are computed relative to the total number of personnel in service all 12 months of 1999. For first-year personnel, the sample includes personnel who entered service in October-December 1998, plus those entering in January 1999, and who stayed in service throughout 1999. Because first payments of enlistment bonuses are received upon entering service but the sample contains only four months worth of entrants (October-January), the sample undercounts the percentage of personnel receiving first payments of enlistment bonuses. Allowing for entrants throughout the year would approximately triple the percentage.*

Table 16. Years of Service at Promotion to Each Grade, by Branch of Service

Grade	Army FY99	Navy FY99	Marine Corps FY99	Air Force FY99	Air Force FY97	Air Force FY90
E4	2.0	2.2	2.5	2.8	2.8	2.8
E5	4.6	5.0	4.2	7.2	7.5	6.9
E6	8.9	11.0	9.0	14.6	13.7	12.1
O3	5.5	7.5	5.8	5.3	4.8	5.2
O4	10.6	11.3	11.9	11.1	11.5	12.0
O5	16.5	16.2	17.7	16.9	17.2	16.4

Figure 4. Average Total Enlisted Pay by Years of Service, 1999

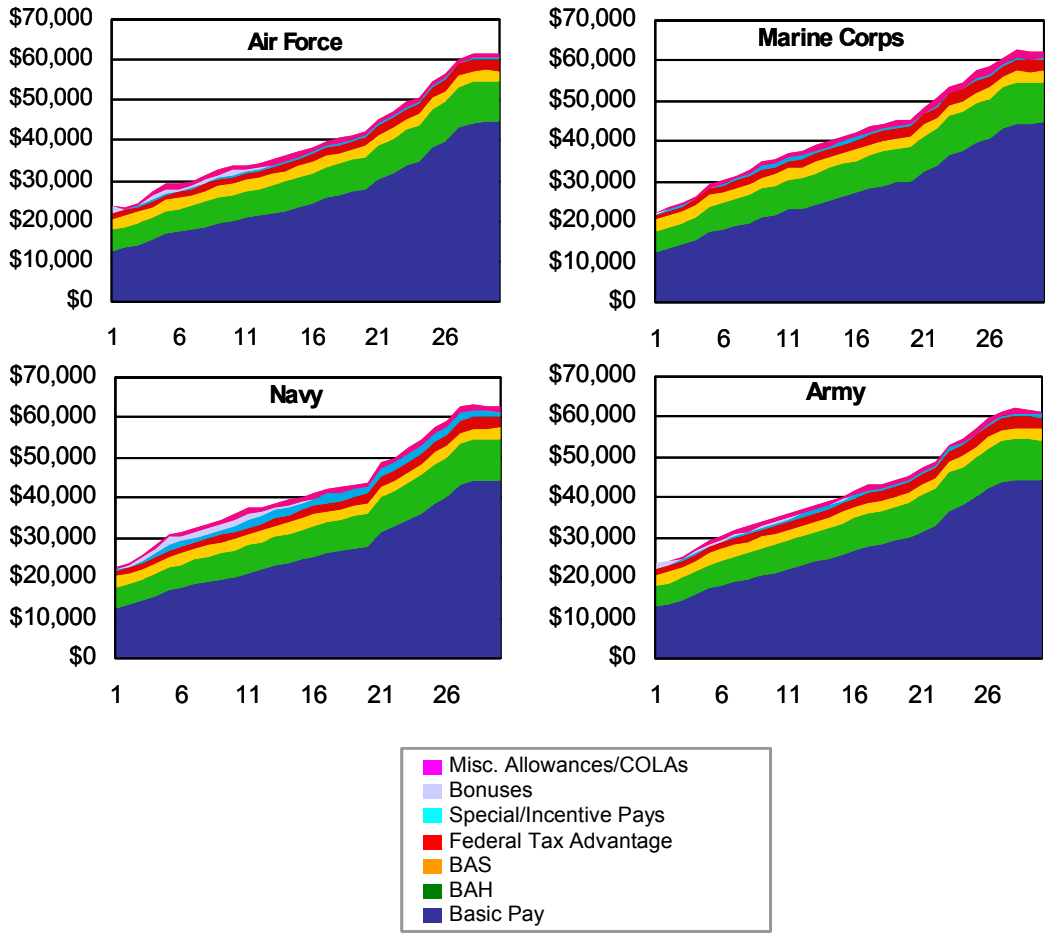


Figure 5. Average Officer Pay by Years of Service, (Commissioning Source is Academy or ROTC), 1999

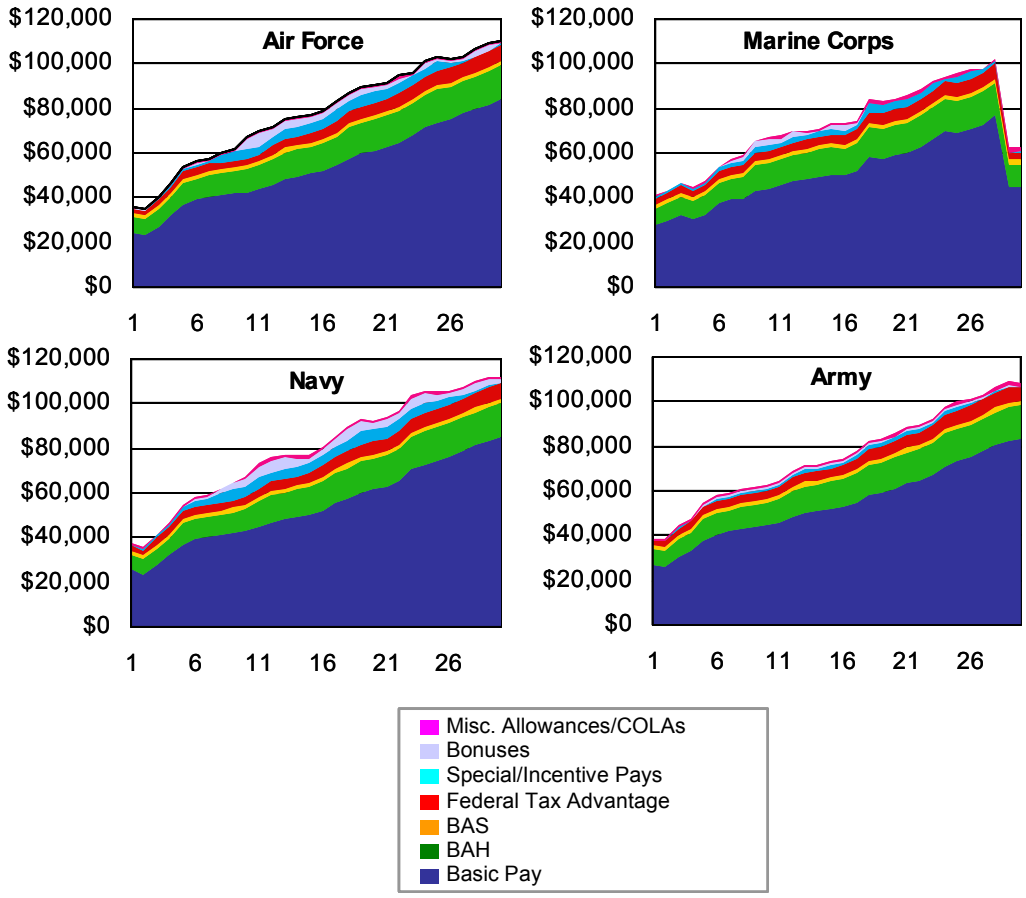


Figure 6. Air Force Average Enlisted Pay by Years of Service and Occupational Area, 1999

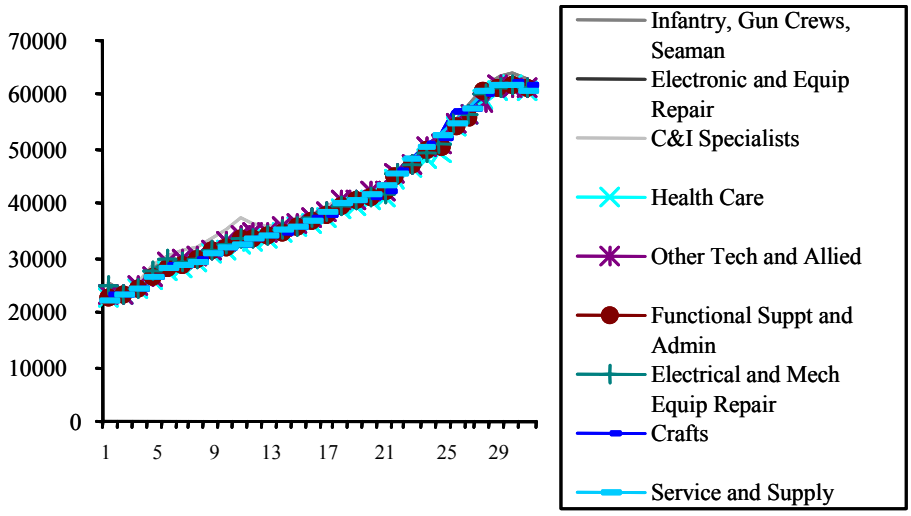


Figure 7. Air Force Average Officer Pay by Years of Service and Occupational Area, 1999

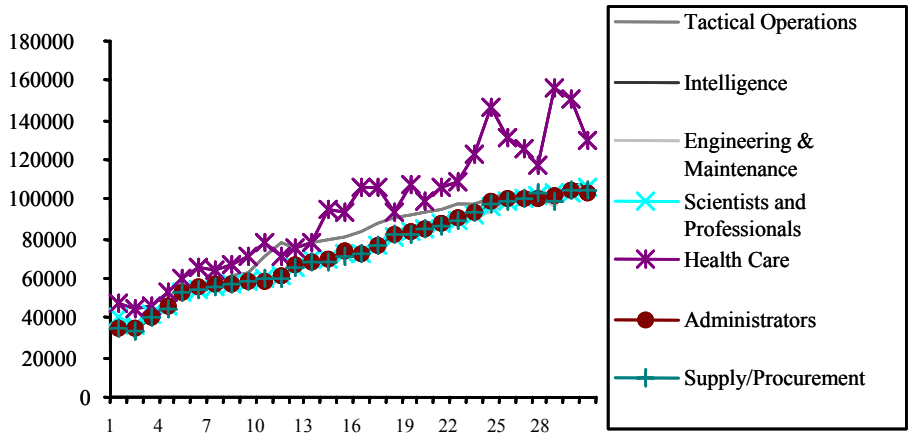


Figure 8. Air Force Average Enlisted Pay by Years of Service and IT-Occupational Category, 1999

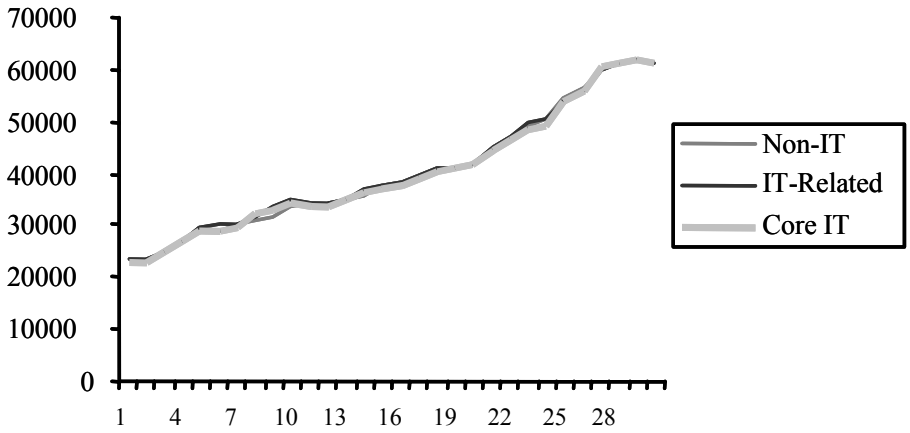


Figure 9. Distribution of Air Force Enlisted Personnel by Pay Grade, 1999

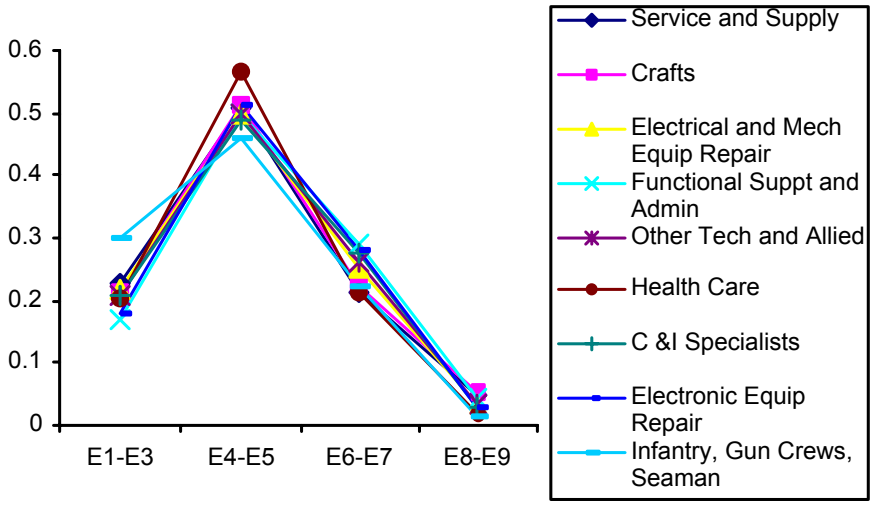
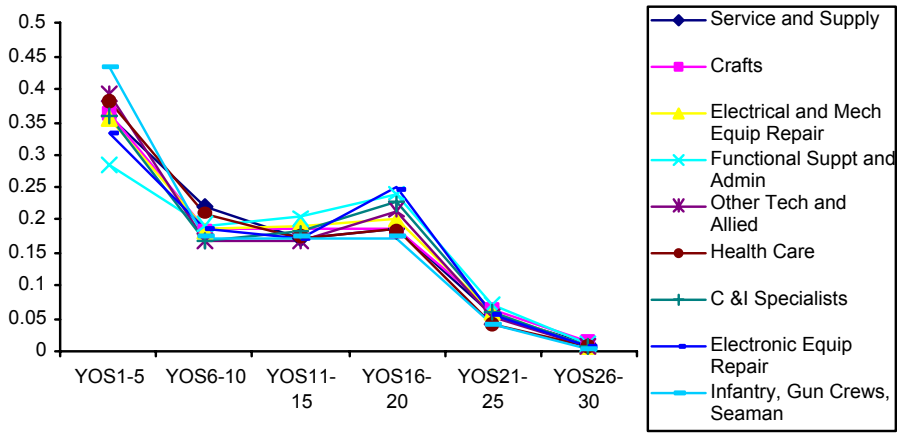


Figure 10. Distribution of Air Force Enlisted Personnel by Years of Service, 1999



4. COMPENSATION ALTERNATIVES

OVERVIEW OF ALTERNATIVES

In light of the Air Force's personnel situation, the civilian labor market trends that are adverse for the Air Force, and the small differences in pay across skill areas, it is useful to consider alternatives that could improve Air Force pay and create greater pay differentiation. We consider three alternatives. The first would alter the current compensation system: better measuring civilian pay, improving reenlistment bonuses, better recognizing hostile duty, and changing the pay table to better reward individuals who have demonstrated superior capability in their skill. The second would introduce a new pay component, skill pay, providing compensation for demonstrated skill attainment. The third alternative would introduce capability pay, based on current and future capability, particularly leadership capability, in the military.

Before discussing these alternatives, we consider a different approach to improving the compensation that Air Force personnel receive over their

military careers. That approach would be to raise the career pay of Air Force personnel by modifying the promotion system and specifically by reducing the length of time it takes to reach E-5.

Because promotion to E-5 takes roughly two years longer in the Air Force than in the other services, it seems likely that the Air Force could gain the support needed from the other services, Congress, and the Administration to speed up its promotions. Advancing promotion by two years would give Air Force personnel a significant pay raise. For instance, if an airman were an E-6 instead of an E-5 at YOS 10, his or her basic pay would increase by about $2,500. Faster promotion to E-5 would accumulate in higher pay over all subsequent years, increasing the present value of career pay. This could be expected to increase first-term retention and retention at higher terms.

Speeding up promotions might require significant changes in Air Force personnel management, however. A job that today requires a new E-5 might be revised to require an E-5 with two years' experience in grade, and so forth. Promotion criteria would also need to be revised.

One drawback of speeding up promotions is that, if such an approach were applied uniformly to all specialties, pay would be increased even in specialties where no retention problems existed. Yet if retention shortfalls were widespread and were expected to persist, this inefficiency would probably be minor. Alternatively, the Air Force could consider speeding up promotions selectively. Promotions could be accelerated in specialties where the Air Force wants to increase career length or where outside wages are highest. As a result of selectively changing promotion speed, differences in rank would no longer reflect differences in military responsibility alone but would also reflect market opportunities. This would be a significant (and not necessarily welcome) departure from the long-time policy of providing equal promotion opportunity regardless of specialty.

Altering the Current Compensation System

The potential changes in the current system discussed here should be put in context. They represent moderate changes to the current compensation system rather than aggressive changes to the components, the levels, or the structure of the current system. Furthermore, the list of changes is not exhaustive but instead forms a feasible alternative to developing entirely new types of pay such as skill pay and capability pay. As the previous chapters make clear, the success of these changes should

be judged in terms of the services' recruiting and retention outcomes. Thus, continued monitoring of recruiting and retention success is also important.

Measuring Civilian Pay Accurately

During the 1990s, the annual adjustment in basic pay equaled the lagged change in the Employment Cost Index (ECI), as prescribed by law. The version of the ECI used to adjust basic pay measures how wage and salary costs change among private-sector establishments. Although the ECI measures overall wage and salary growth accurately, wage and salary growth can differ for different groups. The active-duty military in particular differs from the labor force at large by being younger but more educated, and the wages of younger, more-educated workers tended to grow more rapidly than the ECI in the 1990s. As a result, increases in basic pay fell short of increases in the market. And because the economic expansion lasted so long, these differences mounted from year to year. Therefore, although the ECI provides a useful starting point for considering how much to adjust basic pay, it is equally or more appropriate to check wage growth for the groups whose age and education are most comparable to those of military personnel. This can be done without legislative action. Detecting faster wage growth would naturally argue for a higher adjustment to basic pay.

Not looking at civilian wage growth relevant to military personnel runs the risk of misadjusting basic pay. However, tracking the wages of multiple groups leads to multiple estimates of wage growth. These must be considered jointly in deciding on guidance for adjustments to basic pay, which is more complicated than using a single index. Still, a benefit of detailed wage tracking is determining the extent to which military pay appears out of alignment with civilian pay by age, education, or occupational specialty. Such focused comparisons can be used in developing requests for bonus budgets or adjustments in special pays.

Thus, a case can be made for close monitoring of civilian wages accompanied by periodic, in-depth analysis that might require special surveys or the acquisition of special data. The process of tracking civilian wage opportunities would be greatly assisted if DoD arranged to link the personnel records of service members with their post-service earnings. The Internal Revenue Service offers the best potential source of information on post-service earnings, followed by the Social Security Administration. (IRS data are preferable because the SSA caps earnings subject to Social Security contributions.) But confidentiality considerations may ultimately preclude interagency cooperation. If so,

perhaps the best recourse is a periodic DoD survey of veterans. The survey would have to be designed to sample certain veterans from certain military occupational areas at higher rates. A DoD survey could also ask about post-service training, education, employee benefits, and other items, and the survey could request permission to link a respondent's survey data to his or her military personnel record. This information would help illuminate what kind of jobs veterans took, in which occupations and industries, how much they were paid, how long it took them to find an initial position and how frequently they changed jobs. It would also help identify what aspects of their military experience — training, teamwork, leadership, know-how gained from assignments and missions — proved most valuable.

Improving Reenlistment Bonuses

From the benefit of hindsight, higher and more pervasive reenlistment bonuses might have reduced the decline in Air Force first- and second-term reenlistment rates. The Navy paid reenlistment bonuses in 1999 to 15 percent of its personnel, the Army to 11 percent, and the Air Force to 10 percent. The average bonus payments were $4,452 for the Navy, $1,949 for the Army, and $3,167 for the Air Force. The Navy illustrates the feasibility of paying more and larger bonuses. The Navy's personnel leaders might be a useful source of information on whether the bonuses have hurt Navy culture or helped it.

To make reenlistment bonuses into a more effective tool for short-term response in the Air Force, there should be a prior understanding of the conditions that would trigger an increase in funds for bonuses *within* a fiscal year and an expectation that the funds would be made available. We think it is currently the case that the services must fund additional bonus outlays from their own budgets and must first obtain permission from Congress to reallocate the funds. The notion that unexpectedly large reenlistment shortfalls can be tolerated for a year until new budget allocations are made, and that the new budgets will be sufficient to restore reenlistment, found limited support in the 1990s until the dire conditions of 1999.

In principle, bonuses are a superb instrument for managing actual or impending shortfalls in reenlistment, particularly in response to temporary or cyclical variations in the factors that affect reenlistment in a particular occupational area. Because of persistent threats of shortage in some areas, bonuses tend to raise compensation in some specialties on a semipermanent basis, i.e., certain specialties tend to receive bonuses year after year. Given that bonuses provide an "equalizing differential" to make

military pay more competitive with private-sector pay in these areas, it is to be expected that some of a year's bonus budget is in effect preprogrammed. Within a fiscal year, the opportunity for adjusting bonuses often entails a choice of reducing the presence or amount of a bonus in some specialties in order to introduce or raise them in others. There may also be little willingness to move money from nonpersonnel accounts.

There is concern that making bonus amounts and bonus budgets highly responsive to manpower supply shortfalls might induce "gaming" behavior, with some members delaying their reenlistment decisions to see whether bonuses will rise. If so, tying reenlistment bonuses to expected personnel shortfalls could be problematic.

A greater worry is that bonuses will become too prominent a component of pay. From an airman's perspective, bonuses are temporary additions to pay for the duration of the current term, their amount is uncertain when looking into the future, and they do not count toward retirement benefits. But bonuses offer cash today, not deferred benefits, and many personnel do not stay for 20 years. The present value of counting bonuses toward retirement benefits in general depends on the airman's discount rate and probability of reaching retirement eligibility at 20 years of service. With personal discount rates typically 20 percent per year and higher (Warner, Pleeter, 2001), the present value of incremental additions to retirement benefits is small. Further, it is smaller than the present value of the cost to the government of financing the benefit on an accrual basis.

From the Air Force's perspective, the idea of bonuses and retirement raises an issue of the optimal experience mix within a specialty area. Although it may be desirable to increase the average years of service, it may not be desirable to increase the proportion staying to 20 years or longer. The answer may vary from specialty to specialty, so the value to the Air Force of tying retirement benefits to bonus amounts would also vary by specialty.

The bonus instrument can be made more responsive than it is today. Bonus amounts could be adjusted during the course of the enlistment term. For example, bonuses could be indexed to rise if the current bonus step rose above the level that prevailed at the time of reenlistment. This would result in higher bonus payments in areas where manning shortfalls are becoming more critical, and the higher payments should reduce within-term attrition (although such attrition is low after the first term). If personnel anticipated the indexing of their bonus payments, the expected value of staying in the military would increase, thereby improving future

reenlistment rates. Further, uncertainty would be diminished if there were a stronger expectation that the bonus would continue into the next term, e.g., through an early commitment by the service.

Bonuses might be modified to provide greater incentive for skill acquisition. In particular, the bonus anniversary payment could increase with skill level. Depending on how "skill" and "skill level" are defined, the role of bonuses could be expanded from avoiding manning shortfalls in an occupation to providing an incentive for skill acquisition during the term. Skill could be defined broadly to mean the skills and knowledge typically acquired within a narrowly defined (3-digit) occupational specialty, or it could be defined narrowly to mean the acquisition of particular skills and knowledge. The Air Force already designates skill levels within a narrowly defined occupation. It would presumably be possible to define skill steps between levels if existing levels (e.g., "1", "3", "5", "7") were thought to be too few. This would create possibilities for bonus payment increases *during* the term, and it would offer an additional degree of freedom in setting bonus amounts, which today depend on basic pay at the time of reenlistment. A bonus that accounts for skill level increases during the term might have the added advantage of increasing the reenlistment rate of high-aptitude high performers. Further, Developing Aerospace Leaders (DAL) certification standards provide another indicator of skill, and bonuses could be structured to pay an amount dependent not only on basic pay at time of reenlistment, but also on a member's DAL certification.

Modifying reenlistment bonuses to reward skill and provide incentives for skill acquisition could also enable the Air Force to implement more-variable career lengths and YOS/grade mixes across skill areas. Such variability may be desirable when skill areas vary in the costs of recruiting and training, length of the learning curve, and value of experience to the organization. Reenlistment bonuses could be targeted to areas where longer careers are cost-effective. However, if the incentive were to remain in place and be stable in value, it might be better to consider a special pay rather than a bonus. The special pay could be "stepped" by year of service and grade.

Using reenlistment bonuses or special pay in a way that resulted in more variable career lengths would require changes in the personnel management system and most likely in the Air Force culture, which seems

to provide an implicit promise that careers will be quite similar regardless of skill.[11]

Reshaping the Basic Pay Table

Capability pay rewards people for demonstrating superior leadership capability in their current and future jobs. It also provides an incentive for capable personnel to stay in service. But to some extent these outcomes can be achieved by reshaping the basic pay table. It may seem paradoxical that the basic table can be used to reward capability: the table is common to all personnel, but not all personnel are highly capable. However, changes in the structure of the pay table and personnel management methods that provide greater incentives for capability may be feasible.

Incentives for increasing effort and retention and for sorting capable members into influential positions could be strengthened by restructuring the basic pay table to make pay grow increasingly rapidly with rank. Such a change would "skew" the table with respect to rank because each promotion would result in an increasingly larger pay increase. By creating nonlinearly higher rewards, skewness increases the incentives for effort and retention at any lower rank and, importantly, maintains strong incentives as personnel move up through the ranks.[12] Highly capable members should benefit because, if they exert effort, they are likely to progress faster. If so, this benefits the Air Force by ensuring a supply of highly capable members to high- ranking positions, where decisions can have greater consequences. A skewed pay structure is appropriate in an organization where the probability of promotion declines with each successive promotion (a pyramid-shaped hierarchy).

Microsimulation modeling of retention and productivity among Army enlisted personnel shows that increasing the skewness of the basic pay table increases effort incentives and the retention and sorting of high-ability personnel (Asch and Warner, 1994). The same model was used to analyze the components of the FY00 pay legislation and their effects on retention and productivity. The model predicted that the pay action would have a large positive effect on both retention and productivity (Asch and

[11] This is a generalization. An obvious exception is the management of Air Force pilots, where there are special pays (Aviation Career Incentive Pay, Aviation Officer Continuation Pay) as well as service commitments.

[12] To maintain effort incentives among mid-career personnel and to maintain retention incentives among the most capable officers and enlisted personnel, the reward to promotion should rise with rank. This is also necessary because there are fewer promotions to achieve in the future, as individuals ascend the ranks. To maintain incentives, the "contest prize" or promotion reward needs to increase with rank to offset the fact that there are fewer performance "contests" in which to participate.

Hosek, 2000). This result is not surprising given that the legislation included pay table reform (which was subsequently implemented in July 2000). The reform gave pay raises to mid-career personnel in a way that generally rewarded promotion over longevity.

The microsimulation model showed that it is theoretically feasible to increase the capability of the military force through restructuring the pay table. While it is also possible to increase capability by raising basic pay across the board, the simulation modeling showed that skewing is more cost-effective because it targets basic pay to higher-grade and therefore more senior personnel, who are less numerous.

The mechanism by which a restructured pay table would result in greater pay for capability is promotion, an event that may occur infrequently and depends on one's current rank and years of service. When promotions are infrequent, the discounted present value of the future higher pay associated with promotion is smaller. Therefore, the degree of pay skewness must increase when promotion speed is slow in order to offset the effect of slow speed on expected future pay.

One disadvantage of relying on promotion to implement greater pay for capability is that promotion speed either may not vary much across skill or occupational areas or it may vary in a way that does not adequately reflect the differential demands for capability across occupational areas. Air Force culture puts a premium on providing individuals with equal promotion opportunity, regardless of occupation. If the pay table were restructured to become more skewed and, therefore, to reward and provide incentives for capability, the similarities in promotion speed across Air Force occupations will result in little differentiation in pay. Alternatively, varying promotion speeds across skill or occupational areas would differentiate pay.

Pros and Cons of Improving the Current System

The previous paragraphs discussed how the pay table and bonuses could be modified to strengthen incentives for retaining and motivating high capability members, for acquiring skill, and for creating careers of different expected lengths. These changes seem compatible with the Air Force's culture of equal promotion opportunity regardless of occupation.

There are reasons why pay policies to achieve these goals should build on the current compensation system rather than implement entirely new types of pays or pay systems. Probably the most compelling is that the current system has been in place since the Hook Commission issued its report in 1948, and — while the system has been subject to some criticism

— service members and policymakers have demonstrated enormous confidence in it by their reluctance to change it. It has stood the test of time, including the transition from a draft force to a volunteer one, from a post-World War II peacetime force to a wartime force during the Korean and Vietnam eras, and from a Cold-War to a post-Cold-War force. These forces have varied in size, personnel experience, skill, and aptitude. Nonetheless, the basic structure of the compensation system has changed relatively little, and there appears to be considerable consensus that the system has worked well enough, with a few occasional adjustments, throughout the past 50 years.

The Common Pay Table

One reason for the longevity and popularity of the current system, and why building on it by improving the current bonus system makes sense, is that the current system uses a common pay table for all personnel. It thus provides concrete evidence of the value of a common culture in the military, and it recognizes the equal value placed on patriotism and service, regardless of the member's particular skill area or branch of service. Furthermore, a common pay table helps make the compensation system transparent to the entire military community, including the reserve components, and makes changes clear and open. Movement through the pay table depends on promotion criteria that are also widely known, and a promotion process that, we think, is perceived by members as fair. The salary and merit systems used in the private sector are often much less transparent.[13]

A common pay table in which longevity increases are automatic and where promotions occur periodically and are based on demonstrated ability and achievement also has desirable features from an efficiency or cost-effectiveness standpoint. First, automatic longevity increases save the Department of Defense and the taxpayers from the cost of conducting annual performance reviews for all military members. If the military moved to a merit-based system or a skill-based system that required periodic, say annual, adjustments that could differ across small groups or even individuals, the cost of administering such a review system might be prohibitive. Administration would require the time and effort of supervisors to provide input, Air Force coordination of the information,

[13] Workers, not knowing others' salaries, may believe, rightly or wrongly, that they are underpaid relative to their coworkers. Still, openness would not necessarily stop criticisms of a compensation system. Workers might question why one group is paid more than another, or why certain workers should have merited promotion to a higher grade.

distribution of the information to salary review boards, meetings of salary review boards, and justification of the reviews to individual members.[14] Furthermore, once a significant part of an individual's annual pay adjustment fell under the jurisdiction of immediate supervisors and was not necessarily tied explicitly to easily measured or well-known benchmarks, individuals could take actions to influence the supervisor's assessment to ensure a positive assessment. Such "influence" activities would be in the organization's best interests if they resulted in improved performance on appropriate tasks, but would not be if they were only intended to make a person appear productive without any genuine increase in performance. In addition, individuals who were unhappy with their salary action might write letters to their congressional representatives complaining about the system, resulting in a perception that the system did not work, even when it did.

Currently the promotion system provides a periodic review of performance. However, promotions are generally viewed as a successful tool to pay members more and provide them with an incentive to work hard and attain the skills necessary to gain a promotion. The promotion system is not viewed as having excessive administration costs, given the value it provides in sorting and selecting personnel, and personnel do not seem to complain unduly about promotions. In large part, the perceived fairness of the promotion system rests on the fact that promotions are based on well-known criteria that all individuals have a relatively equal opportunity of meeting.

Another important fact to note about promotions: despite the common pay table, pay can vary across individuals because of differences in promotion speed. Promotion speed operates to differentiate pay among individuals.

Arguments for Changing the System

There are also strong arguments against building on what some critics view as a flawed system.

While a common system has merits, particularly a common pay table, it is criticized as a "one-size-fits-all" system that inhibits force management flexibility. Bonuses and other special and incentive pays create some pay differentiation among military personnel, and they help to prevent low retention and thereby tend to keep retention profiles more similar across occupations than they would otherwise be. The result is a

[14] Not all promotions require centralized overview. For instance, enlisted promotions to lower grades can be made at the discretion of the local commander.

high degree of consistency in the career length and experience mix of personnel across occupations. However, bonuses and special pays could be used to create more varied career lengths and experience mixes. That is, an old tool could be used in a new way. Career lengths are also heavily influenced by basic pay and retirement benefits. We have discussed the potential advantages of adding skewness to the basic pay table, which might be thought of as a major modification to the table. A more radical change would be to alter the retirement system.

The Retirement System and Flexibility in Force Management

Arguably the biggest impediment to managing the force flexibly is the military's 20-year retirement system. Regardless of occupational area, the system tends to lock mid-career personnel in "golden handcuffs" until YOS 20 and gives an incentive to leave at 20 years of service and begin collecting benefits. The services have come to accept the retention lock-in as a commitment that must be maintained to keep faith with successive cohorts of personnel. This can be viewed as an equilibrium situation. Service members are willing to commit to high retention given their beliefs about the stability of the compensation system, especially the commitment to retirement benefits. In addition, the services are willing to commit to sustaining the compensation system given their beliefs about how service members' retention and commitment to duty respond to it. Any move to deviate from the commitment threatens to destroy the current equilibrium. Any system will have flaws, and criticism of the current system is inevitably destabilizing if it is not accompanied by the presentation of positive alternatives for change. To gain acceptance, alternatives not only must hold promise of being superior when fully implemented, but they also require a transition plan that conserves the interests of incumbent personnel who otherwise would be affected by the scope of change or pace of transition.

That said, the role of compensation is so important in meeting national security manpower requirements that a periodic critical evaluation is in the nation's interest. Past studies, including most recently a report from the Defense Science Board, recommended restructuring the military retirement system. A restructured system would vest retired pay earlier, say at YOS 10 or YOS 5, and the new retirement system would resemble a thrift savings plan, where both the member and the government contributed to the investment fund and the retirement benefit depended on the level and timing of contributions. These studies also recommended making the military compensation system more cost-effective by putting a larger fraction of military compensation into basic pay and other up-front forms of pay such as bonuses. Cost-effectiveness is improved because

service members, who on average are quite young, value pay that occurs earlier in their career far more than pay that comes in the form of retirement, while the cost to the government does not change as much. Pay actions, such as the FY00 legislation that offers a $30,000 bonus to members at YOS 15 who choose to stay until YOS 20 and retire under REDUX, and actions that increase basic pay and the role of bonuses, are policies that can help improve the overall cost-effectiveness of the military's compensation system.

Because of the current system's limitations, it is useful to contemplate other approaches to implementing greater pay differentiation in the Air Force while addressing the Air Force's recruiting, retention, and pay issues. The next sections consider two alternatives: skill pay and capability pay.

SKILL PAY

Skill pay would provide remuneration for designated skills. Skill is not synonymous with occupation. A skill and an occupation might be the same, a skill might be present in several occupations, or it might be present among only some members of an occupation. To understand the prospective role of skill pay, we have found it useful to contrast skill pays with reenlistment bonuses. We have done this in Table 17. As the table suggests, a key rationale for skill pay is to protect a valuable stock of current and future human capital when replacing that stock is costly and time-consuming. This rationale contrasts with that of selective reenlistment bonuses, the purpose of which is to prevent or address shortages in the flow of personnel currently needed to meet manning requirements in certain specialties. The emergence of bonuses as the chief retention incentive had occurred by the mid-1970s, as bonuses supplanted proficiency pay.

Table 17. Features of Reenlistment Bonuses and Skill Pays

Feature	Reenlistment Bonus	Skill Pay
Rationale	Prevent manning shortages in critical specialties. Shortages occur when the flow of personnel in a specialty is too far below the current requirements for personnel in that specialty. Assessments of shortage are done by "zone," i.e., by year of service range.	Prevent loss of critical skills, even if those skills are not used on current assignment and/or are not in short supply in critical specialties. Skill pay helps to conserve human capital that would be difficult, costly, or time-consuming to replace and is deemed vital to maintain the capability necessary to meet readiness requirements.
Amount	Bonus amount is the product of bonus step, basic pay, and term length. Bonus step ranges from 0.5 to 6.0 in increments of 0.5.	To be determined. The amount is presumably a function of the value of the skill to the service and the cost of replacing the skill in the short run and/or in the long run. The amount may also depend on the value of the skill in the private sector.
Duration and payment schedule	A bonus is payable over the term of service. The initial bonus payment is made at the time of signing the enlistment contract and typically equals 50 percent of the bonus amount. The remainder of the bonus is paid in annual installments on the anniversary date of signing.	To be determined. For example, skill pay could be a flat dollar amount per month or a percentage of basic pay. The percentage could rise as basic pay increased over a career. Duration of payment would depend on both the member's eligibility and on the service's determination that the skill should receive skill pay. For instance, at some future date the service might determine that the skill is no longer eligible. Also, the payment schedule could be designed to have an end-point, e.g., YOS 20 or YOS 25, and a start-point.
Eligibility	The member must be eligible to reenlist. The service must determine that the specialty is critical and has a current shortage.	The member must demonstrate that the skill has been obtained and maintained. The service must determine that the service's stock of the skill is critical to readiness and would be less than the desired stock if skill pay were not paid.

Table 17. Features of Reenlistment Bonuses and Skill Pays (continued)

Feature	Reenlistment Bonus	Skill Pay
Adjustment	The service can change the bonus multiple at its discretion. Changes are typically not made more than quarterly.	To be determined. Skill pay would presumably be paid to all personnel possessing an eligible skill (not just the flow of personnel who reenlist at a given time). Adjustments would therefore affect all such personnel. Frequency of change in skill pay level would depend on a periodic assessment of the internal and external value of the skill and its replacement cost.
Harmonizing skill pay with other pays		Other pays include bonuses, proficiency pays, aviation career incentive pay, career sea pay, and others. These pays affect the retention of personnel. It may be that personnel who possess an eligible skill are in specialties or assignments where retention is high. Payment of skill pay to these personnel would not be needed to protect the stock of skill but might nevertheless be made. Other personnel who possess an eligible skill may be in specialties or assignments where retention is low. Here, skill pay would help protect the stock of the skill. Targeting skill pay conditional on retention would lower the cost of skill pay. But targeting would make the receipt of skill pay, and its amount, more uncertain to the member, reducing its value as an incentive to obtain and maintain the skill. If skill pay were paid to all members with an eligible skill, it might be possible to reduce bonus amounts in some cases.
Stability over a career	The bonus is valid for the duration of the term. There are no guarantees that a bonus will be available at the next reenlistment point.	Presumably, skill pay would be highly stable over a career. The set of eligible skills would probably be stable over time. The payment schedule would be stable, e.g., a percentage of basic pay, or a rising percentage of basic pay. And the end-point of payment, e.g., YOS 25, would also be stable.

Table 17. Features of Reenlistment Bonuses and Skill Pays (continued)

Feature	Reenlistment Bonus	Skill Pay
Flexibility	Bonuses are highly flexible. Bonus multiples can be changed frequently, and service members are aware of this.	Frequent or large changes would undercut the value of skill pay. But the service would ultimately have to retain flexibility to make changes. Rigid pay schedules would be inefficient in the long run if the need for a skill diminished. If payment level were maintained even though the need for the skill had decreased, members might come to view skill pay as unjustifiably inequitable.
Equity	On average, there is a high degree of horizontal equity in military pay. Given grade and year of service, bonuses create a fairly small difference in pay, e.g., $1,000-$3,000 per year among enlisted personnel. For most enlisted personnel, that is less that 10 percent of their RMC. Officer pay is also highly equitable, granted an exception for special and incentive pays related to aviation and medicine.	Skill pay would create persistent differences in pay depending on a member's skills. The size of these differences would depend on the skill pay schedule, which remains to be determined. Small inequity already exists in military pay, and it is reasonable to expect that small additional inequity would be acceptable if the reasons for it were well known and perceived to be valid. A large increase in persistent inequity could be cause for concern. Service members might doubt why, in times of war or during peacetime operations, their value to the service should be less than that of a member in a designated skill.

It is instructive to review the history of proficiency pay, if only because "proficiency" sounds closely related to "skill."[15] The purpose of proficiency pay and its companion, special duty assignment pay, was to induce the retention of enlisted personnel who were "required to perform extremely demanding duties or duties demanding an unusual degree of responsibility," and to induce "qualified personnel to volunteer for such duties." (p. 477)

Proficiency pay resulted from the deliberations of the Defense Advisory Committee on Professional and Technical Compensation (also called the "Cordiner Committee"). In 1957 it recommended a change in the pay structure that would allow the promotion of a member to a higher pay grade without promotion to a higher rank. The Uniformed Services Pay Act of 1958 permitted the service secretaries "to choose such a 'proficiency pay grade' method for compensating members 'designated as . . . specially proficient in a military skill,'" (p. 477). It also permitted them alternatively to pay up to $150/month. The secretaries chose the latter method and never used the proficiency pay grade method. That is, the secretaries elected not to sever the connection between pay grade and rank.

Three types of proficiency pay were established: shortage specialty proficiency pay, special duty assignment proficiency pay, and superior performance proficiency pay. Shortage specialty proficiency pay was displaced by the selective reenlistment bonus in 1975 and phased out rapidly. By 1977 only 7,000 personnel received shortage specialty pay, compared with 135,000 in 1975. In 1982, the shortage specialty pay program was absorbed into the special duty assignment pay program. Superior performance proficiency pay was authorized until 1976, then ceased. Special duty assignment proficiency pay was paid to "personnel performing such voluntary duties as recruiters, drill instructors, or reenlistment NCOs." (p. 478) In 1985, new proficiency pay authority limited such pay to special duty assignments. Special duty assignment pay was payable to members "when required to perform 'extremely difficult' duties or duties 'involving an unusual degree of responsibility in a military skill.'" (p. 478) The word "proficiency" was dropped.

The history of proficiency pay suggests that much of the intent of the Cordiner Committee was lost along the way. The Committee sought to create a pay for members who were "specially proficient in a given skill." In practice, proficiency pay served to increase retention in specialties with shortages — even though shortages might be completely unrelated to a

[15] The source of this information is Military Compensation Background Papers (1996), pp. 477-481.

ember's skill proficiency. Proficiency pay also compensated for particular assignments, which again were not necessarily related to skill proficiency. Only superior performance proficiency pay seems closely related to the spirit of the Cordiner Committee recommendation, in the sense that superior performance was a demonstration of proficiency.

In any case, it appears that neither proficiency pay nor bonuses had the purpose of conserving the stock of a particular skill. Thus, skill pay represents a departure from the domain of those pays.

Skill pay could enable the Air Force to give explicit recognition to the differing external market opportunities available to personnel in various skill areas. It could provide a means of explicitly rewarding and providing incentives for acquiring and maintaining skills that were essential for military readiness and difficult or costly to replace. Arguably all skills are essential for military readiness, but some skills are particularly costly or time-consuming to replace. Because skill pay could vary across specialties or skill areas, it could create a means of varying career pay profiles across specialties or skill areas and result in different retention profiles and career lengths. Skill pay would be paid to those who have the skill, even if they are not using that skill on their current assignment. The rationale for this approach is that it enables the Air Force to prevent the loss of critical skills and to maintain a ready inventory of the skill, in case of loss or unexpected demand for that skill in the future.

Skill pay has some disadvantages. Once established, skill pay should be varied only gradually. Otherwise, pay would become less predictable for a given member, and the pay system could appear capricious. But problems can arise if skill pay becomes too rigidly established. If changes in military technology and strategy bring changes in skill requirements, the skills covered by skill pay should change — but might not. Similarly, if the external civilian labor market shifts toward new skill areas, the ability of the Air Force to meet these shifts would be hampered by a system that defined too rigidly which skills qualify for skill pay.

Implementing skill pay would require that the Air Force as well as Congress define how skill pay would operate. For instance, skill pay can be a flat amount per month regardless of rank and year of service, or a flat amount varying by rank and year of service, or a percentage increment to basic pay where the percentage might vary by rank or year of service. If it were implemented as a flat amount regardless of rank or YOS, skill pay would resemble Proficiency Pay or hazardous duty pay, such as Parachute Duty Pay. Those pays are a flat amount paid to compensate for the danger and skill associated with such duty, regardless of rank or experience.

There are two potential problems with defining skill pay as a single, flat amount. First, the value of the pay erodes over time with inflation. While its value can be indexed (and Congress has implemented indexing for some military-related benefits, such as the Montgomery GI Bill), indexing is not currently used to maintain the value of S&I pays. Therefore, to ensure that the value of flat-rate skill pay is maintained, attention would need to be paid to indexing its value.

Second, an important goal of the military's compensation system is to provide incentives for individuals, especially high-quality personnel, to work hard and effectively. The primary means by which this goal is currently accomplished is by providing promotion pay increases that exceed longevity increases in the basic pay table. For incentives to be maintained throughout a military career, it is critical that the pay be skewed with respect to grade. By skewed, we mean that the pay increase associated with promotion rises with each successive promotion so that, for example, the monetary reward for a promotion to E-9 exceeds that of a promotion to E-8. The problem with flat dollar amounts of pay is that they reduce the skewness of the pay system, thereby reducing the incentives for performance and productivity. Flat dollar amounts are a larger percentage of pay for individuals in lower ranks than for those in higher ranks. Thus, they flatten the pay system and reduce the relative rewards for higher promotion, dampening incentive. In contrast, skill pay that was a percentage increment to basic pay, where the percentage might rise by rank or year of service, could enhance incentive by increasing the degree of skewness and increasing the relative rewards to higher promotion.

The percentages for skill pay could be designed to vary by skill group, so that different groups could differ in their rewards for promotion versus experience versus time in grade. That is, skill pay could break the link between rank and grade.

Skill pay would create persistent differences in pay across members and decrease pay equity. The military pay system has a high degree of pay equity, although there are pay differences due to special and incentive pays and allowances. Small increases in inequity probably would not be disturbing, especially if members understood the reasons for the change in pay structure. However, large increases in inequity might create tensions. Pay inequity is difficult to explain on the battlefield when everyone is at risk and performing as a team is crucial. That said, some difference in pay might be cost-effective in assuring that manning requirements are met, i.e., that the right mix of personnel reaches the battlefield.

In addition to specifying the skill pay table and determining the mechanism for adjusting skill pay, the implementation of skill pay would

require defining which skills to reward, assuring the skills have been acquired and maintained, and determining if and when skill pay turns off. The amount of skill pay could be based on pass/fail certification or on criteria assessing the breadth and depth of skills and possibly proficiency in their use. Some of the implementation costs are set-up costs and periodic fixed costs, e.g., for reviewing the skill pay schedules and the criteria for selecting skills. Other costs are recurrent, for example, assurance of a service member's skill acquisition and maintenance.

CAPABILITY PAY

The Air Force must conserve the supply of personnel who have a demonstrated capacity for effective decisionmaking and leadership. Leadership counts in determining the effectiveness of an organization, and individuals differ in their leadership capability. Leaders in the highest ranks hold positions of greatest authority and responsibility, and by implication the decisions made by high-ranking leaders can affect the efficiency and morale of all personnel under that authority. Timely, effective, cost-effective decisions have a direct bearing on military capability. Resources can be efficiently allocated to activities, or they can be misallocated — resulting in higher cost, lower output, and less capability. Good leadership can build cohesion, communicate objective and mission, and inspire personnel to peak performance. Weak leadership, even when cloaked in a "command profile" and stentorian voice, may result in wastage, lower performance, cynicism, the loss of personnel, and an unwillingness or lack of incentive to pass undistorted information from lower echelons to the top. These comments apply especially to officers, whose decisions can affect wide portions of the organization, and to senior enlisted personnel, whose role in accomplishing missions is equally vital.

The concept of capability pay, as we understand it, rests on the notion that personnel differ in their leadership capability. We assume a person's leadership capability depends on skills, knowledge, and experience, which in turn depend on opportunities, incentives, effort, and aptitude. Although an organization cannot provide a person with talent for leadership, the organization can make people into better leaders by providing leadership training, relevant assignments, and incentives.

Capability pay is not implementable without an empirical basis for determining leadership capability. We do not have studies or evidence to provide on the topic of what constitutes leadership capability, how it can be measured (e.g., in junior or mid-grade officers and mid-career (E-5, E-6) enlisted members), and how effectively such measures are put into practice. This is a difficult challenge, yet it somehow must already be a

factor in determining promotions and selecting personnel for career-building assignments.

A person's accumulation of skills, knowledge, and experiences relevant to positions of high responsibility — e.g., command positions — might be a coincidental by-product of coming up through the ranks or might be the result of careful, planned personnel management. The Air Force's Developing Aerospace Leaders (DAL) initiative, for instance, represents a move toward careful planning. Further, the organization can provide incentives to induce personnel to pursue a path to develop their leadership capability. The incentives should induce high levels of effort and commitment and at a minimum be strong enough to retain personnel in sufficient quantities to create an adequate-sized pool of future leader candidates. From these points it follows that developing leadership capability depends on both personnel management and the structure of compensation.

Symptoms of concern about a system's capacity to create future leaders include a lack of breadth and depth of experience among personnel. For instance, personnel might not be assigned to the full set of assignments thought to provide the best preparation, and they might spend too little time on an assignment to learn it in detail. These symptoms are closely connected with the personnel management system. Two other symptoms are low retention (e.g., high loss rate of captains) and a lack of incentive to solve systemic problems (e.g., avoiding actions that might be disruptive in the short run and not yield benefits until one's assignment is over). These symptoms relate to the compensation system, including performance evaluation.

Capability pay would recognize superior individual capability, both current and prospective future capability, presumably as revealed through current and past performance. Capability pay seems worth considering when the basic concern is either low retention of highly capable personnel, including future leaders, or inadequate incentive for effort. That is, stronger incentives to perform and increased retention rates are two reasons to introduce capability pay. Thus, capability pay would be based on performance, much like performance-based pay. Capability pay will not directly solve problems related to a lack of breadth and depth of experience, which lie in the province of personnel management. But it can help in solving them by inducing personnel to select leadership tracks. Leadership tracks can point in various directions, e.g., being a general officer or holding high-level command positions in such fields as logistics, intelligence, acquisition, communications, or space. Thus, unlike performance-based pay, which directly links pay with current

performance, capability pay also recognizes potential for superior future performance.

When pay level is largely dictated by rank and year of service, as under the current pay system, there is no immediate reward for exceptional performance. Instead, the reward is deferred (future promotion) or indirect (e.g., selection for a prize assignment or location). As discussed earlier, if the reward is deferred the size of the reward must be larger (i.e., the degree of skewness must be larger) not only because it is discounted but also because the probability of promotion to higher ranks is low. An alternative to restructuring the pay table is to offer capability pay. Capability pay could differentiate pay among individuals given their rank and year of service, and it could be structured to provide incentives for high performance throughout a service career.

Capability pay may also help retain high performers. These personnel form the pool of future leaders, and retaining and motivating personnel who perform exceptionally well today confers a future benefit to the organization in the form of improved selectivity in choosing leaders. A large pool of well-qualified personnel increases the expected capability of the person chosen, reduces the chance of settling for a sub-par selection, and increases the chance of finding a high-quality replacement if the original choice turns out to be sub-par. The assurance of having a well-qualified pool of leaders has enormous value because leaders make decisions affecting many tiers of the organization and numerous individuals in what can be life-threatening situations. This point is important in an organization like the Air Force, which has no lateral entry, because leaders cannot be hired off the street but must be selected from personnel in the lower tiers of the organization. Without lateral entry, personnel in those tiers must be capable of performing their current jobs and must have the potential to fill more responsible, higher-ranking jobs in the future. For the Air Force to fill its leadership positions with well-qualified, high-performing individuals, it must hire them at the lowest ranks and retain and develop them over time within the organization.

The importance of retaining high performers in the Air Force makes the retention trends shown in Table 5 worrisome. Those trends suggest that the Air Force has been struggling to retain high-performers in its enlisted force.

Mechanisms to Implement Capability Pay

There are various ways to implement capability pay. Design questions include:

- Over what range of grades and years of service would capability pay be payable?
- Would all personnel in the range receive some capability pay, or only a portion of personnel?
- How large would the pay be on average for each grade or YOS?
- How wide a variation in pay would exist, if any?
- Would capability pay be counted toward retirement?
- How often would personnel be evaluated?
- In what ways would the current performance evaluation systems for officers and enlisted personnel need to be modified?

The design choices affect the incentive structure created by capability pay, and the incentive structure affects the retention of personnel, their willingness to exert effort, and the extent to which highly capable high-performers are sorted into positions of the greatest influence and responsibility. The latter will determine the transitional and steady-state cost of capability pay, as well as its harder-to-measure benefits. For purposes of discussion, we will describe a possible design for capability pay. In our view, it is too early to be confident that any given design is best.

Capability pay could be payable to officers after completion of their initial service obligation, around the sixth to eighth year of service. It could be payable to enlisted personnel after five years of service, which for most personnel is after the first reenlistment. From these starting years, capability pay could be payable over the remainder of one's service career. By delaying the start of capability pay to these points, its direct and administrative costs are reduced. In addition, it can be difficult to discern a service member's performance and potential during the first years of service because there is small scope for individual initiative. Furthermore, during the initial obligation, random factors may play a relatively large role in measures of performance, making it harder to extract a signal of the member's actual capability. Finally, the initial years of service can be a period of rapid learning for personnel. Officers who might begin their careers with less skill, knowledge, and experience, due to differences in,

say, commissioning source, would have an opportunity to catch up during these years and would not penalized if capability pay was payable only after the initial obligation.

With respect to whether all personnel in the "payable" range would receive capability pay, we distinguish between eligibility and amount of award. Although capability pay could be limited to the top third or top half of performers, we identify several the problems with such a cut-off. First, some personnel will be misclassified, i.e., some high performers will be incorrectly cast as low performers, and vice versa. Second, highly capable personnel who feel as though they can comfortably qualify for capability pay would have little incentive to improve their performance in order to qualify. Third, personnel who received no capability pay might infer they had poor career prospects. They might consider leaving the service, even though capability pay was supposed to improve incentives and retention. Furthermore, the fact that some but not all personnel in a unit received capability pay might prove divisive, perhaps hurting morale and productivity.

Given the importance of equity as a factor in setting compensation, capability pay should be implemented in a way perceived as fair. Fair could mean that capability pay is spread among more individuals, or that only some individuals receive it but everyone is believed to have equal opportunity of receiving it.

As capability pay is spread over more personnel, either the total cost rises or the average award declines for a given budget. Moreover, even if capability pay were paid to all personnel, those receiving a low award could infer a negative signal and some might leave. On the other hand, personnel receiving a high award would presumably appreciate the pay and recognition.

There are different approaches to paying a capability award based on the service member's current performance. It could be paid as a single annual award, in effect a bonus. Or it could be paid as an increment over future years. Between these approaches, it could be paid in a larger amount over a shorter period. If the award were paid over the remaining years of service, it would be more valuable to those intending to remain in service longer.

Also, the award structure could be designed such that for any given level of future performance, the size of the award was a function of one's previous awards. For instance, the award could be higher the higher the level of capability pay being received. This would have the effect of compounding the value of a capability pay award, because a higher award today would automatically lead to higher awards tomorrow, given

tomorrow's performance level. Further, the structure of awards could be skewed so that as performance level rose, capability pay rose disproportionately.

In sum, the capability pay table could be two-dimensional, depending on current performance level and current level of capability pay, which in turn reflects past performance levels. The table could be skewed in both directions, with disproportionately higher increases to higher current performance and to a higher level of capability pay from past performance.

This capability pay table design has another possible advantage. It would enable pay differentiation among personnel at the same rank and year of service. By implication, it would weaken the link between rank and pay, permitting pay to be higher for personnel who have a strong record of performance in their current grade. These personnel might be highly productive in their current grades and positions and may not want to strive for the very highest ranks. Equally important, a service might want to keep these personnel in their current grades and positions, rather than have to promote them in order to increase their pay. Thus, capability pay becomes a means of rewarding officers for their leadership capability in areas requiring a high level of technical competence as opposed to their general leadership capability. This possible role for capability pay intersects with the role of skill pay. By the same token, however, capability pay might also be a means of extending the time an officer spent in a position (longer time on assignment) even though he or she was on a general officer track.

Modeling and empirical work are required to evaluate alternative structures for capability pay. The analysis would consider how retention, productivity, and cost varied across different structures; through policy simulation of these effects, it would be possible to see whether high-ability personnel were more likely to be retained longer under certain pay structures. It would also be valuable to conduct focus groups and surveys to learn whether officers and enlisted personnel would be receptive to capability pay and in what form.

Although capability pay has potential benefits, it also has significant administrative costs. As mentioned, a working definition of "leadership capability" must first be determined. A person's performance would be evaluated periodically, say annually, and ranked against the performance of others and/or against a standard with respect to leadership capability. In many positions, judgment and initiative are important, and of course personnel do not follow a regime of repetitive activities. Careful, subjective evaluation of performance is required. We assume the

evaluation system would be built on that used in the promotion system. So it seems likely that performance would be assessed relative to that of peers. The evaluator would have to operate under guidance prohibiting awarding the highest rating too frequently. One way of constraining the evaluator is to assign a "point budget." This should cause the evaluator to return good relative rankings of personnel by their performance. There could be a separate point budget for each rank (or rank/year of service, etc.). This could allow higher point assignments for higher-ranking personnel, for example. There also must be a mechanism for translating points into capability pay awards; the relationship might not be the same every year or across all occupational areas. Finally, if officers and enlisted personnel perceived the evaluations to have a large random component, the incentive effects of capability pay would be diminished.

5. CONCLUDING THOUGHTS

In the preceding chapters, we presented evidence about the personnel difficulties facing the Air Force and discussed options for altering the structure of military compensation. The options included restructuring the basic pay table to make it more positively skewed with respect to rank, promoting personnel faster, paying higher bonuses, tying bonus payments to current skill level and current rank, and conditioning deployment pay on the number of previous episodes involving hostile duty. We also discussed skill pay and capability pay, describing the roles they could play and their implementation issues. We offer two points in conclusion regarding approaches to evaluating possible new pays and the value of flexibility in managing the personnel force.

PATHWAYS FOR EVALUATING NEW PAYS

The effects and cost-effectiveness of skill pay and basic pay can be analyzed using microsimulation of individual retention and effort decisions in response to the incentive structure posed by the pays. Determining the schedules for skill pay and capability pay and the details of administering these pays would require close consultation with Air Force compensation officers. The simulation model would then be developed to reflect the features of specific options under consideration. Skill pay and capability pay probably would not emerge as highly flexible mechanisms for responding to supply problems caused by the business

cycle. But they probably would be helpful tools for dealing with persistent, large differences between military and private-sector pay, and for encouraging high performers to stay in service.

A complement to microsimulation modeling could be a demonstration experiment in which a subset of Air Force personnel would be randomly assigned to test and control groups and the test groups would be offered alternative skill or capability pays. The retention behavior of each group would be tracked or survey methods could be used to assess their reenlistment intentions at different points in time. Because of perceptions of inequity, such a demonstration experiment would need to ensure that expected compensation was equal across the control and test programs. The use of such experimentation methods has precedence in military personnel research. Experimentation was used to analyze the effects of newly structured educational benefits programs and enlistment bonus programs in the early 1980s. These experiments were extremely valuable in providing empirical evidence on the effects of different educational benefits and enlistment bonus payments and structures. Furthermore, this evidence laid the foundation for the adoption of the Montgomery GI Bill in 1984 and the expansion of the enlistment bonus program in 1985. Experimentation is a particularly valuable approach to assess a narrow set of feasible options for skill pay or capability pay.

Another useful approach that could be used to assess new pay alternatives is to employ a survey with a "factorial" or "conjoint" design. Just as private firms often use survey methods to query potential consumers about their preferences and buying intentions with respect to new products or new product designs, the military has begun adopting such methods in the area of recruiting. For example, RAND is conducting a survey of American youth in the college market to ascertain their enlistment intention and interest levels under a variety of new recruiting policies targeted to the college market. The "factorial" or "conjoint" approach allows us to examine the effects of different policy factors on enlistment intentions and to determine which combination of factors leads to the highest enlistment intentions. Such survey methods enable inferences about how individuals might respond to new recruiting policies. Similarly, such methods could be used to make inferences about the retention effects of skill pay and capability pay alternatives among Air Force personnel in key skill areas. A survey could be designed that would target personnel in various Air Force occupational areas. The survey would include different alternatives for skill pay and capability pay. Analytical methods could then be used to discover which alternatives, or combination of alternatives, lead to the highest level of reenlistment intentions among each group. Surveys can be used to query Air Force

personnel about their retention intentions under a large number of potential skill pay and capability pay alternatives. Consequently, the survey approach is a particularly valuable way to assess a large array of options in order to narrow down the field to a few feasible ones.

SECURING GREATER FLEXIBILITY IN SHAPING THE PERSONNEL FORCE

In designing alternatives, regardless of assessment method, it is important to recognize that long-term manning goals may be substantially different from the manning goals of the past. The services have begun to consider the potential advantages of longer careers in certain specialties and keeping personnel in certain positions for a longer time. In the past, the patterns of retention and therefore average years of service were largely similar across specialties. An increase in career length could take the form of increasing the average years of service, e.g., from 7-8 years to 10-12 years or more. It could also focus on keeping more personnel after 20 years of service and even extending the mandatory retirement date from 30 years of service to 35 or 40 years of service, again depending on the specialty and the position. Lateral entry could be expanded to bring in personnel at middle to high skill levels. Lateral entry might help to avoid shortages and introduce the latest skills and knowledge into the military from fast-changing fields. The counterpart to lateral entry is a greater use of outsourcing for tasks that can be done by private-sector contractors. More reliance on outsourcing would presumably have implications for service manning requirements and rank/experience mix. Skill pay and capability pay seem to have the potential for being effective mechanisms for supporting alternative manning structures.

APPENDIX

Table 1A. First-Term Reenlistment Rates for AFQT I-IIIA Personnel Who Were Fast to E-4, and Others

	1995	1996	1997	1998	1999	2000
Air Force						
Others		57	50	50	44	
AFQT I-IIIA Fast to E-4		41	49	46	41	
Army						
Others		45	51	47	42	
AFQT I-IIIA Fast to E-4		33	43	39	47	
Navy						
Others		30	29	35	32	
AFQT I-IIIA Fast to E-4		37	34	35	35	
Marine Corps						
Others		15	16	17	18	
AFQT I-IIIA Fast to E-4		26	26	26	25	

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CHAPTER V

AVIATION CAREER SAVINGS FUND:

A SKILL-BASED PAY FOR PILOTS

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Brian Simonson
The Lewin Group

The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

Typically, special and incentive pays are designed to provide pay differentials for conditions or circumstances that are expected, in one sense or another, to be temporary. Selective reenlistment bonuses, for example, provide increased retention in skills for which there is an acute shortage. By their nature, they are subject to changes from year to year. From the perspective of the military member, their value is uncertain for horizons that extend beyond a year. Similarly, hazardous duty pays, and differentials such as sea pay, are offered for specific conditions of service or specific assignments. Eligibility for such pays will vary over the course of the member's career.

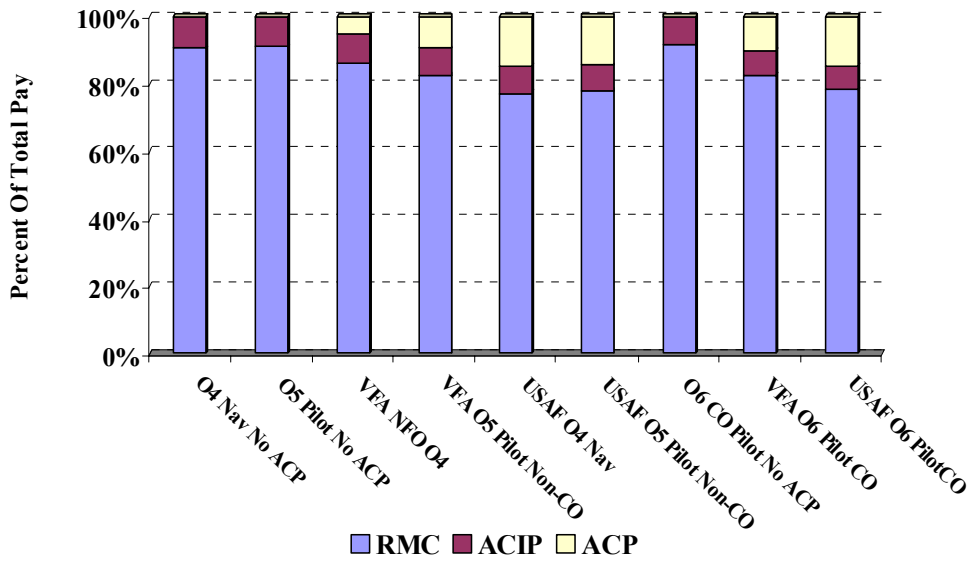
When special and incentive pays are used to compensate for factors associated with a skill on a permanent, rather than a temporary basis, it is useful to consider the pay problem in a different light. Instead of special and incentive pays that are designed for their flexibility in meeting staffing contingencies that may vary over time and with circumstances, the "skill-based" pay differential may be designed to provide appropriate long term career incentives while, at the same time, meeting the same near term retention exigencies as a typical special or incentive pay.

One occupational community for which such a skill-based pay may be appropriate is the pilot community. Military pilots of fixed wing aircraft can, generally, leave active service for a position with the civilian airlines and, within a few years, are earning substantially more than they were on active duty. In recognition of this, two types of special and incentive pays are currently offered to aviators. Aviation Career Incentive Pay (ACIP) is offered to almost all aviators over the course of a career. The amounts vary based on years of service, ranging from less than $125 per month for those with less than two years of aviation service, to over $800 per month for those with between 14 and 22 years of service. In practice, ACIP has become a permanent component of aviator pay. In addition, aviators may receive Aviation Continuation Pay (ACP), a bonus to improve retention of aviators beyond their active duty commitment incurred for flight training. ACP is intended to be a temporary pay designed to alleviate acute shortages, but is not likely to be eliminated in the foreseeable future. The following chart shows the relative proportions of Regular Military Compensation (RMC), ACIP, and ACP that aviators typically receive.

The ACIP/ACP combination is a reasonable way of improving retention of aviators. However, they do little to help shape the career profile of aviators. As a long-term incentive, they can be improved upon. ACIP, for example, varies with longevity, only, and not pay grade. Hence, it weakens the financial incentive for early promotion. Moreover, it declines at the years of service associated with higher pay grades. Further, a significant portion of the total budget is paid to aviators who are inside

their service obligation for flight training, which is inefficient if the purpose is to improve retention. ACP is a bonus and, as such, is subject to some uncertainty in its application.

Career RMC/ACIP/ACP



THE AVIATION CAREER SAVINGS FUND: A SKILL-BASED INCENTIVE FOR AIR FORCE OFFICERS

Air Force pilots now incur a ten-year obligation for flight training. Despite the length of obligation, the Air Force reports that there are no difficulties in filling undergraduate pilot training requirements with qualified applicants. However, this active duty service obligation (ADSO) will, itself, change the shape of the experience profile of pilots, and with it the typical career path and compensation demands associated with that path.

The Aviation Career Savings Fund (ACSF) is a proposed skill-based pay for Air Force pilots that can be used to shape the aviator career path of the future and improve retention in the near term. The basic concept of

ACSF is the following. For each year of aviation service, up to a maximum limit, the Air Force contributes the equivalent of X% of basic pay to a fund for the pilot. The fund grows at the market rate of interest. The member begin to be *vested* in the fund beginning at year of service V, and full vesting may occur over the next few years according to a specified schedule.

One possible contribution, which we use in the analysis of the plan, is 25 percent. The fund contributions begin upon a member's qualification in the skill—when the pilot receives wings. The fund then grows with government contributions and interest payments. These contributions into the fund continue until some specified year of service milestone is reached, or until separation or retirement. For this analysis, fund contributions continue until the twentieth year of service. In addition, the fund is subject to a "vesting" schedule. A member becomes entitled to, or "vested" in a growing percentage of the fund based on a schedule designed to meet retention and force shaping demands for that skill. If the member leaves, only the vested portion of the fund is paid. This may be zero, if the member leaves before vesting has begun, according to the schedule. The fund can be paid out at separation or retirement. Or, possibly, the vested portion may be withdrawn while on active duty. Upon separation or retirement, the member would have the option to roll over unused entitled funds to protect tax-deferred status, subject to federal tax limitations. Finally, that portion of the fund not earned by the member at separation or retirement is forfeited.

The potential advantages of ACSF include the following. First, it is a long term, permanent incentive upon which Air Force pilots can rely. It will encourage a career path, depending on the vesting structure that attracts more pilots to the fifteen-year point, and compensates those who are not promoted to O-6 and therefore separate to start a civilian aviation career. Second, depending on the vesting structure, it encourages pilots to stay beyond their ADSO, and implicitly penalizes those that do not. Third, it offers significant additional compensation for those who choose to stay for twenty years of service.

Now that the concept of the Aviation Career Savings Fund has been described, several specific scenarios will be investigated for Air Force pilots. Of the scenarios that will be reviewed, the differences will be how the member's fund becomes vested over time. Other parameters crucial to the effect of the Aviation Career Savings Fund will remain the same, but could be changed in the future for further analysis. Most importantly, the contribution percentage will be 25 percent of basic pay, and contributions begin at the first year of aviation service. Contributions continue through 20 years of service. Other assumptions underlying the analysis are that the

ACSF plan starts in the fiscal year 2002, the 10-year active duty service obligation (ADSO) is phased in as planned, and there are no changes to other compensation plans.

Before discussing the retention and cost effects of this ACSF plan, a few caveats should be made clear so as to understand the limitations of this analysis. First, the "pay for skill" construct has not been fully analyzed with respect its impact on military culture. It may well be the case that this system for pay incentives could create a morale problem with members of lower pay skills, perhaps creating a shortage of personnel in those low skill occupations. In a related issue, the specifics of which jobs would qualify for benefits are unclear. Furthermore, a relationship between other pays, such as ACP and ACIP, and the ACSF must be fully resolved. This analysis implicitly assumes that the only change is the addition of the ACSF.

Finally, one should recognize that the program parameter assumptions in the pilot notional example are illustrative only. Many basic assumptions have not been fully optimized for pilots (or for other skills to which the concept may be applied). Even the basic design of the ACSF: the time that contributions start and stop, the contribution rate, or the vesting schedule, have been subjectively assigned and could well perform better given a different arrangement.

RESULTS

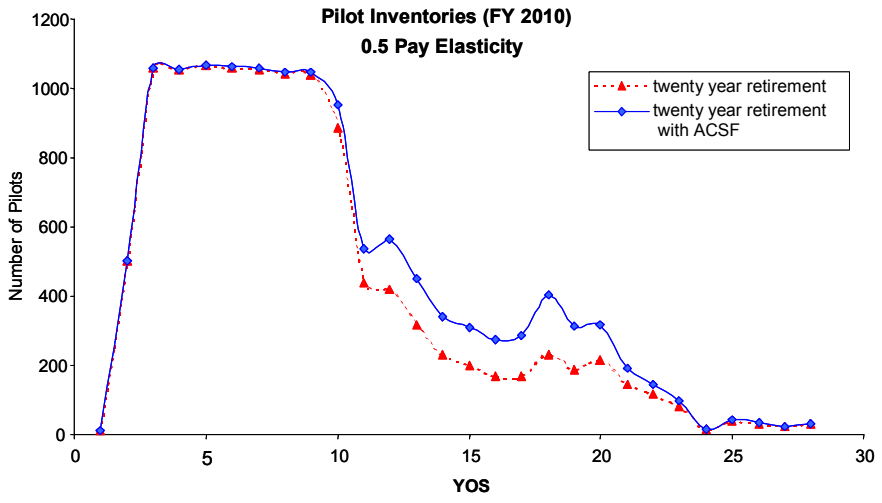
We now consider some specific sets of ACSF parameters and model their effects using the framework presented above. The first ACSF design consists of the following vesting schedule:

	Vesting Schedule A					
YOS	15	16	17	18	19	20
Vesting (%)	50	60	70	80	90	100

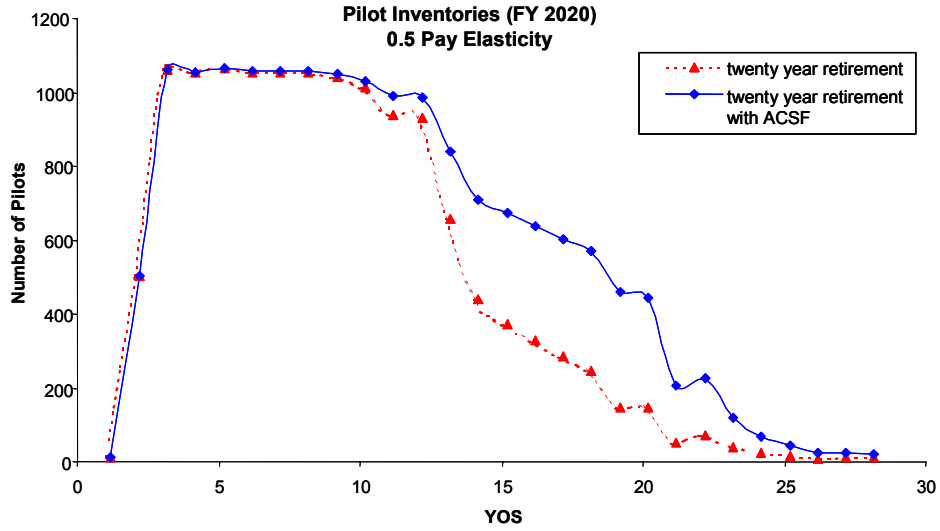
In the simulation analysis, we consider the 'base" case to include the transition to a ten year ADSO for Air Force pilots. The ACSF effects are shown relative to that transition. Using this vesting schedule, the ACSF would increase retention between end of active duty service obligation (ADSO) and initial vesting at year of service 15. Those who would have left at the end of their ADSO will have increased incentive to stay until initial vesting and beyond. Estimates were made assuming a .5 pay elasticity, which means that a 10 percent increase in financial incentives results in a 5 percent increase in retention rates.

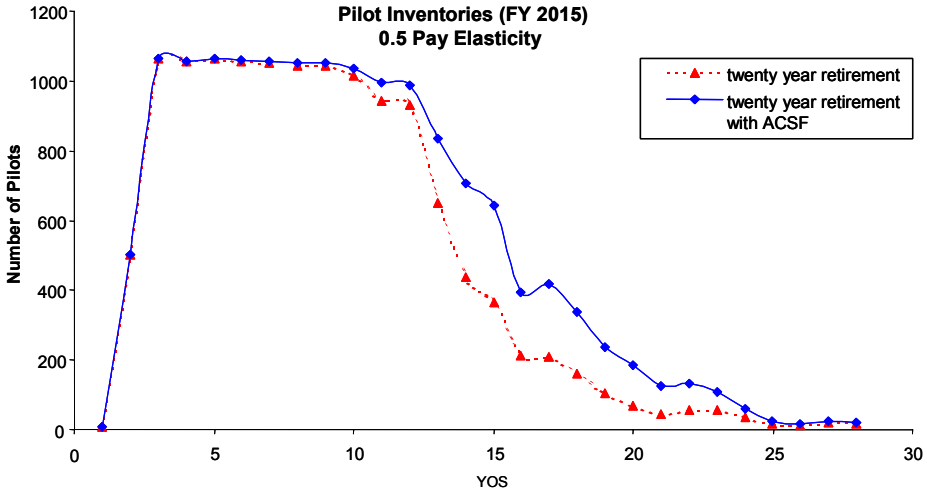
Charts 1a through 1c show the pilot projections for the fiscal years 2010, 2015, and 2020. These charts show that the ACSF helps retain personnel after the ten-year service obligation and maintains this higher retention past the twentieth year of service. The incentive has its most dramatic effect in increasing retention from ADSO to the first, partial vesting point at year 15. This is intuitive since most pilots would remain in service for three additional years to become 50% vested in a fund that had been accumulating since 2002. The retention remains strong after this fifteen-year marker because of the incentive to become fully vested in their fund, coupled with the traditional pull of the 20-year retirement system. Notice also that the effect of the ACSF becomes greater in later fiscal years. This occurs because there is a "transition" period in which the program will not have been in effect long enough for those coming to the vesting points to have enjoyed a full career of contributions to the fund. The longer the ACSF has been in place, the more money that has been stored into the fund, hence the incentive effects grow during the transition.

Charts 1a – 1c : 15-20 YOS Vesting Schedule A



Charts 1a – 1c: 15-20 YOS Vesting Schedule A





The costs for the ACSF are shown below, but the underlying principles for the cost of the fund should be briefly discussed. The first assumption when costing the ACSF is that the program begins immediately in the fiscal year 2002. Second, costs modeled annual contributions to fund, less forfeitures of non-vested portion for pilots who leave. Note that actual outlays to members will differ from this and generally be incurred in later years. Finally, these costs are annual in nature. With these principles in mind, the cost for the program ranges from $112 million in 2002 to $182 million on 2020. Costs rise slightly over time due to the effects of increased retention, and greater numbers making it to the vesting points. Note that costs (and benefits—see Appendix) are lower if we assume a lower responsiveness (pay elasticity).

Costs of ACSF for Vesting Schedule A
(Millions of 2001 Dollars)

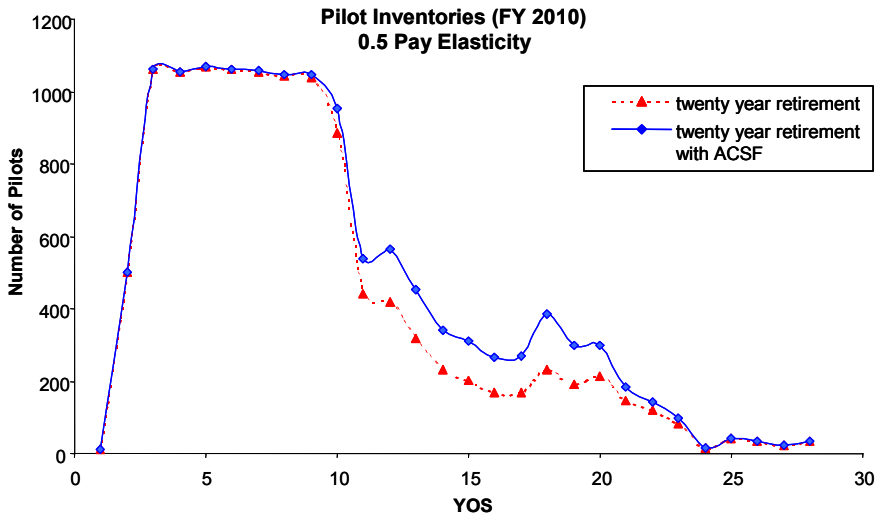
FY	.1 Pay Elasticity	.5 Pay Elasticity
2001	$120	$120
2002	107	112
2003	111	118
2004	88	102
2005	102	116
2006	99	118
2007	88	112
2008	84	113
2009	55	94
2010	75	116
2011	114	149
2012	127	163
2013	106	153
2014	70	137
2015	70	145
2016	69	150
2017	78	164
2018	79	171
2019	80	176
2020	82	182
2021	82	186
2022	83	188
2023	84	190
2024	86	192
2025	84	192

Next consider the effects of a ASCP plan with an alternative vesting schedule. This ASCP design consists of the following vesting schedule:

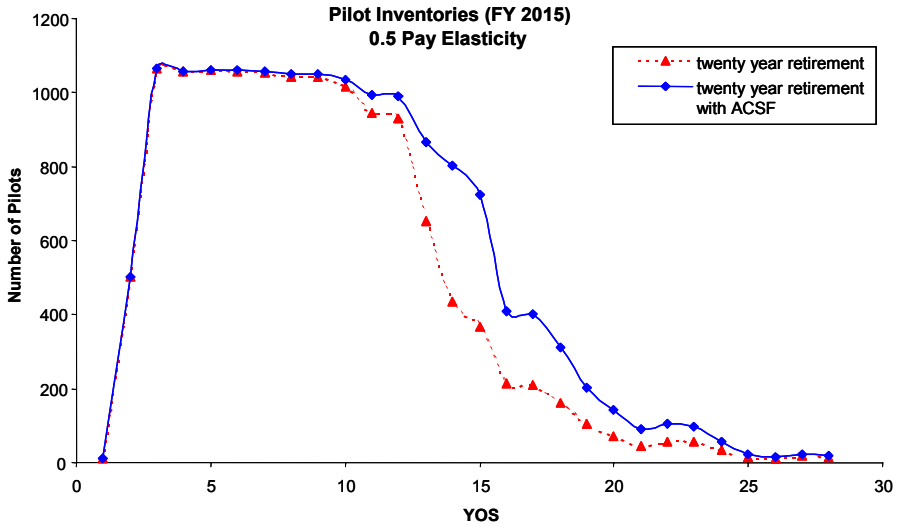
	Vesting Schedule B				
YOS	11	12	13	14	15
Vesting (%)	20	40	60	80	100

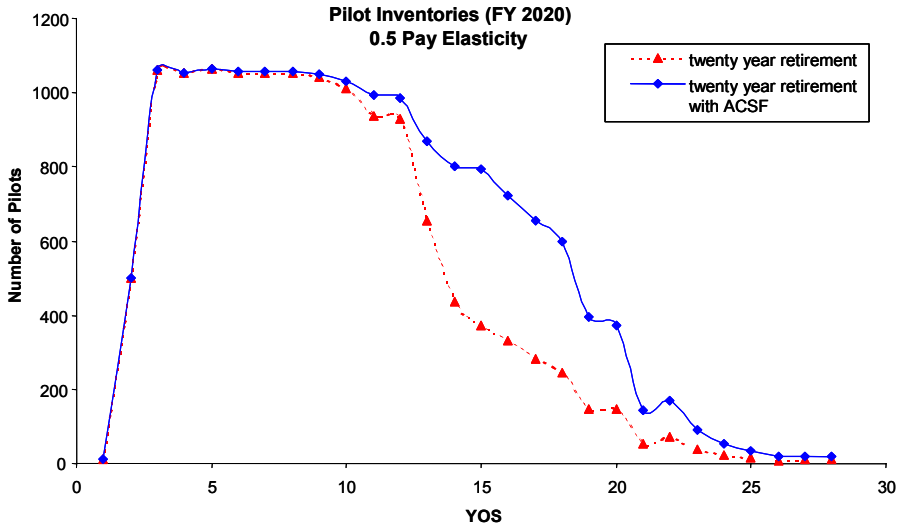
We assume, again, a pay elasticity of 0.5. Also note that although the ACSF plan member becomes fully vested at year of service 15, 25% of basic pay is still added to the fund until year of service 20. With these parameters, pilot inventories would be expected to increase between the 10-year of service obligation and the fifteenth year of service, and even beyond since members would be essentially earning 25% above basic pay, thus encouraging pilot's to remain. This intuition holds true, but the projected inventories appear to be similar to those produced by the previous vesting schedule, as shown in Charts 2a-2c.

Charts 2a-2c: 11-15 Year Vesting of ACSF



Charts 2a-2c: 11-15 Year Vesting of ACSF (continued)





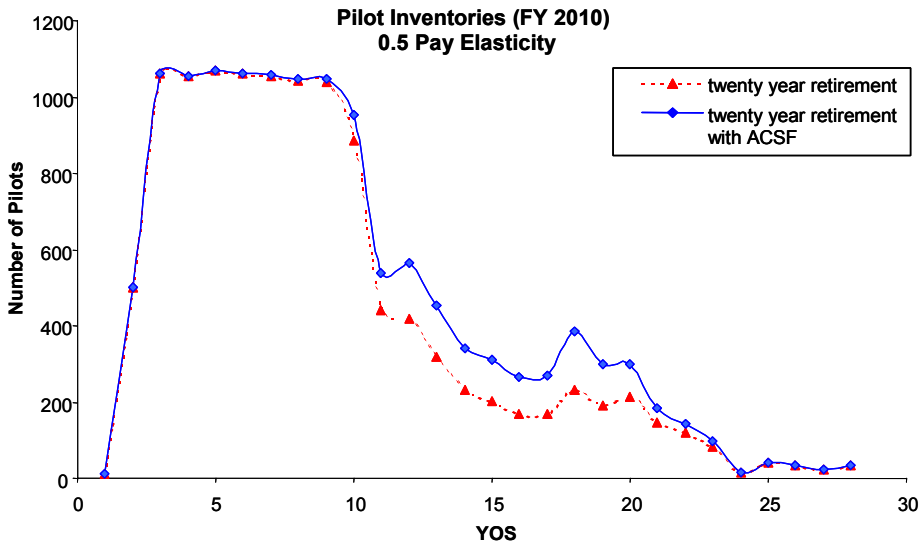
The main difference between the 11 to 15 year of service vesting schedule and the 15 to 20 year of service vesting schedule is cost. The cost estimated for this vesting plan is $116 million in 2002, increasing to $240 million in 2020. This relatively dramatic increase in costs is associated with those members who choose to leave between the eleventh and fifteenth year of service and receive their partially vested funds. Under the previous vesting schedule, these pilots would not have received anything from the ACSF. These expenditures early on coupled with the expectation that retention through the twentieth year of service remains strong results in larger expenditures.

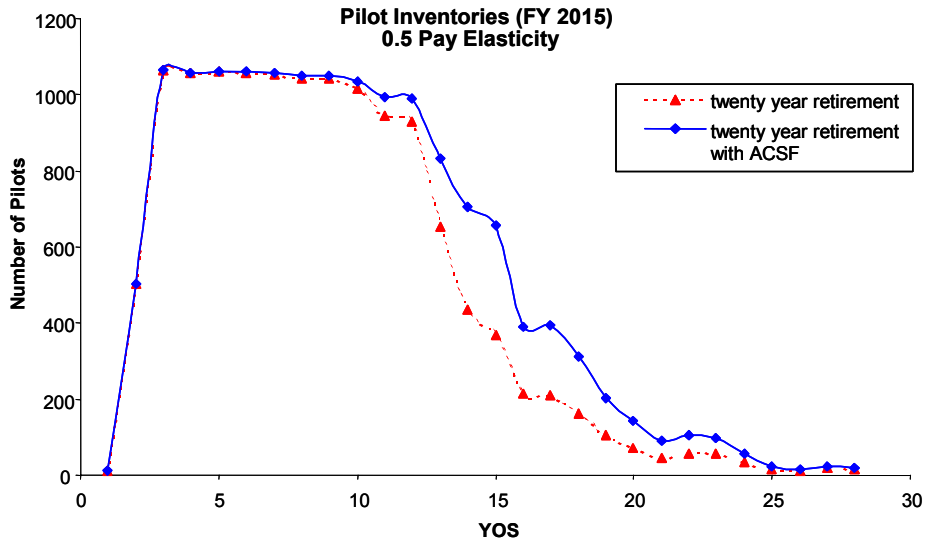
Costs of ACSF for Vesting Schedule B
(Millions of 2001 Dollars)

FY	.1 Pay Elasticity	.5 Pay Elasticity
2001	$120	$120
2002	113	116
2003	118	123
2004	106	116
2005	116	127
2006	117	131
2007	109	128
2008	105	128
2009	83	114
2010	96	130
2011	130	159
2012	146	174
2013	144	178
2014	138	184
2015	143	195
2016	147	206
2017	154	218
2018	157	227
2019	160	233
2020	163	240
2021	164	243
2022	165	245
2023	165	247
2024	166	248
2025	166	249

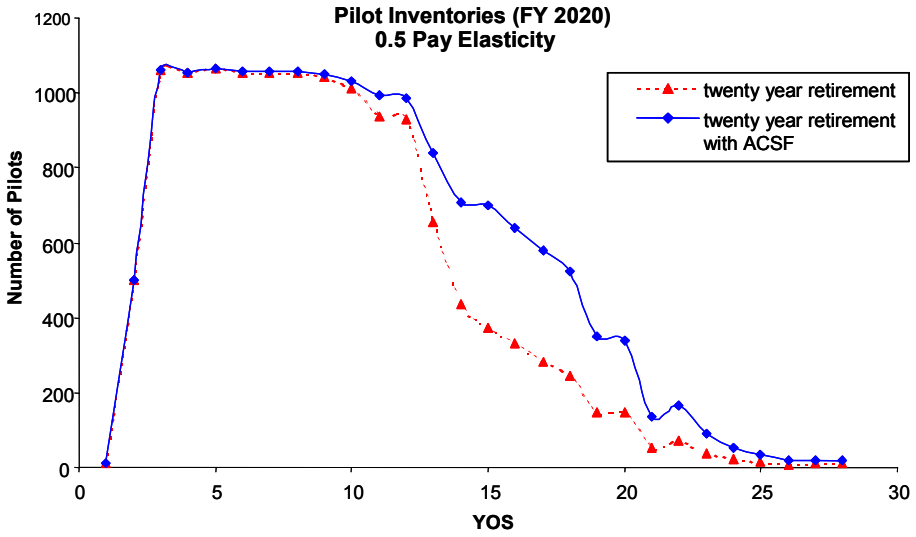
The final vesting schedule we consider is a simple one. We assume that 100% of the fund is vested at year of service 15, with no vesting prior to that point. The fund contributions continue through 20 years of service. The results are shown in charts 3a-3c below.

Charts 3a-3c: 100 Percent Vesting at Year 15





Charts 3a-3c: 100 Percent Vesting at Year 15



Again, the effect on the experience profiles is similar to the previous two vesting schedules. The costs associated with this alternative are shown in the table below.

In summary, three different vesting schedules for the ACSF were investigated. Vesting schedule A –in which the fund becomes vested in years 15 through 20—had the smallest effect on retention to year 15, but increased retention from 15 through 20 relative to the others. Its costs were slightly lower than 100% vesting at 15 and substantially lower than Vesting schedule B, in which the fund is vested from years 11 through 15. However, overall differences in both retention effects and costs among the three vesting schedules are modest largely because the contribution percentage of basic pay is the same in all three alternatives.

All three vesting schedules projected increased retention from the eleventh year of service onward, but there was very little difference in the magnitude of these increases across vesting schedules. Since the projected inventories are close irrespective of the vesting schedule, by definition the schedule that allows earlier vesting will also be the program that costs the most. So it appears that the original vesting plan that begins with 50% in the fifteenth year and incrementally increases until the twentieth year of service improves retention while being relatively cost effective.

Costs of ACSF for Vesting Schedule C
(Millions of 2001 Dollars)

FY	.1 Pay Elasticity	.5 Pay Elasticity
2001	$120	$120
2002	110	114
2003	114	120
2004	93	105
2005	106	119
2006	105	122
2007	96	118
2008	91	118
2009	62	99
2010	80	118
2011	119	151
2012	133	166
2013	114	157
2014	79	141
2015	82	150
2016	86	158
2017	92	168
2018	96	176
2019	98	180
2020	101	186
2021	101	188
2022	101	189
2023	102	191
2024	104	193
2025	103	192

APPENDIX A

METHODS AND SENSITIVITY

In this appendix, we briefly describe how Air Force inventory projections are calculated when considering various parameters. The first component of the projection model is the original projections provided by a previous study for the Air Force. These projections are contained in a

matrix that includes the inventory for each year of service from the year 2001 to 2025. Using these projections, a continuation rate for each year of service and fiscal year was obtained. These projections incorporate the projected effect of a transition to a ten-year service obligation for Air Force pilots.

The second component of the projection model is the calculation of the annualized cost of leaving (ACOL) for years of service one through twenty-five.[1] This was done through the use of a spreadsheet model that considers future pay streams for pilots and determines the maximum cost of leaving for civilian life.

Next these two components were used in conjunction to create a relationship between the continuation rate and the ACOL. This relationship was assumed to be a nonlinear (logistic) function where the retention rate is dependent on the ACOL value. The goal was not to determine the relationship between continuation rates and ACOL, but rather to assume a relationship and then solve for the continuation rate given a change in ACOL values. Hence there are two coefficients that need to be determined: the intercept and the slope. As for the slope, its estimation was based on the literature. We also estimated logistic regressions of continuation rates for FY 2001 on a stream of ACOL values, a coefficient that resulted in a reasonable ACOL elasticity was obtained. Given a slope coefficient, which can change if a higher or lower sensitivity to financial incentives is to be assumed, the values for the intercepts can be solved for algebraically for each year of service and fiscal year so that the model "predicts" the starting values of the continuation rates.

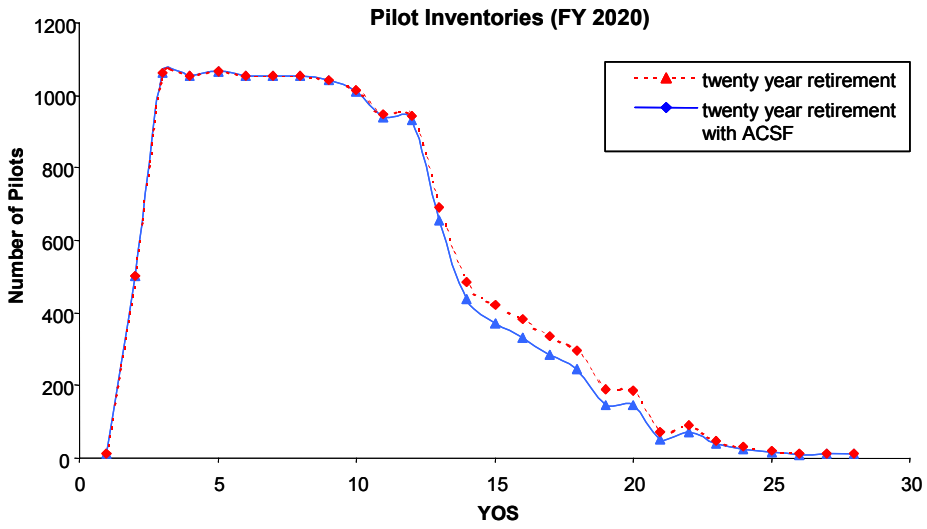
The elasticity of retention rates with respect to ACOL can be adjusted and the sensitivity to changes examined relatively easily in our framework. In our analysis, for example, more emphasis was put on scenarios where the ACOL elasticity is at about .5, which means for every one percent increase in military pay there is a half percent increase in retention rate. Second, given the elasticity, actual values of ACOL can be manipulated to estimate the marginal change in retention rates. In particular, this study was primarily focused on the addition of ACSF plan for pilots that would increase their ACOL and thus increase retention rates. We examined how costs and retention vary with alternative

[1] See, for example, Re-enlistment research: A methodological review (Chapter 2) (with M. Black), in C. Gilroy et al. (Ed.), *Military compensation and personnel retention policies: Models and evidence*, U.S. Army Research Institute, February 1991, for an overview of the ACOL model.

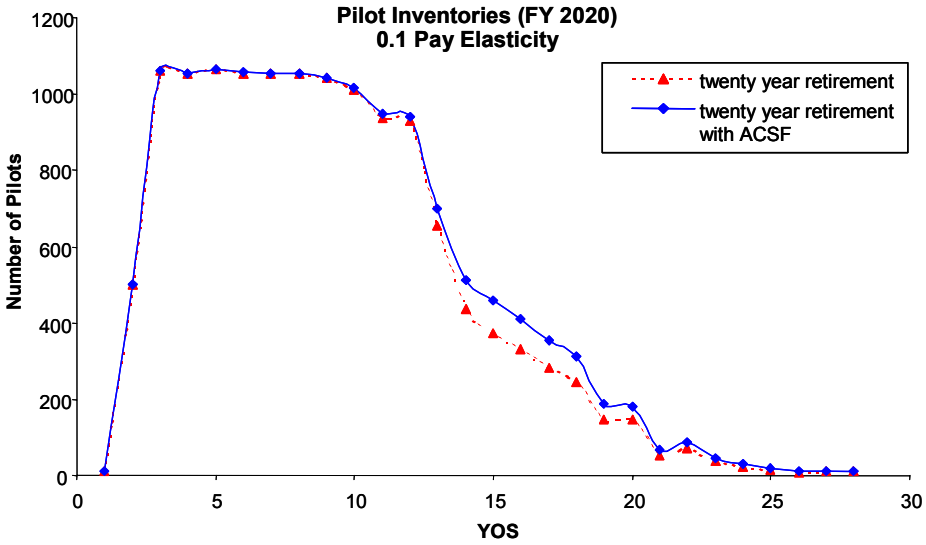
assumption regarding pay responsiveness, as summarized by the pay elasticity as well as alternative vesting scenarios.

The results for an elasticity of 0.1 are shown below, for year 2020. Note that only the pay elasticity is being changed for this sensitivity analysis, and all other parameters remain the same. With this reduced pay responsiveness, the effect the ACSF has on retention is reduced, but costs also are lower. While the ACSF plan does cause retention to improve compared to not having the ACSF, the improvements are marginal. Just as with the .1 elasticity, the ACSF helps retain personnel after the ten-year service obligation and maintains this higher retention past the twentieth year of service. The only difference is that the effect when assuming a .1 pay elasticity is, obviously, not as great as a .5 pay elasticity. Note that the costs of this program under the .1 pay elasticity assumption are also substantially lower.

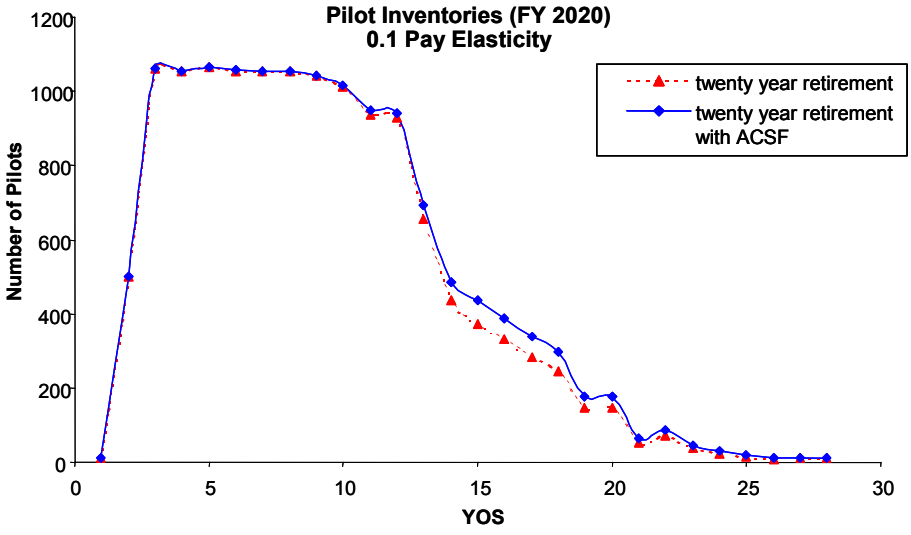
Vesting Schedule A: Year 2020 Projection for Low Pay Responsiveness



Vesting Schedule B: Year 2020 Projections for Low Pay Responsiveness



Vesting Schedule C: Year 2020 Projection for Low Pay Responsiveness



The Report of the Ninth Quadrennial Review of Military Compensation

Office of the Under Secretary of Defense for Personnel and Readiness
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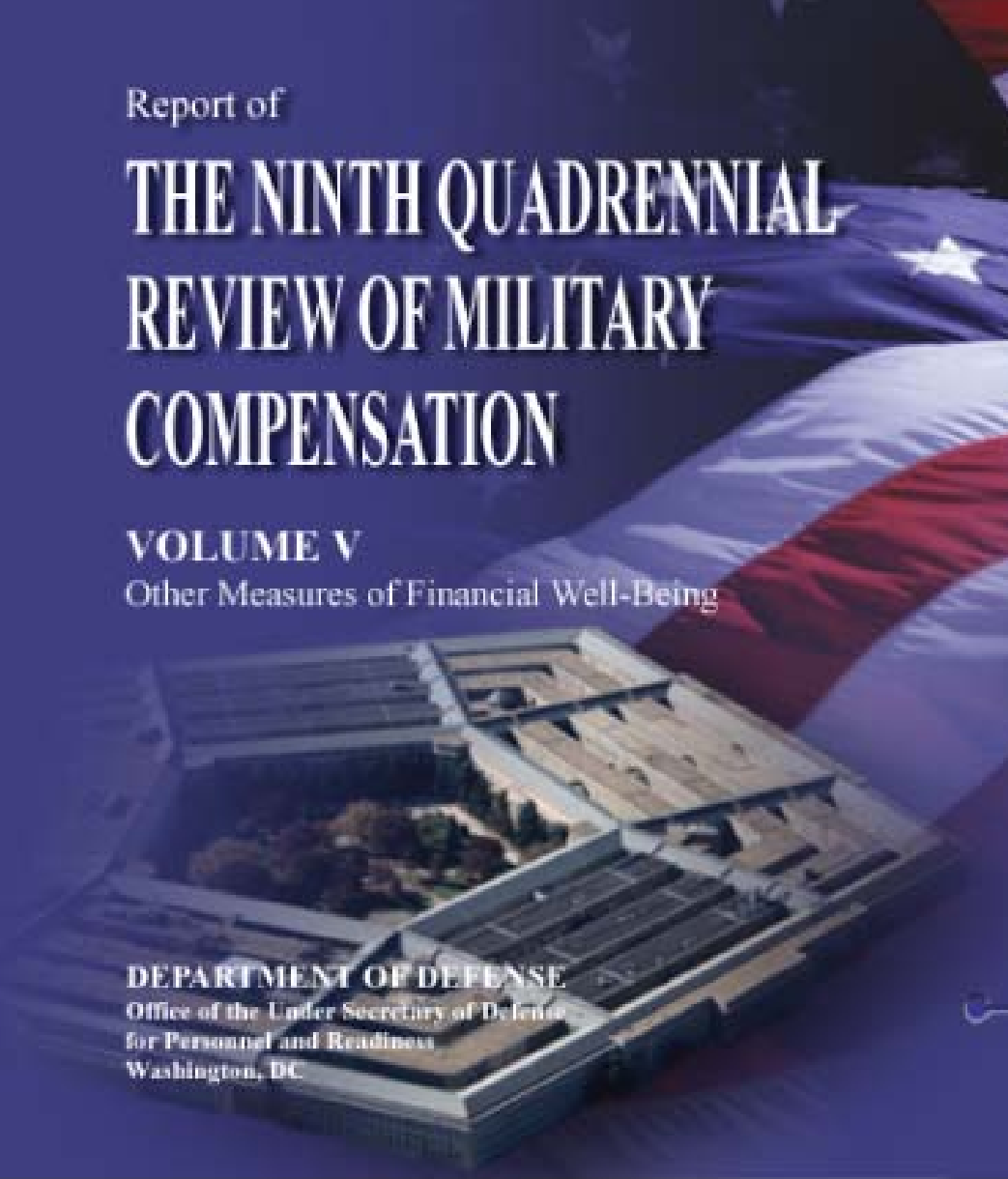
Washington, DC 20301-4000

Report of

THE NINTH QUADRENNIAL REVIEW OF MILITARY COMPENSATION

VOLUME V

Other Measures of Financial Well-Being



DEPARTMENT OF DEFENSE
Office of the Under Secretary of Defense
for Personnel and Readiness
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PREFACE

The Ninth Quadrennial Review of Military Compensation (9th QRMC) assesses the effectiveness of current military compensation policies in recruiting and retaining a high-quality force. The review takes place at a time of increasing pressure on military recruiting and retention—the result of both external and internal pressures on the Department of Defense. A sustained strong economy and changing private-sector compensation practices along with changing missions and operational requirements create a complex environment for sustaining the All-Volunteer Force.

Examining regular military compensation of the "typical" service member masks the financial condition of particular segments of the force or particular groups of individuals. Because the Department cares about its members in all phases of their careers, this document—the final volume of the 9th QRMC report—contains a discussion of selected segments of the force that deserve special attention.

- The standard of living of junior enlisted families is generally good. However, a small percentage of these families face financial stress and some qualify for food stamps. Yet, analyses shows that their financial situation is generally short-lived and has more to do with the size of their families than with the level of their income.
- The earnings of military spouses are lower than comparably educated civilian wives, a result of the fact that military spouses work less during the course of a year and earn less as well. Recent research provides a quantitative assessment of the reasons for this earnings differential.
- An analysis of the Overseas Cost of Living Allowance shows that improvements can be made to several aspects of this program to better ensure that military members are compensated fairly for the differences in the cost of living between the United States and their assigned overseas location.
- A recent study shows that the earnings of military retirees in their post-retirement civilian jobs are generally lower than what civilians with comparable experience and education earn. However, when their military pensions are considered, their

total income is substantially above the average of comparable civilian earnings. Further, the overall majority of military retirees are satisfied with both their military careers and civilian life.

The research papers included in this volume were written in support of the 9th Quadrennial Review of Military Compensation. The views expressed in these papers represent those of the authors and are not necessarily those of the Department of Defense.

CHAPTER I

STANDARD OF LIVING OF ENLISTED PERSONNEL

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The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

INTRODUCTION AND SUMMARY

The level and composition of military pay is crucial to the success of the all-volunteer force (AVF). Most analyses of the "adequacy" of military compensation focus on comparability with earnings offered in civilian labor markets, but an effective compensation system needs to address other goals as well. An important goal is that military pay be sufficient to meet the basic needs of all personnel.

We commonly refer to the economic status or well-being of an individual or group as the "standard of living." This research memorandum focuses on the standard of living that the military compensation system provides its enlisted personnel and their families. Rather than merely characterize the standard of living of enlisted personnel, we also address the adequacy of this standard of living using different metrics developed in the literature.

The literature focuses mainly on a comparison of an individual's (or family's) income with some minimum level of income—a threshold. Following this practice, we also examine the extent to which enlisted personnel are able to surpass these thresholds. In doing so, however, it is important to emphasize that this threshold is a lower bound on the level of compensation necessary to sustain the AVF. Providing a person with this minimum level of compensation, while necessary, is not sufficient to ensure that the level of military compensation is appropriate. The reason we focus on a minimum threshold for the standard of living of enlisted personnel is to assess whether the current system allows its members to attain at least some minimum standard.

Conventional measures are relatively easy to use and interpret, but some criticize the degree to which these metrics reflect a person's standard of living. Therefore, we focus on different measures of the standard of living of enlisted personnel, to give a detailed sense of the degree to which the military compensation system has been successful in meeting one of its primary goals.

We begin by reviewing common methods, both objective and subjective, used to measure standard of living in the literature. Following this discussion, we use these different concepts to evaluate the standard of living of enlisted personnel.

Our results suggest that relatively few enlisted personnel have incomes below the poverty line. Using basic pay as our measure of military compensation, about 4.5 percent of enlisted personnel earn less than the poverty thresholds. When considering regular military compensation (RMC), a more appropriate measure of compensation, virtually no personnel are below the poverty line. A comparison of levels of military compensation and the poverty thresholds indicates that family size, not the level of compensation *per* se, determines whether enlisted personnel are in poverty.

When looking at alternative measures of the standard of living of enlisted personnel, the evidence does not overwhelmingly support the notion that the standard of living of military members and their families is low. Although some participate in federal welfare programs, such as Food Stamps and Aid to Families with Dependent Children (AFDC), the participation rates are substantially lower than those of the civilian population. In addition, many who do participate are able to do so because qualification standards don't fully account for the value of allowances. And, even though a large number of families report "substantial financial difficulties," our analysis suggests that these difficulties are driven by substantial personal debt rather than low levels of compensation.

POVERTY MEASUREMENT

One common method for measuring standard of living is to compare a person's income with some income threshold. If this threshold is a minimum level, it is referred to as the poverty income level. Poverty is defined as a situation in which an individual's (or family's) resources (e.g., income) are less than the minimum amount necessary to consume some adequate bundle of goods (e.g., food, clothing, and shelter). The poverty rate is the percentage of families with incomes below this minimum amount. Determination of the poverty rate requires appropriate measurements of both resources and the minimum threshold.

Hagenaars and de Vos [1] propose three broad definitions of this relationship between resources and adequate consumption:

1. Poverty is having less than an objectively defined, absolute minimum
2. Poverty is having less than others in society

3. Poverty is feeling you do not have enough to get along.

Each has a common focus: a family in poverty has fewer resources than some threshold. However, there are major differences in the way family needs are determined and/or the way family resources are calculated. This section describes each definition more fully.

HAVING LESS THAN AN OBJECTIVELY DEFINED, ABSOLUTE MINIMUM

The U.S. Government's definition of poverty uses a version of this first definition—having less than an objectively defined, absolute minimum. The "poverty line" is the income level required to consume "basic needs."[1] A measure of individual or family income is compared with this threshold to determine the family's position relative to the poverty line.

We attribute the development of the threshold measurement to Mollie Orshansky [2], a staff economist at the Social Security Administration (SSA) in the early 1960s. Orshansky used the Household Food Consumption Survey, administered by the Department of Agriculture in 1955, to establish the original "basic needs" consumption level. This survey found that families of three or more persons spent about one-third of their after-tax income on food.[2] Orshansky selected the least expensive of the Department of Agriculture's four "nutritionally adequate" food plans—the Economy Food Plan—and used the cost of this food plan as an estimate of the expense of an adequate family food budget.

Using the fraction of income spent on food from the Household Food Consumption Survey, Orshansky developed a threshold income measure that set the poverty level for families at three times the cost of the Economy Food Plan.[3] The multiple was chosen to cover the cost of other family expenses. These original thresholds varied by family size, gender of the family head, number of young children (under age 18), and type of residence (farm thresholds were set at 70 percent of nonfarm thresholds). The annual poverty threshold for a family of four (two adults and two children) in 1963 was about $3,100.

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[1] Reference [1] gives other definitions of an absolute minimum.

[2] Interestingly, when the first threshold measure was calculated, survey data from the early 1960s revealed that food represented only one-fourth of the typical family's budget.

[3] This level was set for families of three or more members. The poverty level for two-person families was set at 3.7 times the cost of the Economy Food Plan because of the relatively larger fixed costs of these smaller family units.

Major revisions to the U.S. poverty measure were undertaken in 1969 and again in 1981. In 1969, the SSA began to adjust thresholds annually for changes in purchasing power using the Consumer Price Index (CPI), rather than using changes in the cost of the Economy Food Plan. For example, the poverty threshold for a family of four (two adults and two children) in 1999 was $16,895, which represents the same general purchasing power as $3,100 in 1963. Additional modifications implemented in 1981 included the elimination of separate farm/nonfarm and female-headed household thresholds. The largest family size was also increased to nine persons or more.

Poverty Rates in the United States

The most recent report on U.S. poverty, undertaken for 1998, documents considerable variation in poverty rates across different age groups, races, and regions [3]. The overall poverty rate in 1998 was at 12.7 percent (down from 13.3 in 1997), with the number of poor at 34.5 million. The poverty rate for children under 18 years of age was 18.9 percent (13.5 million), with the rate for children under age 6 at 20.6 percent. By comparison, those between the ages of 25 and 59 had poverty rates under 10 percent; the elderly (65 years and over) had an overall rate of 10.5 percent.

Similarly, there is substantial variation in poverty rates by race: 26.1 percent of blacks and 25.6 percent of Hispanics, but only 8.2 percent of whites, were in poverty in 1998. The poverty rate in the West was 14 percent, compared with 13.7 percent in the South, 12.3 percent in the Northeast, and 10.3 percent in the Midwest. These regional statistics mask sizable differences in state-level (and metropolitan/suburban) poverty rates. The average poverty rate from 1996 to 1998 ranged from 8.4 percent in New Hampshire to 22.7 percent in Washington, DC.[4] In 1998, the average income needed to raise a family above the poverty line was $6,620.

Criticisms of the Official Poverty Measure

Over the past 40 years, many have criticized the U.S. Government's poverty measure [4]. A 1995 National Academy of Sciences (NAS) panel listed several specific criticisms. The primary criticisms focus on the "appropriate" measure of family resources and on the determination of the income threshold.

[4] The highest poverty rate for a state was 22.4 percent in New Mexico.

Measurement of Family Resources

The current measure of family resources includes only cash household income. It excludes in-kind benefits (e.g., food stamps and housing assistance), costs associated with earning income (in particular, child care expenses), direct tax payments (e.g., payroll and income taxes), and the earned income tax credit. In addition, medical benefits (and costs) are omitted from the definition of "income." This omission ignores differences in health insurance coverage and out-of-pocket medical expenses (e.g., premiums, deductibles, drugs, and uncovered medical services) across individuals and families. It also does not reflect the patchy coverage of Medicare and Medicaid.[5]

Government assistance programs. Many of the people categorized in poverty are eligible for several government assistance programs. In fact, the official U.S. poverty income thresholds are also used extensively to determine program eligibility for a variety of federal redistribution programs. The Department of Health and Human Services (HHS) calculates a simplified version of the poverty threshold called poverty guidelines that are closely related to the actual thresholds. In a review of the 70 federal and federal-state redistribution programs providing cash, in-kind transfers, and services, reference [4] found that 27 programs use these HHS-defined poverty thresholds or some multiple to determine benefit eligibility. These programs provide more than 50 percent of all government assistance. The larger federal programs include Head Start, Food Stamps, Medicaid, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), National School Lunch, Job Corps, and Legal Services for the Poor. The programs vary in the way the poverty threshold is used to determine eligibility.[6]

In addition to cash transfers, governments provide various in-kind benefit programs to individuals and families below or just above the poverty line. One of the more important in-kind transfer programs is the federal Food Stamp Program (FSP). A household qualifies for food stamps if its gross monthly income is below 130 percent, or net monthly income is below 100 percent, of the HHS poverty guidelines. In addition, the family's liquid assets cannot exceed $2,000. Net income is determined by

[5] Housing and rental subsidies are also excluded from income. Even though housing represents a large family expense, there is a clear difference between owning and renting. Home ownership is a major family asset and may increase family resources.

[6] Some programs use 100 percent of the income threshold; others use a multiple of the threshold (e.g., 125 percent of the income threshold). Some provide maximum benefits based on the poverty threshold or some multiple (Head Start, Medicaid, and Legal Services). Others use the poverty threshold to determine eligibility but condition benefits based on actual income or wealth (e.g., Food Stamps).

subtracting from gross income a standard deduction, 20 percent of earned income, dependent care expenses, some shelter expenses, and a flat amount for each dependent.

According to the most recent evaluation of the FSP in 1998, more than $16.8 billion of food benefits were issued that covered an average of 19.8 million people per month. The average monthly benefit was $71 per person and $165 per household. At an average monthly gross income of household participants of $584, FSP benefits represented well over one-fifth of the participant household's cash plus food stamp income. Additional smaller low-income food programs include the School Lunch and School Breakfast Programs and the Special Supplemental Nutrition Program for WIC.[7]

The federal government also provides some housing aid to low-income households. This aid is in the form of subsidies to renters (e.g., project-based aid—the construction of new rental units and direct rental subsidies for existing standard units) and mortgage interest subsidies. Project-based aid includes the traditional Public Housing Program, Section 8 New Construction and Substantial Rehabilitation Program, and mortgage interest subsidy payments. Section 8 housing assistance generally goes to families with incomes below 80 percent of the area median. Other block-grant housing programs have been recently established. Rental assistance reduces rent payments to be about 30 percent of their income (after certain deductions). In 1997, about 5.8 million households received some form of housing assistance.

The NAS panel calculates the marginal effects on the poverty rate of specific inclusions and exclusions in the family resource measurement [4]. If these in-kind benefits are included in the measure of family resources to determine poverty status, the impact on the rate of poverty is considerable. For example, when FSP benefits and housing benefits were added to family resources, the panel found that the official overall poverty rate in 1992 fell by about 1.7 percentage points. The reduction varied by age, welfare/work status, and region. With the inclusion of in-kind benefits, the poverty rates fell for older adults (aged 65 and older) by 2.15 percentage points, for individuals already receiving welfare (AFDC/SSI[8]) by 2.5 percentage points, and for individuals in the northwest region by 2.26 percentage points. Blacks, Hispanics, and numbers of large families also

[7] WIC is designed to provide supplemental food to low-income pregnant women, new mothers, and infants. Eligibility is determined by the states, but the Federal Government requires that income limits be no greater than 185 percent and no less than 100 percent of HHS poverty guidelines.

[8] AFDC stands for Aid to Families with Dependent Children, and SSI abbreviates Supplemental Security Income.

had reductions in the poverty rate that were greater than the overall population.

Medical expenses. Medical expenses represent an additional major expenditure category that affects the well-being of low-income individuals. The current measure of family resources excludes the value of Medicare (health insurance for those aged 65 and older), Medicaid (health benefits for low-income people), and employer-provided health benefits. The measure also does not exclude out-of-pocket medical expenses (e.g., entire medical expenses, health insurance premiums, deductibles and co-payments, and uncovered medical procedures), even though these outlays reduce the family's consumption abilities.

Although the consideration of these medical benefits and costs could potentially affect a family's poverty status, the treatment and measurement of medical care benefits are not as straightforward as food and housing in-kind benefits. First, medical benefits are not as interchangeable with money or as fungible as food stamp benefits. Specifically, insurance coverage and/or free care do not free up income to use for other purposes. One peculiarity of simply adding medical benefits to family resources is that sicker people (e.g., disabled or the elderly) appear to be "better off" than healthy ones. A second issue is that, unlike food and housing purchases, medical needs are generally "lumpy"—that is, during some years medical care may not be needed, and extra medical benefits cannot be used to finance extra consumption. A third problem is that it is difficult to measure out-of-pocket medical expenditures. Some medical insurance plans have low or no coverage for certain items (e.g., drugs, long-term care, elective medical procedures).

Reference [5] argues against simply subtracting out-of-pocket medical costs from, and adding health insurance premiums to, family resources. The author notes the weak link between out-of-pocket costs and effective use of health care. In addition, she observes that people in poverty may not have access to health care and, therefore, have low out-of-pocket expenditures. Health insurance may *encourage* medical expenditures beyond the point where the value of the service is equal to the cost.

As with the inclusion of in-kind benefits in measuring family resources to determine poverty status, careful consideration of medical benefits has a large impact on the rate of poverty. However, this impact is sensitive to the way that these costs are estimated. Estimates of the increase in the poverty rate after subtracting out-of-pocket medical expenses from family resources range from just over 1 percentage point to nearly 6 percentage points. These differences are the result of whether out-of-pocket expenses are determined from actual data or are imputed. Using actual data usually

results in lower effects because of the skewed distribution of medical expenses across families that raise average expenditures. Therefore, a simple imputation method is expected to overstate the out-of-pocket expenses.

Reference [6], for example, uses a simple imputation procedure to consider the impact of medical costs (and other expenses) on the 1989 poverty rate. The authors attribute about a 5.4-percentage-point increase to the official poverty rate (12.8 percent in 1989) as a result of out-of-pocket medical care costs. On the other hand, the NAS panel proposes a more elaborate imputation procedure and estimates an increase in the overall poverty rate in 1992 by 2.1 percentage points [4]. The poverty rate increases by 2.9 percent for people without health insurance, 3.52 percentage points for the elderly, and 2.9 percentage points for families with workers. These increases are considerably smaller for blacks (1.04 percentage point increase) and for people in families currently receiving welfare benefits (0.5-percentage-point increase). The NAS estimates are generally consistent with previous estimates using individual data.

Determination of the Income Threshold

A second criticism concerns determination of the income threshold. While poverty thresholds are adjusted for general price increases with the CPI, this general adjustment ignores regional cost-of-living differences, particularly housing costs, that may be responsible for a part of the regional variation in poverty rates. An additional criticism of these calculations is that they are based on a survey of consumers taken in 1955. It has not been adjusted to reflect the reduced proportion (from one-third to about one-seventh) of family income devoted to food consumption since the early 1960s.

Alternative Measurements of the Poverty Line

More complete measures of thresholds and resources have been proposed to account for many of these deficiencies in the current poverty measurement. The Census Bureau calculates alternative unofficial measures of threshold income based on the NAS recommendations. Family resources are expanded to include in-kind transfers, income from capital gains, employer-paid health insurance benefits, government cash (means-tested and non-means-tested) and noncash benefit payments, the value of Medicare and Medicaid, school lunch benefits, and the earned income tax credit. Excluded from the definition of family income are Social Security payroll taxes, and federal and state income taxes. In addition, rather than using the standard CPI to adjust the threshold income,

an alternative experimental price index uses a rental equivalence approach to measure the value of housing.

After making these adjustments, the experimental poverty rate between 1979 and 1996 averaged about 31 percent below the official CPI adjusted poverty rate. For example, the official CPI adjusted poverty rate in 1996 was 13.7 percent. The poverty rate fell to 8.9 percent after making these adjustments to the definition of family income and adjusting income using the experimental price index.

Even though it has many critics, what is striking about the measurement of the U.S. poverty rate is that it is calculated essentially the same way as when it was developed in the early 1960s. Reference [7] makes two points regarding the consistency of this measure over the past 40 years. The author argues that, because of the political sensitivity of the U.S. poverty rate, revisions that significantly affect the size of the official poverty population may be difficult to accept. In addition, because the poverty rate is used to determine eligibility by many large federal redistribution programs, any adjustments to the rate will likely affect the number of program recipients and, as a result, change the level of government expenditures. Similarly, reference [8] observes that any increase in poverty threshold income levels will have a "more than proportional" impact on the poverty population. This change, particularly if it increases government expenditures, may be politically unacceptable.

HAVING LESS THAN OTHERS IN SOCIETY

This second measure of poverty is also objectively determined and is based on the household's relative position in the income distribution or its ability to purchase and maintain or replace a market basket of commodities containing goods typically consumed by other individuals and families during that time period. One proposed relative measure based on income is that the poverty income threshold is some fixed percentage (e.g., 50 percent) of median income. An alternative relative measure is a consumption-based relative poverty index. For example, [1] proposes a consumption bundle consisting of four durable goods: car, color television, refrigerator, and washing machine. They chose these goods because of their common importance across most families. A household gets higher points if it is "deprived" of any of these durable items and it is considered in poverty if its score reaches a threshold level.

The advantage of this consumption-based measure is that it allows the consumption bundle to be updated to reflect changes in consumption

patterns. For example, a current bundle of durable goods would most likely contain a computer and possibly other electronic equipment. However, as pointed out by [1], this particular relative measure of poverty is weak because the choice of consumption goods to include in the threshold measure is arbitrary. Moreover, it does not take into account the fact that families at early stages in the life cycle (e.g., young singles and couples) would be less likely to own all of these durables and, as a result, would be more likely to be classified as impoverished.

FEELING YOU DO NOT HAVE ENOUGH TO GET ALONG

One drawback of the previous two poverty measures is their reliance on experts, either to determine the income threshold or to choose the goods to include in the consumption bundle. In both cases, the poverty threshold is exogenous to the affected individuals and families. However, these families may be in the best position to evaluate their own relative position of well-being or standard of living. A definition of poverty could be designed that would allow self-evaluation of poverty status. Public opinion polls ask people how much income is "just sufficient" or "enough to make ends meet." Answers to these questions are then used to calculate a subjective minimum income level that is "just sufficient." Individual or family income is compared with this minimum income level to determine poverty status. Measures of poverty based on the answers to these types of questions often (but not always) take into account the respondent's family size and own income.

Several subjective poverty measures have been developed in the United States, Europe, and Canada based on different surveys. Poverty measures created from these surveys varied significantly across the different surveys. Threshold estimates for a family of four (two adults/two children) in 1992 dollars ranged from $32,530 [9] to $12,160 [10][9]. Moreover, the subjective income thresholds are generally substantially larger than the official, needs-based income threshold. The threshold measure calculated by [9] is 229 percent of the official income threshold for a family of four. Reference [7] used answers from the Gallup Poll question, "what is the smallest amount of money a family of four needs each week to get along in this community?" to calculate a subjective income threshold. The author found that the subjective threshold was about 168 percent of the official income threshold.

[9] As described in [4], minor variations in the wording of the "sufficient income" questions may have led to some of these differences.

More recent Gallup Polls asked the following: "People who have income below a certain level can be considered poor. That level is called the 'poverty line.' What amount of weekly income would you use as a poverty line for a family of four in this community?" Based on the answers to this question, the subjective poverty-income threshold is consistently at least 115 percent of the official poverty line. An advantage over the official poverty-income thresholds is that the subjective threshold appears to follow changes in income levels over time—rising during periods of economic expansions and falling during recessions.

In an evaluation of these techniques, the Bureau of Labor Statistics (BLS) finds several problems associated with using surveys to determine well-being. Specifically, the BLS found the questions in these surveys to be flawed and subject to potential measurement errors. These questions have obvious interpretation difficulties. Without strict guidelines and definitions, some respondents might interpret such questions to mean the bare minimum, whereas others might interpret them to refer to their current life-style. Items considered to be "needed to survive" will vary considerably across respondents. Respondents also had difficulties interpreting "sufficient and insufficient."

ARE ENLISTED SERVICEMEMBERS POOR?

One can make use of these different measures of standard of living to characterize the standard of living of enlisted personnel. This effort is complicated, however, by the difficulties in measuring the resources available to servicemembers. For example, it is relatively straightforward to compare an individual's basic pay with the current poverty thresholds and to calculate the number of enlisted personnel under the official poverty level. The exercise becomes more difficult, however, because a considerable amount of military compensation exceeds basic pay.

OFFICIAL POVERTY MEASURE AND ENLISTED PERSONNEL

Table 1 displays poverty thresholds for various family sizes, as well as average military pay available to enlisted personnel in 1999. Given that total military compensation is greater than basic pay, two measures of military pay are considered. The first measure is merely basic pay. The

second measure is based on Regular Military Compensation (RMC). RMC is a more appropriate measure of well-being because it includes allowances received by the servicemember, as well as the tax advantage.

Note, however, that both measures of pay represent a lower bound on the family income of enlisted personnel because many servicemembers also receive bonuses, special pay, and benefits. Moreover, this pay represents the earnings of the individual servicemember only. Families could have working spouses and/or the servicemember could have a second job, both of which would increase family income. Nonmilitary salaries would be included in determining the family's poverty classification.

The first part of table 1 lists the actual 1999 poverty thresholds, based on the number of children for families with one and two adults. The second part lists the two measures of military pay available in paygrades E-1 through E-7. Using average basic pay, military personnel at paygrades E-4 and below with two or more children and paygrades E-5 and below with four or more children would be classified as below the poverty level using the official income thresholds. The situation improves considerably when RMC is used as a measure of income. Enlisted personnel at paygrades E-3 and below with five or more children and paygrades E-4 and E-5 with seven or more children would be classified as living below the poverty level.

Table 1. Poverty Thresholds and Military Pay in 1999 (in dollars)

Poverty Thresholds			Military Pay		
No.of Children	Single Adult	Two Adults	Paygrade	Basic Pay	RMC
0	8,677	11,156	E-1	11,512	21,565
1	11,483	13,410	E-2	12,910	23,216
2	13,423	16,895	E-3	13,940	24,514
3	16,954	19,882	E-4	16,551	27,622
4	19,578	22,261	E-5	20,353	32,517
5	21,845	24,934	E-6	23,855	36,915
6	23,953	27,412	E-7	28,975	42,885
7	27,180	33,499			
8+	32,208	32,208			

Data from the Defense Manpower Data Center (DMDC) can be used to determine the number of servicemembers who fall into the paygrade categories identified as falling below the official poverty income level. The DMDC data that are used include information for servicemembers of all branches—Army, Navy, Marine Corps, Air Force, and the Coast Guard—for years 1975, 1980, 1985, and annually for 1990-1998. Available variables include age, gender, marital status, number of dependents, race/ethnicity, education, length of service, paygrade, and occupation.

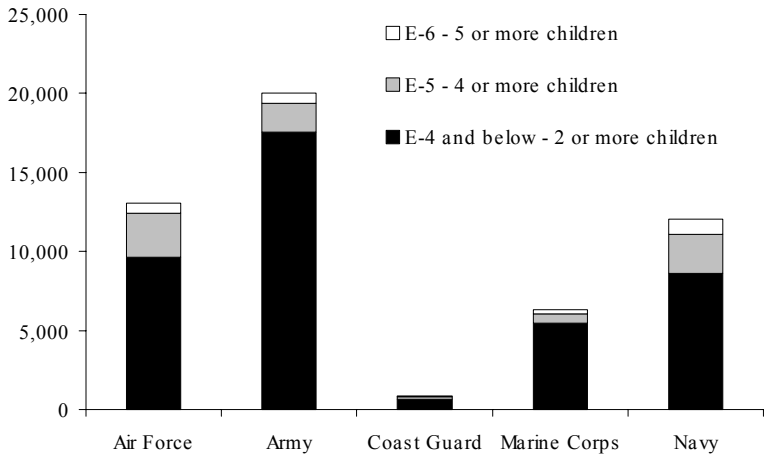
For FY98, we estimate that 4.5 percent of enlisted personnel (52,565 servicemembers) earn basic pay that falls under the poverty thresholds. There is some variation from one service to the next: 5 percent of Army, 3.8 percent of Navy, 4.1 percent of Marine Corps, 4.5 percent of Air Force, and 3.2 percent of Coast Guard servicemembers earn a level of basic pay that falls below the poverty line.

When RMC is considered, there are virtually no enlisted personnel with military earnings below the poverty thresholds. Indeed, in FY98, only 0.4 percent of personnel (509 servicemembers) earn RMC that falls under the income poverty thresholds. These results are similar to those reported in a 1998 Department of Defense (DoD) study [11]. Again, it is worth noting that this represents an upper bound on the number of enlisted personnel with families living in poverty because spouse income and special pays are not included in RMC.

Figure 1 breaks down the number of military personnel by family size and paygrade in FY 1998. The different paygrade/family size combinations are those for which levels of basic pay fall below the official FY98 poverty thresholds.[10] As figure 1 demonstrates, for each of the services, the overwhelming majority of enlisted personnel with "large families" are those who are E-4 and below with two or more children. In total, there are about 42,000 enlisted personal at E-4 or below with families of two or more children. This represents about 3.5 percent of enlisted personnel, or about 80 percent of all enlisted personnel with levels of basic pay below the poverty line.

[10] Given the small number of enlisted personnel with RMC below the poverty thresholds, we focus on basic pay.

Figure 1. Number of Enlisted Personnel with Large Families—FY 98



An examination of the DMDC data from 1990 to 1998, displayed in figure 2, indicates that the percentage of enlisted personnel in this category has changed modestly over the 1990s. The percentage of enlisted personnel E-4 or below with two or more children has ranged from about 3.3 percent of enlisted personnel in 1990 to over 3.8 percent in 1995. In all years, there are far fewer enlisted personnel at paygrades E-5 and E-6 with large families.[11]

An important observation from the DMDC data is that this poverty status is transitory. Figure 3 shows the average length of service (in years) at each paygrade. The figure reflects the rapid movement that enlisted personnel experience from one paygrade to the next, particularly for those servicemembers in the lowest paygrades (E-1 to E-4). For example, E-4s have about 4 years of active duty service, whereas enlisted personnel in paygrades E-1 to E-3 are promoted after about 2 years of service. Remaining in these paygrades, therefore, is not a permanent situation for enlisted personnel; this implies that earning basic pay below the poverty threshold is a temporary phenomenon. In contrast, civilians in poverty are significantly more likely to remain in poverty for extended periods of time [12].

[11] "Large families" are E-5s with four or more children and E-6s with five or more children.

Figure 2. Percentage of Enlisted Personnel E-4 or Below with Two or More Children

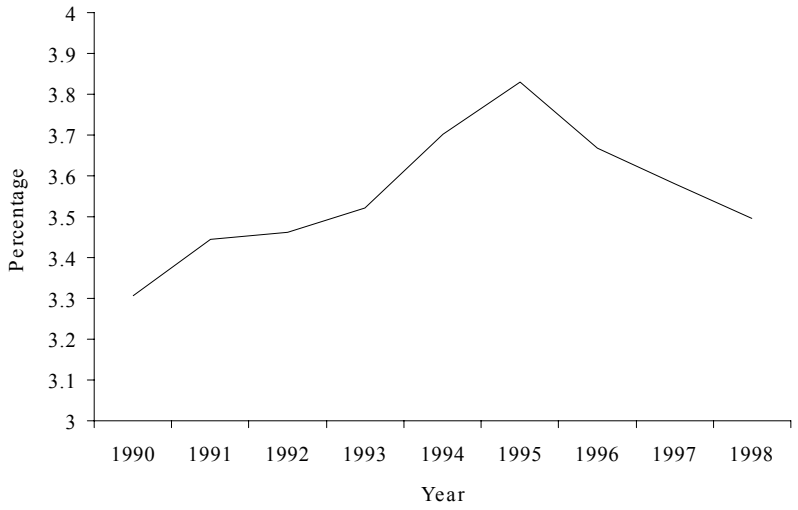
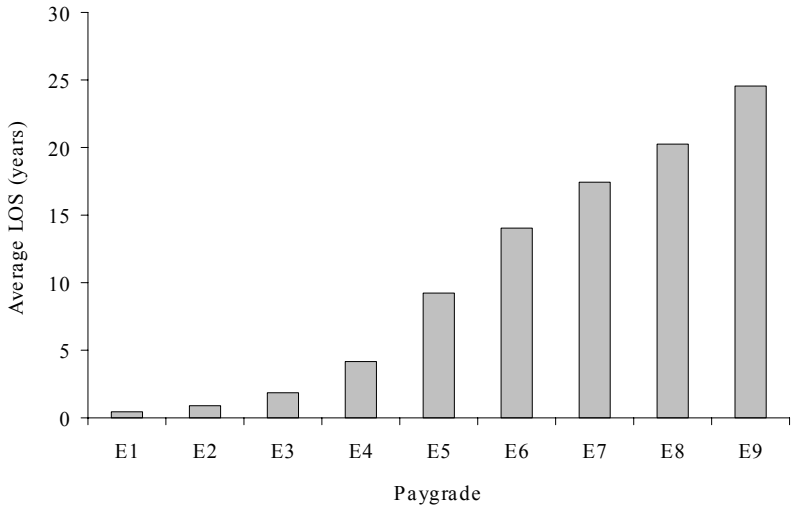


Figure 3. Average Length of Service by Paygrade

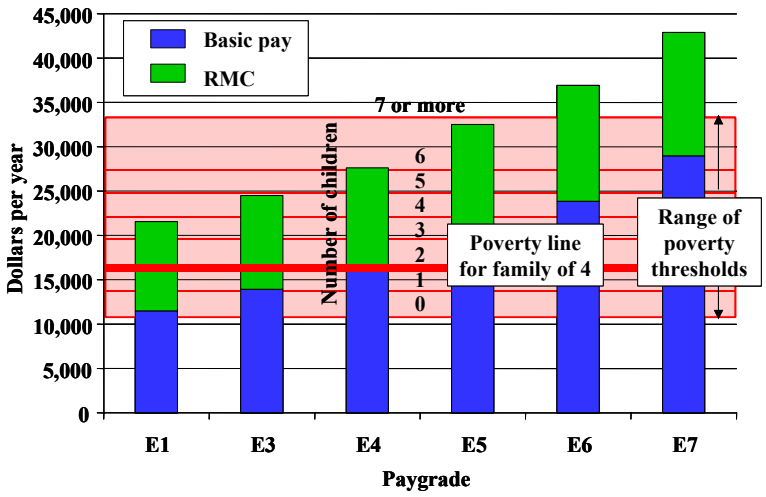


ALTERNATE MEASURES OF POVERTY AND ENLISTED PERSONNEL

Although our analysis indicates that relatively few enlisted personnel live below the official poverty thresholds, such a comparison does not reveal the extent to which their incomes fall above the minimum considered to be "in poverty." If, for example, the incomes of enlisted personnel were marginally above the poverty threshold, one could argue that the standard of living of these personnel is unacceptably low. On the other hand, if basic pay or RMC is substantially above the poverty line, it is likely that enlisted personnel enjoy a relatively comfortable standard of living.

We examine the standard of living of enlisted personnel using an alternate measure of poverty. Figure 4 shows military compensation by paygrade relative to the poverty line in FY99. For comparison purposes, we examine the degree to which both basic pay and RMC fall above (below) the poverty line. As a benchmark, we use the poverty threshold for a family of four—two adults and two children.[12]

Figure 4. How Do Basic Pay and RMC Compare to Poverty Thresholds



[12] As we have shown, people without dependents earn basic pay above the poverty threshold. Our measure of RMC, then, includes allowances for those "with dependents."

As figure 4 indicates, for paygrades up through E-4, basic pay is below, or just barely above, poverty thresholds, even for small families. However, RMC exceeds poverty thresholds for all but large families. For an E-1, military compensation is about 28 percent higher than the poverty line; for individuals who are E-3 or above, RMC is at least 45 percent above the poverty threshold. Our conclusion, then, is that levels of military compensation are not marginally close to the poverty thresholds for a typical family, but are, in most cases, substantially above the level that would place a family in poverty.

Another way to measure standard of living is to calculate the incidence of welfare program participation among enlisted personnel. One of the major welfare programs is the federal Food Stamp Program; the degree of food stamp use among servicemembers in the military has been addressed in several reports to the U.S. Congress. In the most recent of these reports [11], DOD matches military members' social security numbers to USDA food stamp recipiency records for servicemembers from 10 states over 8 months in 1998. Reference [11] concludes that less than one-half of 1 percent (about 0.45 percent) of the servicemembers in their data used food stamps.[13] The number of people qualifying for Food Stamps should be higher than the number of individuals in poverty because the food stamp limit is 130 percent of the poverty level. If these data are representative of the entire military population, the results imply that about 6,300 members received food stamp benefits in 1998. The findings from this study correspond to the findings of two previous DOD studies in 1992 and 1996 that found use to be less than 1 percent.

Survey data from the 1999 Survey of Active Duty Personnel confirm this low degree of Food Stamp Program participation. The weighted proportion of individuals from all services indicating food stamp use over the past 12 months was about 1.2 percent. Food stamp use also varied across service and paygrade. For example, the proportion of enlisted personnel that report using food stamps is 1.2 percent in paygrades E-1 to E-3, 1.4 percent in paygrades E-4 to E-6, and only 0.2 percent in paygrades E-7 to E-9.

When RMC, rather than basic pay, is considered to determine program eligibility, most of these families would not qualify. It is difficult for outside agencies, such as the Department of Agriculture, to determine the full value of military compensation. For example, because 60 percent of food stamp recipients live on-base, adding the value of their base housing

[13] As with the poverty rates, there is some variation from one service to the next in food stamp participation. For example, the incidence of food stamp recipiency was highest in the Army (0.78 percent) and lowest in the Navy (0.22 percent).

into their income would move many families above the program eligibility income threshold. Other resources, such as the tax-exemption, some special pays and bonuses, benefits in-kind, and price subsidies also are not reflected in documents used to verify program eligibility.

Two recent DoD initiatives will serve to increase the degree to which RMC exceeds poverty thresholds and therefore decrease the proportion of enlisted personnel who would be classified as living in poverty. First DoD plans to eliminate out-of-pocket housing costs with increases in Basic Allowance for Housing (BAH) by 2005. Second, the National Defense Authorization Act established the Family Subsistence Supplemental Allowance for Low-Income Members of the Armed Forces (FSSA). FSSA program benefits increase Basic Allowance for Subsistence (BAS) by the amount necessary to remove the member from Food Stamp eligibility. To decrease the number of enlisted personnel who get Food Stamps, however, it will also be necessary to ensure that the Departments of Agriculture and Defense use the same definition of income.

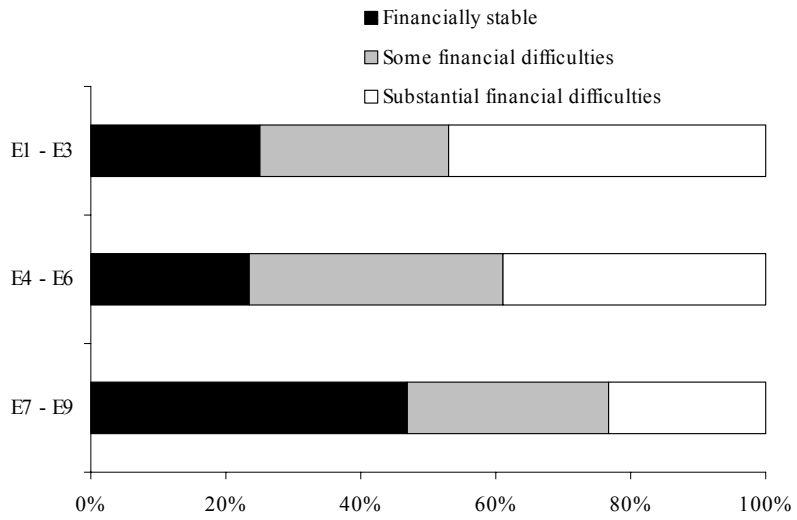
Responses from the 1999 Survey of Active Duty Personnel can also be used to determine the degree of program use in seven other major state and federal welfare programs: Supplemental Security Income (SSI), Unemployment or Worker's Compensation (UI), state-funded child care assistance, WIC, Head Start Program, Aid to Families with Dependent Children (AFDC), and Medicaid. The weighted proportions of active duty personnel using AFDC, the largest cash welfare program, and Medicaid, the largest low-income medical program, were about 0.23 percent and 0.77 percent, respectively. Higher use rates were reported for two other welfare programs over the past 12 months: nearly 11 percent of active duty personnel participated in the WIC program and about 2 percent of personnel received UI compensation.

Responses to questions concerning the servicemember's financial condition can be used to create a subjective measure of standard of living. One such measure is the person's evaluation of his or her family's ability to "make ends meet" financially. Figure 5 presents the perceptions of enlisted personnel about the financial stability of their families.[14] Note that servicemembers in all three paygrade groups (E-1 to E3, E-4 to E-6, and

[14] The categories presented in this research memorandum combine some of the options available to respondents of the survey. Individuals who indicated that their family was "very comfortable and secure" or "able to make ends meet without much difficulty" are considered "financially stable." Those who feel they "occasionally have some difficulty making ends meet" are considered to have "some financial difficulties." Finally, those who find it "tough to make ends meet but keeping your head above water" or "in over your head" are considered to have "substantial financial difficulties."

E-7 to E-9) feel that they are in trouble with respect to their financial condition. As one might expect, however, the proportion with financial difficulties declines by paygrade. For example, 47 percent of E-1s to E-3s report having substantial financial difficulties; this declines to 39 percent of E-4s to E-6s, and 23 percent of E-7s to E-9s. Similarly, only 25 percent of E-1s to E-3s and E-4s to E-6s, but 47 percent of E-7s to E-9s, feel that they are "financially stable."

Figure 5. Financial Stability of Enlisted Personnel—1999

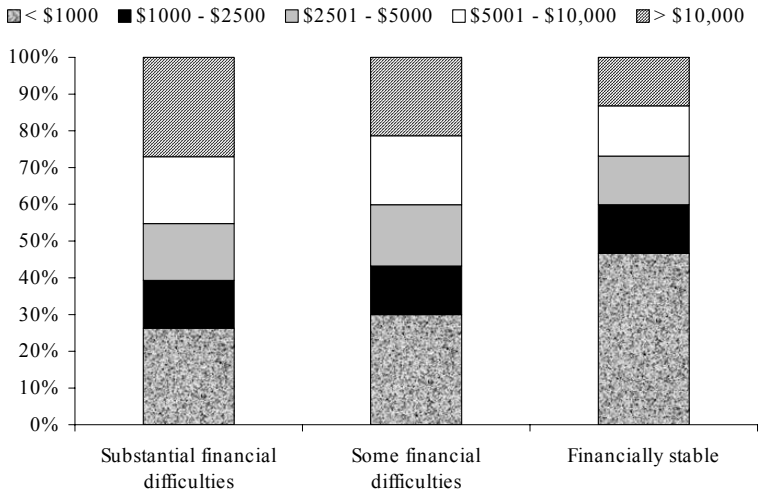


The actual responses available in the questionnaire highlight one of the primary criticisms of using subjective measures of standard of living. It is very likely, for example, that respondents differ in their interpretation of the possible responses (e.g., "very comfortable and secure" versus "able to make ends meet"). Given the ambiguity of these phrases, differences in interpretation cast doubt on the usefulness of this measure of standard of living.

One possible explanation for these perceptions of financial stability could be the degree to which levels of debt are correlated with feelings of "financial stability." As an example, figure 6 presents the proportion of people with different levels of debt. These distributions are presented

separately for those who feel their families are "financially stable," have "some financial difficulties," or have "substantial financial difficulties."[15]

Figure 6. Levels of Debt of Enlisted Personnel



According to the responses to the survey summarized in figure 6, those who indicated that they faced "substantial financial difficulties" were more likely to have substantial levels of debt (> $10,000), whereas those who were "financially stable" were those most likely to have little or no debt. Again, this is consistent with many of the criticisms of subjective measures of standard of living. Although having "substantial financial difficulties" can reflect low levels of income, it is also consistent with people with high levels of income who consistently live beyond their means. In other words, one cannot distinguish between earning a "sufficient" level of income and spending substantially more than one earns.

[15] These relationships are similar for each paygrade. Therefore, figure 6 presents data for all enlisted personnel.

CONCLUSION

In the existing literature, the method commonly used to measure "standard of living" is to compare an individual's (family's) income with some minimum level, or threshold. Determination of whether an individual (family) has fewer resources than this threshold requires an appropriate measurement of both the resources available to the individual (family) and the threshold.

The literature proposes three broad definitions of this relationship between resources and standards. Although these definitions have a common focus, they all differ substantively in the way resources are calculated and in the way "needs" are determined (i.e., how the minimum threshold is set). The easiest methods to use are those that utilize objective metrics of "standard of living"; however, an approach that relies on subjective evaluations does have some advantages.

Using these different concepts of standard of living, this research memorandum concludes that most enlisted personnel and their families are provided a standard of living in the military that is above commonly accepted definitions of poverty. For example, about 4.5 percent of enlisted personnel earn levels of basic pay below the official U.S. poverty thresholds; if one includes allowances and the tax advantage in a measure of military compensation, virtually no enlisted personnel are "poor." An inclusion of additional sources of income, such as spousal income or bonuses, would reduce these numbers even further. Furthermore, a comparison of levels of basic pay and RMC with the official poverty thresholds reveals that family size, not military compensation, is the primary determinant of whether an enlisted member is considered poor.

When looking at alternate measures of standard of living, there is still no compelling evidence to suggest that enlisted personnel are poor. Participation in federal welfare and assistance programs is relatively low, and those who do earn less than the poverty thresholds are typically in junior paygrades where the rate of advancement is rapid. Furthermore, if government agencies used RMC to determine program eligibility, program use would be even lower. While a large number of enlisted personnel indicate that they are faced with "substantial financial difficulties," our analysis indicates that this is strongly related to the levels of debt held by an individual, and not the level of compensation provided by the military. It is possible that people are in significant debt because their earnings are truly "insufficient," but it is equally likely that they are in debt because

they choose to live beyond their means. Consequently, policies aimed at educating personnel about budgeting and debt are likely to be more effective at raising their perceptions of their standard of living than across-the-board increases in compensation or policies targeted at the few personnel who fall below official measures of poverty.

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CHAPTER II

MARRIED TO THE MILITARY

THE EMPLOYMENT AND EARNINGS OF MILITARY WIVES COMPARED WITH THOSE OF CIVILIAN WIVES

James Hosek, Beth Asch, C. Christine Fair, Craig Martin, Michael Mattock

RAND

SUMMARY

The purpose of this report is to analyze the employment and earnings of military wives compared with those of civilian wives between 1987 and 1999. Today's military is a military of families. About half of active-duty members are married as they enter their fifth year of service, and about three-fourths are married as they enter their tenth year of service. Therefore, in supporting the service member, manpower policy must often also support the member's family. Family considerations are apparent in policies on housing, health care, child care, dependents' schools, and compensation for separation from family members. Many military spouses work in the labor force and contribute to their family's material well-being, yet at the same time they must accommodate the demands the military makes of the member in the form of training, drills, inspections, education, exercises, peacetime operations, and hostile deployment. Also, the member is periodically reassigned, and permanent change-of-station (PCS) moves generally require the working wife to leave one job and find another. Thus, this report assesses the labor supply and wage of the military wife, recognizing the wife's contribution to family earnings and realizing that the military's demands on the member also affect the wife.

The analysis is based on a sample of husband-and-wife families drawn from the March Current Population Survey and containing retrospective information for the previous year. The sample has two subsamples: one for military families and one for civilian families. We weighted each subsample for each year to reflect the male age, education, and race/ethnicity composition of the active-duty force in that year. We focused on military wives because there were not enough observations to study the husbands of female military members. Also, we converted all dollar amounts to year 2000 dollars. The weighting of the military subsample assured that it would represent the active-duty population, and the weighting of the civilian subsample assured that it would be comparable to the military subsample. As background to the analysis, we reviewed studies on military wives, economic theories of labor supply, assortative mating, investment in human capital, migration, and sociological literature on "greedy" institutions. We developed behavioral hypotheses from insight provided by the literature.

Over the 1987–1999 period, husband-and-wife family earnings totaled $51,115 on average for civilian families and $40,587 for military families, or $10,528 less. Civilian wife earnings averaged $15,884 compared with

$10,241 for military wives. The difference in wife earnings, $5,643, accounted for more than half the reported difference in husband-and-wife family earnings. The earnings of military members might be understated in the data, so the role of wife earnings in understanding the difference between military and civilian family earnings could be even greater.

The earnings difference between military and civilian wives arises because of differences in labor supply and wage rate. We analyzed different aspects of the wife's labor supply: the probability that the wife worked in the year, the probability that she worked full-time (defined here as at least 35 weeks and at least 35 hours/week), the number of weeks worked, the number of hours per week. We analyzed two wage measures, the weekly wage and the hourly wage. In the weekly wage analysis we estimated models for wives who worked full-time, wives who worked part-time, and all wives who worked. The hourly wage analysis controlled for the possibility that the wage estimates were affected by selection bias, i.e., bias arising from the likelihood that wives with a higher prospective market wage are more likely to enter the labor force, in which case observed wages would overstate the true wage structure.

We found that compared with civilian wives, military wives are less likely to work in a year; less likely to work full-time; have fewer weeks of work; and have similar, though slightly lower, hours of work per week. Together, these factors imply that military wives work fewer hours per year. We also found that their wages are lower, whether measured by weekly wage or hourly wage. To be specific, when we made predictions from our regression estimates with the explanatory variables set to the average values for the military wife subsample, the predicted probability of work in a year was .82 for the civilian wife and .74 for the military wife. The probability of working full-time, given that the wife worked, was .59 for the civilian wife and .48 for the military wife. The civilian wife was predicted to work 40.9 weeks versus 37.6 weeks for the military wife. The weekly wage if the wife worked full-time was $308 for the civilian wife and $268 for the military wife.

Among the hypotheses we considered, several seemed especially helpful in explaining this differential pattern of outcomes for military wives. To begin, military wives are an increasingly self-selected population as the military career of her husband progresses. Many members marry as young junior officers or enlisted members, and a significant fraction of junior and early mid-career members leave the military. The decision to stay in, or leave, the military presumably takes into account the wife's career prospects and career aspirations as well as those of the member. Wives who believe their opportunities to be greater

outside the military will influence the family's decision for the member to leave the military, other things equal. In particular, wives with a stronger interest in the labor market will tend to depart the military if they believe labor market opportunities are greater outside the military. Additional hypotheses suggest reasons why that might be the case.

One hypothesis is that the more frequent moves of the military family lead to a lower-wage equilibrium. Under this hypothesis, military wives know that they are likely to move frequently. In response, they are willing to accept jobs that offer a lower wage rather than use more of their remaining time at a location to find a higher wage job. Employers also know that military wives are move likely to move. They offer positions conditioned on the expectation that the military wife will not be with the firm for a long period and that the military wife in effect faces a trade-off between searching longer for a higher wage versus starting to work, and earn, at a lower wage. A related hypothesis is that the military is demanding of the member's time, and the family's decision regarding the wife's labor supply takes these demands into account. The member must report when commanded to do so, and the member's schedule may have rigidities and uncertainties that are more prominent than in many civilian jobs. Furthermore, the military may be demanding of the wife's time. Officers' wives and senior noncommissioned officer (NCO) wives are often expected to organize and participate in family support activities.

These hypotheses are consistent with our finding that the probability that the wife works in a year declines with age in the military, although it changes little with age in the civilian world. Furthermore, this probability declines more rapidly for military wives with a college education, most of whom are officers' wives. The decline may reflect the selective departure of families with wives who have a stronger interest in the labor market. It may also reflect the withdrawal of military wives from the labor market in order to take on service-related volunteer activities or personal nonwork activities. As the probability of work in a year declines, the probability of working full-time rises among those wives who remain in the labor force. This rise in full-time work is greater for military wives than for civilian wives. This indicates that wives with a weaker, non–full-time attachment to the labor force are the ones that tend to withdraw from it. Also, weeks of work rise with age for the military wife, given that she works—yet they rise faster for the civilian wife. We think this difference in the rise in weeks of work with age is related to the fact that military families move more frequently and longer distances than do civilian families. We estimate that the difference in frequency and distance of moves causes the working military wife to have 2.6 fewer weeks of work per year on average. Finally, the wage of the military wife is lower, as mentioned.

The results were not consistent with the hypothesis that military wives accumulate human capital more slowly than civilian wives because employers are reluctant to invest as much in military wives. This hypothesis predicts that the wage gap between civilian and military wives will grow with age, but we find that is does not. In particular, there is no statistical difference in the relationship of wife age to wage between military and civilian wives. The military wife's wage starts lower and stays lower. However, the results indicate that the civilian wife's wage is independent of husband age, whereas the military wife wage rises with husband age. The increase with husband age could reflect the selective departure of wives for service-oriented volunteer activities (or personal nonwork activities). Departures from the labor market would presumably be more likely among wives with lower market wages, and if so, the wage of wives who remained in the labor force would tend to rise with husband age.

Military families are three times as likely as civilian families to have an out-of-county move in a year. About one-fourth of military families move out of county versus about one-twelfth of civilian families. Moreover, military families move longer distances, and longer moves entail a greater loss of the wife's weeks of work. But military families are more efficient movers in the sense that for a move of a given distance, the military wife loses fewer weeks of work per year. Nonetheless, the greater frequency and distance of moves combine into a larger expected loss of work for the military wife: 3.8 weeks for her versus 1.2 weeks for the civilian wife, a 2.6-week difference.

The effects of children on wife labor supply are largely similar for military and civilian families. The presence of children reduces the probability of work in a year, the probability of full-time work, and weeks of work. The reductions are greater if young children are present. Compared with the civilian wife, the reduction in military wife labor supply is somewhat greater in the presence of young children but somewhat smaller with older children.

Regarding location, it is often assumed that military families live in rural areas where the job opportunities for the wife are poor. We find fairly small differences in the location of civilian versus military families. The difference in location distributions appears to be that civilian families are more likely to be living in suburban areas, and military families are more likely to list their location as "missing." The latter probably reflects the fact that a military family may have a permanent address (e.g., for tax purposes) different from their current address (duty assignment). Contrary to common expectation, we also find little difference between the wage of military wives in urban, suburban, and rural areas. We think this is

because military wives tend to work on or near base, and the local "micro-economy" is stabilized by a steady flow of funds for the base. In contrast, civilian wives in rural areas have a 28 percent lower wage than their suburban counterparts.

With respect to labor supply and wage over the business cycle, we find that a one-point increase in the unemployment rate from one year to the next has little effect on the probability of work in the year but reduces the probability that the military wife works full-time. It also has small negative effects on her weeks worked and her weekly wage, although the wage effect is not statistically significant. In comparison, an increase in unemployment leads to a slight increase in the probability that the civilian wife worked during the year and the probability that she worked full-time, and an increase of about half a week of work. There is no change in her weekly wage given that she worked full-time. This pattern of response of the civilian wife is consistent with the traditional "added worker" hypothesis whereby the wife, responding to her husband's loss of work or threat of loss of work, reacts by increasing her labor supply. The military wife, in contrast, does not appear to respond as an added worker but rather as a worker with a more permanent attachment to the labor force.

1. INTRODUCTION

The experience of military spouses has been the subject of increasing attention among researchers, policymakers, and those in the media. This attention stems from concern about the quality of life of military families and the implications of declining quality for military retention and readiness. Harrell (2001), for example, conducted extensive field interviews to document the stressful financial and sociological issues faced by Army junior enlisted wives. Our analysis complements such ethnographic studies. We provide quantitative information on the labor market outcomes of military wives, relying on a random, representative sample to do so. We are concerned with the extent to which military wives' earnings differ from those of comparable civilian wives, as well as parsing out the factors that help account for the differences. Our research is impersonal, yet it is statistically systematic. It provides a depth and quantitative focus difficult to attain in studies based on interviews, just as the latter can offer penetrating insights that might not be cogently captured in available quantitative data. Our findings suggest that in many ways the labor supply and wage outcomes of military wives have much in common with those of civilian wives. Still, we find evidence of systematic

differences. Our discussion of theory, descriptive differences, and regression analyses forms our attempt to uncover and highlight those differences and to speculate about the reasons why they occur.

The retention of high-quality personnel is a perennial concern for defense manpower managers in the context of the all-volunteer force. Many studies have estimated the effect on retention of military compensation, bonuses, and environmental factors such the civilian unemployment rate. None has examined the effect of family compensation on retention behavior. Yet marriage rates among military members are quite high—even higher than in the civilian sector (Wardynski, 2000)—and the employment rate of military wives is higher than 70 percent (see Chapter 4). It therefore seems important to understand how military life affects family earnings, particularly spouse earnings, and—in future research—to understand how family earnings affect the member's decision to stay in or leave the military.

The lack of research on the effect of spouse earnings on retention is due to a lack of data. Regularly maintained databases on military members do not include information on either a spouse's current and future earnings or on whether the member should stay in, or leave, the military. We are aware of only two studies of how military spouses influence military members' careers. While clearly an important step forward, those studies are only able to examine intentions to leave the military and attitudes toward the military and not actual retention decisions. In the late 1980s, Wood presented evidence that a soldier's intention to leave the Army is significantly affected by the spouse's likelihood of being unemployed (Wood, 1989, cited by Schwartz et al., 1991). More recently, Gill and Haurin (1998) use data from a 1992 Department of Defense (DoD) survey and find that the military husband's satisfaction with the family's work-life situation has more weight than the wife's satisfaction in determining the military member's intentions to leave the military. While retention intentions are likely to be positively related to actual behavior, no estimates exist on how military spouses' labor market outcomes affect the actual decision to stay in the military. Furthermore, past studies of the relationship between enlistment intentions and enlistment behavior show a much weaker relationship between intentions and behavior among those farther away from the actual decision date than those close to it (Orvis et al., 1997). Since the retention decision date only occurs periodically over the military career, the relationship between retention attitudes and actual behavior will only be strong for those near the retention decision.

Much of the research has focused instead on a more addressable question: namely, how does the labor force participation and earnings of

military wives compare with those of their civilian counterparts (Wardynski, 2000; Booth, 2001; Payne, Warner, and Little, 1992; Grossman, 1981; Schwartz et al., 1991; Schwartz, 1990). Our research focuses on this question as well.

There are a number of reasons why military spouses' labor force participation and earnings may differ from their civilian counterparts. First, frequent migration of military families through permanent change-of-station (PCS) moves may retard military wives' ability to accumulate experience, education, and job-specific human capital. Employers may either choose not to hire military wives or not to invest in them, as they are perceived as being migratory. Second, unlike their civilian counterparts who may move to optimize labor force opportunities, military wives are virtually always tied movers and are not necessarily moving advantageously. Third, military bases may be in localities with low wages and limited employment opportunities for military wives. Fourth, the pattern of relatively frequent PCS moves may cause military wives to engage in less job search, resulting in a lower return to their human capital. The returns to search will also be lower if military installations are in low-wage areas with few high-wage jobs for highly educated military wives. Consequently, military wives may be induced to accept lower-wage jobs than if they were in major labor market areas. Fifth, military wives may be self-selected, placing a high priority on the military lifestyle, with its unique opportunities and limitations. Under the self-selection hypothesis, military wives might work less or earn less than civilian wives because they tend to have different tastes for work. Sixth, military wives may be responding to family-related policies. For instance, it may be less of a burden not to work if housing is subsidized at no cost to the family. Also, there may be some incentive to have children sooner (and perhaps to have more children) because babies may be delivered in military treatment facilities at low cost to the family and on-base child care may be available. Further, officer wives and senior NCO wives may be expected to devote time to the support and social cohesion of the wives and families of more junior unit members (Harrell, 2001). These factors imply that military wives are likely to earn less than similar wives of civilians.[1]

Past studies have generally found support for these hypotheses. Payne, Warner, and Little (1992) used March 1985 Current Population Survey (CPS) data together with the 1985 DoD survey of military couples and find that weekly earnings are 5.4 percent lower for military wives and that

[1] Wives are "similar" in the sense that our analysis controls for the age and education of the wife and the age and education of her husband, as well as for race/ethnicity, children, and other factors described below.

annual earnings are 18.4 percent lower, other factors held constant. Gill (1996) used the 1992 survey of military personnel and spouses and the 1992 wave of the National Longitudinal Survey of Youth to compare the earnings of military and civilian spouses age 27 to 35. He found that the annual earnings of military wives with 16 years of education are 57.5 percent of the earnings of civilian wives with 16 years of education. Military wives with a 13 years of education earn 69.4 percent of the annual earnings of civilian wives with 13 years of education.

Much of the difference between military and civilian wives annual earnings appears to be due to lower labor supply among military wives; Gill found smaller differences in weekly wages as did Payne et al. That is, military wives supply fewer hours each year, either because they are less likely to be employed, they work fewer weeks per year, or they work fewer hours per week. More recently, Wardynski (2000) used CPS data for 1993, 1995, 1997, and 1999 and found that military wives are less likely to work full-time and that a higher percentage of military wives are not in the labor force, compared with civilian wives. Specifically, he found 8 to 13 percent lower employment rates among military wives, and 13 to 20 percent lower full-time employment rates. In terms of earnings among full-time workers, he finds that military wives earn 20 to 37 percent less than civilian wives depending on education level.

Two studies examined how moving affects military spouse earnings relative to civilian spouse earnings. Consistent with the early analysis of Mincer and Ofek (1982), who found that career interruptions lower earnings, Gill, Haurin, and Phillips (1994) used the 1985 military couples data file and found that additional PCS moves reduced a military wife's weekly wage by 2.8 percent. Using the 1992 DoD survey of active-duty military personnel and their spouses, Wardynski found that moving is associated with lower military spouse earnings relative to military families who make fewer moves. However, he found that the difference in spouse earnings due to an additional move in the military is dominated by the difference due to being associated with different services. For example, being in the Army was associated with a 12.6 percent reduction in annual spouse earnings (compared with the Navy) while an additional move was only associated with a 2.1 percent reduction in spouse earnings. Wardynski attributed the Service effect to differences in the geographic distribution of military installations across Services. For example, he attributed the negative effect of being in the Army on spouse earnings to the concentration of Army bases in rural, low-wage areas.

While these other analytical efforts have contributed to our understanding of the labor force outcomes of military wives, there are specific areas where further analyses are warranted. For example, work to

date has often used a particular year of data (Payne, Warner, and Little, 1992; Gill, 1996) or has focused on aggregate differences in outcomes and not the trends in outcomes over time (Wardynski, 2000). Other researchers (Grossman, 1981; Hayghe, 1986) have examined trends over time in labor force participation rates and unemployment among military and civilian wives using the March CPS data. However, these studies used data from the 1970s and early 1980s, before the full extent of the changes noted in the text occurred. It is reasonable to hypothesize that the relationship between the labor market outcomes of military and civilian spouses may have changed in recent years. The labor market returns to college relative to high school have increased dramatically in recent decades, the labor force participation of married women has increased as well, and the size of the military has declined substantially because of the defense drawdown. Furthermore, the pace and type of military operations in which the military participates has changed since the end of the Cold War. Departing from Cold War patterns of a superpower standoff, the United States since engaged in a wide range of peacemaking, peacekeeping, humanitarian, disaster relief, border patrol, and nation-building missions. Army and Air Force members were deployed more frequently in the 1990s than in the 1980s, and in every Service the chance of being involved in an operation that involved imminent danger and hostile fire increased (Hosek and Totten, 1998). These changes may have altered the trend in spousal earnings, and the shift may differ for military spouses versus civilian spouses.

Another possible drawback of some earlier studies is that their descriptive analyses of their data did not take into consideration the fact that neither the military families nor civilian families in the Current Population Survey sample resemble the universe of military families generally, as will be discussed below. Use of the CPS in these analyses, without a weighting regime to control for such distributional differences, should be viewed with caution.

Perhaps the study closest in spirit to our own is the study by Wardynski (2000), which also uses CPS data over several years to estimate regressions of military and civilian spouses' labor market outcomes controlling for other characteristics. Our study differs because we examine trends in addition to average differences in labor market outcomes. Furthermore, the Wardynski study includes weeks worked in the earnings regression equation without controlling for the fact that this variable is both right and left censored (at 0 and 52 weeks) and is jointly determined with earnings. Consequently, the study's estimates of the extent to which military wife earnings differ from civilian wife earnings may be biased.

The research presented in this report represents a departure from previous work in several ways. First, use of the CPS March Supplement data allows us to examine trends in spousal labor force outcomes from 1987 to 1999 rather than focusing on one year or the average across years. Our regression models, discussed below, permit us to examine differences in trends for both groups of wives. Second, while we make use of the CPS, we have re-weighted our samples of military families and civilian families so that the husbands in both are representative of the male active-duty population. This adjusts for major differences between the military and civilian family samples related to their age and education levels. For example, wives in the civilian sample are on average more than ten years older than are wives in the military sample. If we had not re-weighted the samples, civilian wives would tend to have higher wages simply because they were older (wages generally rise with work experience, which rises with age). Third, we focus on both labor supply and wages to discern how much of the differences in military and civilian wives' annual earnings is due to differences in how much they are paid (i.e., wages) and how much they work (i.e., their labor supply). While some past studies have also examined labor supply outcomes such as the percentage of wives working full-time, none has attempted to systematically attribute differences in earnings to differences in pay versus differences in labor supply.

The specific questions we address include the following:

- How large a portion of husband-wife earnings come from the wife, and does this differ between military and civilian families?
- How much of the difference in earnings between military and civilian wives traces to the amount of labor supplied and how much to the wage rate?
- Have the trends in labor supplied and wages differed between military and civilian wives?
- How do specific factors affect these differences? Factors we consider include the age, education, and race/ethnicity of the wife and the husband; the presence, age structure, and number of children; the family's geographic location; whether the family has moved recently; cyclical economic conditions as reflected by the change in the state unemployment rate; and time trend.

In analyzing these questions, we have reviewed theory, formulated hypotheses, provided descriptive tabulations, and estimated regression models. To check the robustness of our findings, we have estimated

related yet different models that provide a variety of views of labor supply and wages.

Chapter Two discusses what factors might lead to different labor supply and earnings outcomes for military versus civilian wives from a theoretical perspective. Chapter Three describes our methodology and data. In Chapters Four and Five, we present a descriptive comparison of labor supply and earnings outcomes and then discuss the findings from our regression analysis. In Chapter Six, we present our conclusions as well as caveats to the analysis. We also identify several areas for future research.

2. THEORETICAL CONSIDERATIONS

This section describes the conceptual framework employed in this analysis. A number of approaches have been used to analyze family labor supply decisions (Killingsworth, 1983). We adopt the more traditional approach, which views marriage partners as behaving as a single unit and making joint decisions. This more common approach draws from Becker's theory of the allocation of time and his book *A Treatise on the Family* (1981). It also draws from his human capital framework (Becker, 1964).

An alternative approach would view the marriage partners as separate decisionmakers who bargain over scarce family resources (Manser and Brown, 1979; McElroy and Horney, 1981; Lundberg and Pollack, 1996). This latter approach has some advantages, especially when considering issues pertaining to whether to marry and whether to divorce. However, both approaches recognize that labor supply decisions are jointly made (though they differ with regard to how those decisions get made). We use the Becker approach because it is simpler and because we take a simple reduced-form approach in our empirical analysis. In addition to drawing from the economics literature, this section also explores some of the sociological literature on "greedy institutions" as it pertains to the military and military spouses' labor force decisions.

CONCEPTUAL FRAMEWORK

We focus on wives rather than both male and female spouses of military members. This simplification is motivated by the fact that military spouses are overwhelmingly female and by the fact that the most dramatic change in labor supply over recent decades has occurred among wives.

Wife's Labor Supply

Following Becker (1976), we treat the household as the economic decisionmaking unit. Households are assumed to maximize utility by engaging in home production that requires inputs of time and goods. Goods must be purchased, and household members supply time to the labor market in order to earn income that can be used to purchase the goods. The decision about each spouse's time allocated to the labor market and time allocated to home production will be influenced by the spouses' relative productivity in the labor market and at home (see also Lundberg, 1988). Relative productivity reflects which spouse can produce more home-produced commodities for a given amount of inputs and time, and who can generate more earnings by working for pay for a given amount of inputs and time. The allocation of spouse time between home and work also depends on the price of the inputs into home production and the technology of home production. Changes in the market wage, the price of inputs, or the nature of technology may affect the spouses' time allocation. Time allocation also depends on personal preferences. For given home input prices and home production technology, a husband and wife can in effect iterate over various hypothetical combinations of their labor supply, weighing the benefits of greater earnings against the costs of forgone home production. These benefits and costs reflect the household's relative demand for time-intensive goods like child care, home entertaining, or involvement in community or church activities, versus cash-intensive goods such as a large house, a new car, a family entertainment center, or expensive vacations. In this framework, a wife's labor supply decision is interdependent with that of the husband's labor supply decision. On the margin, a wife will enter the labor force if her market wage compensates the family for her lost home production as well as any fixed or variable costs of labor force participation, e.g., additional child care expenses.

The wife's reservation wage may be affected by a number of factors. First, a wife may have a higher reservation wage and be less likely to work if her husband is a high-earner. One notion is that the higher the husband's market wage relative to the wife's market wage, the greater the demand for the wife's time in home production, assuming her time can substitute for his in home production. The home demand for her time is higher because his time is more expensive in the sense that the family gives up more market income per unit of his time than her time. Another notion is that the marginal value to the family of another dollar of income declines as family income rises; if the husband is a high-earner, neither spouse has as strong an incentive to supply more labor to the market. However, this negative effect on labor supply could be offset if, as family

income rises, the family demand for cash-intensive goods increases. For example, as its income rises, the family might prefer to dine in upscale restaurants rather than eat home-cooked food. Second, the presence of children in the household and, in particular, the age of the youngest child may affect the wife's reservation wage. The family may determine that there are few substitutes for the time a parent spends with a young child. If the wife's market wage is less than the husband's or if the wife is more efficient in producing child care, the family may decide to have the wife spend more time at home when there are young children present. Furthermore, if the wife were to enter the labor force or increase her hours of work, the additional costs of day care would have to be netted out of her wages. Thus, under the conditions mentioned, the presence of young children may be expected to raise the wife's reservation wage and reduce her net market wage. Children and day care may influence the wife's reservation wage in other ways as well. Day care hours may restrain the hours that she can work. If employers set a minimum number of hours of work on jobs that pay a higher wage, she may trade off higher wages for a job that provides more flexible hours or is nearer to the day care provider. (Schwartz [1990] describes such factors as reducing the wife's reservation wage.)

Becker's framework applies to military and civilian families. Differences in the families' situations or constraints could result in differences in military versus civilian wives' labor force participation, weeks, and hours of work. But what are those differences? Perhaps the main difference concerns the organizational commitment required of the military member. The member is expected to be ready and available for duty at all times. The member goes where and when the military orders, undertaking the assigned tasks and missions. For many members, this means periodic change-of-station moves, participation in unit training and major exercises over days or weeks, assignment to unaccompanied tours (i.e., the member is not accompanied by dependents), and deployment in support of military operations in peace or war. These factors are not exclusive to the military. Many private-sector jobs have extensive responsibilities and offer little flexibility over the terms of work (e.g., hours, shifts, tasks). For instance, physicians, nurses, and repairmen are often on call, as are livestock farmers, restaurant staff, firefighters, and police, and there may be little leeway in the job demands placed on livestock farmers, teachers, and shift workers. But even if some civilian jobs have aspects that are counterparts to positions in the military, it seems reasonable to suggest that military positions tend to differ with regard to family moves; absences due to military training, assignment, or operation; and a strict chain-of-command hierarchy that the member must obey. When given an order, the military member has virtually no recourse for

negotiating what is to be done and when. Compared with constraints attendant on many and perhaps most civilian jobs, the military member has more constraints as far as allocating time between work and home, choosing tasks, choosing the timing of activities, determining when and for how long to be deployed for duty, and determining when and where to move. Therefore, more of the time-urgent family tasks fall to the military wife. As a result, the value of the wife's home time may be higher for a military family than for an observationally equivalent civilian family. It is in the family's interest to maintain flexibility in the wife's schedule to handle exigencies, provide child care, deal with unexpected changes in the husband's schedule, shoulder extra work when her husband is away on temporary duty, and have the choice to be at home when he is at home.

The discussion suggests that military wives have a higher reservation wage for labor force participation and a higher demand for flexible employment, compared with similar civilian wives. Following the theory, we expect this to result in a lower labor force participation rate and fewer weeks of work per year for military wives versus civilian wives. Among wives who work, the impact on hours of work per week is not as clear. The discussion points to the value of flexibility in arranging hours of work, and flexibility may depend more on the particular job than whether it is full-time or part-time. That is, part-time jobs may offer much the same flexibility as full-time jobs. With respect to wage rate, there are two reasons to think the wage rate on jobs with more flexibility will be lower. It may be costly for the employer to allow flexibility; arrangements must be made to have staff on hand to provide services, work in production teams, and so forth. Also, workers may be willing to accept a lower wage in exchange for more flexibility.

Furthermore, the wife's weeks of work will be affected by family moves. Moves require considerable time to arrange and carry out, and moves often mean leaving one job and finding another (discussed below). If the member is busy with military duties, the spouse may take on more of the tasks required by the move. However, unless the member is physically absent or required to work unusually long hours (e.g., to prepare for an inspection), the member and spouse will both handle the move, as in civilian families.

Children are also an important factor in the wife's labor supply and earnings. Working wives with children, especially young children, demand child care services. Civilian wives rely on some combination of infant/toddler day care, preschool child care, and after-hours child care. Often, these services are obtained outside the home, and if there are two or more children there are likely to be two or more providers. In some cases, child care is provided in the home. Military wives have essentially the

same choices. In addition, military installations commonly have a range of family services, including on-base child care facilities. These expand the child care options of many military families. Military child care is subsidized by the military and costs less than civilian child care. The availability and lower cost of military child care should increase military wives' labor force participation; i.e., it should lower the wife's reservation wage. In addition, because labor force participants are presumably interested in their wage net of child care cost, military wives might be willing to accept lower-wage jobs than civilian wives accept—and nevertheless have a comparable net wage. Yet, military child care is not available to many families that want it.

A number of military families live off base and might find on-base child care inconvenient. Although the military provision of child care (and family services) no doubt can help military wives who work, it is not clear how large an advantage it provides to military families who do not live near a base. As mentioned below, the military child care system only satisfies 58 percent of the assessed need (Office of Family Policy, 2000). Also, some families may not find suitable housing near a base, and other families may live farther from a base in order to be closer to the spouse's job, thereby reducing her commuting time.

Finally, the theory of labor supply also recognizes that finding a partner to marry is a selective process. Becker's (1973, 1974) theory of assortative mating argues that the equilibrium in the marriage market is characterized by a matching of partners with similar potential earnings power. An implication of this theory is that partners will tend to have the same level of education. Thus, the theory of labor supply by itself suggests that husbands with high education are likely to earn more, which can increase the wife's reservation wage and make her less likely to participate in the labor force. But through assortative mating, the high-education husband is likely to be married to a high-education wife who also has high earnings potential. The latter may induce her to enter the labor market as well, irrespective of her husband's high earnings.

Human Capital Accumulation

According to human capital theory (Becker, 1964; Mincer, 1974), education and experience shape a person's age-earnings profile. If a person expects additional education to increase future earnings, there is an incentive to invest in education. Assuming expectations are fulfilled, earnings will be higher after the investment. Similarly, experience can add to human capital and make a person more productive. Since the wage returns to further investment in human capital depend on the number of years remaining in one's working life, and since past investments in

human capital depreciate, wage tends to rise at a decreasing rate with age. Wage often reaches its maximum value before the end of working life.

Military wives will have lower age-earnings profiles if they accumulate less human capital on the job. The theory implies that the individual bears the cost of investments in general human capital, i.e., capital equally valued by any employer. Assuming military wives have similar total career length horizons to those of civilian wives, there should be little difference in the incentive to accumulate general human capital for that reason. However, if military wives change residence and jobs more often because of change-of-station moves, they may devote cumulatively less time to investment in general human capital. If so, military wives' wages should not rise as fast with age as civilian wives' wages.

Further, the theory implies that the worker and the employer share the cost of investment in human capital that is specific to a firm. This capital includes knowledge of the firm's products, clients, policies and procedures, product production, and relative capabilities of coworkers. But military wives and their employers will recognize that change-of-station moves curtail the returns to firm-specific investments, and therefore military wives are likely to acquire less firm-specific capital than are comparable civilian wives. As with general capital, a lower level of firm-specific capital will result in a lower, less steep age-earnings profile. In addition, this may affect labor supply: Lower market wages (at any age) are expected to reduce labor force participation and may reduce weeks and hours of work. Schwartz et al. (1991) find that military wives' wages rise at a decreasing rate with age.

Migration and Permanent Change-of-Station Moves

Military families move every few years. Consequently, military wives are easily identified as the "tied mover." In contrast, civilian wives may or may not be tied movers. As a result of the military wife being a tied mover, there is less reason to expect that a move will improve her employment and earnings opportunities, compared with those of a migrating civilian wife. Some studies have found migration to have an adverse effect on civilian wives' market wages (Mincer and Ofek, 1982), and the impact on military wives' wages on average could be more adverse because the military wife is a tied mover.

Moves directed by the military are more likely than voluntary family moves to interrupt work and reduce the amount of labor supplied. Frequent job interruptions may retard the mover's ability to accumulate general and specific human capital and may slow the mover's job advancement (Rosenfeld, 1978; Payne, Warner, and Little, 1992). In

addition, moves may operate to reduce the returns to job search by curtailing the expected tenure of a job. As a result, the job search reservation wage would be lower, as would the expected wage given an acceptable offer. The frequent mover may thus settle for lower-quality jobs that present fewer opportunities for training or may be poorly matched with the mover's education and experience.

Not all moves are the same. Our data identify whether a family's move was local, intrastate, out of state, and so forth, but not whether a military-family move was a change-of-station move. Short-distance moves may indicate a change of residence rather than a job change. Longer moves are more likely to involve both a residence change and job change. For military families, longer moves are highly likely to be change-of-station moves.

Related to frequent moves is the geographic location to which the family moves. Local market demand is an important determinant in market wage. This issue is salient for military families as some bases are far from large population centers. For bases in relatively isolated areas, e.g., those not part of a metropolitan area or its fringe, the local demand for labor may be low compared with labor supply. But even if a base is in a rural area, its presence can be expected to increase the demand for goods and services supplied locally, and the supply of labor. In the micro-economy around a base, labor market opportunities might not be that different from a suburban or urban area. In addition, labor demand may differ by skill. The supply of labor added by officers' wives, who often have a college education, may be high relative to the local demand for college-educated workers. In this case, the wage of officers' wives would be relatively low compared with that of comparable civilian wives whose employment was not on or around a military base. Overall, military wives relocating to such areas may have lower reservation wages and may be motivated to accept lower-quality jobs or jobs that are less concordant with their background and training than military wives locating to more urban and populated areas. However, relative to civilian wives in similar areas who also face constrained job opportunities and who have similar characteristics, military wives may actually be better off, given their access to military-provided goods and services on base, such as the commissary and health care.

In addition to possible wage effects, living near a military installation may affect the sensitivity of employment to the business cycle. If military installations tend to be prominent parts of the local economy, employment near the installation may be less affected by variations in business activity. The funding for the installation and the wages paid to military personnel might be less likely to increase and decrease over the business cycle than

the revenues of private enterprises. As a result, there could be steadier employment around installations, e.g., less change in response to changes in the state-level unemployment rate.

"Greedy Institutions"

The literature on "greedy institutions" suggests factors that may condition military wives' labor supply decisions (see Coser, 1974; Segal, 1988; and discussions in Schwartz, 1990; Payne, Warner, and Little, 1992; Wardynski, 2000). This literature argues that military life imposes particular demands on military wives and that these demands adversely influence military wives' labor force allocations and earnings. The factors identified in this literature in many ways parallel our discussion of the lack of flexibility in military members' work schedules compared with those of civilian husbands. In addition, the literature points to the military's expectation that military wives, especially officers' wives, volunteer their services for the good of the military community. However, the literature places less emphasis on the role military family benefits may have in influencing the wife's labor supply. The military may provide subsidized housing, child care, and recreational facilities, and it does provide low-cost family health care. Several of these benefits, though not necessarily subsidized child care, may also operate to reduce the wife's labor supply.

When armed services members have irregular duty hours, the coordination costs for running a household are higher. Harrell (2000) describes the uncertainty in military husbands' work schedules. Such unpredictability could frustrate military wives' labor supply—particularly if children are involved. Wives may need to be flexible in their decisions to allocate labor across domestic and labor force production to accommodate the needs of their children in the face of her husband's erratic availability for household obligations. While such day-to-day uncertainty influences a military mother's decision to enter the labor force, it seems less plausible that increased coordination costs typically have as strong an influence on military wives without children. Further, the husband's irregular or unpredictable schedule may induce the wife to seek employment with a flexible schedule and, as noted, perhaps a lower wage rate.

Another suggested factor in wives' labor supply is long deployment. However, unlike day-to-day uncertainties that contribute to increased coordination costs of the household, long deployments create a kind of week-to-week *certainty* for the wife while the husband is away. The wife may know how long the husband will be gone. For instance, Navy vessels are planned to be at sea for six months, while deployments in the Army and Marine Corps are typically shorter but less certain in length.

Household production is the wife's responsibility while the husband is away, and it is unclear whether a long deployment would adversely influence a wife's decision to be in the labor force or affect her labor supply intensity. Military wives in families with no children seem least likely to be affected by the husband's deployment. But even for families with children, the husband's deployment may mean the wife gains more control over her schedule (she does not have to coordinate with her husband's schedule) while increasing her home workload.

Finally, deployments may also create uncertainty for the wife about her husband's safety, which can induce stress and anxiety. Family support programs are meant to help spouses cope with this uncertainty by providing social support, offering access to counseling, conveying information about the unit's activities, and maintaining periodic, direct communication between member and spouse by telephone or E-mail. Officers' wives and senior enlisted wives are often called upon to organize family support activities, e.g., get-togethers and "telephone trees" to relay information, and there is an expectation, or desire, that the wife participate (Wardynski, 2000; Harrell, 2001). Moreover, Harrell (2001) reports that the wife's participation in family support activities is considered in Army officer evaluation reports. Her participation may reduce her market labor supply.

In summary, the literature on greedy institutions suggests the following:

- Because of the increased coordination costs arising from day-to-day uncertainty, we expect military wives to have a lower labor supply intensity. (The institution is "greedy" to control the time, location, and effort of the husband.)
- The impact on wages may be negative. The wife may trade off a higher wage for more flexibility.
- Although not emphasized in the greedy-institution literature, family-oriented military benefits may also reduce the wife's labor supply.
- These three effects—increased coordination costs, willingness to trade off wage for flexibility, and family-oriented military benefits—may have a stronger negative effect on the wife's labor supply in military families with children.
- Officer and senior enlisted wives who accept responsibility to organize family support activities may have a lower

likelihood of being in the labor force and may supply less labor.

Personal Taste

Personal taste can affect wives' labor force participation and labor supply decisions. Military wives presumably had some idea of the benefits and costs of military life before agreeing to marry into the military or before their husband entered the military. Wives who do not have some level of personal taste for the military lifestyle and for the role of the military in providing national security would presumably not have married a member of the armed forces. Although the regression analysis controls for observable characteristics of military and civilian spouses, it does not control for unobserved factors that may influence a spouse's decision to marry a member of the armed services and adopt the military life. Differences in labor force outcomes between military and civilian wives may be related to these unobserved characteristics. For example, military wives may have lower earnings than their civilian counterparts because military wives have unobserved characteristics that tend to depress their earnings. These characteristics might include a willingness to live in remote areas, to forgo personal opportunity and gain, or to rear a family within the support structure provided by the military. Thus, the comparisons of labor force outcomes do not necessarily indicate how the welfare of military spouses compares with that of their civilian counterparts.

But even though personal taste may differ among military and civilian wives, taste may not be the whole story. Taste aside, the factors we have identified—home production, market wage, labor force participation costs, human capital accumulation, tied migration, institutional constraints and incentives—may systematically affect labor and earnings outcomes of military versus civilian wives. We elaborate these ideas into empirical hypotheses in the Chapter Three, after discussing the data and models we use in our analysis.

3. DATA, METHODOLOGY, AND EMPIRICAL HYPOTHESES

DATA

The data were drawn from the 1988 to 2000 Current Population Survey (CPS) March Supplement. The March Supplement contains information on labor market outcomes in the previous calendar year, i.e., for years 1987–1999. We extracted samples of husband-and-wife families, identifying whether or not the husband was in the military. We refer to the sample of husband-and-wife families where the husband was in the military as the military sample, and we refer to the sample where the husband was not in the military as the civilian sample.

The CPS is designed to be representative of the national population. For our research, however, we wanted the military sample to be representative of the active-duty male population. Also, we wanted the civilian sample to be comparable to that population. We therefore re-weighted the samples. We derived weights from a Defense Manpower Data Center file for each year of our data. The weights are such that our re-weighted military sample is representative of the active-duty male population with respect to education, age, and race/ethnicity. Similarly, our re-weighted civilian sample is also representative of the active-duty male population. Appendix A describes the data more fully. Appendix B presents means from the re-weighted sample and the originally weighted sample. In our regression analysis, we have used the weights of the re-weighted data.

We augmented the CPS data from the Bureau of Labor Statistics on state-level annual unemployment rate and annual inflation. Also, all dollar amounts were converted to year 2000 dollars using the national seasonally adjusted consumer price index.

Unless stated otherwise, definitions used throughout this analysis include the following:

- **Worked:** At least one week of work in the previous year
- **Worked full-time:** At least 35 usual hours of work per week and at least 35 weeks worked
- **Worked part-time:** Worked but not full-time
- **Weeks worked:** Weeks worked during the year

- **Weekly earnings:** Annual earnings divided by weeks worked
- **Hourly wage:** Annual earnings divided by annual hours, the product of weeks worked and usual hours per week.

EMPIRICAL METHODS

Our empirical approach uses tabulations of the re-weighted military and civilian samples for a descriptive analysis. We also estimate a set of regression models as described below.

Descriptive Analysis

The descriptive analysis provides an overview of differences in spousal earnings among military and civilian families[2] followed by a summary of military and civilian family characteristics. Variation in family earnings may be decomposed into differences in husband earnings and in wife earnings. The difference between civilian and military husband earnings has been explored elsewhere (Hosek and Sharp, 2001; Asch and Hosek, 1999; Asch, Hosek, and Warner, 2001).[3] In this effort, we focus on the differences in family earnings that arise from differences in wife earnings exclusive of benefits (i.e., wage income only).

Differences in wife earnings occur because of differences in labor supply and wage. Human capital theory predicts that military wives may have less work experience or lower returns to their human capital. To examine these differences, we present descriptive findings separately for high school and college graduates. We look at the following outcomes for military and civilian wives:

[2] We present total spousal earnings, not total family income. Total family income includes total spousal earnings, children's earnings, asset income, and transfer income. In our sample, average total spousal earnings nearly equal average total family earnings (see Appendix B).

[3] In the CPS, earnings are self-reported. In the cited studies, military compensation includes basic pay, subsistence and housing allowances, and the implicit tax advantage due to the non-taxability of the allowances. This measure of military compensation excludes special and incentive pays, miscellaneous allowances, and COLAs. Also, it excludes the implicit value of military health benefits and retirements. Still, the studies show that military compensation typically exceeds average private-sector compensation, controlling for age, education, occupational area, gender, and race/ethnicity. Given that the military competes in the labor force for its personnel, a higher-level military pay appears to be required to obtain the quality of personnel sought by the military and to compensate for the regimen and dangers of military life.

- Percent worked in year
- Percent worked full-time
- Usual hours worked per week
- Weeks worked
- Weekly earnings

As discussed, migration is expected to affect labor supply and wage disproportionately for military wives because frequent moves diminish the returns to human capital for the wife and her employer, and the moves may be to areas with lower wages or fewer job opportunities. To explore the impact of migration, we also look at the number of weeks worked and weekly wages by migration status and distance of migration.

Regression Models

We estimate regression models for the wife:

- Probability worked during the year (probit)
- Probability worked full-time (probit)
- Weeks worked (double-truncated tobit, $0 <$ weeks worked ≤ 52)
- Weekly wage (ordinary least squares)
- Hourly wage (estimated jointly with probability worked to correct for selectivity bias[4])

With the exception of the selectivity-corrected hourly wage model, we estimate models with the same specification for each outcome. In general, the specification can be described as follows:

[4] In the economic model of labor force participation, participation is a function of the difference between the market wage and the reservation wage. High reservation wages require high market wages in order for participation to occur. Furthermore, the market wage is observed only when participation has occurred. As a result, observations on the market wage are censored. An implication of this is that the ordinary wage regression might over-predict the expected wage of a person who has chosen not to participate in the labor market. Heckman (1974) devised a procedure to correct for the selectivity bias in the ordinary wage regression. In our implementation of Heckman's model, we identify the selection effect by including the husband and children variables in the equation for the probability that the wife worked in the year, and excluding these variables from the wage equation. The husband variables are his age, education, and race/ethnicity. The children variables are the presence of children under age 18, the presence of children under age 6, and the number of children.

$$y_i = \beta Z_i + D_m(\delta Z_i) + \varepsilon_i$$

Here, Z is a vector of explanatory variables for wife i, including a constant term. The β coefficients represent the effects of the variables for civilian wives, D_m is a dummy variable indicating a military wife, and the δ coefficients indicate the extent to which military wives' coefficients *differ from* those of the civilian wives. For the selectivity-corrected model, we delete certain variables from the hourly-wage equation (husband variables, child variables).

The explanatory variables in Z include

- Time trend, which allows for secular changes in the wage structure or in the institutions and attitudes affecting the women's labor supply
- Economic activity, indicated by the annual change in the state-level unemployment rate
- Variables related to the wife's reservation wage and coordination costs (e.g., the number and age category of children) and the husband's age, education, and race/ethnicity,[5] which proxy his wage level
- Variables related to the wife's human capital and the returns to it (e.g., her age, education, and race/ethnicity)
- Variables related to whether the family has moved recently and, if so, how far
- Whether the wife is a federal employee—this variable is not used in the equation for the probability that the wife worked during the year
- Whether the family resides in an urban, suburban, or rural area, indicating the extent or density of the local labor market
- Regional dummies, controlling for persistent differences in regional attitudes and cost of living

EMPIRICAL HYPOTHESES

We summarize the empirical hypotheses in Table 3.1. The table presents hypotheses for civilian wives and hypotheses for how the

[5] Race/ethnicity indicators may also reflect differences in opportunities, attitudes, and the effects of labor market discrimination.

behavior of military wives may differ from that of civilian wives. We use the ⊗ symbol in the table to represent the differ-from concept.

Table 3.1 Empirical Hypotheses

Variable	Group	Hypothesis
Time Trend	Civilian	No explicit prediction from the theories discussed; national trends show a rising labor force participation rate for women, modest real wage growth for women with high school education, and stronger wage growth for women with college education.
	⊗ Military	Trends should be similar for military wives as they too work in the civilian labor market. Trends could differ if the increase in military operations other than war led to rising reservation wage for wife or if access to, and cost of, child care changed differentially for military wives.
Unemployment Rate	Civilian	Cyclical rise in unemployment should decrease the employment probability, weeks employed, probability of being employed full-time. Depending on who is dis-employed, the wage among workers might increase when unemployment rises.
	⊗ Military	Smaller effects if military wives tend to hold jobs, such as civil service jobs, around military installations and if the level of activity and payroll at the installation is less affected by economic upturn or downturn.
Wife's Wage	Civilian	Wage should be higher and rise more rapidly for higher levels of education. This reflects investment in human capital through education and on-the-job training and experience. It also reflects a selection process whereby high ability reduces the cost of acquiring human capital and induces greater investment. Further, the wage is observed only if the wife works, and the probability of working depends on the difference between the market wage and the reservation wage. Thus, the observed market wage may exaggerate the true underlying wage structure because higher-wage women will be drawn into the workforce. We correct for this selectivity bias. Also, we expect higher wage to lead to higher labor supply (higher probability of working, working full-time, and weeks of work).

Table 3.1 Empirical Hypotheses (continued)

Variable	Group	Hypothesis
	⊗ Military	The same factors are at work, but because of frequent moves military wives may acquire human capital at a slower rate. Therefore, the rate of increase in wage with age should be slower than for civilian wives. Also, military wives might adapt to their husband's schedule by holding jobs that have more flexible hours or can be started and ended at low cost. These factors would lead to a lower initial wage as well as slower wage growth. (This is separate from the hypothesis that military wives face poor job prospects around military bases, which may be in isolated areas.) The same selectivity comment as above applies.
Reservation Wage Children	Civilian	The presence and number of children, especially young children, should increase the reservation wage and decrease labor supply. A higher reservation wage should lead to a higher wage conditional on being employed.
	⊗ Military	Competing hypotheses. Constraints on husband's time and higher costs of coordinating family activity raise the wife's reservation wage, reinforcing the effects above. But, wives may be inclined to seek jobs with flexible hours and be willing to accept a job with a lower wage. Also, some wives may use on-base child care, which is subsidized. A desire for flexible jobs and a use of on-base child care should reduce the reservation wage and increase the employment probability, weeks employed, and probability of being employed full-time and reduce the wage conditional on employment.
Husband's Wage (proxied by age and education)	Civilian	Husband's wage is assumed to rise with his age and to rise more rapidly the higher his education. As his wage rises, family income rises and the demand for the wife's home time may increase, which would cause her reservation wage to increase. This should decrease her employment probability, weeks employed, and probability of being employed full-time, and increase her wage rate conditional on employment. However, because of assortative mating, the husband's education and wife's education are likely to be quite similar. Wives with high education have high earnings potential and are likely to have high labor supply and wage.
	⊗ Military	Effects of the military husband's age and education may differ if his wage growth is faster (or slower) than wage growth of the civilian husband. If wage patterns are similar, no differential effects on the wife's labor supply and wage are expected. If senior officers' wives are expected to volunteer their time, their labor supply could decline as husband's age rises. The wage of those wives who are employed should be higher.

Table 3.1 Empirical Hypotheses (continued)

Variable	Group	Hypothesis
Migration	Civilian	Short moves may be for the convenience of residence change but not job change, or for a better job within the local labor market. Longer moves require change of residence and job, and from the wife's perspective the move may or may not be tied. Short moves should have little effect on the wife's labor supply and wage. Long moves may reduce the probability of employment, weeks of work, and probability of full-time employment. Depending on whether the move is tied, the wife's wage might also be reduced.
	⊗ Military	Military moves occur at the behest of the service and may require the military member to report by a certain date. Also, military moving policy enables members to capture some of the cost saving from moving themselves, and the saving is likely to be greater the faster the move. The impact of a long move on labor supply should therefore tend to be less for a military wife. However, since the military wife is always a tied mover, the impact on her wage should be more negative (or less positive).
Federal Employee	Civilian	No particular hypothesis. Federal jobs are paid according to a published wage and salary schedule that differs somewhat by locale.
	⊗ Military	If the federal jobs held by military wives have on average a higher (lower) pay grade, the effect of this variable on the wife's wage will be positive (negative).
Urbanity, Region	Civilian	Variables used to control for possible persistent differences in employment conditions and wage structure that depend on location. If rural areas are characterized by poor job opportunities, the wife's labor supply and wage should be lower, other things equal. If so, and if military families tend to live in rural (or less urban) areas, this would help account for differences in the earnings of military versus civilian wives.
	⊗ Military	If a micro-economy develops because of the presence of a base, military wives in rural areas may have better job opportunities and wages than do civilian wives in rural areas.

Note: "Civilian" refers to civilian wives, and "⊗ Military" refers to the hypothesized difference for military wives relative to civilian wives.

4. DESCRIPTIVE RESULTS

Our descriptive findings provide an overview of differences in family earnings, wives' earnings, and wives' labor force participation intensity. The regression analysis in the next chapter permits relationships to be examined under controlled conditions and identifies the role of particular variables. This chapter identifies significant differences in wives' earnings between civilian and military families and identifies major sources for this variation.

The figures and tabulations below are based on the re-weighted samples, which are representative of the male active-duty population.[6]

Husband-and-Wife Earnings

Earnings include wage and salary earnings plus other labor-related earnings (such as from occasional work). Wage and salary earnings account for the vast majority of husband-and-wife earnings. Also, husband-and-wife earnings account for nearly all the family's earnings; earnings from other family members such as teenagers account for very little (see Table B.1). Figure 4.1 shows the average sum of husband-and-wife earnings over time for military and civilian families. Since the average sum is meant to provide an overall view of military/civilian family differences, it includes wives with positive earnings as well as wives with zero earnings. Virtually all husbands had positive earnings. Over the period 1987 to 1999, husband-and-wife earnings averaged $51,115 for civilian families and $40,587 for military families, or $10,528 less.[7] The minimum difference of $6,271 occurred in 1993, following the national recession, and the maximum of $13,646 came in 1999, as civilian wages rose fast near the end of the boom. While Figure 4.1 suggests that there may be some recent widening, the family earnings difference has remained largely stable over most of this period.[8]

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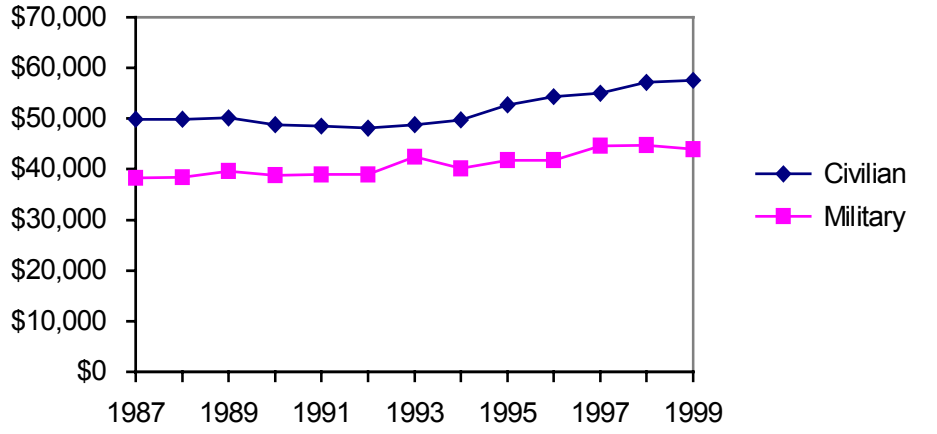
[6] In the next chapter, we present some predictions that reflect the difference between the average characteristics of military families and civilian families, where the latter are representative of the national population of husband-and-wife families. This chapter compares military and civilian families, both of which are weighted to reflect the active-duty population.

[7] We have placed both re-weighted and originally weighted summary statistics for family characteristics in Table B.1.

[8] Our 13 years of data contain about 448 military families per year on average. Thus, some year-to-year fluctuation in military spousal earnings may be attributable to noise

Figure 4.1—Average Earnings of Husband and Wife



Wife's Earnings

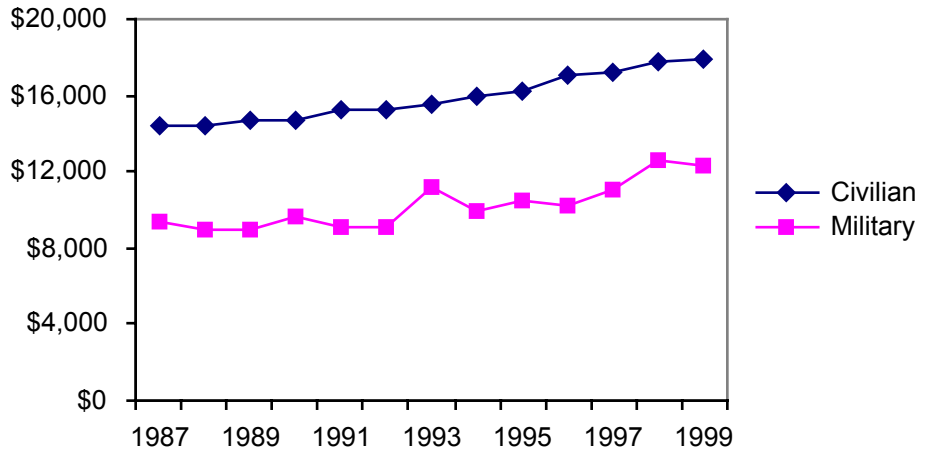
To decompose the difference in family earnings, we examined wife annual earnings (Figure 4.2). In keeping with Figure 4.1, Figure 4.2 shows average earnings over all wives, not only those who worked. During 1987–1999, civilian wife earnings averaged $15,884 and military wife earnings averaged $10,241. The difference in wives' average earnings was $5,643, roughly half the $10,528 difference in civilian and military husband-and-wife earnings.

The portion of the family earnings difference attributable to husbands is $5,000–$6,000. The true difference between husband earnings may be less, however. Possibly, self-reported military earnings in the Current Population Survey (CPS) excludes the implicit tax advantage and makes no allowance for health care benefits provided by the military (see footnote 4). Military members receive a valuable health care benefit, for which they pay no premium. In contrast, civilians covered by employer-provided health care benefits often pay a premium for that coverage. In related work using Joint Uniform Military Pay System data, we compute an average tax advantage in 1999 of about $1,700 for enlisted personnel and $3,900 for officers (Asch, Hosek, and Martin, 2002). Assuming officers comprise about one-fifth of active-duty personnel, the overall

and should be viewed with caution. This caveat holds for all descriptive findings in this section and is particularly salient when we present results by educational attainment and migration status that have even fewer military families per year.

average tax advantage is about .8 ($1,700) + .2 ($3,900) = $2,140. Some allowance for military health care benefits could close much of the remaining gap. This possibility places all the more emphasis on understanding the differences in wife earnings as a key to understanding the difference in civilian versus military family earnings.

Figure 4.2—Average Earnings of Wife



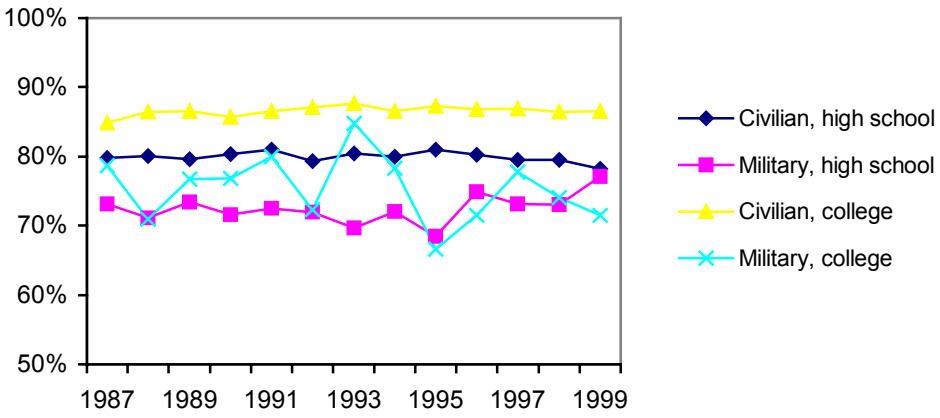
Differences in civilian and military wife earnings can arise from differences in labor supply and wages. We next present results separately for wives who are high school and college graduates for the following outcomes:

- The likelihood of working
- The likelihood of working full-time, conditional on working (we define full-time as 35 or more weeks per year and 35 or more hours per week)
- Hours worked per week for all working wives
- Weeks worked per year for all working wives
- Weekly earnings for wives working full-time (by our definition)

Worked in Year

Figure 4.3 shows the fraction of civilian and military wives who worked at least one week in the year. For clarity, we use a scale from 0.5 to 1.0. On average, 85 percent of military college wives had some employment during the year, compared with 93 percent for civilian college wives. Also, 81 percent of military high school wives had some employment during the years, versus 90 percent of civilian high school wives. While there were some fluctuations, there was no obvious change over 1987–1999 for either group.

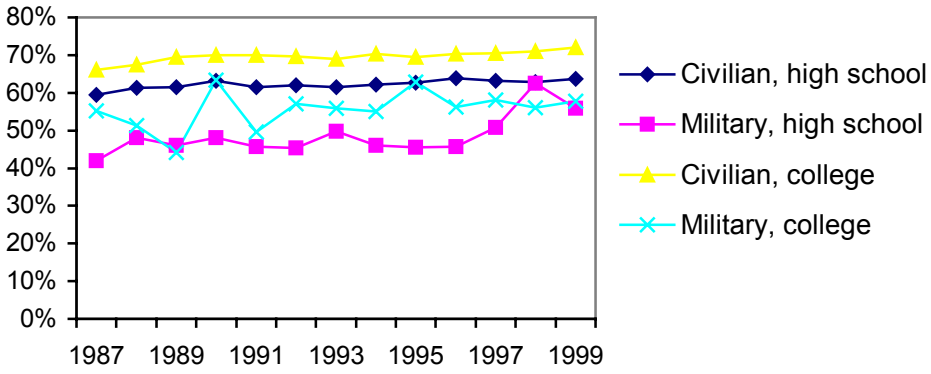
Figure 4.3—Percentage of Wives Who Worked in Year



Worked Full-Time

Among working wives, military wives with either a high school diploma or a college degree are less likely than their civilian counterparts to work full-time. Among high school graduates (Figure 4.4), on average 62 percent of the civilian wives were working full-time, as were 49 percent of military wives. The respective figures for wives with college degrees were 70 percent for civilian wives and 56 percent for military wives. While there was little growth in the fraction of civilian wives working full-time, there was some apparent growth in the fraction of military high school wives working full-time at the end of the 1990s.

Figure 4.4—Percentage of Wives Who Worked Full-Time



Weekly Hours

Among wives who worked during the year, military wives with a high school diploma averaged 34.6 hours compared with 35.7 for civilian wives (Figure 4.5). Among college graduates, military wives worked an average of 35.3 hours compared with 37.1 hours for civilian wives. The one-hour-per-week difference among wives with a high school diploma cumulates to about 40 fewer hours of work per year, or roughly one week's worth of earnings. (As shown below, military high school wives averaged 38.4 weeks per year.) For college wives, there is a gap of one to two hours per week, with the gap being somewhat smaller in the 1990s than in the late 1980s. This translates to about one to two week's worth of earnings per year.

Annual Weeks Worked

Among working wives, military high school wives averaged 38.4 weeks of work, which was 5.4 weeks less than civilian high school wives, who averaged 43.8 weeks. Military college wives averaged 40.5 weeks of work, or 5.2 weeks less than civilian college wives with 45.7 weeks. The large difference in weeks worked must be earmarked as a major contributor to the difference in average annual earnings between civilian and military wives. Also, military and civilian wives both showed an upward trend in weeks worked (Figure 4.6). Civilian wives gained approximately two weeks of work over this period and military wives gained about the same or perhaps a bit more.

Figure 4.5—Wife's Average Weekly Hours of Work

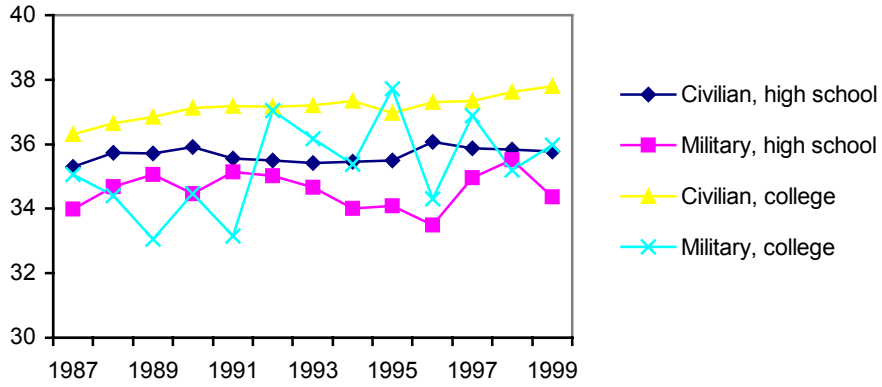
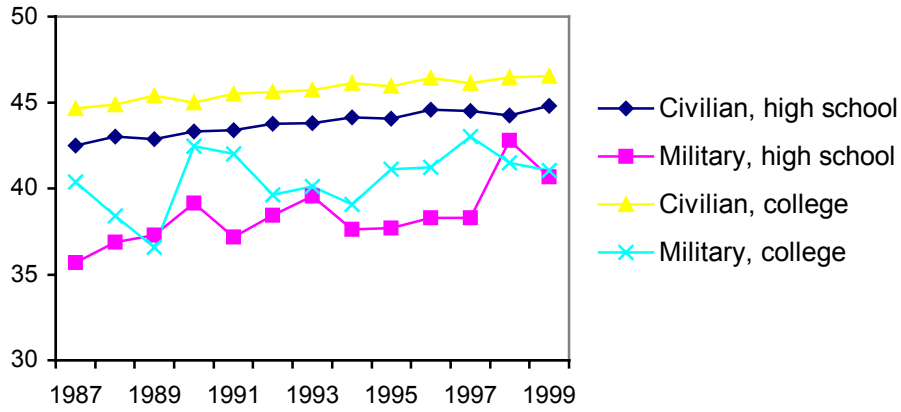


Figure 4.6—Average Annual Weeks Worked for Wives Who Worked in Year

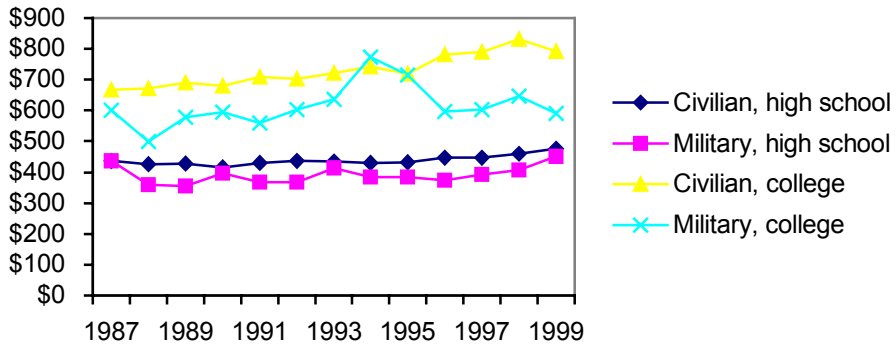


Weekly Earnings

We focus our discussion here on wives who worked full-time. For them, weekly wage largely reflects hourly wage rather than hours per week. In the next chapter, we analyze weekly wage for full-time and part-time wives, and we also analyze hourly wage. We found large differences in weekly earnings between full-time wives (Figure 4.7). Military high school wives averaged $46 per week less than their civilian counterparts—an 11 percent difference ($438 vs. $392). For college-educated military wives, the percentage difference was even greater—16 percent—or $116

per week less than the wages of college-educated civilian wives ($731 vs. $615).

Figure 4.7—Weekly Earnings for Wives Who Worked Full-Time



For those military wives who make use of on-base child care, the effective wage difference is less than suggested by the $46 and $116 figures. The DoD currently provides several types of child care facilities on base: Child Development Centers (CDCs), Family Child Care homes (FCCs), as well as programs for school-aged children. The Military Child Care Act requires the DoD to establish a parental fee schedule for CDC care. This schedule is based on a sliding scale and is intended to provide a subsidy to all families using the system.[9] One study of military child care compared the September 1999 fee schedule and regular military compensation (RMC) tables. It found that CDC care costs comprise around 12 percent of income for those families at the lower end of the income distribution (up to $23,000) and 8 percent or less for those at the higher end ($70,000 and above) (Campell et al., 2000). Notably, in CDC care, parents do not pay higher fees for younger children. FCC providers are independent contractors and set their own fees unless they receive a direct subsidy from DoD. If the provider accepts such a subsidy, the installation commander sets the provider's fees. School-age child care is provided both through CDCs or FCCs, and the fees are set accordingly.

Making a rigorous comparison between on-base child care and civilian arrangements is problematic because there are no recent reliable data

[9] For current CDC fee schedule, see militarychildrenandyouth.calib.com/pdffiles/cdcfee.pdf.

sources that permit such a comparison.[10] One study found that weekly fees paid by military families in 1993 were nearly 25 percent lower than the average weekly fees paid by civilian families with children in comparable care (Zellman and Johansen, 1998, cited by Campell et al., 2000). Campell's study presents more recent findings by comparing a 1998 convenience survey of urban child care costs done by the Children's Defense Fund with information for the same year obtained from the DoD. According to the study, the average cost to military families for full-time CDC care for one child (including infants) was $3,640 per year. In contrast, average civilian cost for full-time, center-based care for a four-year-old in selected cities in the United States ranged between $3,342 (for Birmingham, Alabama) and $7,904 (for Boston, Massachusetts).

There is an excess demand for on-base child care under its subsidized fee structure. In 2000, DoD estimated that it is meeting only about 58 percent of estimated child care need (Office of Family Policy, 2000).

While recognizing that many military families do not have access to military child care, it seems plausible that families using military child care can expect to save upwards of $1,000 per year on child care relative to civilian families. For some families the saving could be considerably more.

Assuming a work year of average length, which is about 38.4 weeks for military wives who are high school graduates and 40.5 for college-educated wives, the child care saving would be $1,000/39 ≈ $25/week or more. Given average weekly earnings of $392 for high school wives, this is roughly equivalent to 6 percent higher earnings or more. Further, since the descriptive comparison indicates a $46 difference in the average weekly earnings of civilian versus military wives who are high school graduates, the military child care savings may make up for a significant fraction of the earnings difference—in this example, half or more. Again, the example assumes that the military wife actually uses on-base child care. For college wives, the relative savings are smaller (4 percent).

Migration

When we compare movers to non-movers among military and civilian families, we find that earnings and weeks worked are lower among

[10] Two of the most important data sources on child care are the National Child Care Survey (1992) and the Cost, Quality, and Child Outcomes (CQCO, 1995). However, both sources are old and the CQCO only covers four states.

families who moved and the difference is larger among military families. Among wives who worked during the year, civilian wives who moved worked 3.6 weeks less on average than did civilian non-movers, whereas military movers lost six weeks of work relative to military non-movers (Figure 4.8). Further, among wives who worked during the year, the average difference in wife earnings between non-movers and movers across all the years in the series was $3,905 for military wives and $3,690 for civilian wives (Figure 4.9). In Chapter 5, we present data on the frequency of moves.

Figure 4.8—Wives' Average Annual Weeks Worked, by Migration Status

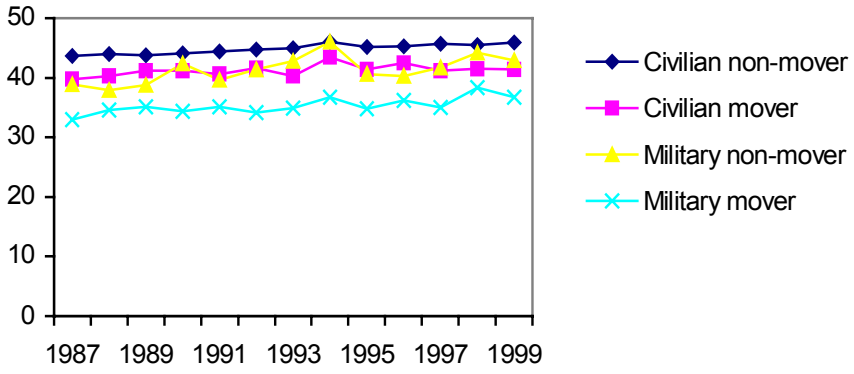
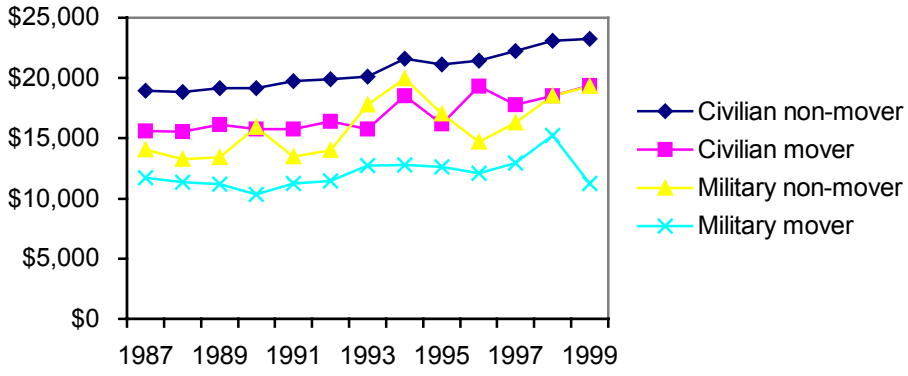


Figure 4.9—Wives' Average Annual Earnings by Migration Status



Summary of Descriptive Findings

Military families earned about $10,500 less than civilian families. About half the difference comes from lower apparent earnings of the husband and about half from lower earnings of the wife. The military husband's earnings may be several thousand dollars higher than reported, however, as it is possible that certain components of income were not counted (e.g., the tax advantage and the imputed health benefit premium). If so, the difference between military and civilian family incomes is less, and more of the remaining difference is attributable to wife earnings. Military wives have lower earnings and a lower probability of working during a year than do civilian wives. Military wives who are high school graduates also work fewer hours per week, although there is almost no difference in weekly hours between military and civilian wives with a college education. Military wives' weekly earnings are also lower—about 11 percent lower for high school graduates and 16 percent lower for college graduates. To the extent that military wives can and do use on-base child care, which is subsidized, their effective earnings increase somewhat relative to those of civilian wives. In addition, military families lose more weeks of work when they move (and we show below that military families move more often). Finally, our descriptive findings do not suggest any dramatic widening or narrowing of these differences over time.

5. REGRESSION RESULTS

This section discusses our regression results for each of the labor supply measures and for weekly wage and hourly wage. We are initially interested in identifying the overall difference in outcomes among civilian and military wives. Consequently, the discussion begins with predictions of labor supply outcomes and weekly wages for military wives and similar civilian wives. We then concentrate on the effects of specific explanatory variables. The first set of variables pertains to the age-earnings profiles of military versus civilian wives. The next sets pertain to the effects of migration and of children on labor outcomes. Finally, we discuss the effects of time trend, unemployment rate, and location.

Predicted Labor Supply and Weekly Wage for Similar Wives

To gain an overview of how labor supply and wage differ between military and civilian wives, we will make use of two facts. First, husband-

and-wife military families differ from husband-and-wife civilian families in the population at large. It was for this reason that we re-weighted our military and civilian subsamples when we made the descriptive comparisons in Chapter 4; re-weighting allowed us to look at military and civilian families representative of those in the active-duty population. Now, in making use of regression models for prediction, we also want to be aware of these differences and to capitalize on them. We make predictions for "average" military families by using the average values of the explanatory variables for military families. We also make predictions for "average" civilian families by using the average values of their explanatory variables, only in this case the civilian families are representative of husband-and-wife families in the population at large. The second fact we use is that the relationship between the explanatory variables and the labor supply and wage outcomes is different for military families than for civilian families. That is, the estimated regression coefficients are different for military and civilian families. As a result, if we make predictions for an average military family, the predictions will be different depending on whether we use the military coefficients or the civilian coefficients to make the prediction. The same point can be made if we make predictions for an average civilian family. The difference in the average value of explanatory variables (e.g., age, education, children) between military and civilian families is referred to as a "difference in means." The difference in the estimated coefficients between military and civilian families is a "difference in structure." Since there are two sets of means and two sets of coefficients, we can make four kinds of prediction, each of which has its own interpretation.

To be more specific, we make predictions that depend on means and structure in the following way. Suppose $y_1 = x_1 \beta_1$ and $y_2 = x_2 \beta_2$. The difference in the predicted value of y_1 and y_2 can be written in terms of the difference in means and the difference in structure:

$$\begin{aligned} \bar{y}_1 - \bar{y}_2 &= (\bar{x}_1 - \bar{x}_2)\beta_1 + (\beta_1 - \beta_2)\bar{x}_2 \\ &= (\bar{x}_1 - \bar{x}_2)\beta_2 + (\beta_1 - \beta_2)\bar{x}_1 \end{aligned}$$

This decomposition is exact in the case of a linear model and often a useful approximation in the case of a nonlinear model. Our wage model is linear and our probability and weeks-worked models are nonlinear. We have prepared Table 5.1 with entries that correspond to this approach.[11] In

[11] The civilian means in the table are for the overall sample of wives. Because 98 percent of the overall sample consists of civilian wives, these means are virtually equal

the body of the table, the lower right entries correspond to predictions at military means and with the military structure. We can associate this with $\bar{y}_1 = \bar{x}_1 \beta_1$. The upper right entries are predictions at civilian means and with the civilian structure: $\bar{y}_2 = \bar{x}_2 \beta_2$. The difference between y_1 and y_2 can be found be going from the lower right to the upper right, then over—this corresponds to the top line in the decomposition above. Alternatively, one can go from the lower right to the lower left, then up—this corresponds to the second line in the decomposition.

Table 5.1. Summary of Joint Effects of Being a Military Wife, Evaluated at Sample Means[1]

Comparison	Prediction Using Civilian Wife Coefficients	Prediction Using Military Wife Coefficients	Difference in Military and Civilian Predictions[2]
At Civilian Means			
Prob. worked in year	.71	.71	0.00
Prob. worked full-time[3]	.59	.59	0.00
Weeks worked[3]	38.1	39.1	-1.0
Weekly earnings if full-time	$317	$317	$0
At Military Means			
Prob. worked in year	.82	.74	-0.08
Prob. worked full-time[3]	.59	.48	-0.11
Weeks worked[3]	40.9	37.6	-3.3
Weekly earnings if full-time	$308	$268	-$40

[1] *Regression results in appendix.*

[2] *Military wives' coefficient estimates in each model are jointly statistically different from those of civilian wives at the 5 percent level.*

[3] *Given that wife worked in year.*

The table indicates that the main reason differences are observed between the labor supply and wage outcomes for the general population of civilian wives and the population of military wives is that the means differ, not because the structure differs. This is true even though the estimated coefficients for military wives are statistically different from those of civilian wives, at a 5 percent confidence level.

to the means for civilian wives. The tables use samples means for the overall sample and for the military wife subsample. Civilian families constitute 98 percent of the overall sample.

The upper panel of the table makes predictions at the civilian wife means. From Table B.1, we know that in the general population the average age of civilian wives is 44 and the average age of their husbands is 46. Half the families have no children under age 18 present, and the average number of children is 1. In military families, the average age of the wife is 31, the average age of the husband is 33, 74 percent have children under age 18 present, and the average number of children is 1.5. Also, military families have higher education on average and have a higher percentage nonwhite. Using the civilian means, we find almost no difference in the predictions between the civilian and military structures (i.e., the civilian coefficients and the military coefficients). In other words, if military families looked like civilian families, there would be practically no difference between the labor supply and wage outcomes of military wives versus civilian wives. (The differences shown in the right column of the upper panel correspond to the term $(\beta_1 - \beta_2)\bar{x}_2$ in the decomposition, where "1" refers to military and "2" refers to civilian.)

In the lower panel, the predictions are made at military means. In this case, the thought experiment is to consider civilian families that look like military families (civilian families are given the same means as military families), but again recognize that structures differ. In this case, we find that structure makes a difference. Military wives are 8 percent less likely to work during the year, 11 percent less likely to work full-time, and have 3.3 fewer weeks of work given that they did work.[12] They have an average weekly wage $40 less than that of civilian wives.[13] (The differences shown in the right column of the lower panel correspond to the term $(\beta_1 - \beta_2)\bar{x}_1$.)

Thus, although structural differences exist, from the upper panel we find that when military families "look like" civilian families the structural differences have little impact on the predicted outcomes. But from the

[12] In Chapter Four, we saw a 5.2-week difference in average weeks of work between civilian and military wives who worked. In Table 5.1, the predicted difference at military wife means is 3.3 weeks. The reason for the difference between the 5.2-week figure and the 3.3-week figure comes from the difference in the distribution of moves between military and civilian wives. As we show below in Table 5.4, military wives move more frequently and their moves are longer. In our discussion of migration (below), we take this distribution into account in making predictions of the effect of migration on weeks of work.

[13] The weekly wage depends on hourly wage and hours of work per week. As seen in the descriptive analysis (Chapter Four) there is little difference between military and civilian wives in hours of work per week. Our analysis of hourly wage, reported below, suggests that the weekly wage for full-time workers carries much the same information as the hourly wage.

lower panel, we find that when civilian families "look like" military families the structural differences come into play. Specifically, the labor supply and wage are predicted to be lower for the military wife than for the civilian wife.

Comparisons between the upper and lower panels provide additional information about the importance of structure versus means. For the most part, the predictions using the civilian coefficients show more modest differences between the military and civilian means. The probability of work in the year declines from .82 to .71, which admittedly is large. However, the probability of full-time work does not change (its value is .59), and the number of weeks worked declines from 40.9 to 38.1, a little less than three weeks. The average weekly wage for wives who work full-time rises from $308 to $317, a small change. (This comparison corresponds to the $(\bar{x}_1 - \bar{x}_2)\beta_2$ term.)

The predictions using the military coefficients show a decline in the probability of work in a year from .74 to .71 when going from military to civilian means. The probability of full-time work rises from .48 to .59. Weeks of work rise from 37.6 to 39.1, and the weekly wage among wives who work full-time rises from $268 to $317. (This corresponds to the $(\bar{x}_1 - \bar{x}_2)\beta_1$ term.)

With respect to wage, the table also shows that at military wife means, the predicted wage is $40 lower for military wives than for civilian wives. This is consistent with two hypotheses. Military wives may be willing to accept a lower wage because they have a limited amount of time before the next PCS move. They might prefer a job with more flexible hours even if it pays a lower wage. Also, some wives may benefit from subsidized child care. The lower wage does *not* seem consistent with a third hypothesis that military wives have higher reservation wages. This poses an apparent contradiction because the results for the probability of employment, probability of working full-time, and weeks of work are consistent with military wives having a higher reservation wage than civilian wives.

We can suggest several ideas to resolve this contradiction. First, the lower labor supply of military wives may reflect selective retention in the military. Military wives with a stronger interest in the labor market may believe they can satisfy their career aspirations more readily in the civilian world. If so, this belief may affect the military family's decision for the member to remain in the military, resulting in the selective exit of wives with a greater labor supply and higher earnings potential.

The second idea is to adjust the observed wage rate for the cost of child care to obtain a net wage rate. The military wife who uses military

child care could have a lower observed wage but a higher net wage, compared with the civilian wife. The military wife's higher net wage would then be consistent with her also having a higher reservation wage. To see this, let the civilian wife's market wage and reservation wage be w_c and r_c, respectively, and let t_c be the cost of child care. In the traditional one-period model of labor supply, the civilian wife participates in the labor force if $w_c - t_c > r_c$. Similarly, the military wife participates if $w_m - t_m > r_m$. We can have $r_m > r_c$ only if $w_m - t_m > w_c - t_c$. This inequality holds if the cost of child care for military wives is sufficiently lower than its cost for civilian wives. Military child care is in fact subsidized and some military wives make use of it. The reservation wage and net market wage of these wives may be higher than those of civilian wives. Moreover, depending on the wife's preferences for work (curvature of the indifference curves describing the labor-leisure trade-off), the military wife's higher net wage is compatible with fewer weeks of work, as observed.[14] The limitation of this approach is that it seems most compelling only for military wives using subsidized child care.

A third, more speculative idea calls for an extension of the traditional model of labor supply in order to model assumed constraints on the husband's time schedule and their effect on the wife's reservation wage and labor supply. Rigidity and uncertainty in the husband's schedule might result in a higher reservation wage for the wife and, when choosing a job, a higher value on jobs with flexible hours, although we have not derived a model to show this. The higher reservation wage would be consistent with a lower probability of employment, fewer weeks of work, and a lower probability of full-time work. The wife's demand for a more flexible schedule when working could be consistent with a lower wage.

Summarizing, when civilian wives are compared with military wives by making predictions at the means of the military family, the military wife is predicted to have a lower probability of work in a year, a lower probability of working full-time, fewer weeks of work, and a lower wage rate. These outcomes are consistent with hypotheses including selective retention in the military and a lower inclination to work among the military wives who remain. At the same time, military wives who choose to enter the labor market may be willing to accept lower-paying jobs if such jobs offer greater hours flexibility, are flexible in the sense of being started and stopped easily, and can be found with limited job search. Moreover, military wives may be willing to accept a lower wage if it means they can start work sooner and thus have more weeks of work

[14] This is possible if leisure (home time) is a normal good, i.e., if the demand for home time rises with income, other things constant.

before their family's next change of station. Such jobs may have low training requirements and a high employee-turnover rate. Military wives may also benefit from subsidized military child care, making them willing to accept a lower offered wage. The data do not allow explicit tests of these hypotheses.

We find only small differences in predicted outcomes between military and civilian wives when the predictions are done at the civilian means.

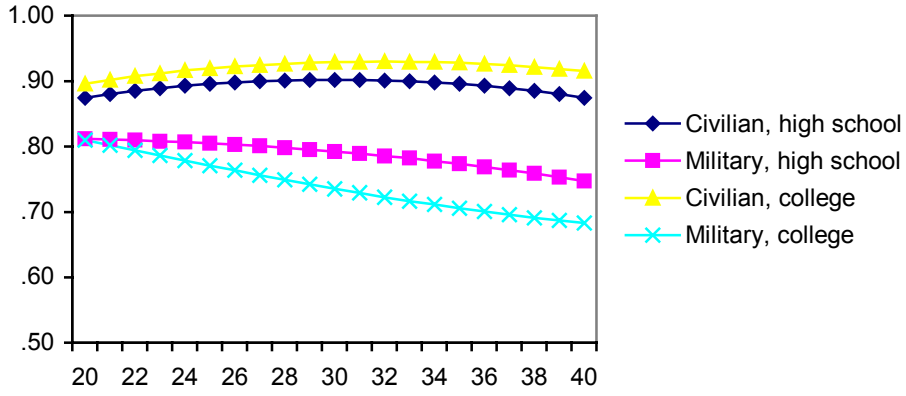
The next subsections investigate military and civilian differences in the effects of three sets of variables: age, migration, and children. We then briefly discuss the effects of time trend, cyclical change in unemployment, and location.

Age

Figures 5.1–5.4 display the age profiles for wife labor supply and wage as predicted from the regression analysis. The regression specification includes separate terms for effects of wife age and husband age, and wife age effects depend on her level of education. In addition, the intercept for the age curves depends on wife and husband levels of education. For the curves shown, we assume the husband is two years older than the wife (see Table B.1) and has the same level of education. That is, wives with a high school education are married to husbands with a high school education, and similarly for wives with a college education are married to husbands with a college education. The presence and age structure of children can also be expected to vary with age, however the figures assume the family has no children. The effects of children are discussed separately below. In addition, although military families move more frequently than civilian families (also discussed below), the figures assume the family has not moved in the past year.

For civilian wives, the probability that the wife worked during the year varies little with age (Figure 5.1). It is in the vicinity of .90 over the 20–40 age range, rising and then falling a small amount. The probability is slightly higher for wives with college than for wives with high school educations. For military wives, the probability starts at .81, nearly 10 percent lower than for civilian wives. The probability then declines with age, and the decline is greater for military wives with college (officers' wives). By age 31, which is the average age for military wives, the probability that the military wife worked is .79 for wives with high school and .73 for wives with college. For civilian wives, the corresponding figures are .90 and .93. Therefore, even from the start, the military wife is less likely to have worked during the year, and the gap widens with age.

Figure 5.1—Predicted Age Profile of Probability Wife Worked in Year

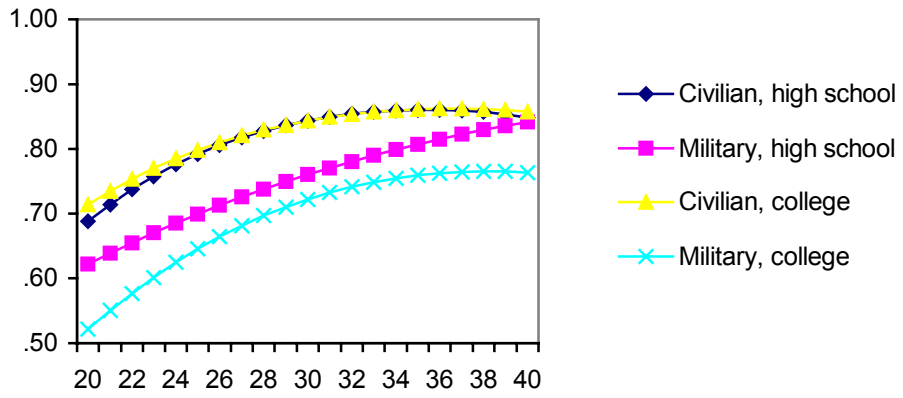


The decline with age in military wives' probability of work may reflect selectivity and choice. Older military wives are an increasingly selected sample. The wives and husbands with a stronger preference for the military are the ones more likely to remain with the military. These wives might have a weaker preference for market work than the wives (and husbands) who leave the military. That said, we have no working hypothesis to explain why there should be a correlation between the preference for the military and the preference for work or leisure, and our null hypothesis is that these preferences are not correlated. Preferences aside, the decline in the probability is consistent with several behavioral hypotheses. Military wives may increasingly choose not to work because they are expected to devote time to service-related activities. They may not work because their husbands are earning higher income or gain access to valuable in-kind income, i.e., nice on-base housing. They may not work because they find it increasingly difficult or tiresome to adapt to their husband's schedule and the frequency of moves required by the military.

For both civilian and military wives, the probability of working full-time (conditional on working) rises with age (Figure 5.2). ("Full-time" is defined as at least 35 weeks worked and at least 35 usual hours of work per week.) For civilian wives, the probability is nearly identical for high school– and college-educated wives. The probability rises from about .70 at age 20 to .85 at age 30 and stays there. For military wives with high school, the probability rises steadily from .62 at age 20 to .85 at age 40. Up to age 31, the average age of a military wife, the probability is nearly .10 lower than the probability for civilian wives. The probability of full-

time work is lowest for military wives with college, however. Their probability at age 20 is .50 versus .70 for civilian wives with college, and by age 40 it has risen to .75, which is .10 below the value for civilian wives at that age.

Figure 5.2—Predicted Age Profile of Probability That Wife Worked Full-Time



The increase with age in the probability of working full-time may reflect selectivity. The decline in the probability of working (Figure 5.1) could be fed mainly by the departure of wives with a weaker attachment to the labor force, i.e., wives likely to work part-time. This would lead to an increase with age in the probability of working full-time among wives remaining in the labor force. Also, the increase in the probability could be a response to wage growth with age.

The findings on weeks of work (Figure 5.3) indicate a persistent, moderately widening gap between civilian and military wives. The figure shows the expected number of weeks conditional on having worked at some time during the year. As with the probability of full-time work, the expected number of weeks worked has virtually the same age profile for civilian wives with high school as for those with college. Weeks rise from 44 weeks at younger ages to nearly 48 weeks by age 30 and then remain there. For military wives with high school, weeks rise from 43 to 44, a small increase. Younger military wives with high school thus have about one less week of work per year than do civilian wives with high school, and older military wives have about four weeks less. For military wives with college, weeks of work rise from 41 weeks at younger ages to 42 weeks at older ages. Compared with college-educated civilian wives,

military wives have three fewer weeks at younger ages and six fewer weeks at older ages. This is consistent with the hypotheses mentioned above, i.e., selective withdrawal of wives with a weaker attachment to the labor force, and greater labor supply in response to a rising wage among those remaining in the market.

Figure 5.3—Predicted Age Profile of Wife's Weeks Worked

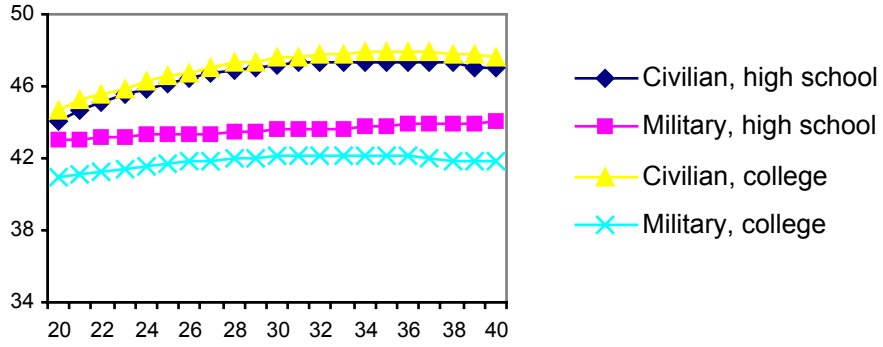
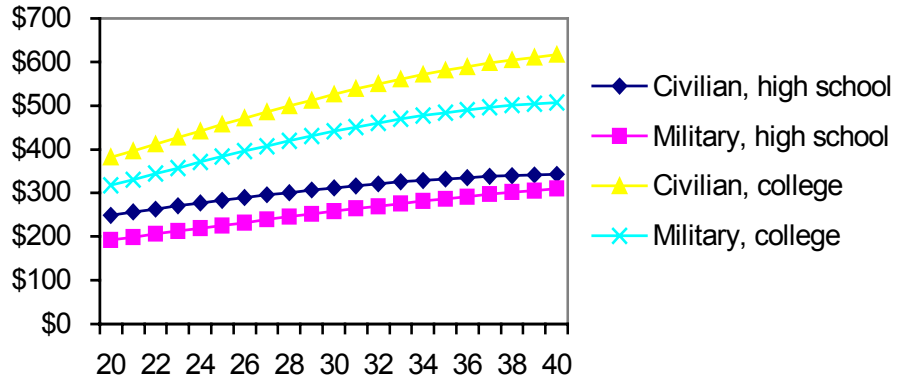


Figure 5.4 shows the age profile of weekly wage for wives who work full-time. The weekly wage appears to rise more slowly for military wives with college than for civilian wives with college. But in contrast, the weekly wage appears to rise more rapidly for military wives with high school than for civilian wives with high school. At younger ages, the weekly wage difference between college-educated wives is about $65, and it rises to over $100 by age 40. For high school–educated wives, the weekly wage difference at younger ages is about $55, and it diminishes to around $35 by age 40.

Despite these appearances, statistical tests (reported in Table 5.2) indicate no difference between military and civilian wives in the effect of wife age on full-time weekly wage. This is true for both college-educated and high school–educated wives. But there is a difference that cannot be detected from the age profiles alone: The weekly wage of military wives who work full-time rises with husband age. For civilian wives who work full-time, husband wage has no statistically significant effect on wage. Figure 5.4 also indicates that the weekly wage of the military wife is always less than that of the civilian wife with the same level of education. Table 5.2 supports this point. The intercept of the military wage profile is statistically less than the intercept of the civilian wage profile.

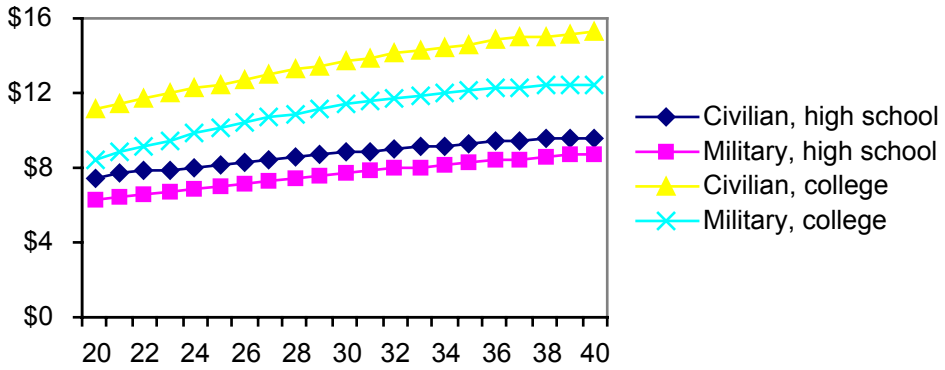
Figure 5.4—Predicted Age Profile of Weekly Wage for Wives Who Worked Full-Time



Before commenting further on these findings, we also want to discuss the hourly wage results. In comparison with the weekly wage results, the hourly wage results control for the selective nature of labor force participation. The weekly wage regression for wives who work full-time are, of course, based on observations of wives who choose to work during the year and in fact work at least 35 weeks and at least 35 hours per week. Variations by age in the decision to work and the decision to work full-time will affect the composition of wives who work full-time, and therefore will affect the estimates of the weekly wage profile. The hourly wage analysis controls for this by simultaneously estimating an equation for the decision to work during the year and an equation for the hourly wage conditional on work. Although the hourly wage analysis does not divide into an hourly wage for wives who worked full-time and one for wives who worked part-time, it does accurately reflect the structure of hourly wage. This is because of the control for selection into work and, further, because hourly wage does not vary with weeks of work. More specifically, we did a tabulation of average hourly wage against weeks of work and found that the level of the hourly wage was independent of (did not change with) weeks of work. (This was true for the range of weeks from 5 weeks to 52 weeks; for 1 to 4 weeks, the hourly wage was extremely noisy and the values were typically far too high to be credible.)

The predicted hourly wage is shown in Figure 5.5.[15] The figure shows predictions from the "structural" wage equation, i.e., the relationship between hourly wage and the explanatory variables after controlling for the selection effect. Selection is modeled as a function of husband age, education, and race/ethnicity and the presence and number of children, in addition to being a function of wife age, education, and race/ethnicity. Hourly wage is a function of the wife's variables, and the estimation methodology recognizes that the observed wage is an outcome conditional on the wife choosing to work. As seen, the age-profiles for predicted hourly wage are similar to those of the weekly wage for wives who worked full-time (Figure 5.4) but show less tendency to diverge or converge.

Figure 5.5—Predicted Age Profile of Hourly Wage for Wives



The hourly wage for military wives with college appears to start relatively lower than the weekly wage, and there is little indication that the hourly wage grows more slowly than for civilian wives with college. For wives with high school, the impression remains that the hourly wage for military wives rises slightly faster than that for civilian wives. Yet this amounts to a small difference. At age 20, the predicted hourly wage is $7.50 for civilian wives with high school and $6.23 for military wives with high school. At age 40, the hourly wages are $9.64 and $8.75.

The main message of Figures 5.4 and 5.5 is that the wage of military wives starts lower and stays lower. The lack of a widening wage gap with

[15] The hourly wage model was estimated on wives who had an hourly wage of $3/hour or more. Initial results that included wages of lesser amounts were not credible. About 5 percent of the observations were removed by this restriction.

age gives little support for the hypothesis that military wives accumulate human capital more slowly than civilian wives. The findings are consistent with a lower-wage equilibrium based on the more frequent moves of military wives. Employers may expect the military wife to move and so will not offer positions that require the accumulation of large amounts of firm-specific capital. Also, employers may take advantage of their knowledge that the military wife will move by offering a lower wage even if investment in firm-specific capital is not a factor. Since the military family expects to move, the wife has limited time to find a job and start earning. A short time horizon leads to a willingness to accept a lower wage rather than search and wait for a higher wage. Employers may therefore offer lower wages in equilibrium.

Another possible hypothesis is that military wives seek more flexible jobs in response to the rigidities and uncertainties in their husband's military schedule. If so, and if employers are aware of this, it is another element that can support a lower-wage equilibrium. This explanation may be less compelling than the one based on more frequent moves because, like military wives, many civilian wives also cope with rigidities and uncertainties in their husband's schedule. Still, these factors may be less important on average for civilian wives; we do not know.

We conducted tests of statistical significance to determine whether the age-related effects of military wives differed from those of civilian wives. Table 5.2 summarizes the results, which generally support the notion that the relationships in Figures 5.1–5.5 are meaningfully different between military and civilian wives at a given level of education. Asterisk entries in the table indicate that the hypothesis that the coefficients for military wives equal those for civilian wives cannot be accepted at the usual levels of significance. The tests show significant differences in every case except for that of the wife age in the weekly wage equation for wives who worked full-time. That is, in terms of statistical significance, the weekly wage increases with the wife's age at the same rate for military wives as for civilian wives. However, the tests also indicate that the effect of husband age on wife weekly wage differs between military and civilian wives. Weekly wage rises faster with husband age in military families (Table B.4).

Table 5.2. Statistical Significance of Tests of the Null Hypothesis That Age-Related Coefficients for Military Wives Equal Those for Civilian Wives

Coefficients Tested	Wife with High School	Wife with College	Husband
Intercept[1]			
Probability of working	**	**	n. a.
Probability of working full-time	**	**	n. a.
Weeks of work	**	**	n. a.
Weekly wage if full-time	**	**	n. a.
Age and age-squared[2]			
Probability of working	**	**	**
Probability of working full-time	**	**	**
Weeks of work	**	**	**
Weekly wage if full-time			*

[1] *Intercept is the sum of the coefficients on the variables indicating the wife's education level and the husband's education level, which is assumed to equal that of the wife. Since here the husband's education indicator is included with the wife's, there are no separate tests of the husband's intercept.*

[2] *Joint test of whether the military wife's age and age-squared coefficients equal those of the civilian wife, and similarly for the military husband's age and age-squared coefficients.*

*Key: * = significant at .05; ** = significant at .01.*

This pattern is consistent with the notion that as military husbands reach higher ranks, their wives with weaker attachments to the labor force either withdraw from it or work part-time. The rise in weekly wage with husband age thus could result from the selective retention of wives who work full-time; the higher wage wives remain as full-time workers. Another related possibility is that as husbands reach high ranks, they have more discretion over their schedules and more predictability in them. As a result, the wife that works full-time is less tied to household activities and not as restricted in allocating her time to market work.

Migration

As discussed in Chapter Two, there are several hypotheses why migration, particularly longer moves that are likely to involve a job change, will more adversely affect the labor supply and earnings of military spouses relative to their civilian counterparts. First, military spouses may accumulate less general and specific human capital because they are tied movers. The empirical findings on wage growth with age did

not support this hypothesis, however. Second, military spouses may be offered and take lower wage jobs for reasons related to moving frequently and a possible desire for more flexible hours of work. The findings supported this hypothesis. Third, the demand for labor, particularly for better-educated spouses, is likely to be lower in the remote locations where some military bases are found. These factors would tend to reduce military spouses' earnings relative to their civilian counterparts. In addition, the literature on greedy institutions suggests that wives are likely to bear the brunt of the tasks associated with moving to a new location. These tasks include coordinating the move, making the move with the household goods, and settling into the new location (i.e., finding new schools, new doctors, new mechanics, and so forth). Consequently, military spouses might be expected to supply less labor as a consequence of a move than their civilian counterparts.

Potentially offsetting the negative impact of moving on military spouses is the effect of Do-It-Yourself Moves (DITY) on spousal labor supply. The government offers military members an incentive to move their own household goods, equal to 80 percent of what it would have cost the government to move the authorized or actual household good weight (whichever is less) commercially, minus the DITY cost incurred. The DITY cost is the amount the government pays a contractor for providing the rental vehicle, equipment, and packing materials. In other words, if a member can move his goods far more inexpensively than a commercial mover, he can realize a financial benefit. The DITY program gives members an incentive to find inexpensive ways of moving their belongings. How this incentive affects spouse labor supply is an empirical question. If the family opts for a financially inexpensive mode of moving their belongings, but relies more heavily on the spouses' time to accomplish the move, the DITY incentive might result in reduced spouse labor supply. But if the DITY incentive induces military families to spend less time moving their households overall, say by spending less time in transit, the negative effect of moving on spousal labor supply might be reduced. That is, the DITY incentive might increase spouse labor supply over what it would have been.

Table 5.3 summarizes the estimated association between moving and weekly earnings and labor supply for civilian and military spouses. These estimates are derived from the regression estimates in Appendix B.

Table 5.3. Estimated Effects of Migration on Weekly Earnings and Labor Supply, by Type of Move

Effect on	Different County	Different State	Different Division	Different Region	Abroad
Prob. Worked in Year[2]					
Civilian	.0037*	-.0222*	-.0061*	-.0402*	-.3024*
Military	-.0098*	-.0086*	.0399*	-.0018*	-.0727*
Prob. worked full-time[2]					
Civilian	-.0643*	-.1354*	-.1032*	-.1842*	-.3379*
Military	.0012*	-.0662*	-.1231*	-.1237*	-.2868*
Weeks Worked[1]					
Civilian	-9.0825*	-16.5958*	-15.9052*	-24.2849*	-49.6923*
Military	-6.9353*	-8.8005*	-12.4433*	-15.0691*	-28.2693*
Full-time Weekly Wage (Percent change)					
Civilian	.0050	-.0111	-.0006	-.0530	-.2295*
Military	.0701	-.0348	-.1369	-.1198	.0300
Part-time Weekly Wage (Percent change)					
Civilian	.1511*	.1816*	.2475*	.2485*	-.0644
Military	.0171	.2878	-.0004	.1341	.1546

** = coefficient estimate underlying this estimated effect is statistically significant at the 5 percent level. Coefficient for civilian wives is tested against the null hypothesis that the coefficient is 0. Coefficient for military wives is tested against equality with the coefficient for civilian wives.*

[1] The figures are estimated effects on the tobit index function for wives who worked 1 to 52 weeks.

[2] The figures are estimated dummy marginal effects, not coefficient estimates. The marginal effect indicates the change in the probability when the dummy variable indicating the type of move is 1 vs. 0, all other variables held at their sample mean values.

Consider labor supply first and weeks worked specifically. We find that spouses who move work fewer weeks and the greater the distance of the move, the fewer the weeks worked in general. For example, moving to a different county reduced weeks worked by 9.1 weeks for civilian spouses and by 6.9 weeks for military spouses. Moving from a different region reduced weeks by significantly more—by 24.3 weeks for civilian spouses and 15.1 weeks for military spouses. What is remarkable about the results for weeks worked is that military spouses who moved generally lost fewer weeks than their civilian counterparts in any given distance category. For example, civilian spouses lost 15.9 weeks if they moved across divisions but military spouses lost only 12.4 weeks. In other words, military wives who moved had more weeks of work and supplied more labor than their civilian counterparts. These results are surprising because the descriptive results showed the opposite result, i.e., that military wives worked five

fewer weeks than civilian wives on average. What can account for the difference between the regression and the descriptive results?

The chief explanation concerns the distribution of types of moves. Table 5.4 shows the distribution of spouses across types of move, i.e., within the same county, different county but same state, different state but same division, different division but same region, different region, and from abroad. The counts are weighted to reflect the military population. Since many of the civilian spouses who moved from abroad are likely to be immigrants, it seems sensible to exclude civilians moving from abroad in the count of movers. Similarly, since some moves within a county are not likely to involve a job change, it seems sensible to put more weight on the regression results for intercounty, interstate, interdivision, and interregion moves.

Table 5.4. Distribution of Move Types Within Past Year Among Civilian and Military Families, 1987–1999, Excluding 1994 (Weighted Counts)

	Civilian	Military
Total	100%	100%
Non-movers	75.0%	60.1%
Total movers, excluding civilians from abroad	25.0%	39.4%
Distribution of movers (excluding civilians abroad) Same county	65.9%	33.6%
Different county, same state	18.5%	7.9%
Different state, same division	6.3%	8.1%
Different division, same region	2.7%	7.6%
Different region	6.7%	31.4%
Abroad		11.4%

The table shows that military families are more likely to move at least across county lines, i.e., their move is more likely to involve a job change, and military families are more likely to move farther distances. The percentage of moving families who moved within the same county (excluding civilians who moved from abroad) was 66 percent for civilians and 34 percent of military families. Thus, two-thirds of all civilian moves were within the same county, while two-thirds of military moves were across county lines and were likely to involve a job change for the spouse. The percentage of moves that were at least across *state* lines was 59 percent for military families and 16 percent for civilian families. The fraction of military moves from abroad was 11 percent.

Another way to state the key points in Table 5.4 is as follows. About 25 percent of civilian families move, of whom about one-third move out of county. Therefore, only one-twelfth (.25 x .33) of civilian families have long moves. In contrast, about two-fifths of military families move, of whom two-thirds move out of county. Therefore, about one-fourth (2/3 x 2/5) of military families have long moves. A larger fraction of military families move long distances.

These figures confirm the conventional wisdom about the frequency of PCS moves. Military families are more likely to be moving and they move longer distances. The regression results indicate that for any given type of move, military families are more efficient movers in the sense that military wives generally lose fewer weeks of work relative to non-moving military wives than do civilian wives. Put differently, compared with wives who do not move, military and civilian wives who move lose weeks of work, but military wives lose fewer weeks of work for any given length of move than do civilian wives. However, military wives move more frequently and their moves are more likely to involve a job change because they are more likely to move long distances.

We can use the regression results together with the distributions shown in Table 5.4 to show the extent to which the difference in weeks worked among moving civilian and military spouses is due to differences in the frequency of long moves and in the average number of weeks lost for a given type of move. Conditioned on having a long move (i.e., moved across counties), we estimate that the average number of weeks of work lost by a working civilian wife is 14.0 weeks and is 15.3 weeks by a working military wife. Thus, the difference is only 1.3 weeks on average. Since one-twelfth of civilian wives move across county lines while one-quarter of military wives make such moves, we estimate that the number of weeks lost due to moving is 1.2 for civilian spouses (1/12 x 14.0) and 3.8 weeks for military spouses (1/4 x 15.3). This is a difference of 2.6 weeks on net. Thus, the greater frequency of long moves among military wives largely explains the differences in the number of weeks worked among moving military and civilian spouses. To summarize, on average military wives who move lose more weeks of work than civilian wives, even though military wives accomplish a given move more efficiently, because military wives are more likely to move, and they move farther distances and farther distances have a bigger penalty on labor supply.

The results for the other measures of labor supply indicate that moving is associated with reduced labor supply, and the reduction is generally greater for civilian wives than for military wives. Furthermore, all of the estimates pertaining to labor supply in Table 5.3 are statistically significant.

Specifically, Table 5.3 shows the effect of moving for civilian and military spouses on the probability of working full-time. The results indicate that moving is associated with a reduced probability of working full-time for civilian wives, and with the exception of moves across divisions, the greater the distance of the move, the larger is the reduction. Furthermore, except for division, the reduction is larger for civilian than for military spouses.

For example, moving to a different state is associated with a 13.5 percentage point reduction in the probability of working full-time among civilian wives. Among military wives, moving to a different state is associated with a 6.6 percentage point reduction. Moving to a different region is associated with an 18.4 percentage point reduction in the probability of working full-time among civilian wives, but with only a 12.4 percentage points reduction among military wives. Finally, civilian wives who moved from abroad had a 33.8 percentage point reduction in the probability of working full-time while military wives moving from abroad had a 28.7 percentage point reduction. It is important to recognize that it is likely that moves from abroad are not comparable for military and civilian wives. A move from abroad is likely to constitute the end of an overseas rotation for a military family. In contrast, a move from abroad probably constitutes immigration in the case of civilian families. These immigrant families are likely to differ in significant ways, unobservable in the CPS, from military families returning from overseas.

The same result is generally obtained for the probability of working for both full-time and part-time wives. As Table 5.3 indicates, moving is generally associated with a reduced probability of working among both civilian and military wives, but, as before, the reduction is smaller for military wives. The probability of working is 30.2 percentage points lower among civilian wives who move abroad but is only 7.3 percentage points lower among military wives relative to non-movers. A similar result is generally found for shorter moves. A move across divisions actually has a positive effect on the probability of working among military spouses while a move across divisions has a small negative effect on the probability of working for civilian wives. Moves across states show about a 1 percentage point reduction in the probability of working among military wives but a 2.2 percentage point decline for civilian wives. However, the effect of moving across county lines within a state on the probability of working appears to be the same for military wives and civilian wives.

Table 5.3 also shows the estimated effect of moving on the weekly earnings of full-time and of part-time spouses. Among part-time civilian wives, those who move generally have higher weekly earnings while among full-time civilian wives, those who move generally have no

statistical difference in their weekly earnings, with the exception of those who move abroad. In that case, civilian movers have lower earnings. Even though there appear to be some differences between military and civilian in the effect of moving on full-time and part-time earnings, these differences are not statistically significant. Overall, these results differ from the descriptive results where we found that, on average, military wives who moved had a somewhat larger reduction in weekly earnings than did civilian wives.

Children

The regressions include three variables that capture the presence and number of children in the family. The first two variables are whether the family has children under age 18, and if so, the number of children under age 18. Since the effects on labor supply and earnings may differ if the family has very young children, the third variable indicates the presence of a child under the age of 6. These variables help proxy the factors associated with the wives reservation wage. In Chapter Two, we hypothesized that the presence and number of children, particularly young children, increases the reservation wage and therefore reduces labor supply. The magnitude of the effect could differ for military families, where we mentioned two additional hypotheses. Inflexibility in the husband's schedule could further increase the wife's reservation wage, which would lead to greater labor supply reductions for the wife. However, the presence of subsidized child care could reduce the market wage she was willing to accept; her wage net of child care costs could be higher than her reservation wage. This subsection reviews the reduced-form empirical evidence related to these hypotheses.

We use the parameter estimates for the three variables to compute the estimated effect of having a child under age 6 and of having a child age 6 to 17. The estimated effect of having a child under age 6 is equal to the sum of the marginal effect of the three variables. The estimated effect of having a child age 6 to 17 is equal to the sum of the marginal effect of the presence of children under age 18 and the number of children. (The variable indicating the presence of children under age 6 is held constant).

Consider the relationship between children and labor supply, shown in Table 5.5. Having a child under the age of 6 is generally associated with reduced labor supply for both civilian and military wives. Civilian wives have about 11.5 fewer weeks of work, an 18.6 percentage point lower probability of working full-time, and a 15.5 percentage point lower probability of working, compared with wives without children. Military wives have 11.9 fewer weeks of work, a 15.3 percentage point lower probability of working full-time, and a 20.6 percentage point lower

probability of working, compared with wives without children. The lower weeks of work and lower probability of working are statistically significant differences. However, for wives with young children we find no statistically significant difference in the weekly wage of either full-time or part-time military wives versus civilian wives.

Table 5.5. Estimated Effects of Children on Weekly Earnings and Labor Supply

Effect On	Children Under Age 18 and	
	Some Children 0 – 5[1]	No Children 0 – 5[2]
Prob. Worked in Year[4]		
Civilian	-0.155**	-0.052**
Military	-0.206**	-0.025**
Prob. Worked Full-time[4]		
Civilian	-0.186**	-0.136**
Military	-0.153**	-0.085**
Weeks Worked[3]		
Civilian	-11.483**	-5.000**
Military	-11.860**	-2.214**
Full-time Weekly Wage (Percent change)		
Civilian	0.020**	-0.061**
Military	-0.057	-0.036
Part-time Weekly Wage (Percent change)		
Civilian	-0.012**	-0.058**
Military	-0.138	-0.191

[1] *Tests were done on the joint significance of coefficient estimates on the indicator for children under 18, the indicator for children under 6, and the number of children. Null hypothesis for civilian wives was that coefficients were equal to 0. Null hypothesis for military wives was that their coefficients were equal to those of civilian wives.*

** = significant at .05; ** = significant at .01.*

[2] *Tests were done on coefficient estimates on the indicator for children under 18 and the number of children.*

[3] *Figures are estimated effects on the tobit index function.*

[4] *Figures are estimated marginal effects, not coefficient estimates. The margina leffect indicates the change in the probability when the number of children of each type is increased by one, all other variables held at their sample mean values.*

Given the importance of young children on labor supply outcomes, it is worth considering whether military families of a given age are more likely than civilian families to have young children. In fact, among families with children, the actual presence of young children tends to follow the same pattern for both groups. When the wife is young and the family has children, it is very likely that there is a child under age 6 present. As the wife ages, the family tends to complete its childbearing, and the youngest child eventually enters first grade. At that time, the family with children typically has no children under the age of 6. This time is reached at different times in different families, depending on when they began having children and how many they have. But the age pattern for the presence of children under age 6 in families that have children present is much the same for military families as for civilian families. The figures in Appendix C support this point.

The effects of children on the wife's labor supply are much smaller when no young children are present. Specifically, civilian wives with children age 6–17 have 5 fewer weeks of work, a 13.6 percentage point lower probability of working full-time, and a 5.2 percentage point lower probability of working, compared with civilian wives without children. Military wives with children age 6–17 have 2.2 fewer weeks of work, a 9 percentage point probability of working full-time, and a .25 percentage point lower probability of working. The difference in weeks of work between military and civilian wives and in the probability of working and of working full-time is statistically significant at the 1 percent level. Civilian wives' part-time weekly wage is 5.8 percentage points lower, whereas military wives' weekly wage is about 20 percentage points lower when young children are not present. In the case of full-time weekly wages, civilian wives' weekly wages are 6.1 percentage points lower and military wives' weekly wages are 3.6 percentage points lower when there are no young children present.

Comparing our results to the hypotheses in Chapter Two, we find strong support for the hypothesis that the presence of children is associated with reduced labor supply. We also find evidence that the reduction is smaller among military wives in the case of the presence of children between the ages of 6 and 17, i.e., school-age children. However, we find the opposite result when the children are younger. That is, we find that the reduction in labor supply tends to be larger for military wives than for civilian wives who have children under 6.

These findings for military wives are consistent with the following interpretation. Younger members of the military have more rigid and less predictable schedules compared with those of civilian husbands, and younger wives faces a greater burden in adapting to those schedules.

Despite the possible availability of military child care, the young military family tends to adapt by not having the mother hold a job. It is possible that despite military subsidies for child care, the availability of reliable day care, especially for younger children, is limited at the times of day that military wives may prefer to work. Military service often involves an erratic schedule, long hours, and the constant threat of deployment. Military wives with young children may be unable to line up reliable day care for young children when their husbands' schedules are so uncertain. Furthermore, because military families usually live away from their extended families (or only live near them by chance), military families cannot rely on their children's grandparents or other relatives to provide day care, like their civilian counterparts who do live near relatives. Therefore, military families must rely on the wife or possibly on neighbors to provide reliable day care.

Given the availability of school and after-school activities for school-age children, the issue of arranging reliable day care may be less problematic for families with older children. Further, as the military family grows older, we saw that the wife's labor force participation declines, whereas for civilian wives it remains approximately constant. Thus, the smaller negative effect of children age 6–17 among military wives may be the result of the changing composition of working wives.

Time Trends

Our analysis incorporated variables that allow us to examine how military and civilian spouse labor force outcomes have varied over time. The civilian economy has grown over the last decade, after a recession in the early 1990s. Furthermore, the DoD has undergone dramatic downsizing and restructuring in the post–Cold War 1990s, with changes in the type of military operations and increases in their pace. It therefore seems reasonable to consider the possibility that the labor force outcomes of military spouses have changed over time relative to their civilian counterparts. To examine this possibility, we included a time trend variable in the regression specifications. This variable is interacted with the military wife variable to account for the possibility that the trends in labor force outcomes differ for military wives. We also interacted the time trend variable with the dummy variables representing the education of wives and the education of their husbands to account for the possibility that the outcomes might differ by educational level. Since the relative earnings of those with college have increased dramatically on an economy-wide scale, it seems reasonable to expect the time trends to differ according to education attainment.

Our main finding is that the joint effects of the time trend variables in the labor supply equations are quite small in magnitude for both civilian and military wives, although they are often jointly statistically significant. For example, we estimate that weeks worked rose by .47 weeks each year among civilian wives and fell by .21 weeks each year among military wives. The trends in weeks worked were even more stable for high school wives and for college-educated wives. Thus, our overall conclusion is that labor supply was quite stable for both civilian and military wives over the time period considered, regardless of educational status.

With respect to earnings, we conclude that weekly earnings rose modestly over the time period under consideration, among civilian wives and among military wives overall. Also, the difference between the full-time weekly earnings of military and civilian wives over time is quite stable. For example, we estimated a 1.1 percent increase each year in the weekly earnings of both military and civilian spouses working full-time. Among college-educated wives, the annual increase was estimated to be 1.1 percent among civilian wives and 1.0 percent among military wives. Thus, over a 10-year period, we estimate that weekly earnings for full-time wives would increase by 11 percent among civilian wives and by 10 percent among military wives.

Unemployment Rate Effects

There are fundamentally two kinds of variation in the unemployment rate: cyclical and structural. Cyclical variation concerns movement in the unemployment rate over time, whereas structural variation concerns persistent differences in the level of unemployment across geographic areas that are presumed to be traceable to differences in the structures of local economies. In our analysis, the unemployment rate is measured as the percent change in the unemployment rate from year to year within a state. By focusing on the within-state difference over time, our measure nets out persistent state-specific structural variation in the unemployment rate. Therefore, our measure primarily reflects cyclical variation in unemployment over time. Of course, it is possible that there are year-to-year structural variations in the level of unemployment in local economies within a given state. Therefore, our measure may also capture some structural changes in unemployment as well.

Cyclical and structural unemployment can be expected to have different effects. An increase in cyclical unemployment is associated with a decrease in new job creation, an increase in job loss, a possible decrease in labor force participation, and a slowing of individual wage growth among workers. The “added worker” hypothesis states that the labor supply of wives increases when their spouses become unemployed while

the "discouraged worker" hypothesis states that wives' labor supply falls as the contracting economy adversely affects her employment opportunities. Thus, the net effect on the labor supply of spouses is theoretically ambiguous, although empirical evidence tends to support the discouraged worker hypothesis (Lundberg, 1985). Therefore, we hypothesize that increases in the unemployment rate would reduce our labor supply measures for the civilian wife. For the military wife, the member's unemployment from the military is not a concern, and therefore the added and discouraged worker hypotheses are less likely to be operative.

As for the effect of unemployment on earnings, again there may be differences in between structural and cyclical effects. A higher level of structural unemployment is associated with a *higher* average local wage. Economists view this as a compensating differential that tends to equal the expected wage across areas. However, higher cyclical unemployment results in the unemployment of lower wage workers; also, job seekers with a weak attachment to the labor force may exit from it. These changes could result in a higher average wage among those who remain employed.

Structural and cyclical unemployment may affect military and civilian wives differently. We hypothesized that the local economy surrounding a military base may differ from the local economy more broadly defined. In particular, even though a base might be local in a rural area, the base might form its own micro-economy. Military wives might have access to job opportunities on military bases, many of which are civil service jobs. Civil service jobs are well-known for being secure and somewhat immune to business cycle fluctuations. In addition, military wives might have jobs in the immediate area—jobs that might be stabilized by a reliable flow of federal funds to the base to support operations, maintenance, and personnel.

In sum, a cyclical increase in the state unemployment rate may reduce or increase labor supply depending on whether the discouraged worker or added worker effect dominates. Also, it could reduce earnings if wage growth is slower as the economy slows and unemployment increases, yet it could be associated with higher earnings if lower-wage workers are dis-employed. Further, these labor supply effects should be smaller for military wives, for whom we expect no added-worker or discouraged-worker effect. The wage of working military wives should be subject to the same cyclical forces as for civilian wives, however the cyclical effects may be weaker if military wives tend to work in micro-economies around bases that have a stable flow of funds from the federal government. We examine the evidence related to these hypotheses in this subsection. Table 5.6 shows the estimated effect of a 1 percentage point increase in the

unemployment rate from one year to the next for military and civilian wives.

Table 5.6. Summary of Marginal Effect of a 1 Percentage Point Increase in the Unemployment Rate from One Year to the Next

Model	Estimated Effect
Civilian Wives	
Prob. worked in year	0.0191***
Prob. worked full-time	0.0046***
Weeks worked ($0 \leq$ weeks ≤ 52) [2]	0.6430***
Log(weekly earnings) worked part-time	0.0784***
Log(weekly earnings) worked full-time	0.0130
Military Wives	
Prob. worked in year	0.0036***
Prob. worked full-time	-0.0744***
Weeks worked ($0 \leq$ weeks ≤ 52) [2]	-0.0685**
Log(weekly earnings) worked part-time	0.0571
Log(weekly earnings) worked full-time	-0.0537

[a]Null hypothesis for civilian wives was that unemployment coefficient was equal to 0. Null hypothesis for military wives was that the unemployment coefficient was equal to those of civilian wives.

*** = significant at .05; *** = significant at .01.*

[1] Regression results are in Appendix.

[2] The figures are estimated effects on the tobit index function.

The findings for civilian wives suggest that the added-worker effect is dominant: the measures of labor supply increase. The size of the increase in the probability of work in the year and in the probability of working full-time is quite small. The effect on weeks of work is larger, though. For wives who are working, weeks are estimated to increase by half a week as the unemployment rises by a percentage point from one year to the next. This can occur if wives increase their labor supply in response to a decrease, or a threat of decrease in the husband's labor supply (e.g., layoff, decrease in weekly hours).

Moreover, there is an increase in the weekly wage of civilian wives who work part-time, though no wage effect for those who work full-time. The wage increase for part-time workers suggests a compositional change. Full-time workers are defined as those working at least 35 weeks per year

and at least 35 hours per week. If these high-hours workers were laid off or terminated, they would tend not to have 35 weeks of work but they may have worked, say, 40 hours per week until they were laid off or terminated. As a result, they would have a relatively high weekly wage but would be counted among the part-time workers. This change in the composition of part-time workers would be reflected by an apparent increase in their wage. The increase would be a statistical artifact.

The lack of an increase for wives who work full-time is consistent with the notion of sticky wages. Employers do not want to increase the wage of full-time workers as business conditions worsen, and they do not want to decrease their wage. (As mentioned before, the wages are in constant, year 2000 dollars, so the lack of change in the wage for full-time workers means that the real wage remained constant.)

The labor supply effects for military wives differ from those of civilian wives. There is practically no change in the probability of work in the year, and there is a decrease in the probability of working full-time and in weeks of work. The reduction in working full-time and in weeks of work suggests that the military wife is affected as one would expect a "primary" worker to be affected. In contrast to this, the added-worker and discouraged-worker hypotheses implicitly refer to the wife as a "secondary" worker, i.e., having a weaker attachment to the labor force, with the husband being the primary worker. The results for military wives also suggest a decrease in the wage of military wives who work full-time, but this effect is not statistically significant, whereas there was no decrease in the wage of civilian wives who work full-time. The wage change for wives who work part-time was the same for military and civilian wives; the wage increased, probably for the reasons discussed.

Location Effects

Given that many military installations are in rural areas and that military wives are often tied-movers, military wives are often seen as being isolated with relatively few labor market opportunities to pursue. Harrell (2000) discusses the social and economic problems facing junior enlisted wives in isolated rural communities, although she does not consider how these problems compare with those of their civilian counterparts. In this subsection, we examine how the labor force outcomes of military wives in rural areas compare with those of suburban military wives and how this comparison differs from the same comparison for civilian wives. As we discuss in more detail, a remarkable finding is that military wives in rural areas compare quite favorably to their suburban counterparts and more favorably than do civilian wives. In other words,

military wives in rural areas appear better off in terms of labor force outcomes than do civilian wives with similar characteristics in rural areas.

Table 5.7 shows the estimated marginal effects of being in a rural area or, alternatively, in an urban area for military wives and for civilian wives. The comparison is with respect to being in a suburban area. All other variables are held at their sample mean values, and as before, we consider the effects of location on weeks worked, given weeks worked are positive.

Table 5.7. Summary of Marginal Effects of Location

Model	Estimated Effect (Relative to Suburban)	
	Urban	Rural
Civilian wives		
Probability of working	-0.0177***	0.0194***
Probability of working full-time	0.0105***	-0.0231***
Weeks worked ($0 \leq$ weeks ≤ 52) [2]	-1.0681***	0.1402***
Log(weekly earnings) working part-time	0.0255**	-0.2821***
Log(weekly earnings) working full-time	-0.03426***	-0.2803***
Military Wives		
Probability of working	0.01166***	-0.0049***
Probability of working full-time	0.0404***	-0.0450***
Weeks worked ($0 \leq$ weeks ≤ 52) [2]	1.2275***	-1.1895***
Log(weekly earnings) working part-time	0.1391	0.0216***
Log(weekly earnings) working full-time	-0.0125	-0.0415***

[a] *Null hypothesis for civilian wives was that the coefficient was equal to 0. Null hypothesis for military wives was that the coefficient was equal to those of civilian wives.*
*** = significant at .05; *** = significant at .01.*

[1] *Regression results are in Appendices.*

[2] *The figures are estimated effects on the tobit index function.*

Military wives who live in rural areas are slightly less likely to work than similar wives in suburban areas while civilian wives who live in rural areas are slightly more likely to work. The net effect for civilian wives is that the number of weeks worked is slightly higher among those who live in rural areas. The net effect for military wives is that the number of weeks worked is slightly lower than military wives who live in suburban areas. However, in both cases, the magnitude of the change in weeks worked is quite small.

The most remarkable finding in Table 5.7 concerns the estimated marginal effect of location on weekly earnings. Consider first civilian

wives who work full-time. Civilian wives who live in rural areas earn 28 percent less than their civilian counterparts who live in suburban areas. In contrast, military wives who live in rural areas are estimated to earn only 4.2 percent less than suburban military wives. Therefore, although military wives in rural areas may have social and economic problems (Harrell, 2000), the analysis here suggests that the relative effect of living in rural areas is less adverse than it is for their civilian peers.

As for wives in urban areas, we find small differences in the weekly earnings relative to wives in suburban areas for civilian wives. For military wives, we find that urban wives have weekly part-time earnings that are 14 percent higher than suburban wives. However, this effect for urban military wives is not statistically significant.

The overall effects of location on the labor force outcomes of military wives will depend on how military families are distributed across location. Table 5.8 shows the distribution of civilian and military families across location, where the distributions are weighted to reflect the age, education, and race/ethnicity of military personnel. Contrary to the stereotypical view that military families are concentrated in rural areas, we see that military families are distributed across urban, suburban, and rural areas. Moreover, their distribution shows a fair degree of similarity to that of civilian families. The main difference between the distributions is that relatively more civilian families are suburban, and relatively more military families report location missing. Our conjecture about the high fraction of missing locations is that military families may have a permanent residential address different from the location of their current assignment. The permanent address may be where military families own a home or pay taxes.

About a quarter of the military families have missing location information in the CPS over the time frame of our analysis while about a fifth of the civilian families have missing information. We find that most military families live in suburban areas. About 28 percent of military families live in the suburbs while about one-fifth of military families live in rural areas. It would be preferable if we could compute the distributions by branch of service. As noted by Wardynski (2000), Army bases are concentrated in rural areas, while Navy bases are concentrated in cities. Thus, the distributions would most likely appear different if we could identify branch of service in the CPS.

We can also discern that the location distribution does not vary much by age. By implication, it would be incorrect to think that young military families are much more likely to be found in rural areas. For example, among wives age 20 to 24, 22 percent live in rural areas, which is not

much different than the 20 percent at age 30 to 34. The exception occurs for older military wives, age 40 to 44: only 11 percent live in rural areas. Thus, at the highest age, and presumably highest rank, military members are less likely to be identified as living in a rural area.

Table 5.8. Distribution of Military and Civilian Families Across Locations, 1987–1999, by Age of Wife (Weighted Counts)

Group	Civilian	Military
Total		
Urban	0.22	0.24
Suburban	0.35	0.28
Rural	0.25	0.21
Missing	0.18	0.27
Age 20–24		
Urban	0.23	0.28
Suburban	0.29	0.21
Rural	0.29	0.22
Missing	0.18	0.29
Age 25–29		
Urban	0.23	0.23
Suburban	0.35	0.27
Rural	0.25	0.24
Missing	0.18	0.25
Age 30–34		
Urban	0.22	0.25
Suburban	0.36	0.28
Rural	0.24	0.20
Missing	0.18	0.27
Age 35–39		
Urban	0.21	0.22
Suburban	0.37	0.34
Rural	0.24	0.21
Missing	0.18	0.23
Age 40–44		
Urban	0.20	0.21
Suburban	0.38	0.38
Rural	0.23	0.11
Missing	0.18	0.31

6. CONCLUSION

We began our analysis of military wives with an outlook shaped by recent studies on military wives. Harrell's (2000) ethnographic analysis described how young Army wives coped with financial stress, geographical isolation, social isolation, and separation of the wife's private life from her husband's professional life. She found impressionable women who along with their husbands were trying to find their way, and who were making their share of mistakes. These young families had trouble living within their means, avoiding indebtedness, and trying to get out of debt. Although her study could claim validity based on a large number of first-person interviews with repeat visits, it was limited to a particular subset of military wives and did not make comparisons to civilian wives. Wardynski's (2000) quantitative study of Army wives found that they earn less than civilian wives because many Army bases are in rural areas where jobs are scarce and wages are low. The wage decrement was greater for Army wives with a college education, presumably officers' wives. The findings led him to suggest that military wives be given a hiring preference for civil service jobs on or near military bases.

We think our work deepens understanding of the earnings of military wives. It encompasses military wives of all ages and in all services, and it looks in depth at their labor supply and wage experience over time. While we cannot say whether junior or senior military families must continually cope with financial stress, and we cannot describe the employment and wage opportunities around any particular military installation or within a given military service, we *can* describe the military wife's wage and labor supply: Was she employed during the year, was she employed full-time, and how many weeks did she work? We can say how variables such as age, education, children, migration, location, and unemployment affect her labor supply and wage outcomes, and whether they trended over time. Also, recognizing that military wives work in the same local labor market as civilian wives, we can compare these outcomes and their determinants with those of civilian wives.

We found that military family earnings averaged about $10,500[16] less than the earnings of civilian families.[17] This may be larger than the actual difference because military families might not have included the tax

[16] FY1999 dollars.

[17] Our samples of civilian and military families were each weighted to reflect the composition of the active-duty military population with respect to the husband's age, race, and education. Weights were constructed for each year of our CPS data.

advantage from the non-taxability of allowances and the value of the military health benefit. Neither of these items is visible, cash income. Using the $10,500 figure, we found that about half the difference in incomes came from the difference in wife earnings, i.e., the military wife earned about $5,400 less than the civilian wife. We traced this to several factors. Military wives were less likely to work during the year. When they worked, they worked fewer weeks per year, were less likely to work full-time (35 or more weeks and 35 or more hours per week), and worked slightly fewer hours per week. In addition, their weekly and hourly wages were lower. With our estimated models, we made specific estimates of the labor supply and wage outcomes for wives from military families and wives from comparable civilian families (see Table 5.1). We found that 74 percent of military wives worked during the year compared with 82 percent of civilian wives. Of those working, 48 percent of military wives worked full-time versus 59 percent of civilian wives. Military wives worked 37.6 weeks versus civilian wives' 40.9 weeks, or 3.3 weeks less. The weekly wage of military wives who worked full-time was $268, $40 less than the weekly wage of $308 for civilian wives. When we later took into account the fact that military wives moved more frequently and their moves were longer, we found that the difference in the frequency and length of (out-of-county) moves accounted for a 2.7-week difference in weeks of work. Therefore, the frequent movement of military families does much to explain why military wives have fewer weeks of work per year on average.

We also found several differences in labor supply and wage patterns by age. The likelihood that the civilian wife worked during the year changes little with her age. For the military wife, it starts lower and falls still lower as the military wife grows older—and the decline is steeper for military wives with college education than for those with high school. Among wives who worked, military wives are less likely to work full-time, although the likelihood of full-time work rises more rapidly with age for military wives. Weeks of work are lower and rise less rapidly with age for the military wife than the civilian wife. Moreover, weeks of work and the likelihood of full-time work are lower for the military wife with college than for the military wife with high school. Finally, the wage of the military wife is lower at every age than the wage of the civilian wife, although the increase in wage with age is similar for military and civilian wives.

We think several broad concepts are useful in understanding these findings. First, the military families that remain in the military for longer careers are an increasingly selected population. We assume the career aspirations and earnings opportunities of the military wife influence the

family's decision to remain in the military. Similarly, these factors may affect whether a woman chooses to become a military wife in the first place. Those women who believe it will be harder to achieve their career aspirations and find good job opportunities while their husbands are in the military will be less inclined to marry into the military or have their family remain in the military. This may help explain why the younger military wife, in comparison to the younger civilian wife, is less likely to work during the year, and why the likelihood of working declines with age among military wives. It may also help explain why full-time work is less likely among younger military wives versus younger civilian wives, namely, because these military wives have on average a lower interest in ("taste for") forging a strong attachment to the labor force.

We also found that the likelihood of full-time work rose more rapidly with age for military wives than for civilian wives, which suggests a second kind of selectivity. Among wives who remain in the military, those that initially choose to work during the year will include wives with weaker and stronger attachments to the labor force. As these wives age, those with a weaker attachment to the labor force will tend to withdraw from it. The remaining wives, having a stronger attachment, are increasingly likely to be full-time workers. Put differently, only those military wives with the strongest attachment to the labor force are likely to remain in it over the long haul.

These two kinds of selectivity suggest interplay between tastes and opportunities. Suppose it is more difficult for a military wife to pursue a career in the labor market and find good job opportunities, and suppose husbands and wives have preferences for the military and preferences for work. Other things equal, wives who want a career and good job opportunities are more likely to induce their family to leave the military. But the family will not leave if its preference for the military is high enough to offset the assumed career cost to the wife. If the wife's taste for work is low and her forgone civilian opportunities are not much different than her military opportunities, then the military preference does not have to be high for the family to remain in the military. If the wife's taste for work is high, then even if her job opportunities as a military wife are worse than they are as a civilian wife, the family might remain in the military. This will occur if the military preference is high, and the wife, with her strong taste for work, will work full-time despite her worse opportunities. Thus, it is consistent to observe:

- lower taste for work among younger military wives than younger civilian wives and hence a lower probability of work during the year and a lower probability of full-time

work among younger military wives versus younger civilian wives;

- exit from the military of wives who have a high taste for work and believe their career opportunities are better if their husband is not in the military; and nevertheless
- an increase with age in the probability of full-time work among military wives who work.

Our findings suggest several reasons why it might be the case that military wives find it more difficult to pursue a career in the labor market and obtain good job opportunities. Perhaps the primary reason is the frequent movement of military families relative to civilian families. Frequent moves might induce the wife to spend less time in job search and to seek jobs with short training times. Employers, for their part, may recognize that military wives are willing to accept jobs with lower wages rather than continue searching for a higher-wage job. These jobs may tend to require short training and perhaps are limited in their scope of responsibility and opportunity for career development. In other words, more frequent moves may support a lower-wage equilibrium.

Another factor is the demand the military places on the military member. We have suggested that the traditional model of labor supply could be extended to account for rigidity and uncertainty in the husband's schedule in the derivation of the wife's reservation wage and labor supply. Rigidity is meant to indicate that the family has little discretion in the husband's duty schedule, training and exercise schedule, and, as mentioned, PCS moves. Uncertainty comes from week-to-week variation in duties as well as the possibility of deployment. If the family has little control over the husband's schedule and it is marked with uncertainty and periodic migration, the family's best response may be for the wife to hold jobs that offer her flexibility when she works. These may be jobs that allow flexible hours and that can be started and stopped without much investment either by the wife or the employer.

Thus, relative to civilian families, military families may condition their family decisionmaking on more frequent change-of-station moves and on the rigidities and uncertainties of the military member's schedule. This idea offers a means of resolving what appeared to be paradox in the findings when viewed from the perspective of traditional labor supply theory. If the military husband's schedule caused the military wife to have a higher reservation wage, then we would expect her to have a lower probability of employment, lower probability of working full-time, and fewer weeks of work given than she worked—all of which we found. With a higher reservation wage, she would also be expected to have a

higher wage when employed—which we did not find. We suspect that the resolution to this paradox lies in the idea of a lower-wage equilibrium, as described. Our wage findings appear to support this view. The results show that the military wife earns less than does the civilian wife at every age. This is consistent with less investment in job search and less training on the job. It may also be consistent with hours flexibility on the job; such jobs may pay a lower wage, other things equal.

We did not find support for two commonly held views. The first is that on-the-job investments in human capital are lower for military wives than for civilian wives. If true, this would lead to a widening gap between the hourly wage of the civilian wife and the military wife. But we found that hourly wage rose at the same rate with age for military wives as for civilian wives. The second view is that military wives earn less because military bases are typically in low-wage, rural areas. Our evidence did not support the notion that military wives are concentrated in rural areas. Furthermore, although it is true that military wives earn less than civilian wives, we did not find that military wives in rural areas earned a lot less than those in suburban or urban areas. In contrast, we found, as one might expect, that civilian wives in rural areas earned more than 25 percent less than do civilian wives in suburban and urban areas.

The presence of young children seems to add to the burden on military wives of an unpredictable and rigid military schedule. We found that the presence of children is associated with reduced labor supply for both military and civilian wives. However, the reduction is greater for military wives when the children are young (between the ages of 0 and 5). Yet the reduction is smaller for military wives when the children are not young (between the ages of 6 and 17). Interestingly, the presence of children between ages 6 and 17 is associated with lower wives' wages, but the reduction for military wives is not statistically different than the reduction for civilian wives. That is, the negative effect on wages of having older children is about the same for both military and civilian wives.

We find that the negative effect of moving on labor supply is actually smaller for military wives than for similar civilian wives moving a similar in distance. This means that when judged in terms of reduced labor supply or reduced wages for a given length of move, military wives are more efficient movers than are civilian wives. Because military wives are more likely to move longer distances, however, their move is more likely to involve a job change and a larger reduction in labor supply. As a result, the overall effect of moving is more negative for military wives.

Directions for Future Research

While our analysis paints a picture of the wife's role as an earner in military families, there are many questions we could not address with our data. It would have been helpful to have precise geographic information on where a family is living and to know where the member is based. A more precise characterization of the "local" labor market would have been valuable, as would information about the availability of child care generally but especially including on-base care. We did not have a service identifier, so we could not examine whether the overall results differed by service. We had no direct information about military wives' career aspirations and no detailed knowledge about the jobs they held and occupations they worked in, nor did we know about the labor supply and wages of military wives *after* their family left military service. We also could not examine the role of military family support activities in sustaining the military family and providing counsel and guidance about housing, family budgeting, health care, and schools. Finally, and very much to the point, we could not analyze how the wife's employment and earnings opportunities affected the retention, morale, and performance of the military member. These topics await richer data and future research.

APPENDIX A

DATA SOURCES

We employ data on military and civilian family income and labor force participation from the March supplement of the Current Population Survey (CPS) for years 1987 to 1999. The early endpoint for this series is driven by the availability of PERSTEMPO data to be described below and the later endpoint is the most recent year for which we have both CPS and PERSTEMPO data. We drew data on annual earnings, labor force participation, and demographics for nationwide sample of households, including those with members of the armed services.

We used data for noninstitutionalized married couples in primary families where the male was at least 17 years of age. The CPS makes a distinction between "primary" families and "secondary" families when multiple families reside in a single household. To eliminate concern over related families pooling resources and acting as a single economic unit, we restricted our analysis to primary families.

Because of our fundamental interest in military and civilian families, we created a variable indicating whether or not a primary family is a military family. We define a military family as a couple in which the male is identified as being a member of the armed services. Because of low sample sizes, we excluded from our analysis sample those military families in which the female spouse is a member of the armed services. We also excluded the small number of dual-military couples as we are interested in the civilian labor force opportunities of military wives.

There are considerable demographic differences between members of the armed services and the male civilian population represented by the CPS. The main reason is that the military population tends to be young relative to the general population. In addition, because of sample frame and sampling variability (sampling error), both the armed service members and civilians in the CPS differ from the universe of armed service members generally.[18] In order to compare outcomes between civilian and military families, we created weights to control for these demographic differences. To construct these weights we used a second data source, the Proxy PERSTEMPO data file,[19] which contains basic demographics for all active-duty service members from December 1987 to September 1999.

From PERSTEMPO data, we obtained counts of males in the armed services by year, age, race/ethnicity, and education categories. Counts in the same categories were obtained separately for males in the civilian and military samples in the CPS. We then formed ratios of cell counts from the PERSTEMPO data to counts from the CPS data to construct the appropriate weights. The ratios for the CPS civilian and military samples were formed independently so that each group would resemble the actual population in the armed services when weighted. Constructing weights in this fashion ensures demographic comparability between the military and civilian CPS samples and the armed services at large. Cells for which there were no observations from the PERSTEMPO data (and hence from the actual military population) received a weight of 0. Combining the PERSTEMPO and CPS samples left 13 years of usable of data, 1987 to 1999, for analysis purposes. Our descriptive tabulations employ these

[18] One reason for these differences among military members in the CPS and the military at large (not just married members) is the fact that the CPS includes military households only by virtue of living with a civilian who is 16 years of age or older. Military families are not part of the CPS sample frame. However, the CPS does sample family housing on base, according to conversations with persons at the CPS Branch at the Census Bureau in August 2000.

[19] The Proxy PERSTEMPO data set is an extract of the Active Duty Master file, an administrative data set containing information for every active-duty member of the armed forces.

weights (unless specifically noted otherwise), as do our non-OLS (ordinary least squares) regressions (probit, tobit, Heckman).

For the years 1987 to 1999, the CPS contains a total of 1,112,930 adults over the age of 16. Since our unit of analysis is a married couple, we collapsed information for both spouses into a single record. Adding the restrictions on marriage and family type mentioned above, we were left with a total of 5,831 military couples and 360,154 civilian couples in our analysis file. This results in a sample of 448 military families per year on average.

We used annual unemployment and inflation data from the Bureau of Labor Statistics. Annual statewide unemployment rates were merged to the CPS sample based on the residences of the survey respondents. All dollar amounts were converted to year 2000 dollars using the national seasonally adjusted CPI.

APPENDIX B

SUMMARY STATISTICS AND REGRESSION COEFFICIENTS

Table B.1. Summary Statistics of Characteristics of All Civilian and Military Families

Variables	Re-weighted		Original Weighting	
	Civilian	Military	Civilian	Military
Number of observations	360154	5831	360154	5831
Wife's annual earnings	15490.87	10024.35		
Wife's annual earnings, less than high school	6088.70	4693.50		
Wife's annual earnings, high school graduate or some college	13406.26	9083.75		
Wife's annual earnings, college graduate	25775.71	15940.22		
Wife's hours worked per year	1292.91	996.58	1109.65	982.24
Log of wife's weekly wage	5.74	5.52	5.77	5.53
Wife works	0.80	0.72	0.68	0.71
Wife works part time	0.30	0.37	0.25	0.37
Wife works full time	0.50	0.35	0.42	0.34
Wife's weeks worked per year	34.92	27.57	30.32	27.28
Log of wife's hourly wage	2.23	2.06	2.29	2.07
Age of wife	30.83	30.68	43.87	31.44
Wife's race is black	0.17	0.15	0.05	0.11
Wife's race is other	0.04	0.09	0.04	0.09
Wife did not finish high school	0.07	0.06	0.13	0.06
Wife finished college	0.21	0.17	0.22	0.20
Husband did not finish high school	0.01	0.01	0.13	0.01
Husband finished college	0.20	0.20	0.28	0.26
Age of husband	31.87	31.65	46.34	32.52
Husband's race is black	0.18	0.18	0.05	0.13
Husband's race is other	0.04	0.04	0.04	0.04
Number of children less than 18	1.39	1.47	0.98	1.45
Presence of children less than 6	0.49	0.48	0.24	0.46
Presence of children less than 18	0.73	0.75	0.51	0.74
Family moved within the same county since the previous year	0.15	0.12	0.07	0.12

Table B.1. Summary Statistics of Characteristics of All Civilian and Military Families (continued)

Variables	Re-weighted		Original Weighting	
	Civilian	Military	Civilian	Military
Family moved to a different county since the previous year	0.04	0.03	0.02	0.03
Family moved to a different state since the previous year	0.01	0.03	0.01	0.03
Family moved to a different census division since previous yr.	0.01	0.03	0.00	0.03
Family moved to a different census region since previous year	0.02	0.11	0.01	0.11
Family moved from abroad since the previous year	0.00	0.04	0.00	0.04
Family has not moved in the past five years	0.02	0.01	0.05	0.01
Family moved within the same county in the past five years	0.03	0.01	0.02	0.01
Family moved to a different county in the past five years	0.01	0.00	0.01	0.01
Family moved to a different state in the past five years	0.00	0.01	0.00	0.01
Family moved to a different census division in past five years	0.00	0.01	0.00	0.01
Family moved to a different census region in the past five years	0.00	0.02	0.00	0.03
Family moved from abroad in the past five years	0.00	0.01	0.00	0.01
Family lives in an urban area	0.22	0.23	0.19	0.23
Family lives in an rural area	0.25	0.21	0.26	0.20
MSA not reported	0.18	0.27	0.18	0.28
Lives in the Northeast	0.20	0.07	0.22	0.08
Lives in the North Central-Midwest	0.24	0.13	0.24	0.14
Lives in the West	0.22	0.42	0.23	0.41
Change in unemployment rate from previous year	-0.02	-0.02	-0.02	-0.02
Wife is a federal employee	0.02	0.10	0.02	0.09

Note: The demographic characteristics of husbands will be nearly identical for both groups due to the use of weights.

Table B.2. Summary Statistics of Characteristics for Civilian and Military Families with Wives Who Worked in Year

Variables	Re-weighted		Original Weighting	
	Civilian	Military	Civilian	Military
Number of observations	243720	4145	243720	4145
Wife's annual earnings	19521.03	14045.80		
Wife's annual earnings, less than high school	10386.44	8724.32		
Wife's annual earnings, high school graduate or some college	16872.00	12624.94		
Wife's annual earnings, college graduate	29976.44	21329.53		
Wife's hours worked per year	1618.83	1387.90	1639.77	1381.77
Log of wife's weekly wage	5.74	5.52	5.77	5.53
Wife works	1.00	1.00	1.00	1.00
Wife works part time	0.37	`0.52	0.37	0.52
Wife works full time	0.63	0.48	0.63	0.48
Wife's weeks worked per year	43.73	38.40	44.80	38.38
Log of wife's hourly wage	2.23	2.06	2.29	2.07
Age of wife	30.85	30.52	40.56	31.19
Wife's race is black	0.17	0.17	0.06	0.12
Wife's race is other	0.04	0.08	0.04	0.08
Wife did not finish high school	0.05	0.04	0.09	0.04
Wife finished college	0.23	0.18	0.26	0.21
Husband did not finish high school	0.00	0.01	0.11	0.01
Husband finished college	0.20	0.19	0.30	0.25
Age of husband	31.83	31.55	43.03	32.33
Husband's race is black	0.19	0.20	0.06	0.14
Husband's race is other	0.03	0.03	0.04	0.04
Number of children less than 18	1.27	1.32	1.03	1.30
Presence of children less than 6	0.45	0.41	0.24	0.39
Presence of children less than 18	0.69	0.70	0.55	0.69
Family moved within the same county since the previous year	0.15	0.13	0.08	0.12
Family moved to a different county since the previous year	0.04	0.03	0.02	0.03
Family moved to a different state since the previous year	0.01	0.03	0.01	0.03
Family moved to a different census division since previous yr	0.01	0.03	0.00	0.03
Family moved to a different census region since previous yr	0.01	0.12	0.01	0.11
Family moved from abroad since the previous year	0.00	0.04	0.00	0.04
Family has not moved in the past five years	0.02	0.01	0.04	0.01

Table B.2. Summary Statistics of Characteristics for Civilian and Military Families with Wives Who Worked in Year (continued)

Variables	Re-weighted		Original Weighting	
	Civilian	Military	Civilian	Military
Family moved within the same county in the past five years	0.03	0.01	0.02	0.01
Family moved to a different county in the past five years	0.01	0.00	0.01	0.01
Family moved to a different state in the past five years	0.00	0.01	0.00	0.01
Family moved to a different census division in past five years	0.00	0.01	0.00	0.01
Family moved to a different census region in the past five years	0.00	0.02	0.00	0.03
Family moved from abroad in the past five years	0.00	0.01	0.00	0.01
Family lives in an urban area	0.22	0.24	0.18	0.23
Family lives in an rural area	0.25	0.21	0.26	0.21
MSA not reported	0.18	0.27	0.18	0.27
Lives in the Northeast	0.19	0.07	0.22	0.08
Lives in the North Central-Midwest	0.25	0.13	0.25	0.14
Lives in the West	0.21	0.43	0.23	0.42
Change in unemployment rate from previous year	-0.02	-0.02	-0.02	-0.02
Wife is a federal employee	0.02	0.12	0.02	0.12

Note: The demographic characteristics of husbands will be nearly identical for both groups due to the use of weights.

Table 5.3 Wife's Labor Supply Regressions

	Weeks Worked tobit	Probability Wife Worked Full-time	Probability Wife Worked in the Year
Civilian Families			
	-46.74920 **	-2.18230 **	0.04550 **
	(0.39120)	(0.01070)	(0.01050)
Civ. Wife Variables			
If wife's ed = High school or some college (HSSC)			
Age	6.45660 **	0.14810 **	0.09750 **
	(0.02370)	(0.00072)	(0.00065)
Age-squared	-0.08960 **	-0.00195 **	-0.00145 **
	(0.00030)	(0.00001)	(0.00001)
Black	5.46220 **	0.20120 **	0.11890 **
	(0.12990)	(0.00344)	(0.00346)
Other	-0.81740 **	0.10280 **	-0.02220 **
	(0.13140)	(0.00354)	(0.00341)
Time	0.48580 **	0.00704 **	0.00171 **
	(0.00570)	(0.00015)	(0.00015)
If wife's ed < HSSC: difference from HSSC coefficient			
Less than HS	-40.77210 **	-0.97800 **	-1.10880 **
	(0.77820)	(0.02560)	(0.01900)
Age	1.16940 **	0.04260 **	0.04000 **
	(0.05080)	(0.00167)	(0.00124)
Age-squared	-0.01870 **	-0.00056 **	-0.00062 **
	(0.00080)	(0.00003)	(0.00002)
Black	-7.55220 **	-0.13190 **	-0.19120 **
	(0.17990)	(0.00553)	(0.00434)
Other	2.03040 **	0.09970 **	0.01810 **
	(0.29040)	(0.00907)	(0.00687)
Time	-0.30470 **	-0.00402 **	-0.00037
	(0.01780)	(0.00054)	(0.00043)
If wife's ed = Col: difference from HSSC coefficient			
College	16.71820 **	0.67390 **	0.82990 **
	(0.76370)	(0.02150)	(0.02220)
Age	-0.68160 **	-0.03590 **	-0.03450 **
	(0.04410)	(0.00126)	(0.00126)
Age-squared	0.01310 **	0.00057 **	0.00050 **
	(0.00060)	(0.00002)	(0.00002)
Black	1.07040 **	0.10990 **	-0.00220
	(0.13390)	(0.00353)	(0.00394)
Other	0.75100 **	0.04580 **	-0.09890 **
	(0.22140)	(0.00597)	(0.00576)

Table 5.3 Wife's Labor Supply Regressions (continued)

	Weeks Worked tobit	Probability Wife Worked Full-time	Probability Wife Worked in the Year
Time	0.52900**	0.00657**	0.01600**
	(0.22140)	(0.00597)	(0.00576)
Husband Variables			
Less than HS	-3.23050 **	0.04730 **	-0.06470 **
	(0.35620)	(0.01040)	(0.00882)
College	-5.98070 **	-0.14870 **	-0.11460 **
	(0.08650)	(0.00227)	(0.00230)
Age	0.83130 **	0.03040 **	-0.01030 **
	(0.02600)	(0.00072)	(0.00070)
Age-squared	-0.01560 **	-0.00054 **	0.00003 **
	(0.00040)	(0.00001)	(0.00001)
Black	3.36500 **	0.10430 **	0.09400 **
	(0.12320)	(0.00327)	(0.00327)
Other	-2.80440 **	0.12660 **	-0.09390 **
	(0.12340)	(0.00333)	(0.00319)
Time x Less than HS	-0.96460 **	-0.00394	-0.02340 **
	(0.15500)	(0.00460)	(0.00379)
Time x College	-0.45690 **	-0.00333 **	-0.01200 **
	(0.01300)	(0.00034)	(0.00035)
Children Variables			
Kids Less than 18	-9.91840 **	-0.20090 **	-0.18610 **
	(0.02190)	(0.00062)	(0.00055)
Kids Less than 6	-16.50920 **	-0.13220 **	-0.36690 **
	(0.04770)	(0.00124)	(0.00126)
Number of Kids	-2.81220 **	-0.16680 **	-0.02910 **
	(0.06460)	(0.00171)	(0.00175)
Moved Variables *Within Past Year*			
Same County	-1.83500 **	-0.01950 **	0.04690 **
	(0.05010)	(0.00132)	(0.00136)
Different County	-9.08250 **	-0.16600 **	0.01360 **
	(0.08330)	(0.00220)	(0.00235)
Different State	-16.59580 **	-0.34460 **	-0.07810 **
	(0.13630)	(0.00372)	(0.00378)
Different Division	-15.90520 **	-0.26390 **	-0.02200 **
	(0.20500)	(0.00561)	(0.00581)
Different Region	-24.28490 **	-0.46830 **	-0.13910 **
	(0.12980)	(0.00362)	(0.00358)
From Abroad	-49.69230 **	-0.88040 **	-0.85930 **

Table 5.3 Wife's Labor Supply Regressions (continued)

	Weeks Worked tobit	Probability Wife Worked Full-time	Probability Wife Worked in the Year
Within Past 5 Years			
Non-movers	2.10420 **	0.00309**	0.01940
	(0.11170)	(0.00290)	(0.00288)
Same Country	2.36190**	-0.01659**	0.05680**
	(0.10480)	(0.00271)	(0.00280)
Different County	-2.60920**	-0.06880**	0.05580**
	(0.16970)	(0.00440)	(0.00472)
Different State	-11.02480**	-0.12110**	-0.16440**
	(0.30400)	(0.00825)	(0.00807)
Different Division	-12.88530**	-0.28140	-0.10620**
	(0.38620)	(0.01030)	(0.01050)
Different Region	-14.35680**	-0.25820	-0.03240**
	(0.25600)	(0.00683)	(0.00717)
From Abroad	-36.10150**	-0.40780**	-0.67890**
	(0.38350)	(0.01190)	(0.00913)
Location			
Urban	-2.72000 **	0.02760 **	-0.06350 **
	(0.04670)	(0.00125)	(0.00122)
Rural	0.35690 **	-0.06050 **	0.07180 **
	(0.04460)	(0.00117)	(0.00119)
Unknown	2.14950 **	-0.05020 **	0.09640 **
	(0.04930)	(0.00128)	(0.00132)
Northeast	-3.54460 **	-0.17820 **	-0.08820 **
	(0.04900)	(0.00130)	(0.00128)
N. Central/Midwest	4.00120 **	-0.10410 **	0.12400 **
	(0.04600)	(0.00120)	(0.00124)
West	-2.55570 **	-0.18890 **	0.00119
	(0.04760)	(0.00127)	(0.00126)
Economic Conditions			
Δ in Unemp. Rate	1.63730 **	0.01460 **	0.06950 **
	(0.11920)	(0.00314)	(0.00316)
Federal Employee Status			
Federal Employee	35.80430 **		0.53330 **
	(0.14510)	(0.00342)	
Military Families*			
Intercept	87.58400 **	1.25200 **	1.29640 **
	(0.54940)	(0.01530)	(0.01450)

Table 5.3 Wife's Labor Supply Regressions (continued)

	Weeks Worked tobit	Probability Wife Worked Full-time	Probability Wife Worked in the Year
Mil. Wife Variables			
If wife's ed = High school or some college (HSSC)			
Age	-5.38030 **	-0.01660 **	-0.11370 **
	(0.03530)	(0.00102)	(0.00093)
Age-squared	0.07060 **	0.00034 **	0.00135 **
	(0.00050)	(0.00002)	(0.00001)
Black	-6.69900 **	-0.27870 **	-0.03140 **
	(0.15870)	(0.00427)	(0.00422)
Other	-9.68010 **	-0.26490 **	-0.18130 **
	(0.15100)	(0.00415)	(0.00388)
Time	0.50020 **	0.01580 **	0.00453 **
	(0.00780)	(0.00021)	(0.00021)
If wife's ed < HSSC: difference from HSSC coefficient			
Less than HS		-0.11560 **	1.54930 **
	(1.14700)	(0.03930)	(0.02820)
Age	-1.16950 **	0.00295	-0.07230 **
	(0.07470)	(0.00257)	(0.00181)
Age-squared	0.00330 **	-0.00005	0.00075 **
	(0.00120)	(0.00004)	(0.00003)
Black	10.68680 **	0.65910 **	-0.05500 **
	(0.29650)	(0.00980)	(0.00702)
Other	12.23320 **	-0.17810 **	0.30690 **
	(0.35180)	(0.01120)	(0.00833)
Time	-1.45500 **	-0.01190 **	-0.04000 **
	(0.02770)	(0.00093)	(0.00066)
If wife's ed = Col: difference from HSSC coefficient			
College	-38.07710 **	-1.83120 **	0.85340 **
	(1.22840)	(0.03370)	(0.03550)
Age	2.77500 **	0.12640 **	-0.03980 **
	(0.07190)	(0.00199)	(0.00203)
Age-squared	-0.04910 **	-0.00210 **	0.00042 **
	(0.00100)	(0.00003)	(0.00003)
Black	5.23540 **	0.02660 **	-0.04640 **
	(0.19080)	(0.00508)	(0.00537)
Other	5.41690 **	0.21970 **	0.09610 **
	(0.27700)	(0.00767)	(0.00712)
Time	-0.32490 **	0.00385 **	-0.01580 **
	(0.01850)	(0.00050)	(0.00050)

Table 5.3 Wife's Labor Supply Regressions (continued)

	Weeks Worked tobit	Probability Wife Worked Full-time	Probability Wife Worked in the Year
Husband Variables			
Less than HS	22.70830 **	0.05230 **	0.77920 **
	(0.49500)	(0.01430)	(0.01350)
College	-1.15570 **	-0.05940 **	-0.09970 **
	(0.11990)	(0.00332)	(0.00311)
Age	-1.67680 **	-0.10180 **	0.01530 **
	(0.03790)	(0.00106)	(0.00100)
Age-squared	0.03420 **	0.00165 **	0.00008 **
	(0.00060)	(0.00002)	(0.00001)
Black	4.25660**	0.17750**	0.06340**
	(0.14810)	(0.00398)	(0.00392)
Other	10.41400**	0.23080 **	0.13200 **
	(0.15760)	(0.00439)	(0.00403)
Time x Less than HS	-4.45990**	-0.09770**	-0.18420**
	(0.22130)	(0.00677)	(0.00559)
Time x College	-0.58580**	-0.01450**	-0.00151**
	(0.01810)	(0.00050)	(0.00047)
Children Variables			
Kids Less than 18	2.81990 **	0.01540 **	0.05250 **
	(0.03060)	(0.00090)	(0.00076)
Kids Less than 6	-8.05530 **	-0.07240 **	-0.24400 **
	(0.06570)	(0.00179)	(0.00171)
Number of Kids	4.27190 **	0.07920 **	0.05630 **
	(0.08950)	(0.00245)	(0.00240)
Moved Variables *Within Past Year*			
Same County	1.29010 **	0.01380 **	0.01950 **
	(0.07230)	(0.00197)	(0.00193)
Different County	2.14720 **	0.16920 **	-0.04880 **
	(0.12880)	(0.00361)	(0.00345)
Different State	7.79530 **	0.17400 **	0.04710 **
	(0.16650)	(0.00463)	(0.00453)
Different Division	3.46190 **	-0.04980 **	0.17720 **
	(0.22670)	(0.00627)	(0.00641)
Different Region	9.21580 **	0.15250 **	0.13240 **
	(0.14000)	(0.00394)	(0.00384)
From Abroad	21.42300 **	0.14450 **	0.61810 **
	(0.25860)	(0.00863)	(0.00617)

Table 5.3 Wife's Labor Supply Regressions (continued)

	Weeks Worked tobit	Probability Wife Worked Full-time	Probability Wife Worked in the Year
Within Past 5 Years			
Non-movers	22.34760 **	0.12240 **	0.39320 **
	(0.23460)	(0.00587)	(0.00624)
Same County	3.13510 **	0.09530 **	0.01640 **
	(0.19030)	(0.00505)	(0.00494)
Different County	-2.60100 **	0.06170 **	-0.17630 **
	(0.29850)	(0.00810)	(0.00791)
Different State	2.19780 **	-0.02340 *	0.31100 **
	(0.34540)	(0.00954)	(0.00916)
Different Division	-0.62870	-0.26680 **	-0.08720 **
	(0.43630)	(0.01200)	(0.01170)
Different Region	1.95540 **	-0.16970 **	0.03910 **
	(0.27690)	(0.00749)	(0.00767)
From Abroad	22.97510 **	0.32290 **	0.50770 **
	(0.41500)	(0.01270)	(0.00995)
Location			
Urban	5.84580 **	0.08020 **	0.10680 **
	(0.06540)	(0.00180)	(0.00170)
Rural	-3.38600 **	-0.05650 **	-0.08950 **
	(0.06520)	(0.00179)	(0.00171)
Unknown	-5.27380 **	-0.03010 **	-0.16210 **
	(0.06690)	(0.00182)	(0.00176)
Northeast	2.89380 **	-0.10950 **	0.11020 **
	(0.08270)	(0.00233)	(0.00212)
N. Central/Midwest	-0.97250 **	-0.05540 **	0.02020 **
	(0.07090)	(0.00194)	(0.00186)
West	5.18650 **	0.05170 **	0.15080 **
	(0.06110)	(0.00167)	(0.00160)
Economic Conditions			
Δ in Unemp. Rate	-1.81180 **	-0.25270 **	-0.05630 **
	(0.16010)	(0.00440)	(0.00419)

Table 5.3 Wife's Labor Supply Regressions (continued)

	Weeks Worked tobit	Probability Wife Worked Full-time	Probability Wife Worked in the Year
Federal Employee Status			
Federal Employee	-6.22270 **	-0.34830 **	
	(0.15640)	(0.00372)	
Scale	48.58490 **		
	(0.01470)		
Log Likelihood	-52923983	-10553641	-11218271

Coefficients for military families are the **difference between the military coefficient and the corresponding civilian coefficient.*

Table B.4. Wife's Weekly Wage Regressions

	All Wives That Worked	Wives That Worked Part-time	Wives That Worked Full-time
Civilian Families			
	4.49720 **	4.55000 **	4.97720 **
	(0.03680)	(0.06549)	(0.03883)
Civ. Wife Variables			
If wife's ed = High school or some college (HSSC)			
Age	0.07195 **	0.04060 **	0.05093 **
	(0.00242)	(0.00429)	(0.00251)
Age-squared	-0.00090 **	-0.00054 **	-0.00058 **
	(0.00003)	(0.00005)	(0.00003)
Black	0.06193 *	0.10790	-0.01675
	(0.02943)	(0.06298)	(0.02694)
Other	0.07037 **	0.12480 **	-0.01338
	(0.01894)	(0.03792)	(0.01787)
Time	0.01126 **	0.01109 **	0.00407 **
	(0.00083)	(0.00159)	(0.00081)
If wife's ed < HSSC: difference from HSSC coefficient			
Less than HS	0.03180	-0.02647	0.15148
	(0.08492)	(0.13006)	(0.10474)
Age	-0.01188 **	-0.00163	-0.01950 **
	(0.00414)	(0.00633)	(0.00513)
Age-squared	0.00013 **	0.00000	0.00022 **
	(0.00005)	(0.00007)	(0.00006)
Black	-0.13038 **	-0.20449 **	0.04977
	(0.03313)	(0.06084)	(0.03333)
Other	-0.00028	0.00002	0.00692
	(0.03742)	(0.07064)	(0.03657)
Time	-0.00454	-0.00290	-0.00749 **
	(0.00235)	(0.00415)	(0.00240)
If wife's ed = Col: difference from HSSC coefficient			
College	-0.05207	0.28855 *	-0.02787
	(0.06829)	(0.12671)	(0.07027)
Age	0.02118 **	0.00109	0.01795 **
	(0.00325)	(0.00584)	(0.00343)
Age-squared	-0.00022 **	-0.00003	-0.00017 **
	(0.00004)	(0.00006)	(0.00004)
Black	0.06211 **	0.14633 *	0.01458
	(0.02346)	(0.06362)	(0.02011)

Table B.4. Wife's Weekly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Part-time	Wives That Worked Full-time
Other	-0.05728 *	-0.10303	-0.03517
	(0.02428)	(0.05314)	(0.02206)
Time	0.00416 **	0.00465	0.00401 **
	(0.00157)	(0.00315)	(0.00149)
Husband Variables			
Less than HS	-0.01822	-0.02492	-0.05463 **
	(0.01350)	(0.02497)	(0.01333)
College	0.00188	0.00108	0.07807 **
	(0.01053)	(0.01962)	(0.01035)
Age	0.00316	0.00046	0.00372
	(0.00212)	(0.00386)	(0.00212)
Age-squared	-0.00006 **	-0.00002	-0.00006 **
	(0.00002)	(0.00004)	(0.00002)
Black	0.06179 *	0.06231	0.00288
	(0.02801)	(0.05936)	(0.02572)
Other	0.02557	0.00983	-0.04673 **
	(0.01741)	(0.03482)	(0.01644)
Time x Less than HS	-0.00956 **	-0.00315	-0.00995 **
	(0.00219)	(0.00414)	(0.00213)
Time x College	0.00259	0.00477	0.00292 *
	(0.00152)	(0.00291)	(0.00147)
Children Variables			
Kids Less than 18	-0.13769 **	-0.10928 **	-0.05372 **
	(0.00337)	(0.00569)	(0.00360)
Kids Less than 6	0.01853 **	0.04606 **	0.08017 **
	(0.00667)	(0.01218)	(0.00669)
Number of Kids	-0.00536	0.05158 **	-0.00687
	(0.00806)	(0.01551)	(0.00797)
Moved Variables *Within Past Year*			
Same County	-0.01692	0.02790	-0.03738 **
	(0.00870)	(0.01662)	(0.00841)
Different County	0.02165	0.15113 **	0.00504
	(0.01467)	(0.02657)	(0.01468)
Different State	-0.00469	0.18163 **	-0.01111
	(0.02337)	(0.04015)	(0.02433)
Different Division	-0.00301	0.24748 **	-0.00055
	(0.03505)	(0.05645)	(0.03880)

Table B.4. Wife's Weekly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Part-time	Wives That Worked Full-time
Different Region	-0.03554	0.24854 **	-0.05300 *
	(0.02274)	(0.03650)	(0.02531)
From Abroad	-0.34217 **	-0.06435	-0.22945 **
Within Past 5 Years			
Non-movers	-0.03338 **	-0.03094	-0.01983
	-0.00905	0.00609	(0.01055)
Same County	(0.01624)	(0.03142)	-0.01979
			(0.01559)
Different County	0.01640	0.06702	0.00585
	(0.02638)	(0.05085)	(0.02535)
Different State	-0.00536	0.14038	-0.05216
	(0.04804)	(0.09133)	(0.04656)
Different Division	-0.12364 *	0.01097	-0.07734
	(0.05961)	(0.10357)	(0.06144)
Different Region	-0.12506 **	0.02487	-0.09115 *
	(0.03897)	(0.06743)	(0.04031)
From Abroad	-0.37124 **	-0.26214 *	-0.24099 **
	(0.06818)	(0.11197)	(0.07392)
Location			
Urban	0.00533	0.02549 *	-0.03426 **
	(0.00641)	(0.01259)	(0.00610)
Rural	-0.28991 **	-0.28215 **	-0.28026 **
	(0.00572)	(0.01071)	(0.00561)
Unknown	-0.12301 **	-0.10698 **	-0.12996 **
	(0.00635)	(0.01202)	(0.00617)
Northeast	0.06668 **	0.12630 **	0.11492 **
	(0.00633)	(0.01231)	(0.00608)
N. Central/Midwest	-0.05507 **	-0.04039 **	0.00294
	(0.00605)	(0.01176)	(0.00581)
West	-0.03036 **	0.00681	0.02943 **
	(0.00628)	(0.01200)	(0.00610)
Economic Conditions			
Δ in Unemp. Rate	0.05189 **	0.07841 **	0.01301
	(0.01570)	(0.02963)	(0.01529)
Federal Employee Status			
Federal Employee	0.48013 **	0.36061 **	0.32731 **
	(0.01468)	(0.04148)	(0.01241)
Military Families*			
Intercept	-0.59396	-0.70958	-0.28138
	(0.30757)	(0.46749)	(0.37834)

Table B.4. Wife's Weekly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Part-time	Wives That Worked Full-time
Mil. Wife Variables			
If wife's ed = High school or some college (HSSC)			
Age	0.00591	0.02102	-0.00479
	(0.02334)	(0.04268)	(0.02484)
Age-squared	-0.00006	-0.00028	0.00003
	(0.00033)	(0.00063)	(0.00034)
Black	-0.07498	-0.02498	-0.01422
	(0.10750)	(0.17694)	(0.11957)
Other	-0.06123	-0.00349	-0.03124
	(0.08285)	(0.13243)	(0.09405)
Time	-0.00000	0.00294	-0.00412
	(0.00589)	(0.00976)	(0.00639)
If wife's ed < HSSC: difference from HSSC coefficient			
Less than HS	-0.78413	-0.82852	-0.65073
	(0.84471)	(1.25452)	(1.24065)
Age	0.04537	0.04486	0.03321
	(0.05433)	(0.08351)	(0.07266)
Age-squared	-0.00064	-0.00046	-0.00057
	(0.00082)	(0.00129)	(0.00103)
Black	0.04973	-0.33866	0.23325
	(0.32588)	(0.51692)	(0.38848)
Other	0.05858	0.01374	0.13791
	(0.23068)	(0.33674)	(0.31279)
Time	0.01788	0.00962	0.02840
	(0.02718)	(0.03791)	(0.04038)
If wife's ed = Col: difference from HSSC coefficient			
College	-0.10977	-1.37862	0.02034
	(0.73665)	(1.47832)	(0.74712)
Age	0.00814	0.07228	0.00741
	(0.04200)	(0.08709)	(0.04204)
Age-squared	-0.00020	-0.00088	-0.00026
	(0.00059)	(0.00125)	(0.00058)
Black	0.03798	-0.08864	0.00338
	(0.14239)	(0.28785)	(0.13757)
Other	0.06682	-0.05200	-0.08697
	(0.16520)	(0.33665)	(0.16010)
Time	0.00464	-0.00229	0.00181
	(0.01312)	(0.02281)	(0.01369)

Table B.4. Wife's Weekly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Part-time	Wives That Worked Full-time
Husband Variables			
Less than HS	-0.27063	0.35448	-0.63234
	(0.40076)	(0.67533)	(0.43766)
College	-0.00967	0.07382	-0.03243
	(0.08215)	(0.13308)	(0.09199)
Age	0.00421	0.00680	0.00510
	(0.02262)	(0.03954)	(0.02509)
Age-squared	0.00008	-0.00003	0.00009
	(0.00031)	(0.00056)	(0.00034)
Black	0.07852	0.01808	0.05358
	(0.09614)	(0.16097)	(0.10542)
Other	0.18768	0.18498	0.15655
	(0.10083)	(0.17032)	(0.10908)
Time x Less than HS	0.06650	-0.17565	0.20345
	(0.15882)	(0.29160)	(0.16005)
Time x College	-0.01133	-0.01780	0.00165
	(0.01228)	(0.02027)	(0.01353)
Children Variables			
Kids Less than 18	0.01522	0.02124	0.00922
	(0.02395)	(0.03624)	(0.02953)
Kids Less than 6	-0.07070	0.00690	-0.10122
	(0.04753)	(0.07834)	(0.05310)
Number of Kids	-0.03252	-0.15489	0.01566
	(0.06429)	(0.10837)	(0.07138)
Moved Variables *Within Past Year*			
Same County	0.04207	-0.02652	0.07929
	(0.05568)	(0.09251)	(0.06005)
Different County	-0.01257	-0.13404	0.06502
	(0.10832)	(0.17271)	(0.12238)
Different State	0.08664	0.10618	-0.02366
	(0.10516)	(0.16550)	(0.12095)
Different Division	-0.11772	-0.24789	-0.13630
	(0.10766)	(0.16095)	(0.13268)
Different Region	-0.01165	-0.11442	-0.06680
	(0.06206)	(0.09356)	(0.07603)
From Abroad	0.26656 *	0.21893	0.25946
	(0.10431)	(0.14421)	(0.15617)

Table B.4. Wife's Weekly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Part-time	Wives That Worked Full-time
Within Past 5 Years			
Non-movers	0.08161	-0.16030	0.16609
	(0.16863)	(0.31351)	(0.16699)
Same County	0.13240	-0.09062	0.23120
	(0.15111)	(0.26924)	(0.15384)
Different County	-0.07150	-0.35202	0.09229
	(0.24549)	(0.45029)	(0.24480)
Different State	0.16913	0.05694	0.20415
	(0.18020)	(0.28781)	(0.20423)
Different Division	0.02360	0.01538	0.14118
	(0.23094)	(0.34385)	(0.28760)
Different Region	-0.05312	-0.11546	-0.04409
	(0.11314)	(0.17381)	(0.13495)
From Abroad	0.21077	0.02837	0.17383
	(0.17718)	(0.29964)	(0.18861)
Location			
Urban	0.07476	0.11358	0.02177
	(0.04817)	(0.08067)	(0.05193)
Rural	0.25432 **	0.30379 **	0.23879 **
	(0.04992)	(0.07930)	(0.05715)
Unknown	0.05792	0.09435	0.04035
	(0.04704)	(0.07595)	(0.05257)
Northeast	-0.03612	-0.08068	0.07497
	(0.06884)	(0.10618)	(0.08187)
N. Central/Midwest	-0.09304	-0.07657	-0.13134 *
	(0.05526)	(0.08912)	(0.06188)
West	0.03331	0.01691	0.01134
	(0.04059)	(0.06638)	(0.04508)
Economic Conditions			
Δ in unemp. rate	-0.06927	-0.02128	-0.06677
	(0.11470)	(0.18271)	(0.13054)
Federal Employee Status			
Federal Employee	-0.28325 **	-0.11035	-0.28541 **
	(0.05565)	(0.10394)	(0.05649)
R squared	0.104327	0.048656	0.133939
F value	288.50	47.37	239.66

** Coefficients for military families are the **difference between** the military coefficient and the corresponding civilian coefficient.*

Table B.5 Wife's Hourly Wage Regressions

	All Wives That Worked	Wives That Worked Full-time	Wives That Worked Part-time	All Wives That Worked: Heckman Model
Civilian Families				
	1.50851 **	1.45815 **	1.51715 **	1.58466 **
	(0.01896)	(0.02158)	(0.03612)	(0.02164)
Civ. Wife Variables				
If wife's ed = High school or some college (HSSC)				
Age	0.03367 **	0.04004 **	0.02152 **	0.03383 **
	(0.00125)	(0.00140)	(0.00237)	(0.00099)
Age-squared	-0.00035 **	-0.00043 **	-0.00020 **	-0.00035 **
	(0.00001)	(0.00002)	(0.00003)	(0.00001)
Black	-0.01547	-0.03225 *	-0.00020	-0.03183 **
	(0.01493)	(0.01477)	(0.03431)	(0.00607)
Other	-0.01758	-0.04228 **	0.02017	-0.03550 **
	(0.00965)	(0.00983)	(0.02073)	(0.00788)
Time	0.00309 **	-0.00006	0.00692 **	0.00372 **
	(0.00042)	(0.00044)	(0.00087)	(0.00039)
If wife's ed < HSSC: difference from HSSC coefficient				
Less than HS	0.06088	0.18734 **	-0.12604	0.02196
	(0.04499)	(0.05936)	(0.07366)	(0.04528)
Age	-0.01321 **	-0.02041 **	-0.00176	-0.01545 **
	(0.00219)	(0.00291)	(0.00357)	(0.00220)
Age-squared	0.00016 **	0.00024 **	0.00003	0.00019 **
	(0.00003)	(0.00003)	(0.00004)	(0.00003)
Black	0.01403	0.05491 **	-0.01109	0.02881
	(0.01722)	(0.01856)	(0.03413)	(0.01734)
Other	0.03729	0.02163	0.06908	0.04244 *
	(0.01931)	(0.02035)	(0.03907)	(0.01943)
Time	-0.00665 **	-0.00878 **	-0.00453 *	-0.00956 **
	(0.00121)	(0.00134)	(0.00230)	(0.00112)
If wife's ed = Col: difference from HSSC coefficient				
College	0.06026	-0.04518	0.34805 **	0.15815 **
	(0.03478)	(0.03855)	(0.06911)	(0.03481)
Age	0.01222 **	0.01615 **	-0.00110	0.01095 **
	(0.00166)	(0.00188)	(0.00319)	(0.00167)
Age-squared	-0.00013 **	-0.00017 **	-0.00000	-0.00013 **
	(0.00002)	(0.00002)	(0.00004)	(0.00002)
Black	0.04938 **	0.03785 **	0.08419 *	0.04616 **
	(0.01178)	(0.01096)	(0.03411)	(0.01187)
Other	0.00168	0.00842	-0.02167	-0.00075
	(0.01231)	(0.01211)	(0.02884)	(0.01238)

Table B.5 Wife's Hourly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Full-time	Wives That Worked Part-time	All Wives That Worked: Heckman Model
Time	0.00466 **	0.00574 **	0.00323	0.00555 **
	(0.00080)	(0.00082)	(0.00171)	(0.00071)
Husband Variables				
Less than HS	-0.07467 **	-0.08626 **	-0.06169 **	
	(0.00695)	(0.00738)	(0.01383)	
College	0.08029 **	0.07503 **	0.10546 **	
	(0.00536)	(0.00568)	(0.01070)	
Age	0.00469 **	0.00425 **	0.00678 **	
	(0.00109)	(0.00118)	(0.00213)	
Age-squared	-0.00004 **	-0.00005 **	-0.00005 *	
	(0.00001)	(0.00001)	(0.00002)	
Black	-0.00744	-0.00722	-0.02935	
	(0.01422)	(0.01411)	(0.03235)	
Other	-0.02750 **	-0.02022 *	-0.06117 **	
	(0.00888)	(0.00905)	(0.01907)	
Time x Less than HS	-0.00525 **	-0.00479 **	-0.00504 *	
	(0.00112)	(0.00118)	(0.00229)	
Time x College	0.00206 **	0.00262 **	0.00170	
	(0.00077)	(0.00081)	(0.00158)	
Children Variables				
Kids Less than 18	-0.03091 **	-0.02791 **	-0.02017 **	
	(0.00174)	(0.00200)	(0.00314)	
Kids Less than 6	0.09755 **	0.07934 **	0.14639 **	
	(0.00340)	(0.00368)	(0.00665)	
Number of Kids	-0.01091 **	-0.00721	0.00790	
	(0.00413)	(0.00441)	(0.00851)	
Moved variables *Within Past Year*				
Same County	-0.04652 **	-0.04187 **	-0.05402 **	-0.04510 **
	(0.00444)	(0.00463)	(0.00914)	(0.00448)
Different County	-0.02715 **	-0.00402	-0.04909 **	-0.01984 **
	(0.00748)	(0.00807)	(0.01452)	(0.00754)
Different State	-0.02500 *	-0.01872	-0.01063	-0.01798
	(0.01196)	(0.01343)	(0.02197)	(0.01205)
Different Division	-0.02699	-0.01023	-0.00950	-0.01491
	(0.01793)	(0.02141)	(0.03074)	(0.01806)
Different Region	-0.03230 **	-0.03390 *	0.00481	-0.02354 *
	(0.01165)	(0.01397)	(0.01992)	(0.01174)
From Abroad	-0.11450 **	-0.05241	-0.09960 *	-0.14028 **

Table B.5 Wife's Hourly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Full-time	Wives That Worked Part-time	All Wives That Worked: Heckman Model
Within past 5 years				
Non-movers	0.00307	-0.00131	0.01174	0.00291
	(0.00555)	(0.00582)	(0.01128)	(0.00559)
Same County	-0.01258	-0.01964 *	-0.00265	-0.00962
	(0.00829)	(0.00857)	(0.01726)	(0.00835)
Different County	-0.00542	0.00925	-0.03026	0.00736
	(0.01338)	(0.01390)	(0.02762)	(0.01349)
Different State	-0.03580	-0.04167	-0.01122	-0.02182
	(0.02453)	(0.02565)	(0.05005)	(0.02473)
Different Dvision	-0.04718	-0.09192 **	0.03558	-0.04095
	(0.03024)	(0.03359)	(0.05620)	(0.03047)
Different Region	-0.08476 **	-0.08330 **	-0.06526	-0.07481 **
	(0.01994)	(0.02222)	(0.03691)	(0.02010)
From Abroad	-0.21669 **	-0.18579 **	-0.22075 **	-0.23359 **
	(0.03537)	(0.04124)	(0.06216)	(0.03574)
Location				
Urban	-0.02658 **	-0.03384 **	-0.02021 **	-0.02885 **
	(0.00325)	(0.00335)	(0.00684)	(0.00328)
Rural	-0.19390 **	-0.21092 **	-0.16156 **	-0.20633 **
	(0.00293)	(0.00310)	(0.00589)	(0.00295)
Unknown	-0.09594 **	-0.10168 **	-0.08559 **	-0.09890 **
	(0.00323)	(0.00339)	(0.00655)	(0.00326)
Northeast	0.10967 **	0.12593 **	0.10043 **	0.11320 **
	(0.00322)	(0.00334)	(0.00670)	(0.00324)
N. Central/Midwest	0.00684 *	0.01929 **	-0.00029	0.01030 **
	(0.00309)	(0.00320)	(0.00646)	(0.00313)
West	0.04865 **	0.05487 **	0.05348 **	0.04856 **
	(0.00321)	(0.00336)	(0.00659)	(0.00322)
Economic conditions				
Δ in Unemp. Rate	0.02166 **	0.02002 *	0.01595	0.02561 **
	(0.00799)	(0.00840)	(0.01613)	(0.00805)
Federal Employee Status				
Federal Employee	0.26714 **	0.26345 **	0.16714 **	0.27199 **
	(0.00735)	(0.00675)	(0.02222)	(0.00740)

Table B.5 Wife's Hourly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Full-time	Wives That Worked Part-time	All Wives That Worked: Heckman Model
Selectivity ( )				0.06051 **
				(0.00835)
Selectivity (rho)				0.11128
				--
Selectivity (sigma)				0.54379
				--
Military Families*				
Intercept	-0.65586 **	-0.11325	-0.89955 **	-0.38961 **
	(0.15854)	(0.21012)	(0.25691)	(0.13582)
Mil. wife variables				
If wife's ed = High school or some college (HSSC)				
Age	0.01805	-0.00839	0.03780	0.00770
	(0.01202)	(0.01366)	(0.02369)	(0.00796)
Age-squared	-0.00022	0.00008	-0.00045	-0.00005
	(0.00017)	(0.00019)	(0.00035)	(0.00012)
Black	0.04354	0.01580	0.08294	0.04231
	(0.05505)	(0.06510)	(0.09780)	(0.03156)
Other	-0.06816	-0.06330	-0.07993	-0.02492
	(0.04240)	(0.05110)	(0.07325)	(0.03897)
Time	0.00625 *	0.00248	0.00912	0.00587 *
	(0.00303)	(0.00353)	(0.00540)	(0.00288)
If wife's ed < HSSC: difference from HSSC coefficient				
Less than HS	0.17043	-0.10355	0.09762	0.21793
	(0.46988)	(0.73268)	(0.73703)	(0.47240)
Age	-0.00458	-0.00430	0.00853	-0.00497
	(0.02992)	(0.04330)	(0.04824)	(0.03007)
Age-squared	-0.00002	0.00003	-0.00022	-0.00002
	(0.00045)	(0.00062)	(0.00073)	(0.00045)
Black	-0.09046	-0.00327	-0.15691	-0.11251
	(0.17045)	(0.21455)	(0.29605)	(0.17089)
Other	0.08955	0.16741	0.02805	0.09395
	(0.11943)	(0.17576)	(0.18525)	(0.11941)
Time	0.03283 *	0.04764 *	0.02116	0.03157 *
	(0.01455)	(0.02239)	(0.02186)	(0.01461)
If wife's ed = Col: difference from HSSC coefficient				
College	-0.46403	-0.11783	-1.96777 *	-0.38941
	(0.37073)	(0.40742)	(0.79661)	(0.37025)
Age	0.03128	0.01467	0.11672 *	0.02791
	(0.02112)	(0.02293)	(0.04698)	(0.02111)

Table B.5 Wife's Hourly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Full-time	Wives That Worked Part-time	All Wives That Worked: Heckman Model
Age-squared	-0.00053	-0.00034	-0.00169 *	-0.00049
	(0.00029)	(0.00032)	(0.00067)	(0.00029)
Black	-0.01310	-0.00208	-0.05399	-0.02784
	(0.07177)	(0.07487)	(0.15538)	(0.07210)
Other	-0.03079	-0.02164	-0.06902	-0.02197
	(0.08429)	(0.08767)	(0.18697)	(0.08405)
Time	-0.00311	-0.00254	-0.00341	-0.00436
	(0.00666)	(0.00746)	(0.01248)	(0.00589)
Husband Variables				
Less than HS	0.10203	0.10146	0.11016	
	(0.23956)	(0.28818)	(0.42722)	
College	-0.01151	-0.00728	-0.00446	
	(0.04204)	(0.05064)	(0.07304)	
Age	0.00877	0.00377	0.00913	
	(0.01166)	(0.01381)	(0.02195)	
Age-squared	-0.00009	0.00004	-0.00019	
	(0.00016)	(0.00018)	(0.00031)	
Black	-0.00791	0.00435	-0.00574	
	(0.04906)	(0.05727)	(0.08866)	
Other	0.14640 **	0.09974	0.20546 *	
	(0.05145)	(0.05936)	(0.09403)	
Time x Less than HS	-0.00931	0.01247	-0.03689	
	(0.08860)	(0.09604)	(0.17868)	
Time x College	-0.00161	-0.00438	-0.00080	
	(0.00627)	(0.00739)	(0.01114)	
Children Variables				
Kids Less than 18	-0.00900	0.00205	-0.01534	
	(0.01249)	(0.01642)	(0.02028)	
Kids Less than 6	-0.02521	-0.05943 *	-0.01061	
	(0.02460)	(0.02941)	(0.04362)	
Number of Kids	-0.04831	-0.00310	-0.13458 *	
	(0.03326)	(0.03937)	(0.06062)	
Moved Variables *Within past year*				
Same County	0.00761	0.03529	-0.01694	0.01371
	(0.02877)	(0.03298)	(0.05179)	(0.02886)
Different County	-0.08469	-0.02542	-0.14284	-0.09998
	(0.05575)	(0.06668)	(0.09663)	(0.05610)

Table B.5 Wife's Hourly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Full-time	Wives That Worked Part-time	All Wives That Worked: Heckman Model
Different State	0.04744	0.03314	0.06096	0.04959
	(0.05516)	(0.06815)	(0.09276)	(0.05541)
Different Division	-0.07014	-0.14714 *	-0.03851	-0.07228
	(0.05714)	(0.07451)	(0.09182)	(0.05748)
Different Region	-0.01343	-0.09031 *	0.00950	-0.02115
	(0.03209)	(0.04197)	(0.05174)	(0.03213)
From Abroad	0.05041	-0.02405	0.06717	0.05857
	(0.05453)	(0.08552)	(0.08072)	(0.05496)
Within past 5 years				
Non-movers	0.05202	0.07956	0.03875	0.06489
	(0.08712)	(0.09060)	(0.18230)	(0.08769)
Same County	0.03827	0.15468	-0.14068	0.05001
	(0.07675)	(0.08348)	(0.14846)	(0.07721)
Different county	-0.04550	-0.02709	-0.06278	-0.02836
	(0.12548)	(0.13281)	(0.25328)	(0.12626)
Different State	0.08560	0.12486	0.02245	0.07891
	(0.09436)	(0.11089)	(0.16635)	(0.09505)
Different Division	-0.00087	0.13432	-0.12611	-0.01006
	(0.12000)	(0.15605)	(0.19380)	(0.12076)
Different Region	-0.08995	-0.00787	-0.17033	-0.09942
	(0.05841)	(0.07561)	(0.09518)	(0.05878)
From Abroad	0.15326	0.12094	0.18330	0.16248
	(0.09334)	(0.10469)	(0.17384)	(0.09404)
Location				
Urban	0.07368 **	0.03764	0.11358 *	0.07598 **
	(0.02484)	(0.02862)	(0.04492)	(0.02493)
Rural	0.13505 **	0.13924 **	0.12023 **	0.14157 **
	(0.02579)	(0.03140)	(0.04422)	(0.02589)
Unknown	0.03424	0.02245	0.05273	0.03326
	(0.02438)	(0.02900)	(0.04247)	(0.02445)
Northeast	-0.02397	0.03022	-0.05219	-0.02372
	(0.03557)	(0.04492)	(0.05897)	(0.03577)
N. Central/Midwest	-0.05631 *	-0.13178 **	0.02478	-0.05952 *
	(0.02867)	(0.03412)	(0.04994)	(0.02881)
West	-0.00732	-0.01004	-0.00602	-0.00420
	(0.02104)	(0.02489)	(0.03712)	(0.02108)
Economic Conditions				
Δ in Unemp. Rate	-0.03944	-0.01060	-0.02409	-0.04975
	(0.05968)	(0.07247)	(0.10242)	(0.06000)

Table B.5 Wife's Hourly Wage Regressions (continued)

	All Wives That Worked	Wives That Worked Full-time	Wives That Worked Part-time	All Wives That Worked: Heckman Model
Federal Employee Status				
Federal Employee	-0.22651 **	-0.21749 **	-0.15549 **	-0.23075 **
	(0.02815)	(0.03091)	(0.05603)	(0.02825)
R squared	0.200236	0.272162	0.126960	
F Value	590.70	562.07	124.36	
Wald chi-sq (152)				66753.72

** Coefficients for military families are the **difference between** the military coefficient and the corresponding civilian coefficient.*

Table B.6 Selection Equation for Hourly Wage Model: Probability Wife Worked in the Year

Variable	Probability Wife Worked in Year
Civilian Families	-0.1733349
	(0.0384839)
Civ. Wife Variables	
If wife's ed = High school or some college (HSSC)	
Age	0.1005665
	(0.0023263)
Age-squared	-0.0014514
	(0.0000247)
Black	0.0422034
	(0.0340271)
Other	-0.0838307
	(0.0182234)
Time	0.0141063
	(0.0009045)
If wife's ed < HSSC: difference from HSSC coefficient	
Less than HS	-0.4477296
	(0.0693222)
Age	-0.0068558
	(0.0032249)
Age-squared	0.0001347
	(0.0000358)
Black	
Other	
Time	-0.0053582
	(0.0021304)
If wife's ed = CoI: difference from HSSC coefficient	
College	0.0482368
	(0.0749253)
Age	0.0107107
	(0.0033176)
Age-squared	-0.0000814
	(0.000035)
Black	
Other	
Time	0.0023682
	(0.0018532)
Husband Variables	
Less than HS	-0.0198849
	(0.0133185)
College	-0.0872351
	(0.0114871)

Table B.6 Selection Equation for Hourly Wage Model: Probability Wife Worked in the Year (continued)

Variable	Probability Wife Worked in Year
Age	-0.0121942
	(0.0020948)
Age-squared	-0.0000175
	(0.0000211)
Black	0.1765227
	(0.0333785)
Other	-0.0355113
	(0.019257)
Time x Less than HS	-0.0157727
	(0.00218)
Time x College	-0.0063625
	(0.0016727)
Children Variables	
Kids Less than 18	-0.174084
	(0.0034135)
Kids Less than 6	-0.4146158
	(0.0075148)
Number of Kids	0.0471629
	(0.0090297)
Moved Variables Within Past Year	
Same County	0.0192983
	(0.009918)
Different County	-0.0121393
	(0.0168224)
Different State	-0.0664528
	(0.0259061)
Different Division	-0.1129816
	(0.0380271)
Different Region	-0.1784593
	(0.0243046)
From Abroad	-1.000573
	(0.0386118)
Within Past 5 Years	
Non-movers	0.0053767
	(0.0115869)
Same County	0.0398471
	(0.0187211)
Different County	0.0129834
	(0.0309276)
Different State	-0.0474962
	(0.055549)
Different Division	-0.1370574
	(0.0652518)

Table B.6 Selection Equation for Hourly Wage Model: Probability Wife Worked in the Year (continued)

Variable	Probability Wife Worked in Year
Different Region	-0.1347397
	(0.0427504)
From Abroad	-0.6769876
	(0.0583384)
Location	
Urban	-0.0512316
	(0.0067891)
Rural	0.0333963
	(0.0062305)
Unknown	0.0393159
	(0.0069268)
Northeast	0.036112
	(0.0067705)
N. Central/Midwest	0.1346808
	(0.0066377)
West	0.0459834
	(0.0066647)
Economic Conditions	
Δ in Unemp. Rate	0.0440295
	(0.0169512)
Military Families*	
Intercept	0.8959689
	(0.3020482)
Mil. Wife Variables	
If wife's ed = High school or some college (HSSC)	
Age	-0.1142498
	(0.0248223)
Age-squared	0.0013112
	(0.0003446)
Black	0.0033058
	(0.1198741)
Other	-0.034129
	(0.0734137)
Time	-0.0137536
	(0.0064528)
If wife's ed < HSSC: difference from HSSC coefficient	
Less than HS	0.6130798
	(0.7999747)
Age	-0.0159586
	(0.0484024)
Age-squared	0.0000346
	(0.0007045)

Table B.6 Selection Equation for Hourly Wage Model: Probability Wife Worked in the Year (continued)

Variable	Probability Wife Worked in Year
Black	
Other	
Time	-0.0418052
	(0.0232418)
If wife's ed = Col: difference from HSSC coefficient	
College	1.380219
	(0.9031203)
Age	-0.0711124
	(0.0504292)
Age-squared	0.0009421
	(0.000693)
Black	
Other	
Time	-0.0217304
	(0.0142803)
Husband Variables	
Less than HS	0.060519
	(0.4393429)
College	-0.0993788
	(0.0853405)
Age	0.0401284
	(0.023531)
Age-squared	-0.0002453
	(0.0003145)
Black	0.0477876
	(0.1115067)
Other	0.1669406
	(0.104383)
Time x Less than HS	-0.0394274
	(0.146062)
Time x College	-0.0062458
	(0.0126895)
Children Variables	
Kids Less than 18	0.0235218
	(0.0232714)
Kids Less than 6	-0.2350403
	(0.0503461)
Number of Kids	0.1039982
	(0.0701619)

Table B.6 Selection Equation for Hourly Wage Model: Probability Wife Worked in the Year (continued)

Variable	Probability Wife Worked in Year
Moved Variables Within Past Year	
Same County	0.0730083
	(0.0616016)
Different County	0.0596926
	(0.1150199)
Different State	0.0285896
	(0.1132995)
Different Division	0.2470894
	(0.1253808)
Different Region	0.2212073
	(0.0674848)
From Abroad	0.8315449
	(0.0994509)
Within past 5 years	
Non-movers	0.4833412
	(0.2175191)
Same County	0.0470243
	(0.1638376)
Different County	-0.2157427
	(0.2473048)
Different State	0.1554973
	(0.1963729)
Different Division	-0.1358723
	(0.2297421)
Different Region	0.1849695
	(0.1226576)
From Abroad	0.4842618
	(0.1756605)
Location	
Urban	0.1349243
	(0.0518255)
Rural	0.0241513
	(0.0537163)
Unknown	-0.0196038
	(0.0500463)
Northeast	0.0510762
	(0.0720882)
N. Central/Midwest	0.0053878
	(0.0592664)
West	0.1705526
	(0.0436587)
Economic Conditions	
Δ in Unemp. Rate	-0.0284316
	(0.1223174)

APPENDIX C

PRESENCE OF CHILDREN UNDER 6 AMONG FAMILIES WITH CHILDREN

Figure C.1 Among Families with Children and Wife with High School Education, Percentage with Children Under Age 6

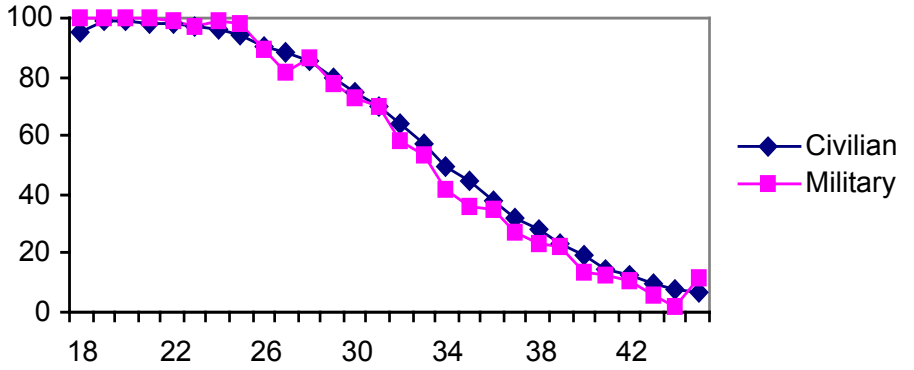
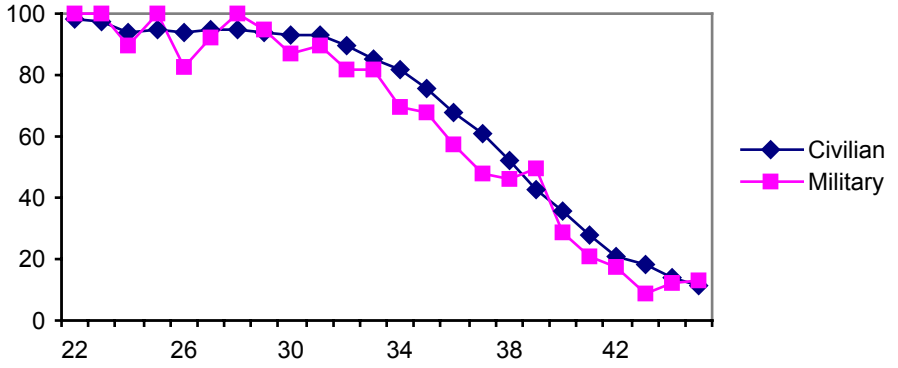


Figure C.2 Among Families with Children and Wife with College Education, Percentage with Children Under Age 6



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CHAPTER III

MILITARY COMPENSATION IN THE AGE OF TWO-INCOME HOUSEHOLDS:

ADDING SPOUSES' EARNINGS TO THE COMPENSATION POLICY MIX

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The views expressed in this paper represent those of the author and are not necessarily those of the Department of Defense.

INTRODUCTION

Heretofore, analyses of military compensation have addressed only the employment and compensation conditions confronting uniformed service members. The following analysis examines the effect of military service on the employment and earnings of civilian spouses in military households. It explores the experiences of civilian spouses in the labor market so that policies can be formulated to reflect the economic conditions facing military households.

By incorporating an appreciation for the relationship between military service and civilian spouse earnings, the effective scope of compensation policy can be expanded. Specifically, to the extent that unique conditions of military life impose a wage and employment penalty on spouses of military personnel, compensatory policies can improve these earnings and thus the lot of military households. Moreover, this approach may engender policy alternatives that increase military household income at a substantially lower national expense than could be achieved through compensatory increases in military pay.

This analysis first addresses the relevance of civilian spouse earnings to discussions of military compensation and explores the degree to which military service impinges upon the employment and earnings outcomes of spouses of military personnel. It then outlines a range of policy measures tailored to address unique employment and earnings challenges that may confront spouses of military personnel.

SCOPE OF ANALYSIS

While the analysis that follows addresses spouse earnings and employment outcomes from the perspective of wives, it is equally applicable to husbands of female service members. Wives are the focus on this analysis because males make up 85 percent of military personnel. Due to higher rates of marriage among male service members, wives constitute 93 percent of civilian spouses.[1] This situation imposes analytic constraints. Specifically, male spouses of female military personnel represent too small a population in available survey data to analyze the wage and employment outcomes of husbands of female military personnel.

[1] Based upon February 2001 Defense Manpower Data Center marital statistics.

THE EFFECT OF MILITARY SERVICE ON WIVES' EARNINGS

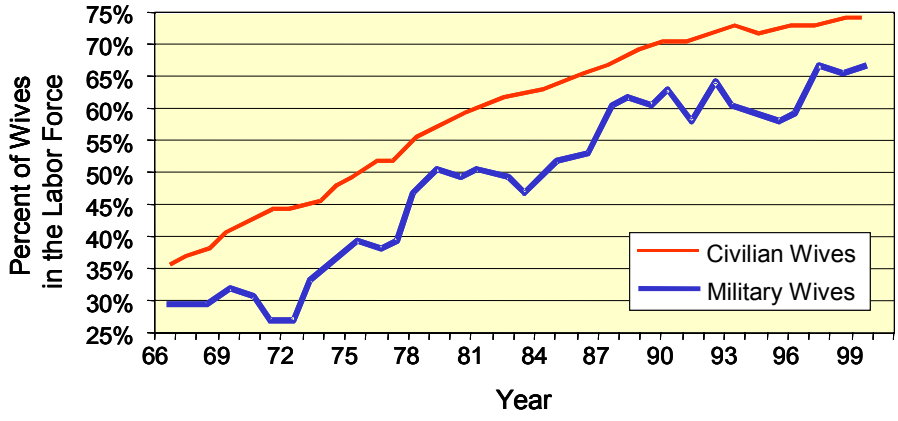
Current formulations of military pay have their genesis in the Gorham Report on military compensation. This report was prepared at the request of Secretary of Defense McNamara in 1962. In its review of military compensation, the Gorham Commission noted that all service members were entitled to basic pay, the basic allowance for quarters, and the basic allowance for subsistence. Taken as a whole, these pays and allowances and their attendant tax advantage were combined by the Commission into "regular military compensation" (RMC) as a metric for comparing civilian and military earnings.[2] Since 1962, with minor adjustments, RMC has served as the conceptual framework within which military compensation policy has evolved. Based upon labor market conditions existent in 1962, RMC was at that time a reasonable basis for assessing pay comparability and adjusting military compensation.

At the time of the Gorham Commission, single income households were the norm. In the civilian sector, male earnings were the predominant source of household income. Similarly, distinctions between soldier earnings and military household earnings could pass without notice. Indeed, high rates of female labor participation and earnings are a fairly recent phenomenon; today's senior uniformed leaders entered the military services in which the preponderance of wives labored within the home or as volunteers. However, dual income households have now become the norm in both civilian and military households. Since the time of the Gorham Commission, the rate of labor force participation among wives has more than doubled so that over 75 percent of wives in civilian households now work or are seeking work outside the home.[3] Paralleling this striking trend, the rate of labor force participation among wives of military personnel now exceeds 65 percent, as is illustrated in Figure 1.

[2] The basic allowance for subsistence (BAS) and basic allowance for quarters (BAQ) are paid to soldiers as allowances rather than income and are thus tax free.

[3] March 1999 Supplement to the Current Population Survey (CPS) for wives of husbands age 20 to 49.

Figure 1. Labor Force Participation Among Wives with Civilian or Military Husbands Age 20 through 49

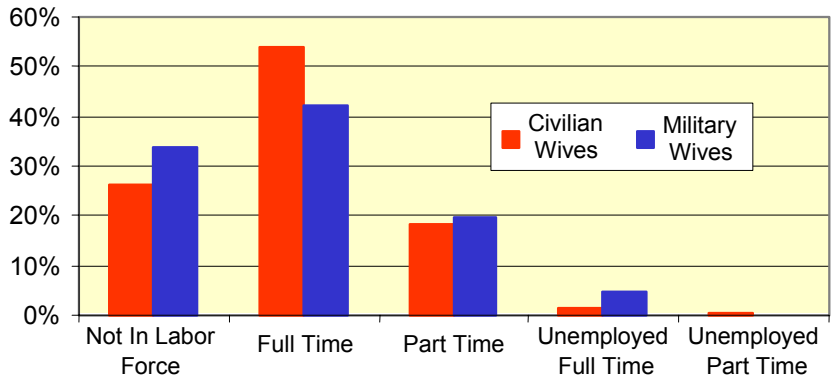


Data Source: March Supplements to Current Population Survey

Statistics based on labor force participation measure the rate at which Americans work or seek to work outside the home. Labor force status, on the other hand, differentiates between employment outcomes – employment (full-time or part-time) and unemployment (those -seeking full–or part-time employment).

Figure 2 shows the differences in labor force status between wives in civilian and military households in 1999. As already depicted in Figure 1, the wives of military personnel were somewhat less likely to be in the labor force than were civilian wives—a difference of about 10 percentage points. Among those in the labor force, however, the unemployment rate of wives of military personnel was about four times higher than that reported for wives of civilians. Between these bounds, full-time and part-time employment follows somewhat disparate patterns. Forty-two percent of military wives were employed full time while 20 percent worked part time. In contrast, 53 percent of wives of civilians worked full time while 18 percent worked part time.

Figure 2. March 1999 Labor Force Status of Wives During the Previous Year Within Traditional Civilian and Military Households (wives of husbands age 20 through 43)



Data Source: March 1999 Supplement to Current Population Survey

Military Wives' Return on Human Capital

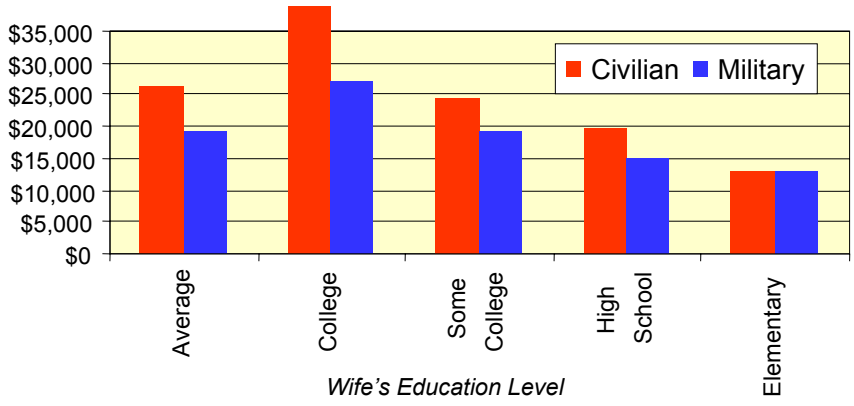
Not only are military wives who seek work less likely to find it but data on annual earnings, as presented in Figure 3, suggests a systemic military wage penalty. Specifically, among those working full time, a $7,000 margin separates the average wage earnings of wives in civilian and military households. Importantly, this disparity increases with educational level from near-wage-parity among wives with only an elementary education to almost a $12,000 gap for those with a college degree.

Thus, the wage gap between civilian wives and military wives is 24 to 30 percent for wives who are high-school through college graduates. While the earnings levels provided in Figure 3 do not control for factors such as hours worked, they demonstrate a linkage between military service and lower earnings for spouses.

Moving Beyond Descriptive Analysis

Many factors can shape employment and earnings levels. Among wives, these include factors that affect labor market participation as well as factors such as human capital and labor expenditure.

Figure 3. Average Annual Earnings of Wives Working Full Time in 1998 (wives of husbands age 20 through 48)

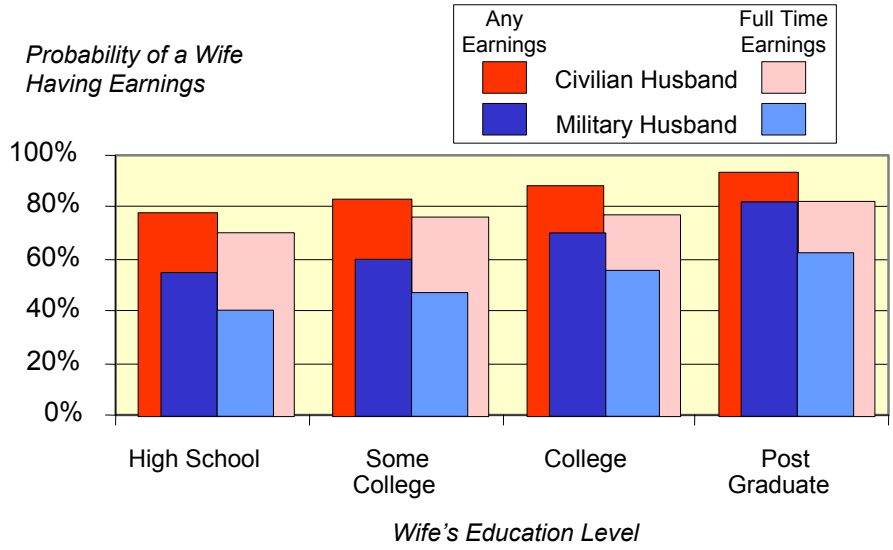


Data Source: March 1999 Supplement to the Current Population Survey.

With regard to labor market participation, the presence of young children in a family can increase the cost of working outside the home since such work will entail childcare expenses. If these expenses are sufficiently high, or prevailing wages are sufficiently low, work outside the home can become a losing proposition. Similarly, the presence of older children can require that a parent be available to drive to and from school and to after-school activities, thus limiting how far an individual is willing to commute between home and work and circumscribing commuting to high-wage areas. Additionally, husbands' current earnings and potential lifetime earnings, as represented by their education level, affect their wives' labor force participation. When husbands' earnings are relatively high, wives may be less likely to exhibit high levels of labor force participation holding other factors constant.

Moving beyond descriptive analyses and controlling for the aforementioned factors using multivariate statistical techniques, one finds that wives of military personnel are much less likely to have earnings from either full-time or part-time employment. Indeed, military wives exhibit far less likelihood of part-time or full-time employment than do their contemporaries married to civilians, holding other relevant factors constant. This situation is illustrated in Figure 4. For example, in the case of a wife with a post-graduate degree, marriage to a service member, rather than a civilian, lowers the wife's probability of full-time employment from 80 to 61 percent.

Figure 4. Employment Outcomes, Military and Civilian Wives (probit simulation results for wives with husbands age 20 to 50)

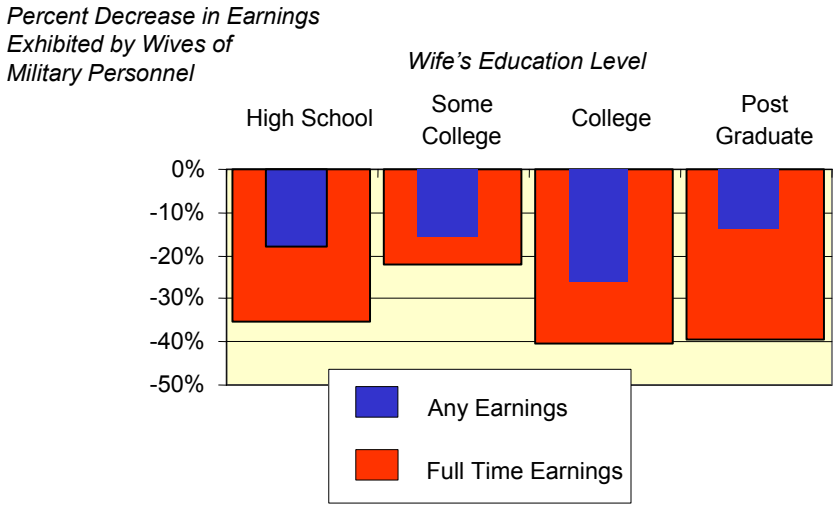


Data Source: 1993, 1995, 1997 and 1999 March Supplements to the Current Population Surveys.

For wives who are working, wages are affected by factors such as accumulation of specific and nonspecific human capital. Typically, specific human capital, accumulated through work experience on a job, yields higher productivity and wages. Similarly, higher levels of nonspecific human capital, as represented by educational attainment, correspond to higher wage levels. From a theoretic perspective, these higher wages are due to the extent to which human capital contributes to and signals higher labor productivity. Of course, labor expenditure—as represented by the number of weeks worked per year—also underpins annual wages.

Controlling for these factors, and those shaping wives' labor force participation decisions, a substantial wage penalty exists among military wives working full time or part time. For example, as indicated above, a wife with a post-graduate degree will, on average, earn some 40 percent less in full time wages than if she were married to a non-military husband. Given the distribution of educational attainment found among wives of military personnel, the situation exhibited in Figure 5 yields an average wage penalty of some 30 percent among wives of military personnel, after controlling for relevant factors. This figure is comparable quite well to the wage penalty exhibited in Figure 3.

Figure 5. Earnings Penalty Exhibited by Wives of Military Personnel (by wife's education level, holding other factors constant)



Data Source: 1983, 1995, 1997, and 1999 March Supplements to the Current Population Surverys.
Note: Assumes 1.2 percent measurement error in weeks worked.

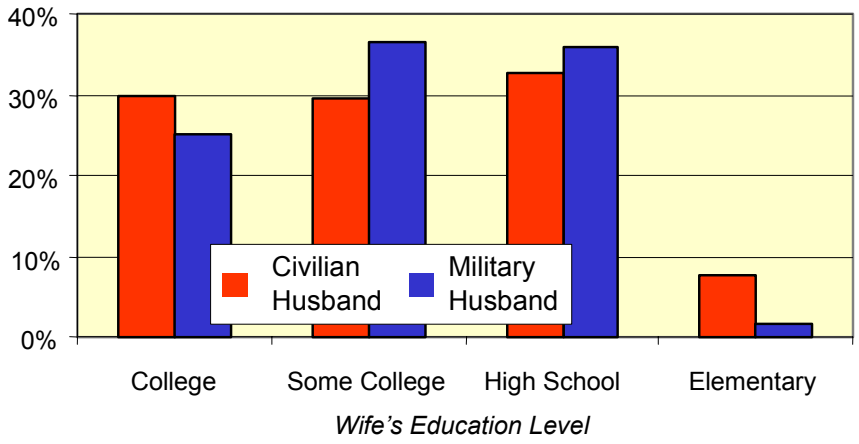
EDUCATIONAL ATTAINMENT OF MILITARY WIVES

Although there appears to be wage parity between military and civilian wives with only an elementary level education (as shown in Figure 3), Figure 6 indicates that almost all wives of military personnel fall within higher education levels where they receive lower earnings than reported by their civilian contemporaries. Indeed, for education levels below a bachelor's degree, wives of military personnel have higher educational attainment than do wives of civilians.

Of course, a confluence of human nature and military personnel policy virtually ensures that wives of military personnel will be a relatively well-educated group. Specifically, with regard to educational attainment, "likes" tend to marry "likes." Indeed, the correlation between the amount of education attained by husbands and wives approaches 66 percent. Educational attainment is a consideration in both accession and career progression decisions in the military Services. By extension, therefore, the spouses of military personnel will be a relatively educated population. Since accession and career progression standards are likely to increase in

tandem with the intellectual demands imposed by today's information-based warfare, it is unlikely that the educational attainment of military wives will decline. Rather, the opposite is far more likely.

Figure 6. Education Levels of Wives of Husbands Age 20 through 43



Data Source: March 1999 Supplement to the Current Population Survey

MILITARY HOUSEHOLD FORMATION

From a compensation policy perspective, the potential value of raising military household income by reducing any wage penalty among wives of military personnel depends on two important factors. These factors are the magnitude of any such penalty and the prevalence of marriage among military personnel. Whereas the foregoing section established the existence and the magnitude of the penalty, this section briefly addresses household formation within the military. Figures 7 and 8 show the extent to which marriage is a dominant trait of the career force.

Figure 7. Marital Status of Male Enlisted Personnel by Branch of Service, December 2000

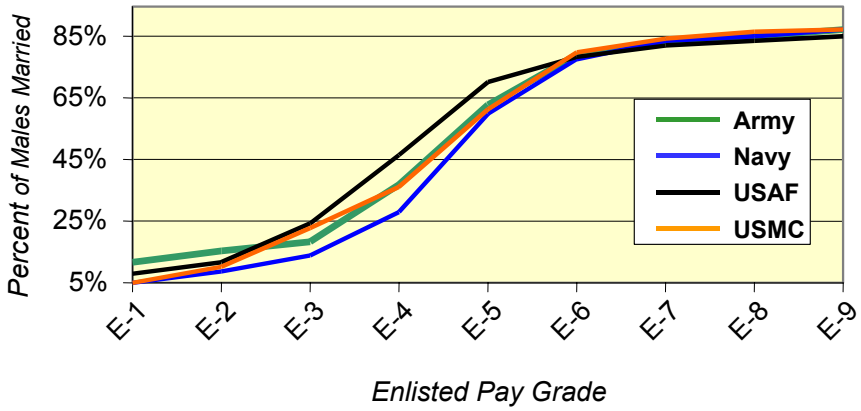
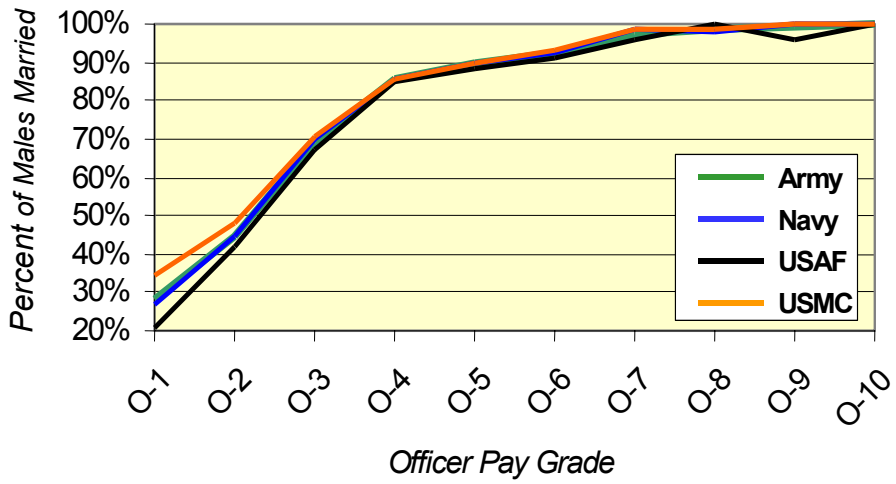


Figure 8. Marital Status of Male Officers by Branch of Service, December 2000



Data Source: Defense Manpower Data Center

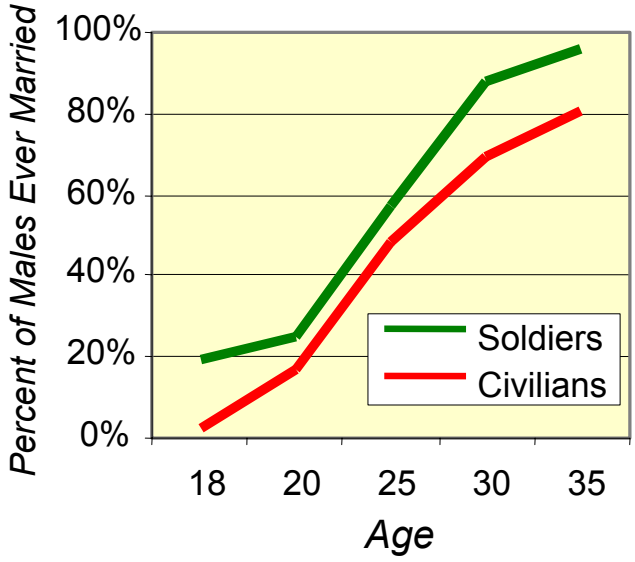
Looking across services and pay grades, two important patterns emerge with regard to marital rates among male service members. First, the percent of married males increases dramatically as males complete their initial term of service. This pattern holds across enlisted and officer ranks. At its basis, this trend is temporal in nature in that marriage is an early life-course event. Consequently, the prevalence of any wage penalty among spouses will be an increasing function of service member

longevity. Therefore, any such wage penalty will bear most heavily upon the career force.

Second, marital rates exhibit low variability across services. That is, high rates of household formation are a Department-of-Defense-wide phenomenon and are not service-specific.

Comparing the marital rates of servicemen and typical civilian males is also instructive. For example, as indicated in Figure 9, Army soldiers exhibit higher marital rates then do their civilian counterparts. Indeed, at any given age, service members are far more likely to be married than are their civilian peers.

Figure 9. Marital Status of Civilian Males and Male Soldiers Age 18 to 35 (ever married as of March 1999)



Data Source: Current Population Survey, Army Enlisted Master File, and Dependent Eligibility Entitlement System

The current conditions and policies relevant to marriage by service members should be contrasted to those existent at the time of the Gorham Commission. Prior to the inception of the All-Volunteer Force, soldiers needed their commander's permission to marry. At the same time, relatively low military pay did not provide junior personnel the resources to set up housekeeping. Furthermore, the military services engaged in practices that were likely to have depressed the labor force participation of military wives. Until the early 1980s, for example, commanders continued

to make reference to wives' community and volunteer activities in their husbands' efficiency (evaluation) reports. Today, however, the military services make a substantial investment in married personnel. This investment takes the form of family housing, increased allowances for off-post housing, medical care for wives, and increased weight and dislocation allowances for transfers between stations. Military personnel now face considerably lower financial barriers to household formation.

THE IMPACT OF MIGRATION

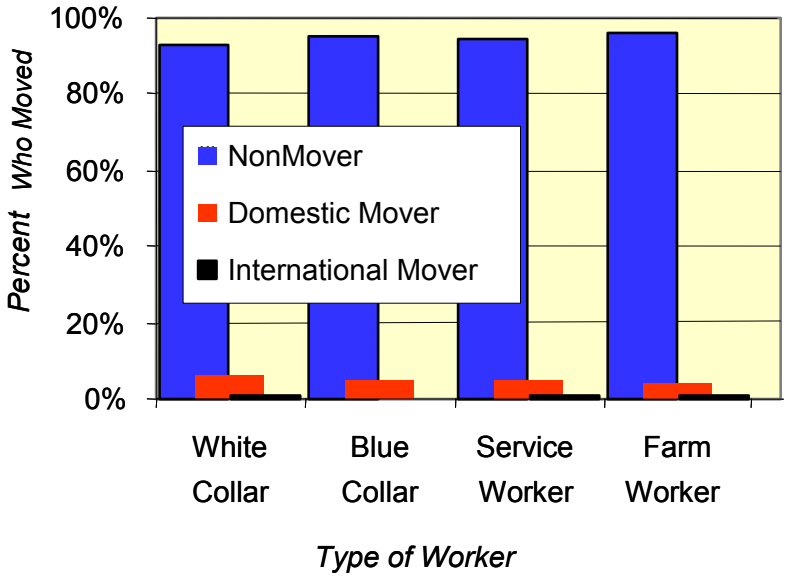
As reflected in Figure 10 below, military service entails frequent moves. For example, 32 percent of traditional military families moved across county or international boundaries between March 1998 and March 1999. This transient behavior ensues from the military utility of shifting personnel between units to satisfy near-term readiness demands and professional development requirements, and to accommodate changing national priorities and heterogeneous rates of personnel turnover. Based on these considerations, the Army, for example, moved one third of its soldiers during the past year. Many of these reassignments were structured to shift personnel from training, recruiting, and acquisition posts to combat forces with the objective of raising the readiness of under-strength divisions. In contrast, as illustrated in Figure 10 below, civilian households were less transient..

Cognizant of the mobile nature of military life, academic researchers have heretofore addressed the topic of military wives' earnings from the context of migration. That is, they have largely attributed the wage penalty suggested in Figure 3 to career interruption and the loss of jobs due to dislocation. While there is certainly a basis for this approach, it does not sufficiently account for the observed penalty. Furthermore, it does not lead to effective policy considerations within the Department of Defense, because resulting policy remedies begin with recommendations to reduce migration, which is a difficult proposition to implement

Migration-based analysis, as applied to the military, is an extension of earlier academic work. This work ensued from the increasingly migratory nature of corporate employment during the 1960s and 1970s. In a corporate setting, wives experienced wage loss and career interruption as they moved according to the dictates of their husbands' career. Within that context, couples would elect to move only if the relocation-induced wage increase garnered by the husband exceeded the wife's earnings loss. However, from the perspective of military households, migration typically has zero net effect on the service members' income. Moreover, it can be an income-reducing proposition for the civilian spouse of a service

member. Within the military, migration is not a matter of household income maximization. Rather, migration is a condition of military service.

Figure 10. Percent of Traditional Households, with Husbands Ages 20 to 49 in the Labor Force, that Moved Across County Lines Between March 1998 and 1999



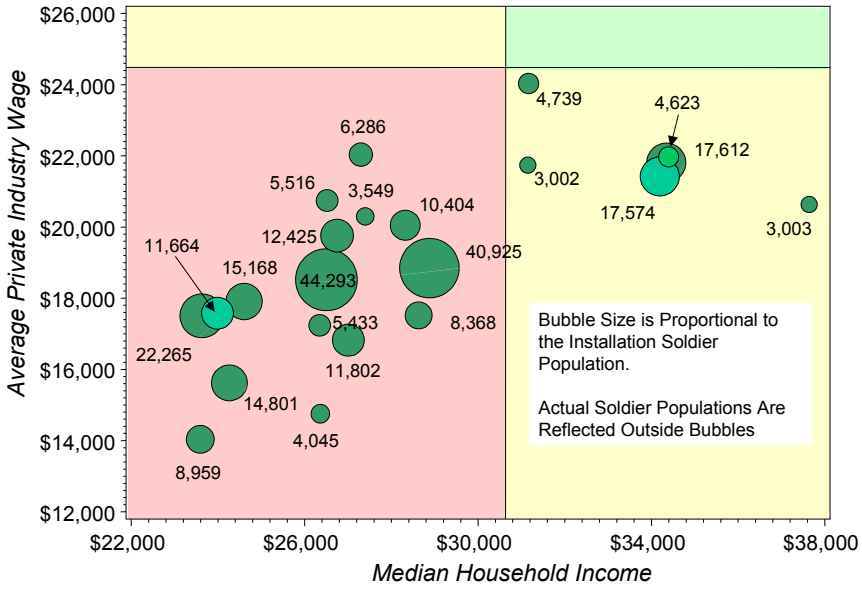
Data Source: March Supplements to the Current Population Surveys.

Based upon the disparate considerations underlying migration in civilian and military households and the difficulty of significantly reducing military migration, this analysis focuses not on the fact that migration occurs but on the location of moves. Specifically, by focusing upon the nexus between military migration and wives' employment and earnings outcomes, earlier analysis failed to account for the market conditions found in the vicinity of military installations. Migration in the military does not entail relocation between areas of economic bounty nor from depressed areas to surplus areas. Rather it typically entails moves between areas characterized by poor employment opportunities and low wages. From this perspective, permanent residence in such areas would not address the primary basis for poor employment and wage outcomes experienced by spouses of military personnel.

ARMY STATIONING PRACTICES: A CASE STUDY

A review of the geographic distribution of Army Posts within the United States finds that most garrisons are located in rural areas that are characterized by relatively low wages and household earnings. Indeed, as shown in Figure 11, average private-sector wages in Army locales are well below the national average.

Figure 11. 1992 Average Wage (U.S.=$24.481) & Median Household Income (U.S.-$30,636) within the County Outside Post Main Gate



Data Source: 1992 Personnel Authorization Manning Document and USA Counties, 1998

In Figure 11, the bubbles represent installations. The size of the bubbles is proportional to the share of soldiers stationed at these posts; their spatial orientation reflects economic conditions prevailing in the vicinity of Army posts. Bubbles located near the top of the graph connote posts located in areas with private sector wages that approach the national average. Bubbles near the bottom of the graph indicate posts that are located in areas with wages well below the national average. Similarly, bubbles found in the region to the right of the national median household income reference line connote posts located in areas characterized by household income above the U.S. median. From this perspective one can

see that Army posts are primarily located in areas characterized by relatively poor wage and income conditions.[4]

The homogeneity of income conditions found in the vicinity of Army posts is not surprising, given the Army's mission. Army operations entail frequent large-scale training exercises involving long-range weapons and fast moving mobile formations. Consequently, Army land use requirements are such that Army posts are not often located near thriving labor markets.

The Army's land requirements became acute in World War II: the need to train mechanized forces for overseas employment led the Army to expand its use of garrisons in the rural South, the West, and Southwest. These areas afforded large maneuver areas and favorable weather for year-round training. As a result, locales such as Fort (Camp) Stewart, Fort Riley, Fort Bliss, and Fort Hood attained growing importance as platforms for training and deploying major combat formations. During the post-Cold-War drawdown, the Army further concentrated its forces in the set of remote installations best able to accommodate the spatial requirements of mechanized warfare.

While the foregoing conditions need not rule out lucrative labor force participation among Army wives, they are not suggestive of characteristics one would seek in selecting migration destinations. Nor are these the sort of conditions envisioned in traditional economic theory as first hypothesized by J. R. Hicks as early as 1932: "…differences in net economic advantages, chiefly differences in wages are the main causes of migration."[5]

Rather, the rural-basing bias evidenced in Figure 11 may have damaging effects on Army household income. Therefore, the analysis that follows explores spouse earnings by gauging the extent to which a paucity of local economic activity impairs the employment and earnings prospects of spouses of military personnel.

Local Labor Markets and Military Wives' Labor Market Outcomes

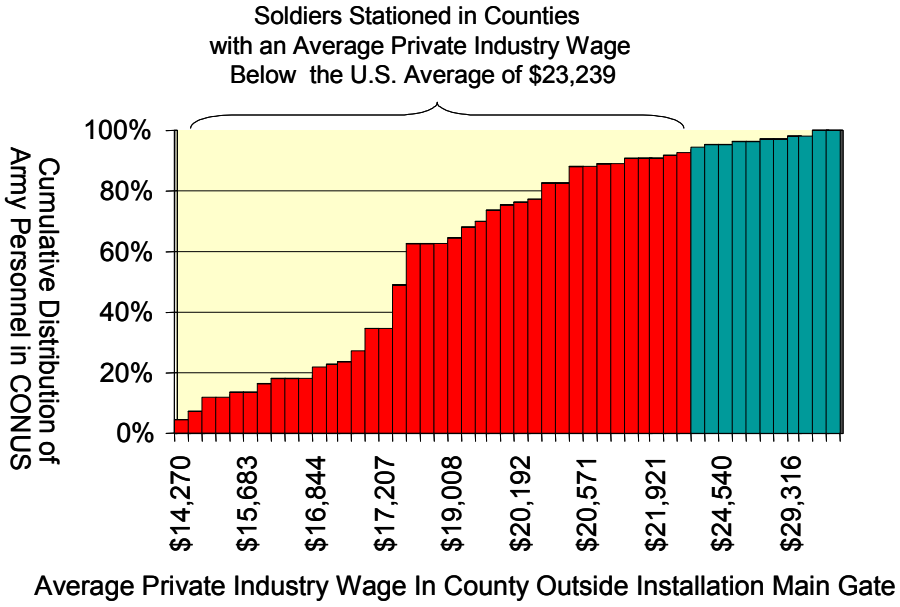
Figure 11 suggests that military wives confront employment opportunities that are distinguishably less robust than those faced by the general population of wives.

[4] Developed from USA Counties 1998, U.S. Census Bureau.

[5] Greenwood, M. (1975). "Research on Internal Migration in the United States: A Survey." *Journal of Economic Literature* 13(June): 397-433.

The unique employment environment confronting military wives can be seen more clearly in Figure 12, which depicts the cumulative distribution of active duty Army personnel in 1991.

Figure 12. Cumulative Distribution of Active Duty Army Personnel by Duty Station According to the Average Private Industry Wage in 1991 Within the County Outside their Duty Station Main Gate



Data Source: 1992 Personnel Authorization Manning Document and USA Counties 1998

Each bar represents an Army installation. The incremental increase in the heights of bars represents the contribution of each installation to the cumulative population of soldiers on installations in the continental United States (CONUS). The horizontal axis provides the average private-sector wage prevailing in the county adjacent to each installation. By arraying installations according to this private industry wage, one can see that the vast majority of soldiers are stationed in areas characterized by relatively low wages. While 1991 data is used for analytical purposes, the message conveyed by Figure 12 is relatively time-invariant. That is, given the relative proportions of soldiers, and therefore soldiers' wives, residing in areas with below-average wages, one can immediately abandon any assumption of random assignment of Army wives to labor markets. The wage environment confronting these wives is not only a function of their

stock of human capital and abilities, but also of military stationing requirements.[6]

From an analytic perspective, one can gauge the influence of local labor market conditions on military wives' earnings through the use of statistical techniques that control for human capital and labor supply factors as well as local labor market demand conditions.

To motivate the analysis that follows, consider the following simple model. First, assume random assignment of military couples to Department of Defense installations. Given this assumption, differences in the earnings of wives of military personnel across installations must be due to local factors. To implement an analysis of this model, reference is made to local private-sector wages in 1991 as the factor of interest.[7]

Average private-industry wages, as a proxy for local labor market conditions, explain much of the variation in wives' average wages across installations, as presented in Figure 13. Here, wives' average wages by installation are presented on the vertical axis. Average local private-sector wages prevailing in counties adjacent to these installations are presented along the horizontal axis. Each bubble represents a military installation with service affiliation denoted by the color of the bubble. Within service bubble sets (installations) bubbles are proportioned to indicate the relative size of installations in terms of their assigned married population.

As Figure 13 shows, most military installations are located in areas characterized by relatively poor wage conditions. This situation is evidenced by the location of most bubbles within the pink shaded area. That area connotes average private-sector wages reported for U.S. counties that fell below the U.S. average private-sector rate of $23,239. Moreover, one can see that installation bubbles follow a pattern suggestive of a nexus between local wage conditions and military wives' earnings. The rising dotted regression line indicates this pattern.

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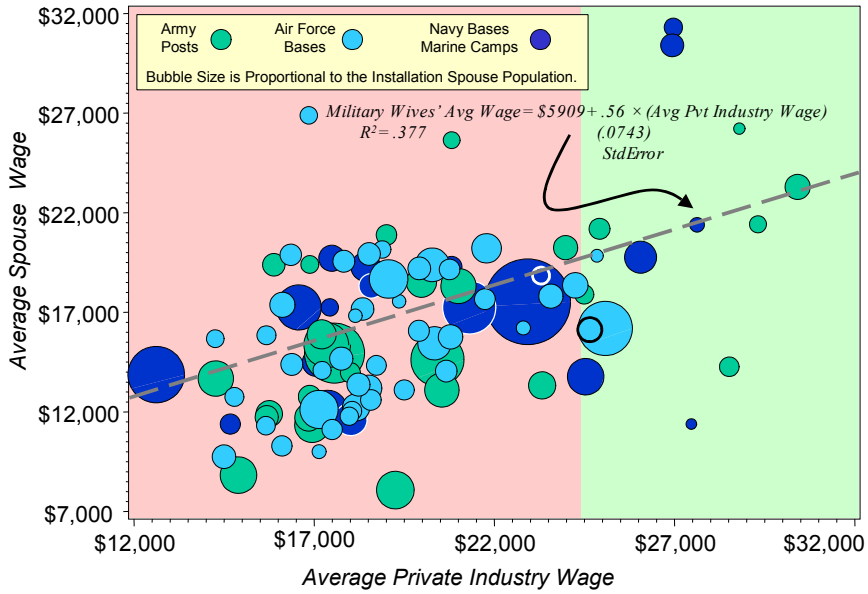
[6] Whereas many U.S. cities grew apace with trade and commerce, the Army's set of installations was accumulated to support military operations. Thus, posts such as Fort Huachuca and Fort Leavenworth were established during the Indian Wars. F.E. Warren Air Force Base was selected as a missile station out of Cold War strategic considerations.

[7] The 1992 DoD Surveys of Officers and Enlisted Personnel and Military Spouses is the most current available source of data regarding the employment and earnings situation of wives of military personnel.

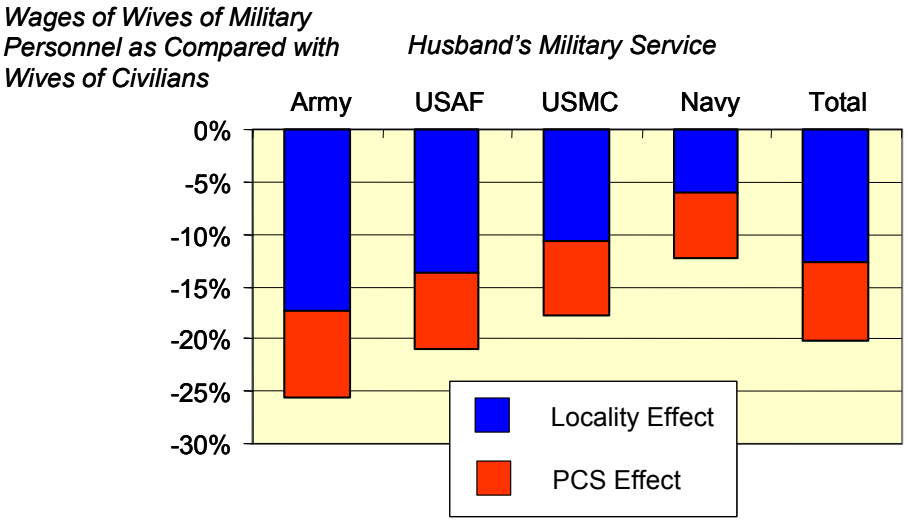
Figure 13. Average Spouse Wage by Installation & Average Private Industry Wage ($24,481) Within the County Outside the Installation Main Gate, 1991



Further exploration of the situation using multivariate regression analysis substantiates the role local conditions play in shaping wives' labor market outcomes. Specifically, after controlling for relevant factors, including local price levels and frequency of permanent change-of-station (PCS) moves, some 63 percent of the wage penalty exhibited among wives of military personnel can be attributed to locality effects. Across services, the greatest burden of these locality effects falls, in order of scale, upon wives of soldiers, then airmen, and then Marines. Among wives of sailors the wage penalty is evenly distributed between locality effects and lost earnings due to migration. The distribution of locality and migration effects is provided in Figure 14.[8]

[8] These figures differ from the 30-percent wage penalty discussed earlier due to differing data sources and time periods. The 30-percent wage penalty addressed previously was based upon 1995 through 1999 Current Population Survey Data that did not include overseas personnel. The figures provided above are based upon 1992 DoD Survey data that did include overseas personnel but did not include a civilian comparison group. Therefore, they entailed indirect comparisons of military and civilian wives' wages using military wives' wages in San Diego as a proxy for average civilian wives' wages. San Diego was selected as the proxy due to the fact that wages

Figure 14. Earnings Penalty Exhibited by Wives of Military Personnel Within Military Services



Data Source: 1992 Active Duty Surveys of Officers, Enlisted Personnel and Military Spouses

Based upon the foregoing analysis, one could expect that a 50 percent reduction in PCS moves would only yield a 5- to 6- percent reduction in the aggregate wage penalty exhibited among wives of military personnel.

Before leaving the topic of locality effects on military wives' earnings, a brief discussion of cost-of-living considerations is in order. First, one might assume that the lower earnings garnered by military wives are offset by a lower cost of living in low-wage locales. Such assumptions do not, however, reflect the realities of the military compensation situation. For example, housing, food, transportation, personal insurance, and health care constitute 80 percent of typical household expenditures. Of these, housing price levels are likely to exhibit the highest degree of variability across labor markets.

For military families, housing allowances are tied to local markets so that families in high- cost areas receive far higher allowances than do families in low-cost areas. Indeed, housing allowances are structured to account for housing price variability. Additionally, in many instances, housing is provided in kind rather than in cash. This policy further

among wives in San Diego were very close to the national average and military wives in San Diego garnered wages comparable to civilian wives surveyed in the Current Population Survey.

reduces the potential that savings on housing expenses can act as an offset to any locality-induced wage penalty.

With regard to food expenses, Department of Defense policy can actually run against the notion of lower living costs offsetting wives' lower wage earnings. Specifically, by policy, military families can purchase groceries in DoD commissaries at cost plus 5 percent. However, the Defense Commissary Agency establishes the price of items that are not nationally branded using 25 pricing zones. Across these zones, transportation and distribution costs can result in military families paying different prices in different regions. Consequently, due to the contribution of higher transportation and distribution costs, military families in rural, low-wage areas can actually face higher food costs than military families in urban areas, which are characterized by relatively high wages.

Finally, from a statistical perspective, there is no basis to assert that low price levels explain, and therefore offset, the wage penalty exhibited by military wives due to locality effects. Indeed, within the framework of multivariate regression analysis, one finds that military wives' continue to exhibit a substantial wage penalty after controlling for local price levels.

IMPROVING LABOR MARKET OUTCOMES: POLICY ALTERNATIVES

As demonstrated, wives of military personnel incur a substantial wage penalty as compared to their contemporaries married to civilians. Moreover, this penalty increases with educational attainment. Wives earn about 40 percent of total household income in civilian households; these earnings thus represent an important contribution to household welfare. In the case of military households, a substantial increase in RMC would be required to offset the wage penalty borne by military wives. For military wives with a Bachelor's degree, such an offset would amount to 12 percent of their husbands' RMC.

Of course, increasing military pay to offset lost spousal earnings would be a poor substitute for solutions that address the basis for these lost earnings. First, many military wives elect to work within the home rather than entering the labor force. Consequently, these wives do not suffer a wage penalty. Providing a compensatory military pay increase, in these cases, would be inefficient and inequitable. Additionally, such a policy would fail to account for intangible aspects of employment sought by

military wives who enter the labor force. When surveyed, 88 percent of civilian spouses of military personnel reported that earnings from work contributed to their self-esteem.[9] Ninety-three percent reported that full-time employment contributed to their career aspirations.

From the perspective of national output and welfare, policies should be directed toward reducing barriers that engender the wage and employment penalty experienced by spouses of military personnel. Absent such policies, these spouses will continue to create less national output, pay fewer taxes, and generate less wealth than they would if they were married to a civilian. From this perspective, a compensatory increase in RMC should not be the starting point in addressing the earnings and employment penalty incurred by wives of military personnel.

With regard to the transient nature of military service, migration clearly impairs the labor market outcomes of spouses of military personnel. However, as previously discussed, the effect of such migration is relatively moderate when compared with locality-based effects. Migration is not the principal labor market challenge facing spouses of military personnel stationed within areas characterized by poor employment opportunities and low wages.

THE FEDERAL EMPLOYMENT EARNINGS PREMIUM

Civil service employment policies may be a logical point of departure in attempting to reduce the wage penalty experienced by spouses of military personnel. Each of the services currently employs large numbers of civilian personnel. Since military wives experience relatively low earnings and depressed employment prospects due to their affiliation with the military, employment of these spouses by the military may offer substantial benefits to military households while furthering defense and national objectives. As a case study, the analysis that follows explores the efficacy and feasibility of increasing employment of military spouses within the Department of the Army.

Department of the Army civilian employment consists of appropriated- and non-appropriated-fund positions. Because appropriated-fund positions entail higher wages, greater career opportunities, and are more numerous

[9] 1992 DoD Survey of Military Spouses.

at major troop installations, the analysis that follows focuses on these positions.[10]

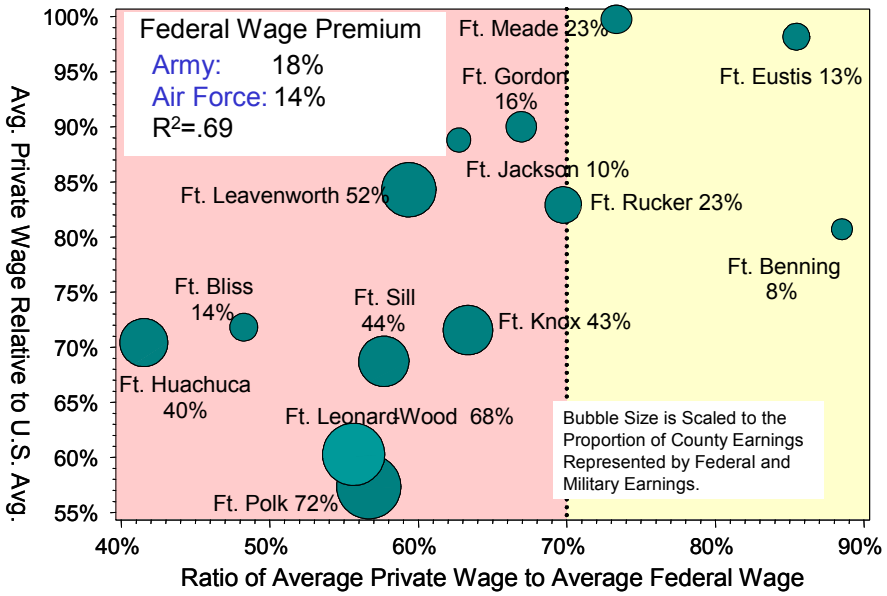
As of the beginning of FY 2000, the Army employed 203,095 civilian personnel in appropriated-fund positions. Of these employees, 139,330 were collocated on major installations with large numbers of active component soldiers. Only 8,800, or 6 percent, of these employees were spouses of soldiers. Given this situation, there is considerable potential to expand Army employment of soldiers' spouses. There is also reason to believe that employment by the Army would significantly raise the earnings of military spouses. Regression analysis of spouse earnings indicates that spouses who are currently employed full time in the federal civil service earn 18 percent more than Army spouses with other sources of full-time earnings. This statistic suggests that the Army could close much of the wage penalty exhibited among soldiers' spouses by affording them greater entrée to federal employment.

Figure 15 illustrates the benefits of federal employment from a local perspective. In this figure, the horizontal axis indicates the ratio of local private-sector wages to local federal-sector wages. The vertical axis indicates the ratio of local private-sector wages to the average private-sector wage for the United States as a whole. Here, local wages refer to average federal-or-private-sector wages within the counties in which Army installations are located. The size of installation bubbles indicates the proportion of earnings in the local county that are derived from federal civilian and military wages. In the case of Fort Huachuca, for example, the average private-sector wage is 58 percent lower than the average federal wage and 30 percent lower than the U.S. average private-sector wage. Additionally, federal civilian and military wages account for 40 percent of all wages in the county in which Fort Huachuca is located.

As indicated above, by moving from private-sector employment to federal employment, spouses of soldiers at Fort Huachuca could anticipate a substantial increase in earnings. This increase is a result of the way in which federal wages are set. Aside from locality adjustments, federal wages are set forth in a pay table that applies uniformly across federal service regardless of location. Thus, in areas of relatively poor wage conditions, federal civil service is likely to offer relatively lucrative compensation.

[10] For example, at the Army's most highly populated post, Fort Bragg, there are 8,700 appropriated and 932 non-appropriated- fund civilian positions.

Figure 15. Ratio of Local Wages to Federal Wages and the Average U.S. Wage



Source: USA Counties 1992 and 1992 DoD Survey

Unlike private-sector employment, federal employment is governed by regulations that present substantial barriers to entry. These procedures are set forth in Title 5 of the Code of Federal Regulations (5 CFR). Executive Order 12721 provides for partial relief from 5 CFR requirements. This order allows the military services to provide priority employment to civilian spouses who are authorized to accompany their military spouse during overseas assignments. The appropriated-fund employment rates exhibited by Army spouses overseas and within the United States demonstrate the efficacy of this exception to 5 CFR appointment practices. In Europe, spouses of soldiers occupy 23 percent of the approximately 13,000 appropriated-fund positions. In contrast, spouses of soldiers compose only 4 percent of appropriated-fund positions on major Army installations in the United States.

Unfortunately, the operation of E.O. 12721 is far from complete in terms of enhancing spouses' entrée to federal employment upon their return to the United States. Though overseas employment under E.O. 12721 does afford spouses returning to the United States non-competitive appointment status, such status still leaves spouses well down the list for

reappointment due to the operation of preferences for groups such as veterans, displaced workers, and noncompetitive transfers. The law states:

> *selection may be made of noncompetitive Army candidates, VRA appointments, appointments of 30% or more disabled veterans, noncompetitive transfers, placements to correct equal employment opportunity deficiencies, placement of the handicapped, and placements of persons returning from overseas tours of duty, without regard to spouse preference.*[11]

Consequently, only 1,980 spouses of active duty soldiers now employed by the Army were selected while using this preference program. It is clear that the Department of Defense will require new authority with considerable hiring discretion if the services seek to improve the earnings prospects of military spouses through appropriated-fund employment.

Aside from the obvious benefits to Army households, appropriated-fund employment of soldiers' spouses could also accrue substantial benefits to the Army and the Treasury. The gains would arise through savings in health benefits afforded to federal employees and through the collection of income taxes on the incremental earnings of spouses employed in federal civil service.

With regard to the first point, the military offers subsidized health benefits to non-temporary employees under the Federal Employees Health Benefit Plan (FEHBP). Currently, the government cost-share of this benefit is $2,529 per enrolled employee.[12] Among Army employees who are not married to an active duty soldier, 89 percent participate in the plan. In contrast, only 19 percent of soldiers' spouses working as Army civil servants avail themselves of this benefit.[13] At these rates of usage, the expected average FEHBP cost for the spouse of a soldier would be $557, while the expected average cost for the spouse of a civilian would be $2,610. Assuming stable FEHBP participation, employment of soldiers' spouses would net the Army approximately $2,000 in expected benefits savings per spouse employed. Since employment is only offered to fully

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[11] Office of Personnel Management (1999). Title 5 Code of Federal Regulations, Administrative Personnel. Washington, D.C., U.S. Government Printing Office.

[12] Office of Personnel Management (1999). OPM Financial Management Letter F-99-03, dated February 5, 1999, Health Benefit Cost Factor. Washington, D.C.

[13] The basis for this low take-rate can be found in the fact that federal employees bear about 30 percent of the cost of the FEHBP while all spouses of soldiers enjoy health coverage under various military health care programs by virtue of their marriage to a soldier. Also, in the vicinity of many installations, military health services are more convenient than care available from civilian providers under FEHBP.

qualified applicants, under the provisions of 5 CFR, there should be no incremental training cost associated with such a strategy.

Moreover, there is substantive reason to expect that spouses of military personnel embody skills that are well matched to job requirements. Recall that soldiers' spouses occupy 23 percent of Army civilian positions in Europe.[14] As installations in Europe engage in many of the same activities entailed in operating posts in the United States, there is reason to believe that rates of Army spouse employment in the United States could mirror those found in Europe.

Army employment of soldiers' spouses would also benefit the United States Treasury through increased tax receipts. If one assumes a 15 percent tax rate and 18 percent increase in spouse earnings, income tax payments from spouses gaining employment in appropriated-fund positions would rise by approximately 3 percent, or $360 on a base of $12,000. Thus, the net change in the federal cost associated with hiring the average soldiers' spouse would be a $2,413 saving.

Of course, from the perspective of other federal employment aspirants, policies directed toward increasing federal employment of soldiers' spouses will decrease federal employment opportunities. That is, the number of positions available in Army civil service is relatively fixed. Therefore, each spouse of a service member who gains federal employment reduces federal employment opportunities available to job aspirants in civilian households. Thus, spouse employment policies may lead to civilian unemployment or underemployment in the vicinity of some posts during a period of labor market adjustment. Since civilian households are free to relocate to more lucrative job markets, however, any burden associated with this adjustment should be transitory. In contrast, spouses of military personnel cannot relocate to better job markets while maintaining an intact military household. Thus, their forgone employment and earnings are not transitory and will persist as long as they are stationed in areas characterized by poor labor markets. Consequently, affording spouses of soldiers enhanced labor market opportunities through federal employment can be beneficial from a national perspective.

It is possible to craft federal employment practices so as to minimize the burden of an enhanced spouse hiring authority on the existing civilian workforce. That is, rather than separating existing workers, the services could employ a policy of replacement through attrition. Spouses of

[14] Department of the Army (1999). Civilian Personnel Master File, Headquarters Army Civilian Personnel System,. 1999.

military personnel could be added to the federal payroll as existing workers retire or leave federal employment. Within the Army this policy would generate federal employment opportunities for 20,000 to 26,000 spouses over the next five years. From a stakeholders' perspective, these spouses could be members of the federal employees union and would thus not materially affect union membership rolls.

Enhancing Spouse Earnings Through Contracting Policy

In addition to employing large numbers of civilians as civil servants, the military services contract with a wide variety of firms for services ranging from communications support to dry cleaning. For example, during 1999, the Army let more than $60 million in service contracts at Fort Polk. The majority of these contracts were awarded under competitive bidding procedures. Borrowing a page from 1970's-era employment programs such as the New Jobs Tax Credit and Targeted Jobs Tax Credit, there is precedent to expand contractor employment of military spouses in such competitive bidding situations.[15,16]

As a matter of policy, the services could provide contractors an employment subsidy for each wife or husband of a service member they employ after winning a competitive bid contract. Such a policy should have the effect of increasing the private-sector employment of military spouses at little or no cost to the government. To the extent that military spouses are as productive as local civilian labor, there should be little to no incremental cost to contractors associated with employing these spouses rather than local civilian labor. Thus, a spouse employment subsidy would pass directly to a firm's bottom line as profit.

In a competitive bidding setting, contractors could lower their bids by the amount of the subsidy that passed to profits. Therefore, the entire subsidy could return to the government in the form of lower contractor bids. At the same time, of necessity, contractors would take maximum advantage of such a subsidy so as to gain the competitive bidding advantages entailed therein.

[15] Perloff, J. and M. Wachter (1979). "The New Jobs Tax Credit -An Evaluation of the 1977-78 Wage Subsidy Program." American Economic Review 69(May): 173-179.

[16] Bishop, J. H. and M. Montgomery (1993). "Does the Targeted Tax Credit Create Jobs at Subsidized Firms?" Industrial Relations 32(Fall): 289-306.

APPLYING TECHNOLOGICAL INNOVATIONS TO EXPAND LABOR MARKETS

To further overcome the untoward effects of local labor markets on the earnings of spouses of military personnel, the services could draw upon innovations in e-commerce. Specifically, following the business model of firms such as Commerce One and Ariba Inc., the services could launch pilot projects to leverage the Internet as a vehicle to expand the scope of labor market opportunities to military spouses using Web-based reverse auctions. Given the shortage of skilled labor now evidenced in the economy, excess labor demand could be matched to excess spouse labor supply through reverse auctions in the Web-based marketplace. Targeted industries could include publishing, telemarketing, and computer software development where transportation and communications constitute minuscule components of production costs.

STATIONING PRACTICES

As another means of improving the labor market opportunities and earnings potential of military spouses, the services could reexamine the basis for retaining installations in remote areas. Heretofore, the services have stationed many of their personnel in remote areas that provided expansive training facilities. However, trends suggest that within the foreseeable future, weapons lethality, range, and speed of movement will exceed the terrain capacity of all but a handful of installations. Additionally, the prohibitive cost of maneuver and weapons training has led to a marked substitution of virtual training environments for traditional training methods. This trend is likely to persist, and perhaps accelerate, as new weapon systems enter the inventory.

Given these advances, it is possible to envision a dual-station operating environment. In this environment, general-purpose forces would be garrisoned in the vicinity of urban and suburban areas that afford robust labor demand for soldiers' spouses, robust housing markets, and a wide array of recreational and cultural activities. By imbedding their garrisons in well-developed markets and communities, the services could divest themselves of nonmilitary functions entailed in stationing forces in remote locations. These functions range from operating movie theaters and bowling alleys to building and maintaining housing stocks. In such urban and suburban garrisons, military personnel could employ simulations to master individual and team skills. At appropriate intervals, deployments to expansive areas in the West would sustain collective skills.

Policies Regarding Home Businesses

The military services currently regulate home businesses operated on military installations. While this regulation can preclude unsafe or unscrupulous practices, it can also impose significant barriers to entrepreneurial activity by spouses. For example, paragraph 2-4 of AR210-7 addresses licensing requirements for spouses seeking to operate businesses on Army installations. Because AR210-7 requires spouses to obtain a license from local municipal or state authorities, its provisions essentially require a spouse to secure a new license each time military requirements engender a PCS move. This situation can be quite burdensome for spouses in occupations such as interior design, cosmetology, hairstyling, manicure, massage therapy, bodywork and somatic therapy, athletic training, landscape architecture, and speech therapy. Given that these occupations are highly portable, they would seem to be ideally suited to the migratory nature of military service. Additionally, they fall within fields that are not well served by on-post agencies under the license of which spouses could gain employment.

Since licensing requirements vary widely among states and cities, the requirement to secure a local license can entail significant costs in terms of testing, additional training to satisfy local requirements, and lost wages pending licensure. Whereas occupations such as insurance sales would continue to be covered under separate regulatory provisions, licensure of home businesses for occupations such as those identified above could be accomplished by simply requiring evidence of prior licensing by any licensing authority. As many locales appear to require that practitioners operate their businesses within the confines of the licensing jurisdiction in order to renew their licenses, the services could avoid a requirement for spouses to keep state or local license current in order to operate a business on a military installation. Alternatively, as the number of occupations requiring licensure continues to grow, the services could seek special status for spouses of military personnel so that their credentials enjoy national standing.

CONCLUSIONS

Wives of military personnel incur a substantial wage penalty and enjoy markedly reduced employment prospects when compared to their contemporaries married to civilians. These outcomes can be attributed to factors endogenous to military service. An exploration of these endogenous military conditions does indicate the operation of a moderate earnings penalty due to migration. However, analysis of earnings and employment across military services finds that much of the wage penalty borne by wives of military personnel can be attributed to local labor market conditions. Analysis of these conditions across installations demonstrates that the four military services occupy distinguishably different pieces of economic real estate. Specifically, the Army, and in many instances the Air Force, operate in areas characterized by relatively poor labor market conditions. To a lesser extent this situation also affects wives of Marines and sailors. To redress this situation, the services can employ a mix of policy alternatives ranging from direct employment of service members' spouses to adjustment of operating practices and policies.

CHAPTER IV

REVIEW OF THE DEPARTMENT OF DEFENSE OVERSEAS COST-OF-LIVING ALLOWANCE

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EXECUTIVE SUMMARY

The overseas cost of living allowance, or OCONUS COLA, is a bi-weekly payment provided to approximately 280,000 members of the Uniformed Services stationed at one of 600 locations outside of the continental United States. Its purpose is to compensate members for differences in the cost of living between the continental United States (CONUS) and the their assigned location outside of the continental United States (OCONUS). It does this by providing an allowance that represents the difference in the cost of purchasing a typical market basket of goods and services at the overseas location compared to the cost of purchasing that same market basket in CONUS. The cost-of-living index, which measures the cost of living at the OCONUS location relative to the CONUS cost, is the same for all members at the location. The COLA itself, however, varies across members because "spendable income"—the amount of the member's pay that is subject to adjustment—varies across members by pay grade and number of dependents. The current cost of the program is almost $1 billion annually. At locations where the COLA is paid, the average amount is $297 per month. The COLA, though, varies substantially by location.[1]

The Per Diem, Travel and Transportation Allowance Committee (PDTATAC), the organization responsible for calculating and adjusting the OCONUS COLA, requested a review of the current system. This paper summarizes the review, which extends from the conceptual or theoretical premises of the current system to technical improvements in the methods of implementing the system.

Under the current system, a "market basket' approach is used to determine the OCONUS COLA. The cost of a market basket of goods and services is estimated at CONUS prices and at the prices at the OCONUS locations. The COLA is based on the percentage difference in the cost of the market basket, applied to the member's "spendable" income—the amount of the member's income that is protected under the OCONUS COLA program.

Our major finding is that, conceptually, the CONUS market basket approach to determining the cost of living adjustment is sound, and is

[1] For example, an E-6 with 10 years of service and 3 dependents would receive a COLA of approximately $36 per month in La Paz, Bolivia, and approximately $1,758 per month in Kure, Japan.

similar to the approach used by many private sector multi-national firms and international organizations. The system can be improved in a number of dimensions, however. Our major findings regarding the current system, and recommendations for improvement, are the following:

THE COST OF LIVING INDEX

Finding: The CONUS market basket is applied in most instances, but adjustments are made in the market basket in some locations to account for location-specific environmental factors. This makes the actual index used a hybrid between a Laspeyres (CONUS market basket) and a Paasche (local market basket).

> ***Recommendation***: The "hybrid" approach tends to improve the welfare of the member, and should be retained.

Finding: The actual OCONUS COLA index value depends significantly on the proportion of shopping that the member does in the commissary and exchange. This proportion is currently based on actual expenditures, and often has perverse implications.

> ***Recommendation***: We recommend commissary and exchange expenditure share estimates that are based either on CONUS patterns or on an explicit policy, rather than actual expenditures.

Finding: The exchange rate adjustment system, under which COLA adjustments are made only after exchange rates exceed a threshold (cumulative) percentage change, can lead to over or under payment of members who rotate into and out of assignments. The percentage change threshold was recently reduced from 10% to 5%, increasing the frequency of COLA adjustments for exchange rates and reducing the potential for a member to have been significantly under compensated due to the timing of the member's departure.

> ***Recommendation***: The new exchange rate threshold of 5% is a reasonable compromise between frequency of exchange rate adjustment and the potential cost to the member. However, we recommend that PDTATAC continue to explore the advantages of continuous (bi-weekly) adjustments for exchange rate changes. Given advances in computer technology, it is unlikely that the costs of continual adjustment will outweigh the benefits.

Finding: Currently, there is a "miscellaneous" category of member expenditure, constituting about 10% of the market basket, for which it is

assumed that prices at the OCONUS location are the same as the prices in CONUS. This biases the index towards no change.

> ***Recommendation***: We recommend that actual prices be collected for the Miscellaneous category. In the interim, we recommend that prices in the Miscellaneous category at OCONUS locations be presumed to bear the same relationship to CONUS prices in that category as the expenditure-weighted average of the prices across the categories that are collected for that location bear. PDTATAC should study the implications of formally pricing the Miscellaneous category prior to a final decision to implement the recommendation.

MARKET BASKET ITEMS

Finding: Most private sector firms provide expatriates with an annual trip home from their assignment. A trip home is not included in the OCONUS COLA market basket.

> ***Recommendation***: We recommend that members and dependents be funded for one trip to the United States for each three-year OCONUS tour. Providing a trip home would, however, require legislative changes and may not necessarily be part of the COLA.

Finding: Long distance telephone service is not included in the current market basket.

> ***Recommendation***: We recommend that the cost of 30 minutes of long distance service per month be included in the OCONUS COLA.

Finding: The potential income loss for spouses during an accompanied overseas assignment could be substantial. Currently, there are no DoD programs, including OCONUS COLA, that adequately compensate for the potential loss of spouse income. Private sector firms typically do not attempt to compensate fully for lost spouse income. Instead, they provide "adjustment assistance' equal to about one-three months of the spouse's expected pay.

> ***Recommendation***: The Uniformed Services should attempt to limit potential spouse losses through a more flexible, voluntary assignment program. In addition, the Services should consider making spouses eligible for the unused portion of the member's Tuition Assistance (TAP) benefit while the member is on an accompanied OCONUS tour, or consider "spouse transition

assistance" in the form of one or two months of the member's basic pay. This would be analogous to a practice frequently found frequently in the private sector. We suggest, however, that the payment be a function of the member's basic pay, to make administration tractable.

DATA COLLECTION

Finding: The Uniformed Services collect OCONUS price data themselves, in cooperation with the Department of State. Actual budget costs are modest, because much of the data collection is done as collateral duty by members or civilian employees, or obtained through reciprocal arrangements with the Department of State. However, the "opportunity costs" of data collection may be significant. Most private sector firms obtain cost-living data by contracting with specialized firms. These specialized firms currently obtain data in approximately 69% of the locations required by the Uniformed Services, but only 50% of the locations where the Uniform Services currently collect price data.

Recommendation: We do not recommend that the Uniformed Services outsource OCONUS data collection at this time. However, we recommend that they continue to explore the issue.

Finding: A major source of CONUS prices used in estimating the CONUS cost-of-living, for comparison with OCONUS, is data reported by the Commissary and Exchanges regarding prices in the U.S. private sector economy.

Recommendation: Because CONUS prices affect all OCONUS COLA payments, we recommend that the PDTATAC regularly validate these prices through independent sampling, independent external indices, and other forms of quality assurance.

Finding: OCONUS price data are gathered annually, or more frequently at command request.

Recommendation: We recommend that the Uniformed Services explore the possibility of using local price indices and information to update the OCONUS COLA on an interim basis—especially in countries with historically high rates of inflation.

Finding: A living pattern survey (LPS) is conducted at each location about every three years to determine the proportion shopping members and families spend in the local economy, on the installation, and through

catalogs, and to determine which stores in the local economy are frequented by members and families. This LPS is then used to estimate the proportion of shopping done at a government facility versus in the local economy. These "expenditure shares" are used in developing the COLA index. The LPS itself is controversial and the Commands typically consider it an imposition.

> ***Recommendation***: If the recommendation is accepted to set government facility/local economy expenditure shares by policy, we recommend that the frequency for the administration of the LPS be scaled back. The actual survey results may be used only as one piece of information to be considered in setting on/off installation expenditure shares.

Finding: Sample sizes for the LPS are small and the method of sample selection is unscientific.

> ***Recommendation***: PDTATAC should produce scientifically based sample selection and administration guidelines for the locations, and should select sample sizes that meet requirements for desired precision of estimates.

Finding: There is seasonality in prices that may bias the OCONUS COLA price indices, or result in high error rates.

> ***Recommendation***: PDTATAC should begin to develop methods that would ensure prices are not biased or suffer from error rates due to seasonality. (We have suggested several approaches.)

SPENDABLE INCOME

Finding: The spendable income table is an important determinant of the member's COLA, because it indicates the amount of income that is subject to COLA protection. It has not been updated since 1989. A new table, using data from 1997-1998, is scheduled for introduction in FY 2001. Because the proportion of real income protected declines as real income grows, and because the member's nominal income has grown substantially over this period due to inflation, the member's COLA has been significantly below what it otherwise would have been if the table were updated more frequently.

> ***Recommendation***: We recommend that the table be updated more frequently and that it be indexed for inflation in years in which it is not updated.

Finding: The current method of estimating the spendable income tables, using very aggregate data and few covariates, is inefficient and possibly biased.

> ***Recommendation***: We recommend an alternative method, using data at the individual household level and an expanded set of covariates.

LOCATION-UNIQUE EXPENDITURES

Finding: The current method of determining whether a particular item should be included in a location's COLA payment as a location-unique expenditure could be more systematic.

> ***Recommendation***: We recommend a set of criteria or principles for determining location-unique items.

Finding: The Uniformed Services do not have "hardship" pay for locations with especially onerous living conditions. The State Department, international organizations (e.g., the World Bank and the United Nations), and many international companies have hardship pay.

> ***Recommendation***: We recommend that the Uniformed Services continue to explore this issue as a means to improve staffing at hard-to-staff locations.

Finding: Members in Alaska are required to carry safety kits in their cars. Members also incur large expenses to winterize their cars, some of which are not currently covered. These two items are not addressed adequately through the market basket for that location.

> ***Recommendation***: We recommend that car safety and winterization costs be expanded under the COLA as location-unique items.

Finding: Members at a number of locations incur large "pet quarantine" expenses to bring their pet into the OCONUS location.

> ***Recommendation***: We recommend that pet quarantine be considered for coverage under the Permanent Change of Station (PCS) move program, not the OCONUS COLA.

COLA SAFETY NET

Finding: An OCONUS COLA payment may decline for one or more of three reasons. First, prices in the local economy may decline. Second, prices in CONUS may grow at a faster rate than prices in the local economy. Third, exchange rate movements may cause the dollar to appreciate relative to the local currency. In the first case, the member's cost of living will have declined, both relative to CONUS and in the local economy. The only argument for not permitting the COLA payment to decline is that the member may have entered into fixed price contracts in the local currency. Given the nature of COLA expenditures, this will not typically be a major concern. In the second case, the member's cost of living has declined relative to CONUS, but it has not declined relative to the local economy. Here, a case can be made that a reduction in the COLA payment will make the member worse off. This is so even though such a reduction is consistent with a system that compensates members for the cost of living difference between CONUS and the OCONUS location. In the third instance, in principle the dollar will have appreciated, decreasing the cost of living in the local currency. A reduction in the dollar amount of the COLA is consistent with maintaining the same cost of living relative to both CONUS and relative to the local economy.

> ***Recommendation***: We recommend that a COLA "safety net" be established that keeps the COLA payment from declining for members on their current tour when the COLA payment would otherwise decline due to an increase in CONUS prices. Because the current pay system may not be able to track the timing of tours, the safety net should apply to all at the location on an interim basis.

Finding: During periods of very rapid exchange rate changes such that the dollar is appreciating rapidly relative to the local currency, the dollar-denominated COLA payment is declining rapidly. However, it may be the case that large changes in exchange rates may be accompanied by significant changes in local prices, perhaps in a way that offsets all or part of the cost of living decline implied by the appreciation of the dollar. Because local prices are sampled only annually, the member may be significantly worse off in the interim.

> ***Recommendation***: We recommend that when the dollar appreciates by more than 30% since the last scheduled local price survey, a moratorium should be placed on further reductions in the dollar-denominated COLA payments. This "safety net" will prohibit further declines until the scheduled annual price survey

validates the decline in the cost of living. In the interim, the command may request and conduct a price survey. If the survey reveals that local prices have increased, so that even the implied decline in COLA is incorrect, the COLA payment will be restored to the level implied by the price survey. If the survey reveals that the cost of living relative to CONUS has declined by more than that implied by the exchange rate changes, further declines in the COLA payments would not be implemented until the time of the scheduled annual price survey.

OCONUS COLA AND A VOLUNTARY ASSIGNMENT SYSTEM

Finding: There are a number of costs to members associated with OCONUS assignments for which OCONUS COLA, or other forms of allowances and reimbursements, could not fully compensate the member and the member's family under today's assignment system. These include: lost spouse employment income; discontinuity in dependent's schooling at critical periods; and strong aversion to particular types of climates, cultural settings, and other member-specific factors.

Recommendation: We recommend that the Services attempt to move more strongly in the direction of a purely voluntary assignment system. A key element to such a system is a solid OCONUS COLA. In addition, it should be supplemented, to the extent that budget realities permit, with a system of special pay incentives for difficult to fill OCONUS assignments. These special pay incentives will be set by supply and demand conditions for OCONUS positions. Potential advantages of moving toward such a system include: (1) a better match of the preferences of qualified members with assignments; (2) higher retention rates; (3) reduced turnover and greater productivity within an assignment; and (4) explicit budget costs of filling certain positions that more fully reflect the true economic cost of those positions.[2]

[2] The importance of the last point is that, if there are certain assignments or billets that are extremely costly to fill, the Services, by recognizing the true cost of those positions by filling them through voluntary assignments, will become more innovative in developing ways to accomplishing missions without such costly positions.

ADMINISTRATIVE ISSUES

Finding: There are a number of items included on COLA payments for which the member must make a single "lump sum" payment, annually or per tour. However, the nature of the current allowance is that it is a per diem, or per day, payment. Hence, the cost of these items are reduced to an implied daily rate, and included in the bi-weekly COLA payment as if the expenses were incurred continuously over the year. If these lump sum payments come early in the member's tour, financing them can pose a hardship, especially for junior enlisted. However, changes to allow lump sum payments would require legislation.

> ***Recommendation***: PDTATAC should consider recommending that legislation be prepared that would permit lump sum COLA payments for certain items. Special consideration should be given to items that are legally required or mandated and for which a lump sum payment is required by the member early in the member's tour.

Finding: The commands, and other legitimate forums, frequently raise issues for consideration regarding member's expenses that are not covered under the OCONUS COLA, or other programs. The PDTATAC often serves as the de facto organization for consideration of these issues. Often, however, the expense at issue is more appropriately addressed under another program, such as the Department of Defense Dependent Schools (DoDDS). However, there is no organization which has the formal responsibility for ensuring that the issues are addressed by the appropriate program.

> ***Recommendation***: We recommend that a committee be formed to ensure that the issues are formally addressed by the appropriate program. We recommend that the primary members of the committee should be the Compensation Directors for the Office of the Secretary of Defense and the Uniformed Services, and the chairman of the Per Diem committee. The Director of Compensation Policy for the office of the Secretary of Defense (FM&P) should chair the committee.

1. INTRODUCTION AND PURPOSE

The overseas cost of living allowance, or OCONUS COLA, is a bi-weekly payment provided to approximately 280,000 members of the Uniformed Services stationed at one of 600 locations outside of the continental United States.[3] Its purpose is to compensate members for differences in the cost of living between the continental United States (CONUS) and the their assigned location outside of the continental United States (OCONUS). It does this by providing an allowance that represents the difference in the cost of purchasing a typical market basket of goods and services at the overseas location compared to the cost of purchasing that same market basket in CONUS. The cost-of-living index, which measures the cost of living at the OCONUS location relative to the CONUS cost, is the same for all members at the location. The COLA itself, however, varies across members because "spendable income"—the amount of the member's pay that is subject to adjustment—varies across members by pay grade and number of dependents. The current cost of the program is almost $1 billion annually. At locations where the COLA is paid, the average amount is $297 per month. The COLA, though, varies substantially by location.[4]

The overseas COLA attempts to compensate the member for differences in the cost of living between CONUS and the overseas location. It does this by providing an allowance that represents the difference in the cost of purchasing a typical market basket of goods and services at the overseas location compared to the cost of purchasing that same market basket in CONUS. The percentage difference in the cost of the national market basket is the same for all members at the location. The COLA itself, however, varies across members because "spendable income"—the amount of the members' pay that is subject to adjustment—varies across members by pay grade and number of dependents.

The Per Diem, Travel and Transportation Allowance Committee (PDTATAC), the organization responsible for calculating and adjusting

[3] We will refer to these as "overseas" locations, though in some instances they are clearly not overseas. DoD does not calculate a separate cost-of-living index for all 600 locations. In many instances, multiple locations in a geographic region will use the same cost-of-living index. DoD calculates cost-of-living indices for approximately 275 locations.

[4] For example, an E-6 with 10 years of service and 3 dependents would receive a COLA of approximately $36 per month in La Paz, Bolivia, and approximately $1,758 per month in Kure, Japan.

the overseas COLA, requested a review of the current system. The purpose of this paper is to summarize this review.

This review extends from the conceptual or theoretical premises of the current system to technical improvements in the methods of implementing the system. We summarize the major areas of review in the form of the following set of questions:

1. What can be learned from private sector firms and other organizations that may help to improve the overseas COLA?
2. Can the current system be improved? What are the likely effects of the current system on staffing? Are there changes that can improve the well-being of the member and family and, perhaps, improve staffing? Are there technical improvements that can be made in the logic, data, data collection, and calculation of the COLA that can improve accuracy and/or lower the cost of administering the system?
3. Are there alternatives to the current system that may be preferable to it? Are there ways to complement the system with other programs that can make the staffing of overseas assignments more efficient and/or improve the welfare of the member assigned?

The report is organized as follows. ***Section 2*** of this report presents a review of the current overseas COLA. The theory underlying the current system is reviewed first, then the mechanics. In ***Section 3***, practices in the private sector and in other organizations are considered. This is followed by a section that analyzes the shortcomings of the current system and suggests alternatives for improvement (***Section 4***). It draws from the foundation provided by the review of the current system and review of private sector and other organizational practices. ***Section 5*** discusses the effect that the OCONUS COLA has on recruiting and retention. ***Section 6*** presents the case for moving towards a more voluntary assignment system, and how a solid COLA complements a voluntary assignment system. ***Section 7*** discusses two potential administrative changes to the COLA system. Finally, ***Section 8*** summarizes the findings and recommendations in tabular format.

2. DESCRIPTION OF THE CURRENT SYSTEM

The purpose of the overseas COLA is to reduce or eliminate the financial disadvantage of an overseas assignment due to differences in the cost of living between the assignment location and the continental United States. Thus, the overseas COLA is designed to help OCONUS members "maintain a CONUS purchasing power level." In this section, we examine the concept of the current system and describe the methods and data used to calculate and update the COLA. We critique some aspects of the current concept and methods in this section, but describe these issues in more detail in ***Section 4***.

2.1 CONCEPT

2.1.1 An "Optimal" COLA

An ideal OCONUS cost of living adjustment would hold the member harmless for differences in prices between the overseas location and the continental United States. Ideally, one would want to construct a cost of living allowance that made the member and his or her family indifferent between the overseas assignment and an assignment in the (continental) United States, at least if the only differences were differences in the cost of living.

One way of representing this ideal, for the individual, is through an analytical device economists call the "indirect" utility function.[5] This is a functional relationship between a notional measure of a member's well-being or "utility" and the member's income and prices he or she faces at the location. For an assignment in the United States, we write for the individual:

$$U_i = U_i(p_c, I)$$

where p_c is a vector of prices in the United States for all goods and services, and I is the member's income. The function, $U(....)$ takes into account the member's tastes or preferences and translates prices and income into a (notional) measure of the members welfare. Note that the member's well-being or utility increases with increases in income, other

[5] See, for example, Hal R. Varian, *Microeconomic Analysis*, Third Edition, W. W. Norton & Company, Inc. 1992, p.102

things being equal, and decreases with increases in the prices that he or she must pay for goods and services.

Now, if the individual is assigned overseas, he or she will face a price vector p_{oc}, so that the member's utility is:

$$U_i^{'} = U_i(p_{oc}, I).$$

If prices overseas are generally higher than those in the United States, holding all other factors constant, the member's welfare or utility is lower:

$$U_i(p_{oc}, I) < U_i(p_{oc}, I).$$

We define the "optimal" cost of living allowance, ΔI, as that increase in income that just compensates for the higher overseas prices and restores indifference. That is, the optimal COLA is ΔI such that the member's welfare or utility is again the same regardless of the overseas or U.S. assignment:

$$U_i(p_{oc}, I + \Delta I) = U_i(p_{oc}, I).$$

This is, in principle, the "ideal" cost of living adjustment—one that makes the individual indifferent between the overseas location and the domestic location. In this form, if there are no other differences between the overseas location and the domestic location except prices, the COLA (or increase in income) required to compensate for the differences in prices will generally be ***less*** than the difference in cost of consuming the same set of goods and services consumed domestically at overseas prices. This is because the member will substitute, at the margin, goods and services that are relatively less expensive overseas for goods and services that are relatively more expensive overseas, compared to domestic prices for those goods and services.[6]

However, it is also true that the overseas and U.S. assignment will differ by ***more*** than simply the differences in prices between the two locations. Let E be a vector of environmental factors, such as climate, scenery, cultural opportunities, and other non-priced amenities that are not

[6] Consider a simple, if trivial, example. Let us suppose that, in the U.S., the member consumes 2 loaves of rye bread per week, at a price of $1.00 per loaf. On being assigned to Naples, the member finds that rye bread is available only at the U.S. equivalent price of $1.50 per loaf. The increase in the cost of living, holding the quantities consumed at the domestic level of 2 loaves per week, is $1.00 per week. However, the member finds that Italian bread in Naples is offered at the U.S. equivalent price of $1.10 per loaf, and the member is (almost) indifferent between consuming rye bread and Italian bread. Hence, the member's actual cost of living has increased by only $0.20, not $1.00, per week, and the member would be indifferent with a COLA, i.e., ΔI, of only $0.20 per week.

captured by the price vector. Members will value these environmental factors or amenities according to their tastes. Some members may have a preference for cold, remote climates where there is hunting and fishing; others may prefer moderate climates; members with spouses from other countries may prefer an assignment in that overseas location; and so forth. We incorporate these environment factors into the member's welfare or utility function as:

$$U_i = U(p_c, E_c, I)$$

for the United States. For the overseas location, we similarly have:

$$U_i = U(p_{oc}, E_{oc}, I).$$

Now, assume we hold non-priced environmental differences constant. Define ΔI_{COLA} to be that income differential which exactly compensates the member for cost of living differences, holding environmental differences and other non-priced amenities constant (i.e., the *E* vector is the same in both CONUS and OCONUS). It is that value for which the following holds:

$$U_i(p_{oc}, E_c, I + \Delta I_{COLA}) = U_i(p_c, E_c, I).$$

Next, let the E vary between the continental United States and the overseas location, so that:

$$U_i(p_{oc}, E_{oc}, I + \Delta I_{COLA}) <=> U(p_c, E_c, I).$$

That is, we recognize that the non-priced amenities at the overseas location could be preferred to the amenities in the United States, or vice versa, or the member could be indifferent. Let $\Delta I_{amenities}$ be the dollar change in income that again makes the individual indifferent between the overseas location and the location in the United States (after making the [notional] adjustment for cost-of-living differences while holding environmental factors constant between the two locations), such that:

$$U_i(p_{oc}, E_{oc}, I + \Delta I_{COLA} + \Delta I_{amenities}) = U_i(p_c, E_c, I).$$

Note that $\Delta I_{amenities}$ may be positive or negative, depending upon how the overseas location amenities are valued relative to those in the United States. In general, we would anticipate that it is positive for most locations. That is, other things being equal, most members prefer the environmental conditions and other non-priced amenities of the United States compared to those of the typical overseas location. If true, this suggests that even if we were able to offer an "optimal" COLA, such as

ΔI_{COLA}, most members would probably prefer an assignment in the United States.

Based on this analysis, the total adjustment necessary to hold a member harmless in an overseas assignment is:

$$\text{Total adjustment} = \Delta I_{COLA} + \Delta I_{amenities}.$$

In the remainder of this section we focus our discussion on the concept and technical aspects of the cost-of-living adjustment, ΔI_{COLA}. In later sections we discuss in more detail the concept of a "hardship" allowance, $\Delta I_{amenities}$, and programs to complement the overseas COLA program to adjust for differences between CONUS and OCONUS in terms of environmental differences and other non-priced amenities.[7]

2.1.2 Laspeyres Price Index

The purpose of the overseas COLA is to compensate members for the difference in the cost of living between the continental United States and the OCONUS location. The precise notional measure, ΔI_{COLA}, cannot, of course, be achieved in practice. It would require knowledge of the member's utility or welfare function, U(.....), which is not observable, and which differs for each member.

A practical alternative is to compensate the member for the difference in cost of goods and services in the OCONUS location relative to the CONUS cost by computing a specific index of the differences. The current overseas COLA is a modified version of a Laspeyres Price Index. A Laspeyres index is calculated by selecting a basket of goods and services (i.e., the "market basket") relevant to one time period or location, and then determining the cost to purchase the identical market basket in a different time period or location. In the case of overseas COLA, the market basket is determined by expenditure patterns in the continental United States. The index is formed by determining the cost of purchasing the U.S. market basket at the overseas location relative to the cost of purchasing it in the United States.

To illustrate, let us assume that the CONUS market basket consists of two goods, purchased in the United States in quantities $Q_{1,C}$ and $Q_{2,C}$,

[7] As discussed in Section 3, private sector firms often pay their employees assigned overseas allowances and premiums that represent, respectively, ΔI_{COLA} and $\Delta I_{amenities}$. Likewise, the State Department and the World Bank pay hardship premiums to employees assigned to locations with more onerous living conditions.

respectively, at prices $P_{1,C}$ and $P_{1,C}$. Similarly, let prices at the OCONUS location for those same goods and services be $P_{1,OC}$ and $P_{2,OC}$, respectively. Then, the overseas COLA index[8] in this stylized example would be:

$$Index = \frac{P_{1,OC}Q_{1,C} + P_{2,OC}Q_{2,C}}{P_{1,C}Q_{1,C} + P_{2,C}Q_{2,C}}.$$

The salient point is that the quantities of the two goods that are priced at CONUS and OCONUS prices are the CONUS quantities. Now, let the member's income in CONUS be $P_{1,C}Q_{1C} + P_{2,C}Q_{2,C} = Income$. Then, if the index value calculated is, for example, 1.1, the member would receive a COLA equal to 0.1**Income*. In general, this makes the member at the overseas assignment somewhat better off than the notional "optimal" COLA , ΔI_{COLA} , that precisely holds the member harmless, in terms of prices differences, between the OCONUS location and the United States. The reason is that the member in the overseas location will substitute among goods and services, consuming more of those items that are lower in price relative to CONUS, and vice versa. Hence, a COLA that compensates the member for the differences in cost between a fixed market basket that is based on CONUS expenditure patterns, and the cost of that same market basket at the OCONUS location will, other things being equal, make the member better off.

The Laspeyres index that is actually used is in terms of expenditure proportions, rather than quantities of good and services. They are, in fact, equivalent. Rewrite the index as:

$$\frac{P_{1,OC}Q_{1,C} + P_{2,OC}Q_{2,C}}{Income} = \frac{P_{1,OC}(P_{1,C}Q_{1,C})}{P_{1,C}Income} + \frac{P_{2,OC}(P_{2,O}Q_{2,C})}{P_{1,C}Income} = \frac{P_{1,OC}}{P_{1,C}}w_1 + \frac{P_{2,OC}}{P_{2,C}}w_2,$$

where w_1 and w_2 are expenditure share weights.

This is the general form of the actual index. Note that the expenditure weights must be the current CONUS expenditures on the respective goods and services that are consistent with the current CONUS prices. If the expenditure weights are from an earlier period, and are not those associated with the current level of CONUS prices, this is not a valid Laspeyres index. In particular, if the expenditure weights lag behind the prices, the index will overstate price increases in CONUS and therefore

[8] In the absence of commissary/exchange purchases, which are described later.

understate the overseas COLA.[9] Hence, it is important to keep expenditure weights as up-to-date as possible in the calculation of the index.

The overseas COLA is not a true Laspeyres index, however, because the market basket is not completely fixed across locations. Although the market basket is based on the consumption patterns of military members who reside in CONUS, significant differences in climate and living conditions in some OCONUS locations (relative to CONUS) have led DoD to modify the structure of the market basket for some OCONUS locations. That is, the basket is modified at some locations to more closely reflect expenditure patterns of members at those locations.

Mathematically, the cost-of-living index used by DoD is described by the equation:

$$Index = \sum_{G} w_G \sum_{g} \frac{P_{g,OC}}{P_{g,C}} \times w_g ,$$

where $P_{g,oc}$ and $P_{g,c}$, are the OCONUS and CONUS prices, respectively for item "g". Also W_g is the expenditure weight of item "g" within Category "G" and W_g is the expenditure weight of category "G."

Within a category, item weights sum to 1 (i.e., $\sum_{g} w_g = 1$). Across categories, the category weights sum to 1 (i.e., $\sum_{G} w_G = 1$). Under the current system, the category weights can vary across locations.

2.1.3 Other Concepts

The index reflects variation across OCONUS locations in the cost of the basket. To determine the additional income required to maintain parity in purchasing power between CONUS and OCONUS locations, one must determine the portion of household income spent on purchasing the goods and services in the market basket. To do this, DoD uses a "spendable income" table that estimates the amount of money that a household spends on the goods and services in the market basket. Estimated spendable

[9] The reason for this is the same reason that the Laspeyres index generally will overstate cost-of-living increases. In CONUS, members will reduce purchases of items that have risen relatively more in price, and increase purchases of items whose prices have risen relatively less. Hence, expenditure weights will change with price changes and the true cost of living to the members in CONUS will be less than that implied by a calculation using lagged expenditure weights. We anticipate that the bias from this source will be small, however, as long as the expenditure weights are updated without too much of a lag. The reason is that we would expect that changes ***in relative*** prices, which generate this effect, will be small in a quarterly or even annual update.

income increases with household size and pay grade. The concept of spendable income is described in more detail later.

A final concept of the overseas COLA is to hold members harmless for changes in currency exchange rates that would cause the price of goods and services purchased in the local economy to increase in terms of U.S. dollars. This concept is described in more detail later.

2.2 METHODS

To calculate the income adjustment needed to help OCONUS members "maintain a CONUS purchasing power level," DoD (1) constructs a market basket of goods and services that reflects the spending patterns of its members, (2) collects information on the prices of items in that market basket—both in OCONUS and in CONUS, (3) creates a cost-of-living index based on these prices, (4) applies the cost-of-living index to estimated spendable income, and (5) updates the index for currency exchange rate fluctuations. ***Figure 1*** provides a brief overview of the process. The following sections describe in more detail the methods and data used to update each of these COLA components.

2.2.1 Market Basket of Goods and Services

The market basket consists of 120 items (e.g., ground beef), separated into 11 categories (e.g., meats/dairy), that reflect the types of goods and services that members purchase (see ***Table 1***).[10] Movement in the price of items in the market basket (e.g., tomatoes) is assumed to be indicative of movement in the prices of related items not in the market basket (e.g., carrots, lettuce). Consequently, there is no need to collect price data on the thousands of different items that members actually purchase.

[10] The number of categories is somewhat arbitrary. In Table 1 we list 14 categories. Sometimes, when referring to the categories in the market basket, people will combine categories—e.g., combining the Fruits/Vegetables category with the Groceries category.

Figure 1. Overview of Overseas COLA Determination Process

Determine market basket items and weights

- The Market basket consists of 120 items in 11 categories representative of the types of goods and services purchased by households in the continental United States.
- Market basket item and category weights (i.e., spending proportions) are determined using Consumer Expenditure Survey (CES) data on military members in the continental United States .
- Item and category weights are updated approximately annually.

Determine spending patterns

- A Living Pattern Survey (LPS) is administered to members stationed overseas to identify the proportion of spending that takes place at the commissaries/exchanges, at stores in the local economy, through the mail, and from CONUS.
- The LPS is used to identify at which stores in the local economy members purchase items.
- The LPS is administered every three years, or more often at command request.

Determine prices

- At OCONUS locations, selected members are assigned to price items in the market basket at the commissary/exchange and at stores in the local economy identified through the LPS.
- In CONUS, commissary/exchange price data come from the commissary and exchange services (e.g., DECA, AAFES).
- In CONUS, price data for stores in the local economy also come from the commissary and exchange services.
- OCONUS prices are collected annually and compared to CONUS prices for the most recent quarter.

Calculate Indices

- Calculate locality indices based on the ratio of OCONUS to CONUS prices, and weighting these ratios by the proportion of purchases at commissaries/exchanges, local outlets, mail orders, and CONUS, and using item and category weights.

Compute the COLA

- Apply locality indices to members' spendable income.
- Adjust component of index that reflects spending in the local economy for exchange-rate fluctuations.
- Add location-unique expenditures covered under COLA.

Table 1. Market Basket Categories

Category	# Items in Category	Category Weight
Clothing	9	7.3
Domestics	2	3.0
Food Away	3	10.7
Fruits/Vegetables	8	1.6
Furnishings/Household	6	12.4
Groceries	14	6.6
Meat/Dairy	11	3.9
Medical	9	3.8
Miscellaneous	1	9.4
Personal Care	10	3.9
Phone	3	5.0
Recreation	11	11.3
Tobacco/Alcohol	4	3.2
Transportation	11	17.9
Total	**102**[11]	**100.0**

As discussed previously, each item in the basket is assigned a weight that reflects the proportion of expenditures for that item (and related items) within the category by military members stationed in the continental United States. For example, if fish makes up eight percent of expenditures in the meat/dairy category for the typical CONUS member, then fish is given an item weight of eight percent. If expenditures for meats and dairy products are 3.9 percent of total expenditures, then the meat/dairy category is given a weight of 3.9 percent.[12]

DoD uses expenditure data collected by the BLS through the annual Consumer Expenditure Survey (CES) to determine item and category weights. The weights are determined based on expenditure patterns of members of Uniformed Services who are randomly selected to participate in the CES. The CES is given to a stratified random sample of the U.S. population in CONUS, but military members are not intentionally over- or- under sampled. Consequently, only a small number (i.e., several hundred) military members are randomly selected to participate in the CES each year.

[11] Although there are 120 separate items in the market basket, some items that are similar are combined.

[12] Thus, fish would have a total weight of 0.312 percent (i.e., 0.08 x 0.039=0.00312) in the market basket.

One problem with using only data on military members in the CES sample to determine item and category weights is that small sample sizes reduce the reliability of estimates. The BLS relies on a large sample to determine item and category weights when analyzing expenditure patterns among the U.S. population. Large samples are especially important to determine weights in categories where consumers make infrequent purchases of high-cost items (e.g., automobiles and major household appliances). To help ensure that the estimated weights in fact reflect the purchasing behavior of military members, DoD generally pools three years of CES data on members to increase the sample size.

An alternative to the current system is to use data on both military members and civilians and data on the entire U.S. population to determine market basket weights. One possibility is to use data on the civilians with incomes similar to those of members to determine item weights but use data on members to determine category weights. Another possibility is to use market basket weights that are a weighted average of expenditure patterns of members and expenditure patterns of civilians.

As discussed previously, the category weights vary (from those in ***Table 1***) across OCONUS locations to adjust for differences in climate and living conditions that impose an additional financial burden on the member and his or her dependents. The process for adjusting the category weights is somewhat ad hoc, but reflects input from members stationed at OCONUS locations and reflects the findings of several government studies on the relationship between such factors as (1) climate and food spoilage, and (2) geographic and climate conditions and transportation costs.

2.2.2 Spending Patterns and Price Data

To determine the cost to purchase the market basket at different locations for comparison against the CONUS cost, DoD must collect information on where members shop and then collect price data at those locations. Under the current COLA program, different methods are used in OCONUS and in CONUS to determine shopping patterns and to collect price data. We first describe the process at OCONUS locations, and then describe the process in CONUS.

2.2.2.1 OCONUS Shopping Patterns and Prices

Member shopping patterns are determined through a triennial survey, the Living Pattern Survey (LPS), given to a sample of members at each OCONUS location. (The LPS may be administered more frequently at the

request of a location's command.) The purpose of this survey is to determine the proportion of goods and services in the market basket that members purchase in the local economy, at the commissary and exchange, through the mail, and from CONUS. Also, members are asked to list the stores off base where they purchase these goods and services.

In countries with multiple installations (e.g., Germany), one person is often designated to coordinate data collection efforts across the different locations. Similarly, installations within the same geographic location generally coordinate price collection efforts. DoD shares data collection responsibilities with the U.S. State Department for some locations where both organizations have members stationed. DoD has primary collection responsibilities at approximately 100 OCONUS locations, while the State Department has primary collection responsibilities at approximately 175 locations where DoD members are stationed. This shared responsibility for data collection must be considered when evaluating proposed changes to the overseas COLA program that affect data collection—such as adding items to (or dropping items from) the market basket.

Members often have multiple options concerning where they purchase goods and services. For purposes of computing the COLA, these options are grouped into four venues: (1) the local economy, (2) the commissary and exchange, (3) the mail, and (4) CONUS. The major proportion of expenditures occurs at the first two venues.

Accurately measuring the proportion of expenditures at commissaries/ exchanges and the proportion in the local economy can have a substantial effect on the overseas COLA. There are two reasons for this phenomenon. First, the price of particular items in the market basket can vary substantially between the commissary/exchange and stores off the base. Second, adjustments to the COLA to reflect exchange rate fluctuations apply only to the proportion of expenditures off base. The following equation shows how shopping patterns (e.g., the proportion of shopping at the commissary) are accounted for in the cost-of-living index.

$$Index = \sum_{G} w_G \sum_{g} w_g \frac{\sum_{v} P_{g,v,OC} \times s_v}{P_{g,C}} .$$

The price (P) of each item (g) in the market basket is collected for each shopping venue (v) at the OCONUS location. Then, each price is weighted by the proportion of expenditures for the item in each of the four shopping venues, where

$$\sum_{v=local,commissary,mail,CONUS} s_v = 1 \quad .$$

The current system is an expenditure-based system that collects prices where members report shopping. In actual practice, where members shop is determined in part by the availability of goods and services (including the proximity of a commissary/exchange and off-base stores to where members reside and work) and the prices of goods and services in one venue relative to prices in other venues.

Conventional wisdom suggests that the proportion of goods and services purchased from the commissary/exchange is inversely proportional to the distance one resides (or works) from the commissary/exchange. Also, members are more likely to shop at commissaries and exchanges that carry a larger selection of items.

Similarly, in practice members will be "efficient" shoppers and purchase items—especially expensive items or items that constitute a relatively large portion of household expenditures—from the location with the best prices. Thus, if the price of groceries at the commissary is significantly lower than the price of groceries in the local economy, then one would expect members to purchase most of their groceries at the commissary.[13]

OCONUS members purchase some items through the mail or while in CONUS (e.g., prior to relocating overseas). Items purchased through the mail or in CONUS tend to be non-perishable items, such as clothing, and make up a small percentage of household expenditures.

Collecting price data from the local economy for some 100 foreign locations is costly. However, the budget cost is modest because most price data are collected by members assigned to gather the information as collateral duty. Price data are collected annually, although more frequent data collection can occur at the request of a location's command.

Members assigned to collect prices generally have some training in data collection, but little formal training in sampling. Training is usually greater for those collecting data in the larger locations. Typically, the data collector is given a list of items and a list of stores in the local economy that reflect members' responses to the LPS. The data collector will then visit these stores and the commissary/exchange and record the price of items on the list.

[13] High prices or lack of availability of goods and services in the local economy may drive members at some OCONUS locations to purchase a larger proportion of goods and services from the commissary/exchange than the member desires. This, in turn, may have a perverse effect of producing a smaller COLA referred to by some as a "death spiral." This issue is discussed in more detail in Section 4.

Because stores will carry products of varying quality and different brands, data collectors must use some discretion in choosing items to actually price. Under the current system, members should price those items (e.g., brands) that reflect the brands that members typically would purchase. Items of comparable quality are priced at the different locations. If the item is not available, the member will collect prices for a close substitute or will not report a price for that item. Items are usually priced in per-unit prices (e.g., the price per pound). There are few mechanisms in the current system to ensure that the quality of items priced at OCONUS locations are of comparable quality to items priced at CONUS locations.

Price data for items purchased in CONUS are described in the next section. Items purchased through the mail are priced at CONUS prices plus a surcharge to cover shipping.

2.2.2.2 CONUS Shopping Patterns and Prices

To determine the cost of purchasing the market basket in CONUS, DoD must collect and analyze data on the prices of goods and services purchased at CONUS commissaries and exchanges and in the local economy. Every quarter, DoD receives price data for selected items from the Defense Commissary Agency (DECA), the Army and Air Force Exchange Service (AAFES), the Marine Corps Exchange Service (MCX), the Navy Exchange Service (NEX), and the U.S. Coast Guard Exchange Service (CGES).

The commissary and exchange services provide DoD with prices for selected items and with estimates of savings that members realize when they shop for those items at a commissary/exchange relative to shopping in the local economy. The commissary/exchange prices, combined with estimated savings from shopping at the commissary/exchange, are used to estimate prices in the local economy. The process for estimating prices in the local economy can be described mathematically by the following equation:

$$P_{non\text{–}commissary,g} = P_{commissary,g} \times (1 + S_{commissary,g}),$$

where $P_{commisary,g}$ is the price of item g at the commissary and $S_{commissary,g}$ is the estimated savings rate from purchasing item g at the commissary relative to purchasing the item from an outlet in the local economy.

The commissary and exchange services estimate savings rates for a subset of the items sold at the commissary/exchange. Items selected by the commissary/exchange services for the price comparison are major volume

items (i.e., items with large total sales) and a sample of other items.[14] The commissary/exchange services then price these items in the local economy where members shop and compare the off-base prices to the commissary/exchange prices.

A fundamental problem in the process used to estimate CONUS prices is the criterion for selection of items by DECA and the exchange services to price in the economy. As indicated previously, all else being equal, the efficient consumer will purchase an item at the location where he or she receives the best price. That is, if an item can be purchased either at the commissary or a local grocery store, and if all other factors are held constant (e.g., the items are of identical quality and both the store and the commissary are equally accessible), then the consumer will purchase the item at the location with the lower prices. Thus, high-volume items at the commissary are more likely to be those items where members realize the greatest savings.

For illustration, consider the following example. Suppose that the member desires to purchase two items—items X and Y. Further, suppose that item X costs $100 at the commissary and $120 in the local economy, while item Y costs $100 at the commissary and $80 in the local economy. The cost to purchase the two items at the commissary is $200 ($100+$100), and the cost to purchase the two items in the local economy is $200 ($120+$80). Assuming that items at the commissary and in the local economy are of equal quality, then the consumer would purchase item X at the commissary and purchase item Y in the local economy for a total cost of $180 ($100+$80). If many members exhibited similar efficient shopping behavior, then item X would be more likely to be chosen by DECA as a high-volume item whereas item Y would not. Estimated savings from shopping at the commissary for item X, relative to shopping in the local economy, is 20 percent (i.e., the non-commissary price [$120] is 20 percent higher than the commissary price [$100]). This selection bias in how items are chosen for price comparisons might overestimate true savings from shopping at the commissary. Consequently, it might over state the price of goods and services in local outlets in CONUS. The result would be to artificially deflate the OCONUS cost-of-living indices and thus the COLA amounts.

[14] DECA's 1999 Market Basket Price Comparison Study describes the process used to sample commissaries and the process for selecting items for price comparison. DECA selects items that are "clear sales leaders" to represent each category of goods sold at the commissary when comparing commissary prices to private sector supermarket prices. In addition to high volume items, DECA selects a random sample of other items for price comparison.

Thus, the DECA-AAFES price data used to calculate CONUS prices for the overseas COLAs have two potential shortcomings: (a) there is a potential conflict of interest for DECA and AAFES to report private sector prices; and (b) the method for choosing which items to report—the ones with the greatest sales volume in the commissary and exchange—is biased.

DoD also calculates a CONUS COLA—different from the OCONUS COLA—to determine cost-of-living allowances for members living in high-cost metropolitan areas in CONUS. The process used to collect CONUS prices for the CONUS COLA is different from the process used to collect CONUS prices for the CONUS COLA. Historically, DoD has contracted with Runzheimer International to collect prices in the United States for the CONUS cost of living adjustment.

Every three years, Defense Manpower Data Center (DMDC) surveys a random sample of military members using the Living Pattern Survey to determine where the members shop and to determine the portion of spending that occurs at commissaries and exchanges. Then, Runzheimer prices items in the market basket to determine geographic variation in prices throughout CONUS. In ***Section 4***, we discuss in more detail the possibility of using Runzheimer price data to calculate the OCONUS COLA.

2.2.3 Spendable Income

An important component of the overseas COLA process is the determination of "spendable income." This is the portion of the member's income to which the cost of living adjustment applies. Members allocate a portion of household income to items not considered living expenses for purposes of the COLA. These items include housing (which is partially covered by a separate housing allowance), savings, and other miscellaneous items (e.g., college tuition). The remainder is "spendable income." Spendable income is expected to rise with total household income and with household size. The *proportion* of military income that is "spendable" declines with income, though, under the current way it is calculated.

The overseas COLA is calculated by applying the cost-of-living index to member spendable income. Mathematically, this is described by the following equation:

$$COLA = (Index - 1) \times S_m ,$$

where S_m is the estimate of spendable income for member "m" (given the member's income level and number of dependents).

The spendable income table used prior to FY 2000 is based on data collected by the BLS in 1988-1989. In October 2000, the table will be replaced with one using BLS data from 1997-1998. Failure to update the spendable income table has resulted in "nominal income creep" which reduces the proportion of income protected through the COLA, especially for junior enlisted personnel. This issue is discussed in more detail in ***Section 4***.

2.2.4 Currency Exchange Rates

DoD continuously updates overseas COLA amounts to reflect fluctuations in currency exchange rates. If exchange rates become more (less) favorable toward the dollar, then prices on the overseas local economy fall (rise) relative to U.S. prices. Thus, currency fluctuations can affect the prices of goods and services in the local economy and items purchased in the local economy for resale in the commissaries/exchanges (e.g., produce). Currency fluctuations, therefore, can affect the price of locally purchased items relative to CONUS prices and relative to commissary/exchange prices.

The change in relative prices between the OCONUS location and CONUS, and the change in relative prices between the local economy and the commissary/exchange can affect the overseas COLA in two ways. First, price changes will have a direct effect on the cost of living overseas relative to the continental United States. Second, the change in prices can influence the proportion of household expenditures at the commissary/exchange.

PDTATAC analyzes currency exchange rates bi-weekly to determine their direct effect on the price of items purchased in the local economy. Only the component of the cost-of-living index that reflects spending in the local economy is adjusted. Commissary prices are assumed to remain unchanged even though some items (e.g., perishable produce) are purchased in the local economy and thus may change in price.

PDTATAC obtains information on daily exchange rates from three sources. In countries with a major command, the COLA point-of-contact typically provides PDTATAC with information on the daily exchange rate paid by members at on-base currency exchange facilities. PDTATAC obtains exchange rate information for the remaining countries from both the Wall Street Journal and the Regional Administration Management Centers (RAMCs).[15] The Wall Street Journal and RAMC exchange rate

[15] RAMCs are State Department Centers that purchase local currency for U.S. embassy transactions.

quotations do not include the service charges and commissions typically paid by military members when they exchange currency. To offset the exclusion of the services charges, PDTATAC uses the exchange rate reported by the Wall Street Journal or RAMC that is most advantageous to the member.

To reduce the frequency of modifications to COLA amounts, PDTATAC adjusts COLA amounts for currency fluctuations only when the actual exchange rate exceeds the exchange rate used to determine the current COLA amount by a specified threshold. PDTATAC compares the actual daily exchange rate (E_a) to the exchange rate used to determine the current COLA (E_c) and updates the exchange rate used for COLA determination when the cumulative difference in E_a and E_c at time T exceeds 5 percent. That is, when:

$$\frac{\left(\sum_t \left(E_{a,t} - E_{c,t}\right)\right)}{E_{c,t}} > .05$$

then E_c is replaced with E_a. A new E_c results in a new cost-of-living index and a modification to the COLA amount. Prior to September 1999, the threshold for revising the COLA due to changes in exchange rates was 10 percent.

Because the LPS is administered approximately every three years at a location, changes in members' on/off base shopping patterns caused by changes in the relative price of goods in the local economy are not reflected automatically in the cost-of-living index. Likewise, any change in the prices of goods and services are not incorporated into the cost-of-living index until the next annual price survey is completed. The local command can, however, request an out-of-cycle LPS or an out-of-cycle price survey. The issues of changing shopping patterns and changing prices caused by rapid and significant changes in the exchange rate are discussed in more detail in ***Section 4***.

2.2.5 Location-Unique Expenditures

At some OCONUS locations, members incur expenses that are not incurred by members in CONUS. These location-unique (or "COLA-unique") expenses typically are not captured in the cost-of-living index because the items are not part of the market basket or, if they are included in the basket, are not considered in the appropriate quantities. Under the current system, DoD increases COLA amounts in some locations to cover these additional expenses incurred by members. The process used to

determine which of these location-unique expenses will be covered under the COLA and the process used to determine payment amounts is discussed in more detail in ***Section 4***.

3. PRIVATE SECTOR AND OTHER ORGANIZATIONS

International companies, governments, and international organizations generally provide various living allowances and other pecuniary benefits to their members stationed overseas. There are many similarities between DoD and these organizations in terms of the types of compensation paid for overseas assignment and the COLA determination process. There are also many differences.

In this section we summarize the compensation practices and COLA determination processes common in the private sector and the practices and processes used by other organizations with employees assigned overseas (i.e., the U.S. Department of State, the Office of Personnel Management, and the World Bank[16]). Then, we compare the COLA programs of these organizations to DoD's overseas COLA program and discuss the implications if DoD where to implement some of the practices used in the private sector and other organizations.

Best practices in the private sector and international organizations, and the feasibility of their application to the military overseas COLA, should be considered with the understanding that the purpose of the military's overseas COLA program, and the institutional structure in which it is applied, is different than that of international companies. The Department's case differs from that of typical international companies in several important ways. First, most international companies only relocate company executives, senior managers, and technical specialists from the U.S. to overseas locations. They typically hire indigenous workers to perform most tasks. The Uniformed Services, on the other hand, relocates members at all levels to OCONUS locations.[17] Second, many global companies negotiate individual compensation packages with employees

[16] The United Nations and International Monetary Fund both use the same COLA program as the World Bank

[17] The two main categories of expatriates consist of managers and employees with technical skills that are not readily available in the overseas location. In a 1996 survey by Foster Higgins International of 171 U.S. and Canadian employers with employees stationed overseas, only 23 percent of surveyed companies placed junior-level employees overseas (Prince, 1996).

who are being considered for overseas assignments. Thus, in addition to cost-of-living increases employees may receive additional compensation for hardships associated with overseas assignments. When employers negotiate individually with employees, the individual circumstances of employees can be taken into account when the compensation package is formulated.[18] The Uniformed Services do not, and cannot, negotiate separate compensation agreements. Third, in the private sector overseas assignment is voluntary.[19] This is typically not the case in the Uniformed Services. Fourth, global companies do not typically have Congressional oversight.

3.1 PRIVATE SECTOR PRACTICES

Private sector corporations face many of the same problems as the Uniformed Services in selecting and assigning staff (i.e., "expatriates") for foreign duty. These include family considerations, spouse career and employment, and subsequent retention. To attract employees to overseas assignments, motivate them, and retain them, the companies often pay substantial allowances and premiums in addition to base salaries.

To identify best practices in the private sector for compensating expatriates and for determining COLAs we interviewed human resource specialists at major international companies[20], conducted a review of literature on the subject, and contacted companies that specialize in providing COLA-related information and services. Many of the compensation policies and practices found in the private sector are similar to those used by the Uniformed Services to compensate members assigned overseas. Many policies and practices, however, are found only in the private sector.

The traditional approach used by the private sector to determine compensation for expatriates is referred to as the "balance-sheet"

[18] Individual (or family) circumstances include whether dependents will attend a private or public school while living overseas, and the standard of living the employee and his or her depends expect to maintain.

[19] Arguably, international companies can "force" employees to accept overseas assignments with the threat of adverse consequences to their careers (e.g., job loss). Based on our review of the literature and interviews with human resource specialists at major international companies, most employees selected for overseas assignments either volunteer for the assignment, accept the assignment as a necessary requirement in their career progression, or are induced with higher compensation to accept the assignment.

[20] We interviewed human resource specialists at Daimler Chrysler, Quintiles Transnational Corp., Ford Motor Company, International Business Machines (IBM), and Glaxo Welcome.

approach. Balance-sheet compensation policies were developed in the 1950s and 1960s with the objective to keep the expatriate from suffering any *financial loss* or decline in *standard of living* when taking an overseas post.

To prevent expatriates from suffering *financial loss* when taking an overseas assignment, international companies typically pay different types of allowances—including cost-of-living allowances, housing allowances, travel allowances, education allowances, and foreign tax allowances—when the cost for these goods and services exceed those typically found in the United States. To prevent expatriates from suffering a decline in *standard of living* when taking an overseas assignment, international companies will often pay premiums (e.g., for hardship and danger).

Based on our review of the literature and discussions with international human resources specialists, companies with large expatriate populations tend to have well defined (and inflexible) policies for determining overseas allowances and premiums and for assigning employees to overseas posts. Companies with smaller expatriate populations, on the other hand, tend to structure individual packages to reflect the specific needs and purpose of the assignment (Carey, 1995). In addition, companies generally are more flexible when they determine the compensation package for executives relative to junior and mid-level employees. For example, executives are more likely to receive perks and benefits such as the use of a company vehicle, a home security system, and completion bonuses. In a recent survey by Towers Perrin, 70 percent of respondents recognized that there are different kinds of expatriates, and about 50 percent indicated their company pays differently according to type (Mervosh, 1997).

Below we discuss the two main types of compensation paid specifically for overseas assignments (i.e., allowances and premiums), but we focus our discussion on cost-of-living allowances. In addition, we present findings from our literature review on important issues in the private sector relating to assigning employees to overseas posts.

3.1.1 Cost of Living Allowance

Most international companies pay a cost-of-living allowance to expatriates assigned to high-cost areas overseas. The purpose of this allowance, similar to the overseas COLA paid by DoD, is to put the expatriate on an economically equal footing with employees who remain in the U.S. That is, the expatriate should not suffer economically from differences in cost-of-living between the assignment location and the U.S.

International companies typically outsource the function of determining living allowances. We identified the six major suppliers of COLA data to the private sector (***Table 2***).

Table 2. Private Sector Suppliers of International Cost-of-Living Data

Organization	# Cities Where Data Are Collected	# Clients	Frequency of Data Collection
Associates for International Research Inc. (AIRINC)	300+ overseas	300+	6 months
Economic Research Institute (ERI)	1400 overseas	NA	continuous
Economist Intelligence Unit (EIU)	123 overseas	NA	6 months
Employment Conditions Abroad (ECA)	235 overseas	1,300	6 months (more for areas with high inflation)
Organization Resources Counselors, Inc. (ORC)	300+ overseas	1,600	continuous
Runzheimer International	200 U.S. and 100 overseas	1000+	continuous

These six organizations collect price data for a market basket of goods and services in major cities throughout the world. These organizations then use this information to compare the cost-of-living between cities, or between specific cities and a national average. For example, U.S. international companies may contract with one of these six suppliers to provide information on the cost-of-living at overseas locations relative to the overall cost-of-living in the U.S., or relative to the cost-of-living at a particular city in the U.S. (e.g., where the international company is headquartered).

These six organizations produce variations of two types of cost-of-living indices. "Standard" cost-of-living indices show the relative price across cities of purchasing a basket of goods that reflects U.S. consumption patterns. Mervosh (1997) comments that the standard indices used by most companies accentuate the cost-of-living differences between the U.S. and foreign cities because they assume upscale shopping patterns. "Efficient purchaser" indices reflect how consumers shop if they have lived in a location for a while and know where the bargains are. Thus, the index values for efficient purchaser indices are lower than the values for standard indices. These six organizations use the cost-of-living indices to provide their clients with tables showing the COLA amounts by household income level and by family size for each overseas location.

For proprietary reasons, these six companies provide little information on their process for collecting price data and constructing the cost-of-living indices. Some information, though, was obtained from the organizations' internet web sites and by contacting the companies. We provide a brief summary of the companies below and compare index values for selected overseas locations in a later section. The companies are listed alphabetically.

- ***Associates for International Research Inc. (AIRINC)*** collects price data in over 300 cities throughout the world. The data are collected by pricing agents every six months. AIRINC computes cost-of-living indices using the following process. First, AIRINC analyses expenditure data in different countries to identify market baskets of goods and services and to identify weights for each item in the basket. The market basket changes by country. Thus, international companies headquartered in different countries can base their COLAs on the market basket that best reflects consumption patterns in their own country. Second, AIRINC periodically conducts surveys of expatriate living patterns in cities throughout the world. Third, AIRINC surveys retail prices at each foreign location every six months. Fourth, the company calculates foreign expenditures for the market basket and compares foreign and home country expenditures to create cost-of-living indices. Finally, AIRINC combines the cost-of-living indices with information on income level and family size to generate a table for each location showing the COLA for each income level (in increments of $100) and family size (up to seven family members).
- ***Economic Research Institute (ERI)*** provides companies with the computer software and data to compare the cost of living between over 5,900 U.S. and Canadian cities and 1,400 international locations. The database containing price information is updated continuously using data compiled from published surveys and reports.
- ***The Economist Intelligence Unit (EIU)*** computes a cost-of-living index every six months for 123 of the world's major economic centers. The study uses a lengthy list of corporate essentials to compare the cost-of-living in different cities. Fox (1998) comments that the EIU cost-of-living index demonstrates a poor correlation between cost-of-living and perceived level of luxury (or standard of living). The EIU index appears to be designed primarily to calculate living

allowances for highly compensated business executives and their families stationed overseas.

- ***Employment Conditions Abroad (ECA)*** computes a cost-of-living index every six months for 235 locations worldwide. ECA publishes three different indices. The "Standard Home-Based" Index assumes the expatriate purchases the same basket of goods that would be purchased in the U.S., but that the expatriate shops less cost-effectively abroad than at home. The "Cost-Effective Home-Based" Index assumes the expatriate purchases the same basket of goods that would be purchased in the U.S., but that the expatriate shops as cost-effectively abroad as at home. The "Cost-Effective International" Index assumes the expatriates' purchasing patterns are similar to those of an international lifestyle. ECA was originally created as a non-profit organization sponsored by 35 multinational firms. The purpose of creating the organization was to combine the resources of the member firms to collect cost of living data, and then make the data available to the member firms. One of ECA's main sources of price and expenditure data is the expatriates themselves. During certain times of the year, the employees (or their spouse) keep a diary of all expenditures—including quantities and prices. The survey participants receive nominal compensation (e.g., a gift certificate for dinner at a nice restaurant). Because information is collected by expatriates of a large number of firms, the combined number of survey participants is generally sufficient to provide reliable estimates of purchasing behavior and prices. ECA supplements data collected by expatriates with data on consumption patterns and prices collected by professionals employed by ECA.
- ***Organization Resources Counselors, Inc. (ORC)*** collects price data in over 300 cities in more than 40 countries. ORC provides both a "standard" cost-of-living index that keeps the expatriates' purchasing power comparable to that in the home country, and designs customized "efficiency" indices that assume the expatriates adopt the purchasing patterns of nationals in the overseas location. ORC collects data through a large number of pricing agents. Data are collected continuously, so companies can purchase up-to-date information.

- ***Runzheimer International*** produces two overseas cost-of-living indices. The "Standard" plan uses the traditional balance sheet approach which assumes a local national lifestyle in the home country and a traditional expatriate lifestyle in the assignment location. The "Corporate" plan is an efficient purchaser plan that assumes the expatriate modifies his or her lifestyle in the assignment area. Runzheimer's pricing agents continuously collect price data, so clients can purchase up-to-date cost-of-living data. One major difference between Runzheimer's indices and the OCONUS COLA index is that the Runzheimer index for a given location varies by income level. The rationale for this variation by income is that the market basket of goods and services consumed varies by income level. DoD, on the other hand, calculates one index value for each location regardless of income level.

3.1.2 Premiums and Other Special Pays

In addition to living allowances, international companies often pay premiums and other special pays to encourage employees to accept overseas assignments and to compensate for factors that may reduce the expatriates' standard of living. These premiums and special pays include foreign service premiums, hardship and danger premiums, and compensation for lost spousal income.

International companies have traditionally paid foreign service premiums as an inducement to accept a foreign assignment (Kates and Spielman, 1995). Mervosh (1997) reports that foreign service premiums generally are a percentage of base salary (often as much as 15 percent), and are paid for making what has traditionally been considered a high-risk career move. Kates and Spielman report, though, that companies are eliminating this premium as foreign assignments become more desirable and as foreign assignments become an integral part of the career development process.

The second category of premiums is hardship and danger premiums. These are paid when conditions that affect the standard of living vary substantially from one location to another. Swaak (1997) reports that many companies that pay hardship and danger premiums base their premiums on the hardship and danger pay allowances calculated by the U.S. Department of State, although private sector companies sometimes pay higher premiums than the federal government's maximum rate of 25 percent of base salary.

Some international companies provide other special pays or reimbursements to employees assigned overseas. The two most relevant to this project are pay for lost spousal income and an education allowance.

According to Organization Resources Counselors, Inc. (ORC, 1995), the management of dual-career couples on international assignment is one of the five most important international human resources challenges facing international companies in the coming decade. In many international companies, employees must apply to be considered for an overseas assignments.[21] Thus, the potential loss of spousal income is one factor that the employee must consider in making the decision to apply for an overseas assignment. In other companies, however, employees are assigned overseas as part of career development or to meet a specific need of the company.

ORC (1995) reports that ninety percent of the 144 international companies they surveyed indicated that they ***do not*** compensate expatriates for loss of spousal income when the employee is transferred overseas. Respondents in the ORC survey stated that the multiple variables involved in each dual-career overseas relocation make policy development extremely difficult. Swaak (1995) reports that few of the companies he surveyed provide any form of income replacement to spouses who give up their jobs to accompany expatriates on foreign assignments. Instead, most companies provide employment assistance services to help spouses find new employment at their new location. Companies that do provide income replacement for lost spousal income generally do not exceed two or three months of lost base salary. One company surveyed by Swaak reported that it negotiates income replacement for one year. One of the international firms we contacted, Quintiles Transnational Inc., reported that they reimburse a small number of company executives assigned to overseas posts for up to two years of lost spousal income.

[21] Daimler Chrysler Corporation is one example of an international company where overseas assignments are voluntary. Chrysler posts an internal job opening when there is an overseas position that the company wishes to fill. Candidates must apply for the overseas position and undergo a rigorous selection process. The selection process is much more rigorous than the process to hire employees in the U.S., and the candidates for overseas employees and the candidates' families undergo a series of diagnostic tests. The position is filled with the candidate with the best qualifications—cost is a distant secondary consideration. Chrysler has approximately 500 expatriates throughout the world. Approximately 350 of these employees are U.S. citizens stationed overseas, and the remaining 150 are foreign nationals stationed both in the U.S. and in foreign companies. Chrysler expatriates consist of company executives, managers, and technical professionals.

Mervosh (1997) reports that most international companies provide generous education allowances for dependents of expatriates. A 1996 survey undertaken by the Monks Partnership found that the provision of educational costs for expatriates' children decreased between 1993 and 1996. In the 1993 survey, 69 percent of companies paid home boarding school fees. In 1996 the number fell to 42 percent of companies.

3.2 OTHER ORGANIZATIONS

United States federal government agencies such as the State Department and the Office of Personnel Management (OPM), and international agencies such as the World Bank, the United Nations (UN), and the International Monetary Fund (IMF) have a large number of employees assigned to overseas locations. The COLA programs and policies of these organizations are similar in many ways to those of the Uniformed Services. There are, however, some important differences. Below we describe the COLA programs for the U.S. State Department, the Office of Personnel Management, and the World Bank. (The COLA programs of the UN and the IMF are identical to the World Bank's COLA program.) Then, we discuss the implications if the Uniformed Services were to adopt certain practices of these organizations.

3.2.1 U.S. State Department

Like DoD, the State Department pays a cost-of-living allowance to employees assigned outside the continental U.S. The State Department calculates a cost-of-living allowance for State Department employees stationed overseas in much the same way that DoD calculates the overseas COLA. In fact, the State Department and DoD share much of the data used to compute cost-of-living indices in locations where both organizations have members stationed.

There are five major differences in the methodology used by the State Department and DoD to determine overseas COLA amounts.

- First, to compute a cost-of-living index the State Department compares the cost of living in the overseas location to the cost of living in Washington, D.C. DoD, on the other hand, compares the cost of living at the overseas location to the average cost of living in CONUS.
- Second, the State Department does not pay a COLA if the cost-of-living index is below 103 (where 100 represents parity in prices between the overseas location Washington,

D.C.). DoD pays a COLA whenever the index value exceeds 100.9.

- Third, the category weights in the market are different for the State Department and DoD. The category weights used by the State Department are based on Bureau of Labor Statistics (BLS) data for the Washington D.C. metropolitan area. The category weights used by DoD are based on three years of BLS data of military members who participated in the consumer expenditure survey.
- Fourth, DoD uses the LPS to determine the percentage of spending that members incur outside the foreign country of assignment. This percentage varies by location. The State Department, however, calculates cost-of-living indices using the assumption that 15 percentage points of the cost-of-living index represents consumer expenditures outside the foreign country of assignment. Thus, to calculate a new index when there are fluctuations in the exchange rate the State Department uses the following formula:

$$\text{new index} = 15 + (\text{local index} - 15) \times \left(\frac{\text{old exchange rate}}{\text{new exchange rate}} \right).$$

- Fifth, the State Department uses a different process than does DoD to adjust the COLA at a given location due to minor adjustments in the cost-of-living index. The State Department uses the following table (***Table 3***) to determine what range the cost-of-living index is in, and then uses the product of the midpoint of the range and estimated spendable income for each member to compute the COLA for each member at a given location.

In addition to cost-of-living and housing allowances, the State Department pays a "hardship" premium and a "danger" premium for employees stationed in locations where living conditions are more onerous or more dangerous, respectively, than in the U.S. The purpose of these premiums is to compensate employees assigned to areas where the perceived standard of living is lower than in the U.S. Also, because the assignment of State Department employees is largely voluntary, the premiums help recruit State Department employees to locations with more onerous or dangerous living conditions. At locations where these premiums are paid, the hardship premium ranges from 5 to 25 percent of base salary, while the danger premium is 15 to 25 percent of base salary.

Table 3. Local Cost-of-Living Index and Percent Applied to Spendable Income to Determine Post Allowance

Local Index	Percent applied to spendable income	Local Index	Percent applied to spendable income
103-107	5	166-175	70
108-112	10	176-185	80
113-117	15	186-195	90
118-122	20	196-205	100
123-127	25	206-215	110
128-132	30	216-225	120
133-137	35	226-235	130
138-145	42	236-245	140
146-155	50	246-255	150
156-165	60	256-265	160

Source: U.S. Department of State 1999 Quarterly Report Indices, Table A..

To calculate hardship premiums for a location, the State Department assesses living conditions in the following 15 categories: isolation, education, community, facilities, food, importation, altitude, climate, housing, recreation, natural hazards, sanitation and disease, crime and harassment, medical facilities, and political violence. These 15 categories are sub-divided into approximately 124 factors, which are given weights.

The State Department computes a danger pay index that is used to determine danger pay premiums for employees assigned to locations plagued by civil revolution, civil war, or terrorism—i.e., conditions that threaten physical harm or imminent danger to the expatriates' health or well-being.

The State Department offers a 'Foreign Transfer Allowance' that covers expenses typically covered by DoD under the Permanent Change in Station (PCS) move program. Some expenses covered in this allowance, though, are expenses considered for coverage in the OCONUS COLA (i.e., as "COLA Unique" expenditures). For example, the allowance covers pet quarantine expenses, conversion of electronic equipment to use native utilities, costs to alter automobiles to comply with local laws—e.g., catalytic converter installation, and automobile registration fees. These expenses are covered on a reimbursement basis.

In addition, the allowance includes a wardrobe component designed to allow recipients to purchase special clothing required by the country's climate. Overseas locations are grouped into three zones according to

climate, and there are three categories of family size. The flat rate expense covered is intended only to offset a part of the wardrobe cost implied by a shift from a Zone 1 area with a cold climate, such as Alaska, to a warm Zone 3 climate, such as Puerto Rico, or vice versa. The allowance also covers moving expenses such as food and lodging, travel costs, connection fees for appliances and utilities, and various housing costs (e.g., expenses associated with breaking a lease or non-refundable agent fees).

3.2.2 Office of Personnel Management

The Office of Personnel Management (OPM) has responsibility to determine the cost-of-living allowance paid to approximately 44,000 federal government employees (excluding military members) assigned to Alaska, Hawaii, Guam, Puerto Rico, the Virgin Islands, and the Northern Mariana Islands. OPM's method for determining COLAs is similar to DoD's method, but there are four important differences that we list below.[22]

- First, like the State Department, OPM compares the cost of living at the OCONUS location to the cost of living in Washington, D.C. That is, the COLA is based on the cost to purchase a fixed market basket of goods and services at the overseas location relative to the cost to purchase the same market basket in Washington, D.C.
- Second, OPM includes housing in the market basket used to calculate cost of living. DoD, on the other hand, has a separate allowance for housing.
- Third, by law, the OPM COLA is limited to a maximum of 25 percent of basic pay. The COLA is exempt from federal taxes, but is subject to state and local taxes.
- Fourth, OPM calculates separate cost-of-living indices for three income levels. Data from the national Consumer Expenditure Survey (CES) are used to determine which goods and services are in the market basket and the weights assigned to each item. Separate indices are calculated for upper income, middle income, and lower income households by using market basket weights that more closely reflect consumption patterns for upper income, middle income, and lower income households, respectively. Linear regression is

[22] Information on the methods used by OPM come mostly from: Report on 1996 Surveys Used to Determine Cost-of-Living Allowances in Non-foreign Areas, Federal Register, Vol. 62 No. 57, Tuesday, March 25, 1997, 14190.

used to derive weights for the components at each income level and in categories by regressing expenditures reported in the CES data on characteristics such as income level and family size.[23] The following table (***Table 4***) illustrates how expenditure patterns vary by income level.

Table 4. Typical Consumer Expenditures By Income Level and Market Basket Category

Income Level	Goods and Services	Housing	Transportation	Misc.	Total
Lower	$8,558 (40%)	$5,556 (26%)	$3,992 (19%)	$3,465 (16%)	$21,571 (100%)
Middle	$12,821 (39%)	$8,8047 (24%)	$5,994 (18%)	$6,037 (18%)	$32,899 (100%)
Upper	$19,300 (38%)	$11,710 (23%)	$9,044 (18%)	$10,246 (20%)	$50,300 (100%)

Source: Federal Register, Vol. 62, No. 57, March 25, 1997, p. 14198, Table 2-2.

The cost-of-living indices are updated annually. Historically, most of the data collection and analysis effort to compute COLAs was performed by a contractor. A sample of federal government employees in both the Washington D.C. metropolitan area and the overseas locations do participate, however, in a survey designed to identify where federal government workers shopped. Currently, federal government workers and their union representatives pay a more prominent role in determining the COLAs. In April 1996, OPM and the plaintiffs in *Alaniz* v. *Office of Personnel Management* and *Karamatsu* v. *United States* entered into a Memorandum or Understanding to resolve long-standing issues regarding OPM's COLA program. Under court-approved agreement, representatives of the federal employees affected by the COLA began to play a more prominent role in designing the survey used to collect data to determine the COLA and to oversee the data collection efforts. In regions where non-military employees have access to commissaries and exchanges, such as Guam, they are used for local retail pricing. To calculate the cost of the

[23] "To determine the appropriate income levels, OPM analyzed the 1995 distribution of salaries for General Schedule employees in all of the ... areas combined... [and] divided this distribution" into three equally sized groups. Median incomes for each group were taken and rounded to the nearest $100 to obtain representative incomes of $21,600, $32,900, $50,300. These values are used to produce three sets of expenditure levels for each region and Washington, D.C. These estimated expenditures are then weighted and eventually combined into a single index for each region (Source: Federal Register, Vol. 62, No. 57, March 25, 1997, pg. 14196).

market basket in Guam, the assumption is made that 70 percent of food and home items are purchased at the commissary.

3.2.3 World Bank

The World Bank assigns staff members to numerous countries on both temporary and long-term assignments. Currently, there are approximately 350 American World Bank employees assigned overseas. To serve these employees, the bank has a department that monitors the costs of living abroad and makes adjustments in the living allowances paid to its employees. In this summary we focus on the COLA paid to U.S. employees stationed outside the U.S. The process used by the bank to calculate COLAs is similar to that used by DoD. There are, however, some fundamental differences that we list below.

- First, the bank uses the U.S. State Department's private sector Index of Living Costs Abroad that compares living costs between the Washington, D.C. Metropolitan Area and overseas locations. The State Department's private sector cost-of-living index is similar to the locality index the State Department uses to determine COLAs for its own members, but assumes the individual stationed overseas does not have access to commissaries and exchanges on U.S. military installations. The bank calculates its own cost-of-living index for those few duty stations for which the U.S. State Department produces no index.
- Second, the category weights in the market basket are different than those used by DoD. The category weights used by the bank reflect purchasing patterns of Washington-based families. The category weights are adjusted for each overseas location, however, based on survey data collected from World Bank employees. For example, food spoilage occurs more frequently in locations with warmer climates so the category weight for food expenditures is increased in these locations.
- Third, the bank updates the cost of living indices quarterly (i.e., in January, April, July and October) for movements in the exchange rates and inflation rates.[24] The bank assumes that 20 percentage points on the index represents spending

[24] For quarterly review and updating, the bank uses CPI and exchange rate data published by the IMP. For some countries, the UNDP published exchange rate data are used while the INSEE/Paris CPI data are used for some francophone countries.

that is done outside the assigned location (and thus is not adjusted for changes in the exchange rate or the Washington, D.C. consumer price index [CPI]). The following formula is used to make quarterly adjustments in the cost-of-living index:

$$\text{new index} = 20 + (\text{old index} - 20) \times \left(\frac{\text{old exchange rate}}{\text{new exchange rate}} \right) \times \left(\frac{\text{old Washington D.C. CPI}}{\text{new Washington D.C. CPI}} \right).$$

- Fourth, one of the distinguishing features of the bank's COLA is the use of a "safety net". Every year a base COLA is determined. The COLA is updated quarterly using the formula described above. The safety net policy at the World Bank means that if fluctuations in the exchange rate or the Washington, D.C. CPI cause the quarterly updated COLA to fall below the year's base COLA, then the base COLA amount is retained. The safety net does not prevent the base COLA from falling from one year to the next, though. Upward adjustments in the COLA cannot exceed 30 percent of the year's base COLA.
- Fifth, like the State Department, the World Bank has different ranges for the cost-of-living indices. The cost-of-living differential paid at a given overseas location is the midpoint of the range into which the location's cost-of-living index falls. For example, if the index is between 105 and 109, then a cost-of-living differential of 7.5 percent is given. For indices between 110 and 114, a 12.5 percent adjustment is made. The maximum COLA differential payable for any post is 97.5 percent.
- Sixth, the World Bank calculates the COLA using the assumption that 40 percent of the salary is spendable income, regardless of family size or income level.

The World Bank provides other allowances and benefits to its employees stationed out of country. Before transferring overseas, the member is allowed a pre-assignment visit. In addition to travel and shipping costs associated with the transfer, the employee receives a relocation grant to cover miscellaneous costs such as food and lodging costs associated with the move. Employees transferred overseas receive an assignment allowance of $25,000. Half of the allowance is paid at the beginning of a tour (which usually is for three to four years), and half is paid on the third anniversary of the tour. The bank pays a locality

premium, or hardship premium, to bank employees posted in locations with more onerous living conditions. The premium is based on the United Nations Hardship Rating Scheme, which is different than the scheme used by the State Department. In addition, employees living in a location that is especially dangerous receive a hazard premium. Members receive an education allowance for dependents in primary or secondary education. The bank also pays a housing and utilities allowance. The employee contributes a specified amount of money towards housing and utilities, and the bank pays all costs above the employee contribution up to a ceiling. Finally, the employees receive a home leave allowance that pays for the employee and his or her dependents to travel to the U.S. once per year.

3.3 COMPARISON OF COLA PROGRAMS

In the following table [Table 5], we summarize similarities and differences between the COLA programs used by DoD, the private sector, the State Department, OPM, and the World Bank.

4. ISSUES AND ANALYSIS OF THE CURRENT SYSTEM

The goal of the current system is to calculate and pay members a COLA that holds members financially harmless for the potentially higher cost of living they may experience in an overseas assignment. A number of factors make it difficult to realize this goal. Theoretical issues, themselves, make this goal impossible to realize fully in practice. Members have different tastes. Consequently, a single "market basket" cannot be literally correct for everyone. Moreover, members can substitute goods and service in response to differences in relative prices between the overseas location and the United States, allowing them to achieve a given level of well-being at lower cost. This cannot be captured in an index. Practical issues add further complication. Limitations on price measurement and data collection, time lags in adjustment, location-unique circumstances, and member circumstances make exact realization of the ideal infeasible in practice.

Table 5. Comparison of COLA Systems

	DoD	Private Sector	State Department	OPM	World Bank
Recipients	▪ Approximately 280,000 members of the Uniformed Services stationed outside the continental U.S.	▪ Varies, but generally corporate executives, managers, and highly trained specialists	▪ Federal Employees living outside the U.S. and its territories	▪ Approximately 44,000 federal employees living in Alaska, Hawaii, and U.S. territories	▪ Approximately 350 American World Bank employees assigned overseas
Market Basket	▪ Items and category weights based on CES data ▪ Reflects expenditures of Military members in CONUS ▪ Category weights adjusted in some OCONUS localities	▪ Private sector market baskets are often modified versions of the CES market basket ▪ Weights are adjusted to different localities, income levels ▪ Some companies use a Balance Sheet" approach that assumes a U.S. lifestyle ▪ Some companies use an Economy" approach that reflects a modified lifestyle	▪ Items and category weights based on CES data ▪ Reflects expenditures of Washington, D.C. population	▪ Items and category weights based on CES data ▪ Reflects expenditures of Washington, D.C. population ▪ Expenditures are measured at three different income levels	▪ Category weights are adjusted at some locations to reflect expenditure patterns of surveyed World Bank employees stationed overseas
Exchange Rate and Data Adjustments	▪ Indices are adjusted to reflect exchange rate differences each pay period, but only if the change exceeds the threshold.	▪ Varies depending on company, policies	▪ COLA adjustments made only if exchange rate fluctuation causes the cost-of-living index to move outside of a range	▪ None (All locations use U.S. currency)	▪ Adjusted quarterly
Spendable Income	▪ Index is applied to a spendable income table	▪ Varies, cost-of-living indices are constructed on spendable income, actual salaries, or other methods	▪ Index is applied to a spendable income table	▪ Index is applied to recipients' spendable income based on total basic pay derived from GS schedule and dependents	▪ Assumes 40 percent of salary is spendable income regardless of income level and family size

Table 5. Comparison of COLA Systems (continued)

	DoD	Private Sector	State Department	OPM	World Bank
Price Data and Collection	▪ Triennial LPS used to identify where members shop, and proportion of expenditures at each source ▪ Price collected annually by designated military member at OCONUS location ▪ CONUS prices from commissaries/exchanges and price data for items in the local economy provided quarterly by commissary/ exchange services, and from other sources ▪ DoD collects price data at approx. 100 locations ▪ DoD receives price data from State Department for approx. 175 locations.	▪ Data collection outsourced to private companies ▪ Price data collected both at upscale stores and at stores where "efficient" consumers are expected to shop	▪ Prices are collected annually by assigned State Department employee at each OCONUS location ▪ BLS collects price data in Washington, D.C.	▪ Prices are collected annually both in the DC area and other locations by DC based federal employees, with observers from the allowance areas ▪ Items are priced at available local outlets (including PX, where available), and through catalogues, where this is common practice	▪ Does not collect price data—uses State Department's private sector cost-of-living index
Allowance Calculation	▪ Compares overseas location cost of living to CONUS average cost of living	▪ Compares overseas location cost of living to U.S. average, or to a specific city	▪ Compares overseas location cost of living to Washington, D.C. cost of living ▪ Index values fall into a range, and the midpoint of the range is applied to spendable income to determine the COLA	▪ Compares location cost of living to Washington, D.C. cost of living ▪ Separate cost-of-living indices are created for each of three income levels	▪ Same as State Department methodology

Table 5. Comparison of COLA Systems (continued)

	DoD	Private Sector	State Department	OPM	World Bank
Other Special Pays/ Allowances	▪ Department of Defense Dependent Schools (DoDDS) ▪ Housing allowance ▪ "COLA-Uniques"—e.g., UK TV tax, Singapore car tax	▪ Education allowance for dependents ▪ Housing allowance ▪ Travel allowance ▪ Automobile allowance ▪ Hardship allowance ▪ Danger allowance ▪ Allowance for lost spousal income or transition benefits (provided by some companies)	▪ Foreign Transfer Allowances—includes PCS move expenses as well as expenses for pet quarantines, automobile registration, removal or installation of legally required automobile parts—e.g., catalytic converter ▪ Wardrobe expenses—to purchase new clothes when transferred to a location in a different climate zone (amount depends on zone change and number of dependents) ▪ Hardship allowance ▪ Danger allowance	▪ None (housing included in cost-of-living allowance)	▪ Pre-assigned visit ▪ Relocation grant (to cover misc. expenses in addition to PCS move expenses) ▪ ▪ Assignment premium ($25k paid half at beginning of assignment and half on third anniversary) ▪ Locality premium (or "hardship" pay) ▪ Hazard premium ▪ Housing and utility allowance ▪ Education allowance for dependents ▪ Home leave allowance—one trip home per year

Nevertheless, it is possible to get closer to the ideal. In this section we address some of the major issues surrounding the current system and we discuss possible changes and improvements to the system that, we believe, would tend to move the system closer to the ideal. Specifically, we address (1) ways to better reflect true cost of living differences, (2) ways to eliminate current practices that are perceived as inequitable (e.g., overseas COLA reductions that result when CONUS prices rise faster than OCONUS prices) or that significantly disadvantage the member and his or her family, and (3) ways to improve data collection and technical validity.

We address these issues in the following order: (1) cost-of-living index issues, (2) data collection issues, (3) spendable income issues, (4) location unique expenditures, and (5) COLA adjustment issues.

4.1 THE COST-OF-LIVING INDEX

4.1.1 Type of Index

The cost-of-living index for the overseas COLA is nominally a "Laspeyres" index. As described in ***Section 2***, a Laspeyres index is one in which the cost to purchase a fixed market basket of goods and services is determined at two or more locations (or at different points in time at the same location if one desires to measure inflation). For the overseas COLA, the cost of a CONUS market basket is priced at CONUS and OCONUS prices.

An alternative to a Laspeyres index is a "Paasche" index wherein an OCONUS market basket would be priced at CONUS and OCONUS prices. That is, one would analyze the expenditure patterns of OCONUS members to determine the market basket, instead of the current practice to analyze the expenditure patterns of CONUS members to determine the market basket.

Technically, the Laspeyres index will overstate the cost of achieving the same level of "satisfaction" from purchases in OCONUS relative to purchases in CONUS. The Paasche index, on the other hand, will understate the cost of achieving the same level of "satisfaction" from purchases in OCONUS relative to purchases in CONUS. Thus, the choice of a Laspeyres index is to the advantage of the member.

In practice, the overseas COLA index is a hybrid of the Laspeyres and Paasche indices. As described in ***Section 2***, two related sets of weights are used—item weights to determine the proportion of income spent on each item within a category of goods and services, and category weights to

determine each category's share of total household expenditures for items covered under the COLA. The item and category weights are determined by the expenditure patterns of military members in CONUS. The item and category weights are, however, adjusted at some OCONUS locations. At some OCONUS locations (e.g., remote locations), not all the items in the market basket are available. When incomplete price surveys are received from a location, the items for which there are prices are re-weighted. In addition, category weights are sometimes adjusted to capture "environmental" differences. For example, in locations with extremely warm climates the category weights for the food categories are increased to account for greater spoilage of food in warm climates. Similarly, in areas with extremely cold climates the category weight for clothing is increased. In areas where certain category weights are increased, the other category weights are decreased so that the weights always add to 100 percent.

The implications of using a pure Laspeyres index (i.e., CONUS weights only) are that "environmental" adjustments are not considered. Consequently, at some locations the COLA would decline. The implications for the services are shown below, although the effect to the members would vary substantially by location. The total cost of the overseas COLA would decline by $32 million across all Uniformed Services, while the average COLA of the member would decline by $144 per year. The per member decline in COLA would be greater for members of the Coast Guard (-$477), and least for the Marine Corps (-$91). This variation in the COLA adjustment across services reflects where members of the various services are located. Appendix C contains a brief description of the model used to estimate these cost estimates.

Table 6. Implications of Using a Pure Laspeyres Index

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	-5.11	-10.16	-12.92	-2.08	-1.73	-0.00	NA	-32.00
Additional Annual Cost per Member ($)	-62	-201	-207	-9	-477	-269	NA	-144

We conclude from this that the differences between a pure Laspeyres index and the "hybrid" are not large, and that the differences that do exist reflect adjustments that benefit the member.

4.1.2 Government Facility/Local Economy Expenditure Share

Members at most overseas locations have access to a Commissary and Exchange located at the installation or at a nearby installation. Prices from the commissary and exchange enter the location's index weighted by the proportion of expenditures estimated to be incurred by the member at the commissary and exchange. Typically, commissary and exchange prices are lower than prices in the local economy. Hence, it is usually the case that the COLA index and COLA payments decline when a higher proportion of expenditures are estimated to occur at the commissary and exchange.

Currently, estimates of the proportion of expenditures in the commissary and exchange are derived from members' actual expenditures as recorded by members in the triennial Living Pattern Survey. There are two problems with the current procedure. The first is that estimating expenditure proportions from a survey places a burden on the integrity of the system by potentially pitting the members' narrow economic interests in conflict to an honest response. It is undoubtedly the case that most members respond to the survey honestly, and to the best of their knowledge and ability. Nevertheless, it constitutes a poor design feature of the current system.

Moreover, the LPS itself is costly to administer and is subject to challenge based on sample size, representativeness within population sampled, and content. (Sampling issues are discussed in a later section). A major benefit of administering the LPS to members, however, is that it does link members with the process for determining the allowance, thus encouraging "buy-in."

The second problem is the use of actual expenditures to determine the proportions. Basing the proportions on actual expenditures appears, on the surface, quite reasonable. However, it leads to some perverse results. For example, a sort of "death spiral" may occur in which high prices in the local economy drive members to do more of their shopping in the commissary and exchange, which in turn reduces their COLA payment and income, resulting in further increases in the proportion of shopping at the commissary and exchange. Thus, members are doubly burdened—once by the effect of external forces that adversely affect their shopping patterns, and again by the effect of changing shopping patterns on the COLA amount. If the price of goods and services in the local economy

rise relative to the prices at the commissary/exchange, shoppers will purchase more goods and services on base—even if there is less selection. Consequently, in the short run, the increase in local prices will be reflected in the COLA amount. In the long run, one may observe the perverse result that as prices in the local economy rise, the COLA declines because the member does more shopping in the commissary and exchange.

The potential for perverse results which most observers would consider an inequitable and undesirable feature of the system can be seen even more clearly in the comparison of two similar installations. Consider an actual case in Alaska. Elmendorf Air Force Base, a few miles outside of Anchorage, has a very nice commissary and exchange. Eielson Air Force Base, about 400 miles to the north, is about 25 miles outside of Fairbanks. Its commissary and exchange is similar to Elmendorf's, though perhaps smaller and somewhat less well-stocked. Members and their families at Elmendorf do a significant portion of their shopping in the local economy at Anchorage, even though prices are higher than the commissary or the exchange. Prices are higher in Fairbanks, and variety is less, compared to Anchorage. Moreover, the roundtrip distance from Eielson, 50 miles, is a significant impediment to shopping in the winter. Consequently, members at Eielson do a smaller proportion of their shopping in Fairbanks. Consider the following:

- Members at Elmendorf and Eielson have roughly equivalent commissary and exchange facilities, (or, arguably, Elmendorf's may actually be better).
- Members at Elmendorf have better shopping opportunities in the local economy, and face lower prices in the economy, than do members at Eielson. In a sense, before COLA, they are better off economically than those at Eielson.
- Elmendorf members have a higher COLA reflecting the greater proportion of shopping they do in the local economy compared to members at Eielson.

The same factors that drive Elmendorf to higher expenditure proportions in the local economy of Anchorage compared to Eielson and Fairbanks are also undoubtedly at work elsewhere. Most particularly, the proportion of expenditure in the local economy for members stationed in the continental United States is greater than the proportion in the typical overseas location. Because prices in the U.S. economy are typically higher than prices in the commissary and exchange, and because the CONUS price index forms the denominator of all of the OCONUS COLA indices, this affects all COLA payments.

In addition to the case studies and anecdotal evidence of this effect, we conducted regression analysis that suggests that:[25]

- Commissary/exchange shopping proportions are higher, the greater is the selection in the commissary and exchange;
- Commissary/exchange proportions are lower for those who must travel to visit the commissary and exchange;
- Commissary/exchange proportions are higher, the higher are the prices in the local economy. In particular, we find that a 10% increase in the prices in the local economy increases the commissary/exchange expenditure proportions by 6%.

An alternative to using actual expenditures to determine the proportion of items purchased on base is to create a normative standard for government facility/local economy expenditure share. This normative standard would be similar in concept to the standard adopted in the basic allowance for housing (BAH), where standard housing is defined. It would simplify the process and reduce the concern among members of the "death spiral" issue.

One specific alternative is to apply the commissary and exchange expenditure proportion observed for members in the continental United States to all OCONUS locations. There are two reasons for this. First, one can consider the opportunity to shop in the local economy as well as at the installation as part of the member's standard of living. That is, arguably, CONUS shopping patterns are themselves part of CONUS standard of living or quality of life. Second, members in the continental United States purchase a higher proportion of their goods and services in the local economy (i.e., the U.S. economy) than do members at the typical OCONUS location. Because prices in the United States economy are typically higher than prices in the commissary and exchange, this means that the CONUS portion of the COLA index is higher than it otherwise would be. This forms the denominator of the OCONUS COLA indices at all the locations outside of the United States. Hence, the OCONUS COLA indices and the COLA payments themselves are lower than they otherwise would be.

Using CONUS commissary/exchange proportions results in a substantial increase in COLA on average (***Table 7***). The COLA is lower at seven locations in our model, though, such as Paris and London. The approximately 8,245 members who live at these seven locations would see their COLA decline, on average, by $783 per year. Alternatively, one

[25] The details of this analysis are in ***Appendix A***.

could use a weighted average of CONUS commissary/exchange proportion and the OCONUS commissary/exchange proportion (***Table 8***). In this scenario, the COLA would decline by $196 per year, on average, for the 8,245 members at the seven locations.

Table 7. Implications of Using CONUS Commissary/Exchange Proportions

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	165.18	70.26	142.14	39.37	1.55	0.02	NA	418.52
Additional Annual Benefit per Member ($)	2,009	1,389	2,278	1,722	426	1,701	NA	1,884

Table 8. Implications of Using Weighted Average of 75% OCONUS Proportion and 25% CONUS Proportion

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	41.92	17.59	37.97	10.12	0.60	0.01	NA	108.21
Additional Annual Benefit per Member ($)	510	347	608	442	166	431	NA	487

A second option is to use the minimum of (1) the actual proportion of expenditures on base, and (2) the CONUS-determined proportion of shopping on base. The purpose of this option is to ensure that members with unattractive local shopping opportunities are not further disadvantaged by a lower COLA.

A third option is to vary the proportion by the class of commissaries and exchanges. This option could use a multivariate regression analysis to determine the government facility/local economy expenditure share as a function of the characteristics of the on-base facilities and location of members. Then, the expenditure share would be set for a particular location based on the regression results. This is approximately equivalent

to setting the expenditure share at a specific OCONUS location to be the average expenditure share at all similar locations.

To model CONUS conditions under this third option, we predict the proportion of members' spending at the commissary/exchange using the regression described previously and setting the local index to 100.[26] When we do this, the proportion of members' spending at the commissary/exchange falls from 40.5 to 28.6 percent, on average. This, in turn, increases the cost-of-living index values for most locations and the average COLA rises. At some locations (e.g., Alaska and Puerto Rico) the COLA actually falls. The Coast Guard, which has a large portion of its OCONUS members in Alaska and Puerto Rico, experiences a decline in COLA amounts, on average. Under this scenario, the COLA would increase for most members but would fall, by an average of $846 per year, for approximately 43,252 members at 16 locations in our model.

Table 9. Implications of Using Commissary/Exchange Proportions Based on a Regression Model

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	58.87	32.66	79.19	30.95	-2.17	0.01	NA	199.51
Additional Annual Benefit per Member ($)	716	645	1,269	1,353	-597	450	NA	898

A fourth option is simply to set proportions as a matter of policy. That is, commissary and exchanges are provided to members and their families at OCONUS locations. As a matter of policy, it would be assumed that x% of expenditures would be at the commissary/exchange, and the OCONUS COLA would be computed appropriately. Basing expenditure proportions on policy, rather than on actual expenditures, is similar to practices used by the State Department and the World Bank to determine the proportion of spending that employees will make in-country (i.e., at the overseas location) versus out-of-country.

[26] The regression analysis is described in more detail in ***Appendix A.***

4.1.3 CONUS/OCONUS Expenditure Share

The State Department and the World Bank both assume a fixed percentage of spending will occur outside the overseas location and thus will not be affected by exchange rate fluctuations. When the State Department adjusts the COLA for exchange rate fluctuations, it assumes that 15 percentage points in the cost-of-living index will not be affected by exchange rate fluctuations. The estimate used by the World Bank is 20 percentage points in the cost-of-living index.

A benefit of assuming that a fixed percentage of spending occurs in the U.S. is simplification of the data collection process. In addition, the criticism of using actual expenditures to estimate commissary/exchange proportions also applies here.

4.1.4 Exchange Rate Adjustment System

As described in ***Section 2***, under the current system exchange rates are assessed bi-weekly to determine whether the market exchange rate has deviated sufficiently from the exchange rate actually used to determine the current COLA to warrant a COLA adjustment. If the cumulative difference between the daily market exchange rate and the exchange rate being used to calculate the current COLA exceeds 5%, then a COLA adjustment is made. Previously, a 10% threshold was used.

The purpose of the current system of exchange rate adjustment is to balance the costs of frequent exchange rate adjustments with the potential cost to the member if the COLA does not reflect current exchange rates. In most countries, because the exchange rates are fairly stable, COLA adjustments are infrequent. At times, though, economic conditions can cause rapid and significant changes in a country's exchange rate which necessitates a mechanism for rapid and accurate COLA adjustments. The COLA adjustment mechanism should minimize differences between market exchange rates and the exchange rate used to determine COLA amounts.

Movements in freely floating exchange rates approximate a "random walk" or fair game, where the best predictor of tomorrow's rate is today's. Because PDTATAC uses a cumulative threshold to determine whether changes in the exchange rate warrant a COLA adjustment, the U.S. dollar may appreciate (relative to the foreign currency) for a period of time and then depreciate without causing a COLA adjustment. Although members are not disadvantaged under the current system, on average, the member is advantaged (disadvantaged) during times when the market exchange rate

is above (below) the rate used in the COLA calculation—i.e., when the dollar has appreciated (depreciated).

As part of this review, we investigated whether members are disadvantaged by the current system of exchange rate adjustment. To do this, we analyzed COLA payments using three different thresholds before a COLA adjustment would take place—i.e., a 10%, 5%, and 1% cumulative threshold. The simulation used data from calendar year 1999 for five countries—Germany, Italy, Japan, Singapore, and the United Kingdom.

Our analysis indicates that under the old threshold (i.e., 10% cumulative difference in exchange rates), in 4 of 5 countries considered the member was slightly advantaged by exchange rate changes over the period. In Germany, UK, Singapore and Italy, the member gained between 0 and 1.5% of COLA over the period. In Japan, however, members lost about 1% of COLA because the exchange rate used in the COLA calculation lagged behind the market exchange rate.

The new cumulative threshold (i.e., 5%) increased the frequency of adjustment for each country from about 8 to about 13, on average. The lower cumulative threshold results, on average, in smaller deviations between the actual COLA and what the COLA would be if it were continuously adjusted for change in exchange rates. A 1% threshold dramatically increased the frequency of COLA adjustments to about 90% of bi-weekly pay periods.

The new exchange rate threshold of 5% is a reasonable compromise between frequency of exchange rate adjustment and the potential cost to the member. However, we recommend that PDTATAC continue to explore the advantages of continuous (bi-weekly) adjustments for exchange rate changes. Given advances in computer technology, it is unlikely that the costs of continual adjustment will outweigh the benefits.

4.1.5 Miscellaneous Category

The “Miscellaneous” category in the market basket contains a mixture of items that do not logically fit into one of the 13 other categories. This category accounts for almost 10% of the total cost-of-living index weight. The prices for this entire category are set equal to CONUS prices for all locations, which biases the index toward “no difference” in cost of living. Ideally, one should compute actual price differences for these items.

One major item in the “Miscellaneous” category is the cost of owning an automobile. The purchase price of an automobile can vary substantially by OCONUS location, and is often substantially higher in OCONUS than

in CONUS. The current reasoning, that automobile purchase costs are the same regardless of location, is questionable. The argument is that though one may pay more for a car at the OCONUS location, one can also sell it for more before returning to CONUS, so the net cost of owning an automobile is the same regardless of location. However, automobile depreciation costs and interest related costs from purchasing a vehicle will vary with the price of a vehicle, and thus by location.

We recommend that actual prices be collected for the Miscellaneous category. In the interim, we recommend that prices in the Miscellaneous category at OCONUS locations be presumed to bear the same relationship to CONUS prices in that category as the expenditure-weighted average of the prices across the categories that are collected for that location bear. That is, if the average of prices in all other categories were 10% above CONUS prices, for example, it should be presumed that the local prices for items in the Miscellaneous category should also be 10% above CONUS prices, rather than equal to CONUS prices, as is now the case. In essence, this option would be equivalent to omitting the items from the index. The table below (Table 10) provides an estimate of the budget implications under the assumption that the Miscellaneous category prices will bear the same relationship to CONUS prices as do prices in other categories.

Table 10. Implications of the Miscellaneous Category Analysis

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	26.18	18.96	24.35	8.04	1.11	0.00	NA	78.64
Additional Annual Benefit per Member ($)	318	375	390	351	305	308	NA	354

Although the COLA may increase at many locations if price data were collected for items in the Miscellaneous category, the COLA may fall at some locations. We recommend that PDTATAC study the implications of formally pricing the Miscellaneous category prior to a final decision to implement.

4.1.6 Market Basket Items

The market basket items were determined, in part, by the Interagency Allowance Committee—a committee whose participants represent every federal agency with civilian personnel assigned overseas. The market basked contains a subset of the items collected in CONUS by the BLS. Three criteria used to select items for the market basked are (1) the items are representative of those goods and services purchased by members, (2) the items are available overseas, and (3) the items are good indicators of price changes overseas. An important question is whether there are important items that are excluded from the market basket, or included inappropriately.

4.1.6.1 Trip Home and Long Distance Call Service

Some items in the CONUS market basket are "inputs" to producing intrinsically valuable goods and services. We consider two: (1) travel to visit relatives/friends out of town, and (2) long distance calls to talk to relatives/friends who live in another town. Costs for these "goods and services" are not accurately captured in CONUS market basket, so price differences are not captured in the COLA.

Because the market basket prices items in per unit costs (e.g., the price for a gallon of gasoline), difference in the cost of a "travel mile" is, arguably, captured. If the good itself is the "visit", not the "travel mile", then the market basket does not capture the cost of the greater distance for an OCONUS visit to CONUS friends/relatives. A similar argument can be made for long distance phone service.

Most private sector firms and the World Bank provide an annual trip to the U.S. for expatriates and family members. Members of the Uniformed Services may have access to Military Airlift Command (MAC) flights at low cost on a "stand-by" status, depending on where they are assigned. Inherent uncertainty in "stand-by" status increases expected travel time and variance in travel time. Problems increase with family size (i.e., number of passengers). Furthermore, access to MAC flights may be extremely limited in some locations. Moreover, the member is often left to his or her own devices from the CONUS air force base to his or her final CONUS destination. These limitations make MAC flights a less than adequate substitute for funded commercial travel.

Below we consider the budget implications of adding two items to the COLA: (1) one trip for each member and up to four dependents over a three year OCONUS tour (***Table 11***), and (2) 30 minutes of long distance time per month from the OCONUS location to a central CONUS location

(***Table 12***). Providing a trip home would, however, require legislative changes and may not necessarily be part of the COLA.

Table 11. Implications of Paying For a Trip Home Per Tour

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	55.7	44.09	49.82	15.21	1.97	0.01	0.41	167.20
Additional Annual Benefit per Member ($)	677	872	798	665	544	454	980	753

Table 12. Implications of Paying For 30 Minutes Per Month, Long Distance

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	3.54	2.59	2.89	1.18	0.14	0.00	0.02	10.36
Additional Annual Benefit per Member ($)	43	51	46	51	37	36	36	46

4.1.6.2 Dependents' School Expenditures

At most OCONUS locations, primary and secondary education for members' dependents is provided in-kind by DoDDS. DoDDS will fund enrollment in non-DoDDS schools, however, if DoDDS schools are unavailable or inadequate at a location. DoDDS attempts to provide an education that is the equivalent of U.S. public school. DoDDS will fund tuition, fees, books and transportation up to the Department of State standard allowance for the location.

A concern some members have is that some educational expenses are not fully covered in either the COLA or DoDDS funding. For example, some non-DoDDS schools may require students to participate in overnight

school-related travel. Under the current DoDDS polices, much of the cost of overnight travel is not covered by the DoDDS system.

We do not believe that dependent school expenditures should become part of the OCONUS COLA payment under the current institutional framework, for two reasons. First, expenditures that can be directly linked to dependent education-related factors should be the concern of the relevant program for dependent education. Second, reimbursement through DoDDS is more efficient because it would allow the Uniformed Services to more easily reimburse only those members who actually incur the expenses. Reimbursement through the COLA, which is paid to all members at the location regardless of whether a particular expenditure is actually incurred, would under-reimburse members who incur the expenses and over-compensate members who do not incur the expenses.

4.1.6.3 Spouse Employment

Strictly speaking, the effect of a member's overseas assignment on spouse earnings is not a cost of living issue. It would be a significant extension of the concept of the market basket of goods and services to include spouse earnings opportunities. Nevertheless, one of the most difficult problems in the overseas assignment of members is the effect that an accompanied overseas tour may have on the employment opportunities of the member's spouse. If the spouse had been working in the United States, it is likely that the transition to the overseas location will result in some lost spouse income in most cases.[27]

In most cases, the lost spouse income will be substantial. There are several reasons for this. First, the primary source of jobs for spouses at overseas locations is the installation itself. Jobs as federal civilians are limited and difficult to obtain. Jobs through non-appropriated fund sources, such as AFFES, DECA and morale, welfare and recreational activities (MWR), are somewhat more plentiful, but the positions are limited both in starting salary and advancement opportunities. Second, employment in the local economy is difficult and may not be possible in some instances. Language and customs barriers may limit immediate opportunities. More importantly, legal restrictions on non-citizen employment and restrictions codified in Status of Forces (SOF) agreements may make working in the local economy impossible at some overseas locations, and very difficult at others.

[27] A possible exception to this is the case in which the spouse works as a civilian employee of the member's Service, and is able to arrange a transfer to the overseas location at the same civilian grade.

In the private sector, it is rare for a multinational firm to compensate fully for a spouse's lost earnings due to the assignment of the employee. That is, they do not typically pay 100% of the spouse's salary prior to the assignment for the entire duration of the employee's assignment. Typically, however, they may provide "transition assistance" which may be about one to three months of the spouse's earnings. In principle, this provides funds for training and placement services, and lost earnings over a modest transition period. In practice, it provides a sum that is, in most cases, only partial compensation for lost earnings. Because overseas assignment in the private sector is largely voluntary, compared to the military where overseas assignment is largely involuntary, lost spousal income for employees of private sector firms is largely internalized. That is, private sector employees who will suffer financially from lost spousal income will be less likely to volunteer for overseas assignment.

The effect of a member's overseas assignment on spouse earnings opportunities is a particularly difficult issue for the Uniformed Services to address. Any significant program in this area would be costly. We offer three points for consideration.

First, the Services could offer "spouse transition assistance" in the form of one or two months of the member's basic pay. This would be analogous to a practice frequently found frequently in the private sector. We suggest, however, that the payment be a function of the member's basic pay, to make administration tractable. Such a program would have two shortcomings. It would be quite costly, even if only one month's of basic pay were offered. In addition, if it were offered only to members with spouses, which after all seems reasonable for a "spouse transition assistance", it would be yet another benefit that favors the married member relative to the unmarried member.

Second, the Services might consider permitting the member's spouse to use the member's tuition assistance program (TAP) benefit, or a portion of the benefit, for the period of time that the member is on an accompanied tour outside of CONUS. Along with eligibility for the benefit, the spouse would also have full access to overseas opportunities for higher education programs that are provided to members. As we have suggested, the spouse may not have the opportunities for using human capital in the job market while overseas. The tuition assistance entitlement would provide an opportunity for increasing human capital.

Third, the Services could place a greater emphasis on a voluntary assignment system. As discussed in ***Section 6***, this would help to reduce the most difficult spouse employment issues by permitting those members for whom an assignment is particularly costly to the household, because of

spouse employment, to choose an assignment which would not adversely affect the spouse's employment opportunities.

4.2 DATA COLLECTION

The collection of price data and information on members' spending patterns is resource intensive. In this section we discuss alternatives to the current data collection methods (e.g., outsourcing). In addition, we consider three data collection issues: administering the Living Pattern Survey, seasonality in prices, and using inflation indices to update the overseas cost-of-living indices

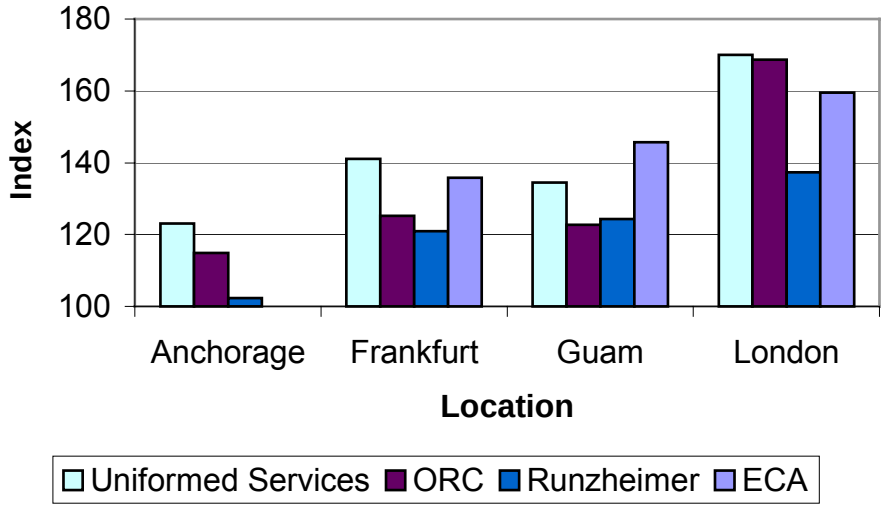
4.2.1 Outsourcing For Cost-of-Living Data

Outsourcing for cost-of-living data is a common practice of most international private companies. Furthermore, outsourcing for cost-of-living data is currently being used by OPM, and by DoD to calculate the CONUS COLA.

One rationale for outsourcing the data collection effort is to reduce the burden placed on in-house staff overseas who currently collect price data as collateral duty. Also, data collected by a third party may be seen as being more objective. Reducing member participation in the COLA determination process, however, could in turn reduce member "buy in." As discussed above, OPM has increased member participation in the COLA determination process in recent years as a result of litigation efforts by affected members.

No analyses were performed to estimate the cost of purchasing cost-of-living data from these suppliers. Outsourcing data collection is not likely to reduce budget costs because most price collection is done as collateral duty. Also, at many of the locations the State Department already is collecting price data which it shares with DoD at no additional cost to DoD. Moreover, DoD would still have some data collection responsibilities—such as collecting data from commissaries/exchanges and collecting data at locations not covered by the contractor. Another related issue is the cost of adjusting to a new index. A contractor would most probably be required to modify its indices to reach index levels similar to those now in place. ***Figure 2*** shows a comparison of current private sector index values to current indices for the Uniformed Services. While the indices are broadly similar, some effort would be required to ensure that privately collected data would maintain continuity with the goals, basket, and spending patterns of the current program.

Figure 2. Comparison of Private Sector Index Values [28]



To determine how many military members are assigned to OCONUS locations where cost-of-living data currently is being collected by private suppliers, we obtained lists of cities where private suppliers currently collect data. These were matched to a list of 478 OCONUS locations where DoD paid overseas COLAs in FY 1999.[29]

We obtained information from three of the six largest companies regarding the overseas locations for which they provide cost-of-living information suppliers (i.e., AIR, ORC, and ECA). One or more of these three suppliers collects data on cost of living at 329 DoD locations. Nearly 180,000 members are assigned to these "covered" locations, which is approximately 69 percent of members assigned to OCONUS locations in FY 99 (see ***Table 13***). These estimates may under-represent coverage

[28] It is difficult to obtain data from the different sources that reflect prices in precisely the same month. These price data are all from 1999, but the months vary. This may explain some of the disparity across indices. Note also that the indices are ratio of the OCONUS location market basket cost to an estimate of the CONUS market basket cost. Also, the Uniformed Services indices are computed using data solely from the local economy and the CONUS economy, to be consistent with the private indices.

[29] The number of OCONUS locations on this list (478) differs from the number of locations listed on the Per Diem website (800) and presented earlier. This discrepancy, however, reflects differences in how locations are counted. In some cases, several locations from the 800 number are combined into one location on the list of 478 locations.

because we only counted a DoD location as "covered" if we were reasonably confident that the DoD location was the same as (or in close proximity to) the location listed by AIR, ORC, or ECA as an area where they collect cost of living data.

Currently, DoD and the State Department share responsibility for collecting cost of living data. The 329 locations where either AIR, ORC or ECA provides cost of living data covers 96% of OCONUS locations where DoD shares data collection with the U.S. State Department, and covers 50% of OCONUS locations where DoD has primary responsibility for collecting data.

Table 13. Number of Members at OCONUS Locations Where Private Sector Companies Collect Data on Cost of Living

Company	Coverage		
	DoD Locations	DoD Members	Percent of DoD Members
AIR Inc.	230	146,347	56%
ORC	307	171,101	66%
ECA	273	136,394	52%
AIR, ORC, or ECA	329	179,890	69%

4.2.2 Using Inflation Indices To Update Cost-of-Living Indices

Under the current system for determining OCONUS COLA, prices are updated annually for each location, and occasionally at more frequent intervals, if the command requests an out-of-cycle survey. While the price survey system results in accurate prices for the COLA market basket, it requires significant investments of time and effort. Another potential problem is that it is difficult to respond quickly to sudden price shifts at OCONUS locations under the current system.

Although out-of-cycle surveys may be initiated to deal with the latter problem, they too require significant investments of time and money to be completed. Moreover, in an unstable economic environment, prices may continue to shift significantly during the course of implementing the out-of-cycle changes, thereby making the survey results less useful. Because of these factors, it may be useful to utilize some form of consumer pricing index for OCONUS locations.

A consumer price index for OCONUS locations could be a useful addition to the standard price collection scheme because it would allow the COLA to be quickly supplemented, without a costly price survey, at

times of rapid price increases in local economies. With a consumer price index that is measured frequently, on a monthly or quarterly basis for example, the negative effects of rapid consumer price inflation may be alleviated.

It may also be possible to use a consumer price index to reduce the frequency of OCONUS location price surveys. As discussed previously, the costs of conducting annual surveys at OCONUS locations can be significant in terms of the opportunity costs of the staff that conduct the surveys. One alternative may be to survey prices less frequently at each location, and instead make interim changes based on common indicators of consumer prices.

Although there are several potential benefits to using consumer price indices to update OCONUS location prices, there are also significant difficulties that must be resolved. Most importantly, such indices must be accurate and consistent in measuring price increases. The market basket used by each country to compute an inflation index may be different, so the inflation indices might not be directly comparable across countries.

4.2.3 CONUS Prices and Price Index

Prices collected to represent the cost of living in the continental United States are, arguably, the single most important set of price data collected in that they affect the COLA of every OCONUS location. The estimated CONUS cost of the specified market basket of goods and services forms the denominator of the COLA index for each OCONUS location.

Currently, CONUS price data is collected from a variety of sources, including the Bureau of Labor Statistics. However, the single largest source of price data for the private U.S. economy is data reported by the commissary and exchange services themselves. DECA and AAFES report prices for the U.S. economy based on price sampling they undertake to determine the price savings that their goods and services provide to military members in the continental United States.

There are two potential difficulties with relying on the commissary and exchange services as a major source of price information for the U.S. economy. First, there is an apparent conflict of interest. It is in the interest of the commissary and exchange services to show that the prices at which they supply goods and services to the member result in significant savings relative to prices prevailing in the economy. Hence, they are not likely to underestimate private sector prices. Second, there is an additional potential problem in the way the items are chosen for price sampling. Commissaries and exchanges typically choose particular items for sampling that are high

volume items at their respective outlets. While reasonable on the surface, one of the factors that may make a particular item a high volume item relative to another similar item is that its price is particularly attractive relative to the private sector price for that item.[30] Hence, a procedure which potentially biases the price comparison is employed for selecting items to sample.

It is an empirical question of whether the prices estimated by DECA and AAFES do, in fact, overstate private sector prices on average. To test this proposition, we obtained price data collected by Runzheimer International as part of the CONUS COLA program to compare to the price data supplied by DECA and AAFES. As discussed previously, prices collected by Runzheimer are used to calculate the CONUS COLA, while prices supplied by DECA and AAFES are used to calculate the OCONUS COLA. The DECA/AAFES price data are not the prices of items at the commissary/exchange. Rather, they are estimates of prices at stores in the local economy where members shop.

The Runzheimer prices reflect the average prices for items in the CONUS COLA market basket, as of September 1999, for the "standard" city in the continental U.S. The prices supplied by DECA and AAFES reflect the average CONUS prices as of July 1999. Hence, other things being equal, we would anticipate that the Runzheimer prices should be slightly greater than the commissary/exchange prices, because they reflect prices about three months later.

We compared prices of only those 62 items in the OCONUS COLA market basket that typically would be found at either a commissary or exchange. Not all items in the OCONUS COLA market basket are in the CONUS COLA market basket, but we were able to identify 49 items (79%) that both market baskets had in common. Thirteen items could not be matched across the two market baskets. For example, the CONUS COLA market basket includes butter, while the OCONUS COLA market basket includes margarine. Furthermore, the CONUS COLA market basket includes whole wheat bread, while the OCONUS COLA market basket includes white bread.

[30] Consider a hypothetical example. Assume that the commissary stocks both Cocoa Puffs and Wheat Chex. Its price for Wheat Chex is about 20% below the private economy's price, but the price for Cocoa Puffs is about the same. Consequently, military members who like Wheat Chex stock up when shopping in the commissary, but members who like Cocoa Puffs do not. Because Wheat Chex is the high volume cereal for the commissary, it samples its price in the private sector, but not the price of Cocoa Puffs.

We computed an index that shows the ratio of the DECA/AAFES-determined prices to the Runzheimer prices. The index for each category of market basket items reflects the ratio of DECA/AAFES prices to Runzheimer prices, weighted by the item weights in the OCONUS COLA market basket. For the 13 items where no Runzheimer prices were available, we assumed a price ratio of 1.

The index value of 1.04 for the meat and dairy category indicates that CONUS average prices as determined by DECA/AAFES are four percent higher than average prices as determined by Runzheimer (***Table 14***). DECA/AAFES-determined prices are substantially lower than Runzheimer prices for clothing and fruits and vegetables. Using the OCONUS COLA category weights to combine the indices for each category, we calculated that the DECA/AAFES-determined prices for all items typically purchased at a commissary or exchange are 9 percent lower than the Runzheimer prices.

Table 14. Comparison of DECA/AAFES-Determined Prices at Local Outlets to Runzheimer Data

	Meat/ Dairy	Groceries	Fruits/ Vegetables	Personal Care	Tobacco/ Alcohol	Furnishing/ Household	Clothing	Total
Ratio of DoD to Runzheimer prices	1.04	0.94	0.80	0.89	1.04	0.96	0.71	0.91

Hence, accepting the Runzheimer data as a valid comparative measure, we find no support for our hypothesis that the price data from DECA and AAFES overestimates prices in the local economy. The difference in prices may, however, reflect an imperfect matching of items in the OCONUS COLA and Runzheimer market baskets. That is, the quality of items in the Runzheimer market basket may be different than the quality of items in the OCONUS COLA market basket despite our attempt to compare prices of comparable items.

Based on our analysis, we can not state that the price data collected by DECA and AAFES systematically overstate the true prices in the continental U.S., as we conjectured. However, because the prices estimated for the continental U.S. affect the COLA of all locations, we recommended that the prices be periodically validated through independent random sampling of U.S. prices, and through comparisons with alternative price measures, such as the Runzheimer data.

4.2.4 Living Pattern Survey

The LPS is administered to a sample of members at each OCONUS location approximately every three years. The purpose of the survey is to obtain information on (1) the proportion of spending for each item in the market basket at the commissary or exchange, at the local economy, through the mail, or from CONUS; and (2) the stores in the local economy at which the members and their dependents shop.

Under the current system, DoD administers the LPS to approximately 150 members at each location. The number of members actually sampled is typically somewhat greater at larger installations and somewhat fewer at smaller installations. At locations with a small number of members, all members are asked to participate in the survey.

Shopping and expenditure patterns will generally vary by member. To obtain statistically valid answers—answers that represent the overall population means – the LPS should be administered to a random (or a "stratified" random) sample of members. Moreover, the sample should be of sufficient size so that the sampling variation that occurs is within acceptable bounds.[31]

The sample size should be determined based on the number of members (N) at the location, the desired confidence interval, the desired level of precision at the confidence interval, and the proportion of spending on items at the commissary or exchange. A formula to estimate sample size from a finite population is:

$$n = \frac{NZ^2 p(1-p)}{e^2(N-1) + Z^2 p(1-p)}$$

where "n" is sample size, Z is related to the desired level of confidence (or the probability that the estimate will be within a given range of the true population value), e is the level of precision or the desired length (range) of the confidence interval, and "p" is the underlying proportion.

To illustrate how these factors affect the desired sample size, consider the following two examples. ***Figure 3*** shows how the proportion of spending at the commissary and the desired level of precision in the estimated proportion of spending at the commissary affects the desired sample size. In this example, the desired confidence interval is held constant at 95 percent (i.e., Z=1.96), and the number of members at the OCONUS location is assumed to be 100 people. If members purchase

[31] The probability that a sample mean will be within a given range of the population's true mean increases with sample size. Larger sample sizes will increase the likelihood that estimates are close to the true population values.

approximately 30% of goods and services at the commissary, then a sample size of approximately 77 members would produce an estimate of commissary usage that is within 5 percentage points of the true proportion with probability 0.95. If the level of precision is increased from 5 percentage points to 3 percentage points, then the desired sample size would increase to 90 members. ***Figure 4*** shows how the desired sample size changes at a location with 1,000 members.

Figure 3. Sample Size Determination (N=100, C.I.=95%)

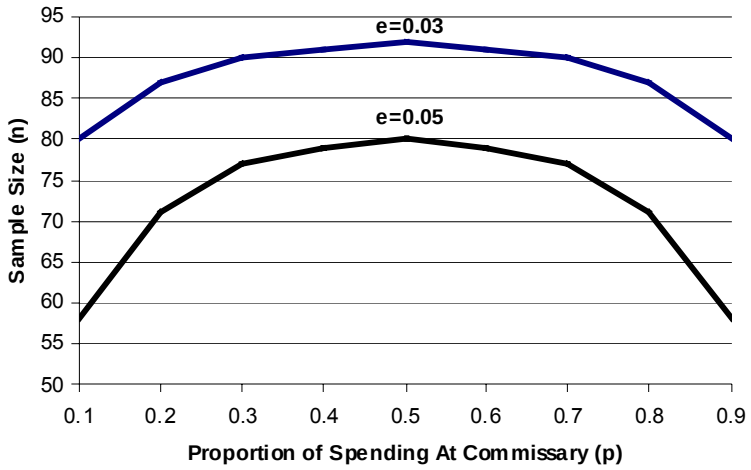
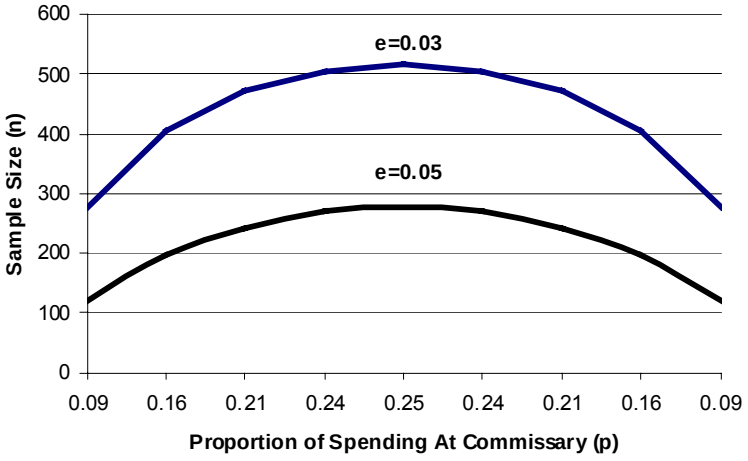


Figure 4. Sample Size Determination (N=1,000, C.I.=95%)



Because shopping patterns of households will differ by income level and by household size, the survey should be administered to a random sample of members, stratified by income level (or grade) and household size. For example, if 23% of the members at a location are single, enlisted grades E1 through E4, then 23% of the LPS sample should be single, enlisted grades E1 through E4. The following table reflects the distribution of OCONUS military members by grade and dependents status as of July 1999. The distributions vary substantially across OCONUS locations. If the number of members at a location is small (e.g., fewer than 50), then all members should be surveyed.

Table 15. Distribution of OCONUS DoD Members by Grade and Dependent Status (July 1999)

Service	NO Dependents	YES Have Dependents	Total
E1-E4	23%	20%	43%
E5-E6	10%	23%	33%
E7-E9	3%	8%	11%
O1-O4, W1-W4	4%	6%	10%
O5-O10	1%	2%	3%
Total	**41%**	**59%**	**100%**

One issue in collection and application of the data is the problem of small area estimation techniques. For some locations, the sample is very small, with a potentially high variance. Statistical methods, sometimes called "small area estimation techniques" or shrinkage estimators, have been suggested in such cases. The concept is to combine the estimates at the small site with estimates from larger sites, in order to obtain an estimate with lower variance. When DoD decides to combine locations and apply a single COLA to several sites, it is, in a sense, an extreme form of this concept.

4.2.5 Seasonality in Prices

In general, OCONUS price levels are sampled once a year. That set of prices is used to adjust the COLA index used over the ensuing twelve months (i.e., it is meant to reflect the average annual difference in prices of items in the market basket). The prices of many goods and services, however, vary throughout the year. Systematic seasonal variation in price levels may result in an inaccurate, and possibly biased, COLA index.

CONUS prices are collected quarterly, while OCONUS prices are collected at different times of the year for different locations. Thus, most OCONUS price surveys should be within a month of the CONUS price surveys to which they are compared. For example, OCONUS prices collected in April will be compared to CONUS prices at the end of the first quarter (i.e., March). OCONUS prices collected in May will be compared to CONUS prices collected at the end of the second quarter (i.e., June).

Price seasonality is a problem only if the seasonal variation in prices differs between CONUS and OCONUS locations. If OCONUS and CONUS price variations are positively correlated (i.e., they move in the same direction and are of approximately the same magnitude), seasonality in prices will result in little bias in the COLA index. However, *relative* seasonality discrepancies may cause the COLA index to over- or under-state the true price difference between CONUS and the OCONUS location. This may arise if the seasonal variations in CONUS prices do not match the observed patterns in OCONUS locations.

If the relative seasonality difference is positive (meaning OCONUS price levels are relatively higher than CONUS price levels for the same time of year) the observed COLA index will be higher than the "true" annual average of the index. On the other hand, a negative relative difference means the actual COLA index will be understated. It is important to note that it is the relative difference that matters in this case.

To test for evidence of bias, we constructed seasonality indices for the United States and for other countries—including the U.K., Italy and Germany—in which there are significant numbers of OCONUS COLA recipients. We used ten years of monthly price data from Eurostat.[32] We calculated indices that measured how much price levels in a particular month of the year varied from a 12-month average price level over the ten-year period. Index values greater than 1.0 denote "expensive" months, while index values below 1.0 are associated with months in which price levels are lower than average. ***Table 16*** shows the monthly indices for general price levels by country.

[32] Eurostat is the Statistical Office of the European Communities. This data is distributed by the Resource Centre for Access to Data on Europe, Department of Geography, Durham University (UK).

Table 16. Monthly Indices, General Price Levels

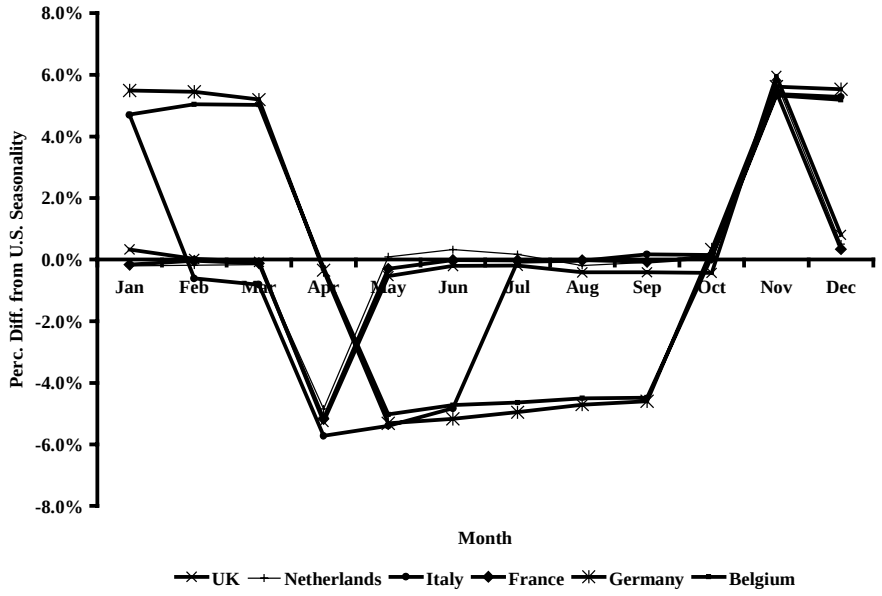
	Country						
Month	US	UK	Netherlands	Italy	France	Germany	Belgium
January	0.999	1.002	0.997	1.046	0.998	1.054	1.046
February	0.999	0.999	0.997	0.993	0.998	1.053	1.049
March	0.999	0.998	0.997	0.991	0.998	1.051	1.049
April	1.052	0.997	1.001	0.992	0.998	1.049	1.049
May	1.052	1.046	1.053	0.995	1.049	0.996	0.999
June	0.997	0.995	1.001	0.949	0.997	0.946	0.950
July	0.995	0.993	0.997	0.994	0.995	0.946	0.949
August	0.996	0.992	0.994	0.996	0.996	0.949	0.951
September	0.997	0.993	0.996	0.998	0.996	0.951	0.952
October	0.997	0.993	0.999	0.999	0.998	1.000	0.998
November	0.948	1.004	1.002	0.998	0.999	1.001	0.998
December	0.948	0.956	0.953	0.998	0.951	1.001	0.997

Seasonal variation appears to be important in some cases. For example, price levels may vary by as much as five percent above or below the annual average in a particular month in both the U.S. and some of the other countries. Moreover, the seasonal patterns are not consistent across countries. Some "high-cost" months in the U.S. (e.g., April) are "low-cost" months in other countries.

We next computed the relative monthly difference by calculating the percentage difference between each country's indices and the U.S. indices for the same month. For example, the February index for Germany is 1.053 (i.e., February prices in Germany are about five percent higher than the annual average) and the U.S. index for the same month is 0.999. Therefore, the German index for February is 5.45% higher than the U.S. index. These percentage differences are shown in ***Figure 5***.

Using Italy as an example, we can construct a hypothetical scenario in which the COLA produces a biased result. If an annual price survey conducted in April at an Italian location yielded an index of 115, the COLA would likely understate the price differential with CONUS. Such an index compares April prices in Italy to CONUS prices for the same period, but does not consider the fact that April is an above average month in the U.S., but a slightly below average month in Italy. This difference, shown graphically above, is about 5.7%.

Figure 5. Seasonality in Prices



This means that the COLA index of 115 was created at a time when prices were higher than normal in the U.S., and lower than normal in Italy. The ultimate result is that the COLA is understated and an Italian-based member will be able to purchase fewer goods, on average, than his or her CONUS-based counterpart, unless seasonal fluctuations were accounted for, by increasing the index to 121 (a 5.5% increase). It is also important to note that the outcome of the index is highly dependent upon the time of year the survey is taken. As relative prices rise in Italy and fall in the U.S. during November and December, a survey taken during that time would bias the results in the opposite direction, overestimating the benefit due to Italian-based personnel.

Given some knowledge of local seasonal patterns, one might expect that commands will not choose to undertake surveys at times that bias the calculation against members at OCONUS locations. Moreover, requests can be made for out-of-cycle surveys, which could be used to adjust a COLA created from disproportionately lower OCONUS price levels.

Currently, commands have some discretion in choosing the month to undertake price surveys in OCONUS locations. Prices are collected for Germany in November of each year, with the exception of Frankfurt

(where the State Department provides price data) which collects prices in February. Local commands in the United Kingdom, Netherlands, Italy, France, and Belgium all collect price data in March. According to our data, most have selected a month in which the price index is very close to one. The exception is Belgium, for which March is a relatively high-cost month. However, the true extent of any bias depends as well on the U.S. indices for the same period. The ratio of the country's seasonal index value to the seasonal index value in the United States, for that month in which the price sampling is conducted at the overseas location, is shown in the following table. Note that a value of 1.0 indicates that the month for the survey is neutral, a value greater than 1.0 indicates it favors the member, and a value of less than 1.0 is to the member's disadvantage.[33]

Table 17. Ratio of Seasonal Indices: Overseas Country Relative to U.S.

Country	Germany	UK	Netherlands	Italy	France	Belgium
Month	November	March	March	March	March	March
Index	1.06	1.00	1.00	0.99	1.00	1.05

With the exception of Germany and Belgium, the countries shown suggest no seasonal bias. The month in which prices are sampled in both Germany and the Netherlands tends to favor the member. While these indices are sufficiently imprecise to be suggestive, rather than definitive, this analysis does suggest that seasonality in prices is a legitimate concern and may affect the measure of cost-of-living differences

An alternative to eliminate the problem of seasonal fluctuations is to gather data for annual average prices at each OCONUS location. By calculating average annual prices, the possibility of overstating or understating an index due to the time of survey would be completely eliminated. Further, it would require no additional data collection in CONUS. However, this alternative would impose significant additional costs and time requirements on local commands in order to collect the additional price data.

A second possibility is to use statistically derived seasonality indices to adjust for fluctuations. While this method would require some additional periodic price collection at OCONUS locations, it would require less data than computing average annual prices for each location

[33] Note that price indices that were available for this analysis may not precisely match the market basket that is included in the COLA calculation and the specific seasonal patterns that are relevant may differ.

every year. This alternative assumes that the seasonal fluctuations are relatively stable over time. Also, it would require no additional CONUS sampling. However, such a method would make the COLA calculation process more complicated.

A final alternative is to use seasonally adjusted CONUS prices. This alternative will reduce (but does not eliminate) COLA differences due to seasonal fluctuations if prices in CONUS and the OCONUS location are uncorrelated, or negatively correlated. However, it will increase fluctuations if there is positive correlation in the seasonality. No additional price collection at OCONUS locations is needed in this alternative.

4.3 SPENDABLE INCOME COMPONENT

OCONUS COLA is calculated by applying a location index to a spendable income table. Spendable income is an estimate of the portion of total income that is used to purchase items in the COLA market basket. It excludes expenditures on housing, taxes, life insurance, gifts and savings.

The Department of State generates the spendable income table using data from the Consumer Expenditure Survey (CES). Because the number of military respondents to the CES is small, it is not possible to generate a spendable income table using only data from households with a member of the Uniformed Services. Hence, civilian households are included. The State Department model is used to estimate spendable income for all Federal government civilian and military employees assigned to OCONUS locations. The State Department model estimates spendable income as a function of total income and number of dependents, yielding a lookup table similar to the one shown in ***Table 18.***

Spendable income data is derived from *Table 7050. Income before taxes: Average annual expenditures and characteristics, Consumer Expenditure Survey* (various years). This table is published periodically by the Bureau of Labor Statistics and includes data aggregated from the CES. The table includes average reported expenditures and income in eleven income ranges, from less than $5,000 through $90,000 and over.

The steps in the calculation of spendable income are as follows. State Department first calculates average spendable income (SI) for each observation:

$$SI = Average\ Annual\ Expenditures - Shelter - Utilities,\ fuels,\ and\ public\ services + Telephone\ services - Cash\ contributions - Personal\ insurance\ and\ pensions - Gifts\ of\ goods\ and\ services.$$

Table 18. Current Spendable Income

Income Range		Spendable Income by Number of Dependents					
Low	High	0	1	2	3	4	5
0	13,999	8,600	9,700	10,800	11,300	12,400	13,000
14,000	15,999	9,400	10,500	11,700	12,300	13,500	14,000
16,000	17,999	10,100	11,300	12,600	13,200	14,500	15,100
18,000	19,999	10,700	12,100	13,400	14,100	15,400	16,100
20,000	21,999	11,400	12,800	14,200	14,900	16,300	17,000
22,000	23,999	12,100	13,600	15,100	15,900	17,400	18,100
24,000	25,999	12,700	14,300	15,900	16,700	18,300	19,100
26,000	27,999	13,400	15,000	16,700	17,500	19,200	20,000
28,000	29,999	13,900	15,700	17,400	18,300	20,000	20,900
30,000	32,999	14,700	16,600	18,400	19,300	21,200	22,100
33,000	35,999	15,600	17,600	19,500	20,500	22,400	23,400
36,000	38,999	16,500	18,500	20,600	21,600	23,700	24,700
39,000	41,999	17,400	19,500	21,700	22,800	25,000	26,000
42,000	44,999	18,200	20,400	22,700	23,800	26,100	27,200
45,000	47,999	19,000	21,300	23,700	24,900	27,300	28,400
48,000	50,999	19,700	22,100	24,600	25,800	28,300	29,500
51,000	54,999	20,600	23,100	25,700	27,000	29,600	30,800
55,000	58,999	21,500	24,200	26,900	28,200	30,900	32,300
59,000	62,999	22,500	25,300	28,100	29,500	32,300	33,700
63,000	66,999	23,400	26,300	29,200	30,700	33,600	35,000
67,000	70,999	24,200	27,200	30,200	31,700	34,700	36,200
71,000	74,999	25,000	28,100	31,200	32,800	35,900	37,400
75,000	79,999	25,800	29,000	32,200	33,800	37,000	38,600
80,000	84,999	26,600	30,000	33,300	35,000	38,300	40,000
85,000	89,999	27,400	30,900	34,300	36,000	39,400	41,200
90,000	94,999	28,200	31,700	35,200	37,000	40,500	42,200
95,000	99,999	28,800	32,400	36,000	37,800	41,400	43,200
100,000	105,999	29,400	33,100	36,800	38,600	42,300	44,200
106,000	111,999	30,000	33,800	37,500	39,400	43,100	45,000
112,000	117,999	30,600	34,400	38,200	40,100	43,900	45,800
118,000	124,999	31,000	34,800	38,700	40,600	44,500	46,400
125,000	131,999	31,400	35,300	39,200	41,200	45,100	47,000
132,000	138,999	31,600	35,500	39,500	41,500	45,400	47,400
139,000		31,700	35,600	39,600	41,600	45,500	47,500

Spendable income is simply average annual expenditures minus those elements that are not included in the COLA basket (e.g., housing).[34] The second variable derived from this table is average income before taxes (total income, or TI). Thus, we have estimates of average total income and the amount spent on items in the COLA basket for each of eleven income categories.

Next, total income is regressed on spendable income, using an equation of the form:

$$SI_i = \beta_0 + \beta_1 TI_i + \beta_2 TI_i^2 + \varepsilon_i,$$

where the βs are regression coefficients and ε is an error term. This estimates the effect of total income on spendable income. The quadratic term allows spendable income to vary non-linearly as a function of total income. In past estimations, β_0 and β_1 were positive, and β_2 was negative. Thus, spendable income increases with total income at a decreasing rate (the proportion of total income devoted to expenditures on items in the COLA basket decreases with total income, but the absolute level of spendable income continues to increase).

The regression coefficients are used to calculate predicted spendable income for a series of income levels that represent the midpoints of the income ranges shown in ***Table 18***. The midpoint values are inserted in the equation above on the right-hand side, yielding predicted SI levels. These predicted SI levels are assumed to represent the spendable income amounts for an employee with two dependents (family size 3). SI levels for other family sizes are derived with a constant adjustment to the family-size-3 estimate (e.g., Family Size 1 = 0.8 * Family Size 3).

To apply the Spendable Income table to military members, total income for each paygrade/dependents combination is calculated using an estimate of Regular Military Compensation (RMC), which includes Basic Pay, an average Basic Allowance for Housing (BAH), Basic Allowance for Subsistence (BAS) and the tax advantage associated with tax-free allowances. Total income range can be found in the first two columns of the table. For this range of total income, spendable income depends on the number of dependents.

4.3.1 Potential Problems with Current Method

There are three potential problems with the current method of imputing spendable income. First, spendable income estimates based on a

[34] Note that, while utilities are subtracted, telephone costs (part of the COLA basket) are added back in.

largely non-military population may not accurately represent military members' spending patterns. Second, infrequent updates of the spendable income table may lead to "bracket creep," biasing COLA amounts downward. Third, the current method of estimating the spendable income table is inefficient in that it makes poor use of the data, possibly resulting in estimates that have higher error rates around the "true" relationship between spendable income and total income than they could have.

Because the spendable income calculation subtracts several types of spending (including savings and housing costs) from total income, the current method implicitly assumes that military members' consumption patterns do not differ significantly from the general population with regard to the excluded items. This assumption may not be valid if military personnel systematically spend a different proportion of their total incomes on non-spendable income factors than do civilians.

If military members and their families generally devote less of their total incomes to excluded items than their civilian counterparts, the spendable income table will understate the proportion of total income they spend on items in the COLA market basket. Consequently, COLA amounts will be biased downward since the COLA index would apply to a smaller proportion of their total income than is, in fact, being used as spendable income.

For example, if the average military member with an income of $30,000 and two dependents has an actual spendable income of $20,000, his or her COLA will be understated.[35] In this case, a hypothetical COLA index of 110 would pay the member $1,840 instead of $2,000, the actual amount needed to compensate him or her for the loss in purchasing power in his spendable income.

Infrequent updates of the spendable income table are another source of inaccuracy in COLA levels. The current spendable income table is based on data from the 1988 and 1989 CES. Because all data is in nominal (then-year) dollars, inflation has led over time to "bracket creep." The table will be updated as of 1 October 2000 to a table based on 1997-1998 data.

The main problem is that spendable income as a proportion of total income generally declines as total income rises (individuals at higher income levels devote more of total income to housing, savings, etc.). While one would expect this relationship to remain fairly stable over time for real income, changes in nominal income levels may have a different effect. For example, an E-5 at YOS 9 with two dependents had a military income of $21,220 in FY 1988. Using the current table, the member's

[35] From the current table, the member's imputed spendable income is $18,400.

imputed spendable income is $14,200 (67% of total income). However, by FY 1999, an E5 at YOS 9 with two dependents earned a military income of $32,331 (a nominal pay increase of 52%). Because of inflation across this eleven-year period, however, real income did not rise as much (based on changes in the Consumer Price Index, the real increase in income is about 21%). Using the current table, the FY 1999 spendable income for the example member is $18,400, or 57% of total income. As a result, spendable income, as a percentage of total military income, has fallen by 15% for the FY 99 member. At a COLA index of 122, this represents an annual loss of $712 to the member.

This problem may be addressed using two approaches. First, the spendable income table may be updated more frequently. Second, the table could be indexed for inflation between updates. ***Tables 19 and 20***, respectively, show the cost and benefit to member recipients of indexing the old FY table to FY 1999 dollars, and of implementing the new spendable income table for FY 2000. ***Table 21*** contains estimates of the cost, and benefits to the member, of implementing the new table indexed through 1999.[36]

Table 19. Implications of Indexing the 1988-1989 Spendable Income Table to 1999 (millions of dollars)

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	30.52	22.42	27.94	9.40	1.23	0.004	NA	91.52
Additional Annual Benefit per Member ($)	371	443	447	411	338	361	NA	412

[36] Note that the cost of implementing the new table and then updating it for inflation though 1999 is about $10 million less than the cost of updating the old (1989) table for the effects of inflation though 1999. This suggests that there has been a modest, real change in the relationship between spendable income and total income.

Table 20. Implications of Implementing the 1994-1995 Spendable Income Table in FY 2001[37]

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	9.01	6.53	8.29	2.72	0.36	0.00	NA	26.91
Additional Annual Benefit per Member ($)	109	129	132	119	98	107	NA	121

Table 21. Implications of Implementing the 1994-1995 Table Indexed to 1999[38]

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	19.16	13.69	15.30	5.65	0.62	0.003	NA	54.42
Additional Annual Benefit per Member ($)	233	270	245	247	170	245	NA	245

In addition to the two potential problems noted above, the current method of deriving the spendable income table is a source of concern. While we have no evidence that the tables are unreasonable, we believe that an alternative method, making better use of the available microdata, should be considered. One weakness of the current approach is the small sample size (a maximum of eleven observations) when using the aggregated data. CES data is also readily available as individual observations (one for each consumer unit). In the most recent survey, this would increase the sample size to approximately 84,000. In statistical terms, the disaggregated data increases the efficiency of the estimates, leading to smaller error between the estimated relationship and the "true" relationship. Also, the income-range averages represent groups of individual observations varying widely in size (from fewer than 5,000

[37] Subsequent to conducting this analysis using the 1994-1995 Spendable Income table, PDTATAC announced that in FY 2001 a table based on 1997-1998 data will be used instead of 1994-1995 data as was previously anticipated.

[38] See footnote #37.

consumer units to more than 12,000), but each observation carries equal weight in the regression analysis. This further decreases the efficiency of the estimates.

Individual data offers several advantages beyond a larger sample size. First, additional explanatory variables can be added to the equation. The most obvious addition would be family size, but other variables (e.g., age and other demographic characteristics) may also be important. The advantage of additional explanatory variables is that predicted spendable income could be tailored more precisely to the target population.

In addition, a more rigorous methodology could explore alternative functional forms for the relationship between total income and spendable income.

Finally, we should briefly consider the question of whether there should be a spendable income table at all. Why not just have a single, constant proportion of total income "covered" by the COLA, or a single absolute amount of income covered? This concept would be appealing if there were less variation in the total income levels of the population covered under the COLA. The evidence, and common sense, suggests that expenditures on items covered under COLA will constitute a higher proportion of income for lower income members and vice versa. An attempt to set the spendable income amount equal to a constant proportion of total income for all income levels is likely to disadvantage junior enlisted, while setting a constant absolute amount would probably be unfair to officers.

4.3.2. Cost-of-Living Index that Varies By Income Level

Consumption patterns vary by income level. Consequently, some organizations that compute cost-of-living indices (e.g., OPM and Runzheimer International) compute cost of living indices that vary by income level. In particular, the market basket of goods and services for which prices are collected in CONUS and at OCONUS locations would vary by income level. Therefore, the cost-of-living indices would vary by income level. Computing cost-of-living indices that vary by income level presumably increases the accuracy of COLA amounts, in terms of holding members financially harmless for cost-of-living differences across assignment locations. Unfortunately, such a practice substantially increases the amount of data required to ensure reliable estimates. In addition, index values that vary by income (and thus by members' grade) create the potential for additional issues. For example, the potential for the cost-of-living index that applies to higher income members (e.g., officers and senior enlisted) may change at a different rate than the index that

applies to lower income levels. This, after all, would be the point, but would undoubtedly generate perceptions of inequity. For these reasons, we do not recommend introducing further complexity into the system by developing separate indices by income level.

4.4 LOCATION-SPECIFIC COMPENSATION

4.4.1 Payment of a Hardship Premium

The private sector and organizations such as the State Department, the World Bank, and the United Nations pay a premium to employees stationed in overseas locations. Because overseas assignment in these organizations is largely voluntary, the hardship premium is largely an incentive to encourage employees to volunteer for the overseas assignment.

The rationale for hardship pay to military members is somewhat different. Because assignment to an overseas location is not necessarily voluntary, the purpose of a hardship premium is largely to compensate members for the hardships incurred because of more onerous living conditions at the overseas location relative to conditions in the U.S. The hardship premium, therefore, can be used to compensate members for differences in living conditions that are not easily reflected in the cost-of-living allowance. Such a pay can at least imperfectly compensate for lack of security or safety, lack of amenities, and so forth at a particular overseas assignment.

In FY 1999, approximately 4,063 military members at 139 locations lived in areas where State Department employees are offered a hardship allowance. The following table (***Table 22***) provides the budget implications of offering a hardship allowance to the Uniformed Services that is similar to the one currently provided by the State Department.

The Department of Defense is developing its own version of hardship pay, using a concept similar to that of the Department of State. For reasons discussed in ***Section 6***, it is not possible for a cost of living adjustment to fully compensate members for the differences in living conditions between the United States and some overseas locations. Hence, an additional pay such as DoD's proposed hardship pay is another step towards full compensation. Moreover, if the Uniformed Services were to move closer towards a fully voluntary assignment system, such a pay will increase in importance.

Table 22: Implications of Applying State Department "Hardship Allowance" Pay to Military Members

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	4.24	1.83	2.3	0.52	0.00	0.00	NA	8.89
Additional Annual Benefit per Member ($)	51	36	36	22	1	0	NA	40

4.4.2 Location-Unique Expenditures

At some OCONUS locations members incur expenses that are unique to the location. Because they are unique, the expenses typically are not included in the COLA market basket (or, not in the quantities that reflect expenditures at the OCONUS location). The current practice is to increase COLA amounts at locations where members incur these unique expenses to offset the expenses. The current criteria for covering items as a location-unique (or "COLA-unique") are that the expenditure must be "substantial" (where substantial is not defined), and the expense must be incurred by 50% or more of members at the location.

The system for addressing location-unique expenditures is less systematic than it could be. A good system must have a systematic method for the following.

1. Determining the types of expenditures that should be considered for coverage as a location-unique expenditure—that is, a set of principles or guidelines.

2. Identifying or surfacing specific items for consideration.

3. Determining the payment amount, given coverage.

Below, we suggest a specific method for each of these areas. However, the location-unique issue is one of the most difficult in this area. It is certainly difficult, and perhaps not possible, to develop a perfectly objective, logical and systematic method for determining location-unique items and expenditures.

4.4.2.1 Criteria for Coverage

DoD needs a systematic method to determine what location-unique items will be covered through the COLA program. The following are suggested principles.

- The expenditure for the item should be related to member/household living in a particular location, and the member/household should have little discretion in incurring the expenditure.
- The item should not already be included in the current COLA market basket or, if included, not considered in the quantities required in the OCONUS location.
- Location-unique payment should apply to all at the location.
- The expenditure is not obviously more related to an existing program (e.g., PCS move, DoDDS system).

The first criterion is that members at a location have little discretion in incurring the expenditure. This is not meant to limit expenditures to items of absolute necessity, but to eliminate exotic, discretionary items. This would include items/services that are legally required for the household but not typically required in CONUS—such as taxes in excess of any related CONUS tax for items/services typically consumed in CONUS. One example is the TV tax in the United Kingdom. Other taxes include unusual taxes on automobile ownership and usage. In the case of the TV tax, one could argue that the expenditure is discretionary because the household could always do without TV. However, in today's culture TV could be considered to be a basic item in almost all households and, in that sense, almost nondiscretionary.

Another example of items/services that members have little discretion in incurring are command-mandated safety items, such as the automobile safety kits[39] in Alaska, that the household would typically not purchase in CONUS. One criterion for considering command-mandated items/services under the COLA is that the items/services be for the household—not just the member. That is, the items/services should not be related solely to military operations or duty. Such expenditures should be more appropriately considered part of the Operations and Maintenance portion of the Command's budget.

[39] The command-mandated safety kits contain items such as a first aid kit, non-perishable food items, a blanket or sleeping bag, flares, etc. Possession of these kits also is highly recommended by the State of Alaska Department of Transportation and Alaska State Troopers.

Other reasons why members at an OCONUS location may have little discretion in incurring specific expenditure include whether the expenditures are required because of local custom or whether the expenditures are incurred because of atypical local conditions (e.g., weather conditions and geography). One test of whether items/services not mandated should be considered under the COLA is whether purchase of the items/services are prudent expenditures.

4.4.2.2 Identifying Items for Consideration

The current method for identifying items that should be considered by the Per Diem committee for coverage is through the chain of command at the location. This is clearly a valid method, and we would not consider supplanting it. However, because commands differ in the degree to which they emphasize the COLA, this, by itself, is unlikely to ensure a systematic treatment across all commands.

A complement to the current process for identifying location-unique items/services to cover under the COLA system is to conduct a periodic, systematic survey of members, households, and command across locations. This will provide the opportunity for all potential items to surface across all commands, and not solely the commands that have chosen to emphasize COLA issues. Items would then, of course, be subject to coverage criteria and approval by the Per Diem committee.

4.4.2.3 Determining Payment Amount

Currently, items are considered for coverage as location "unique" expenditures only if more than 50% of the location's population is estimated to incur the expenditure. But, if approved, all at the location receive 100% of the estimated expenditure in their COLA, even those who do not incur the expenditure. Hence, the 50% rule is, in part, a reflection of the policy to include 100% of the expenditure in the COLA for all members at the location, regardless if they actually incur the expenditure.

Clearly, the current criterion that over 50% of members are expected to incur the expenditure limits the number and types of items that can be included as location-unique expenses. An alternative that avoids the dilemma of compensating members who do not incur the expenditure would be a reimbursement system for location-unique expenditures, only. Under this system, the criterion that at least 50% of members are expected to incur the expense would be dropped. In its place, members would present receipts or "proof of purchase" for items that are covered as

location unique items. Then, only those who incurred the expenditure would receive payment.

We recommend against such a system for two reasons. First, there may be additional administrative costs of verifying purchase and authorizing and administering reimbursement. Second, the reimbursement system would induce some members, who otherwise would not have considered purchasing an item, to purchase the item because they would receive reimbursement. They may value the item at much less than its cost, but would purchase it anyway as long the cost was reimbursed. Such a system would induce inefficiency.[40]

Nevertheless, we believe it is arbitrary to categorically exclude potential items from some coverage simply because fewer than 50% of member incur the expenditure. Instead, we propose the following. When fewer than 100% of members incur the expenditure, we suggest that the payment amount be limited to the product of the estimated proportion of members who incur the expense and the average expense incurred.[41] Thus, the total payment by the Uniformed Services would equal the total cost incurred by members. Payment for location-unique expenses covered under the COLA, however, goes to all members at a location—it is not a reimbursement. Consequently, payment for items purchased by only a small proportion of members at a location will result in a large proportion of members being paid for an expenses not incurred, while members who incur the expense receive only partial compensation for the expenditure. The method allows some coverage for items that would otherwise not be considered. Moreover, under such a system there may well be a number of such items covered. An individual member may actually incur expenses for only one or two. But, by compensating for all items "on average" the individual member may be about as well off, on average, as if they were fully reimbursed for the covered items for which they actually incur expenditures.

Under such a system, members would be receiving the correct amount "on average". While this may at first appear bizarre, in that it does not guarantee than any member receive exactly the "right' amount of

[40] A possible exception to this recommendation against a "reimbursement" system is the case in which the member incurs a legally acquired expenditure, such as a tax.

[41] This amount is the "expected value" for all members, and is calculated using the formula:

$$payment = p \times \left(A_{OCONUS} - A_{CONUS} \right),$$

where p is the proportion incurring the covered expense, and A is the actual cost incurred by members at the OCONUS location and the typical CONUS location. Estimates of A and p may be constructed or determined through a systematic survey of members.

compensation for items incurred, the entire market basket approach that underlies the major part of the index makes the same assumption. That is, some members consume more fish, relative to other meats, than others, some members dine out more frequently than others, and so forth. The market basket and expenditure weights are in fact "averages" of actual expenditures made by military families, who vary in their expenditure patterns.[42]

If 100% of members do, in fact, incur the expenditure, it would of course be included at 100%. For legally required items/services, such as mandated items (or taxes), the payment amount should pay 100 percent of the differential between OCONUS and typical CONUS expenditure (CONUS expenditure may be zero) for all members. Finally, one could lower the threshold for full coverage as a matter of policy. For example, the policy could be adopted that the full amount is paid for an item if 80% of members incur the expenditure.

The current system for payment of location-unique expenditures is an "all or none" system under which 100% of the cost of an item is paid through COLA if at least 50% of the members incur the expense, but no payments are made if fewer than 50% incur the expense. We are suggesting an alternative policy under which otherwise appropriate items can be included as location-unique items even if fewer that 50% of members incur the expenditure. The payment would be made to all members at the location, but would be covered only at the "expected value" of the expenditure for all members. That is, the full cost multiplied by the estimated proportion of the location's population that incur the expenditure. While this would not result in exact reimbursement for any member, the same is true for the "market basket" of items underlying the COLA index itself.

4.4.2.4 Applications

In Alaska, weather conditions require that members in some locations (especially northern locations) purchase special equipment for their automobiles. These expenses are not fully covered under the current program. Items currently not covered include special snow tires and chains, and block heaters.

[42] This point may become clearer when one considers the large number of households that underlie the Consumer Expenditure Survey, from which expenditure weights are derived. Surely no one believes that

We estimated the cost to the Uniformed Services of expanding car winterization and safety kits expenditures under the COLA in Alaska (***Table 23***). These estimates are based on several assumptions:

- Winterization kit expenditures consist mainly of snow tires (at $400/set) and block heater, trickle charger and blanket (at $300/kit);
- Members would incur these costs once per 3-year tour for each car and the resale value for heater & charger is 50% of the purchase price;
- Members without dependents have one car while members with dependents have two cars;
- Members with dependents will spend approximately $250 per 3-year tour to purchase items in the safety kits; members without dependents will spend approximately $150 per 3-year tour.

The estimated annual cost for the winterization kits across all Uniformed Services is approximately $5.3 million. The annual cost for safety kits is approximately $1.2 million.

Table 23: Estimated Cost To Cover Car Safety Kits and Winterization Kits Under the COLA in Alaska

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Members in Alaska	6,180	77	9,538	24	975	1	207	17,002
Estimated # Cars	10,412	125	16,107	45	1,619	2	414	28,724
Total Cost of Winterization Kits	$1,908,867	$22,917	$2,952,950	$8,250	$296,817	$367	$75,900	$5,266,068
Total Cost of Safety Kits	$450,067	$5,450	$695,867	$1,900	$70,217	$83	$17,250	$1,240,834
Total Cost for Kits	$2,358,934	$28,367	$3,648,817	$10,150	$367,034	$450	$93,150	$6,506,902
Cost/ Member in Alaska	$382	$368	$383	$423	$376	$450	$450	$383
Cost/ Member in Service	$29	$0.56	$59	$0.44	$101	$38	$223	$29

In Guam, Hawaii, Iceland, and the United Kingdom, members are required to quarantine their pets upon entry into the country. These costs can be substantial, as indicated by the table below. Members currently pay these expenses out-of-pocket. The 19,360 members newly assigned to one of these four locations in FY 99 brought approximately 2,592 pets that required quarantine at a cost to the members of an estimated $3.3 million (or approximately $1,276 per quarantine).

Table 24: Estimated Pet Quarantine Costs, FY 99, for Army, Air Force, Navy, and Marine Corps.

Location	Pet Quarantined	Aprox. # New Members	% New Members Who Incur Cost	Average Cost/ Quarantine	Total Cost
Guam	280 25% cats, 75% dogs	2,368	12%	$1,055/cat $2,375/dog	$572,600
Hawaii	1,522	10,621	14%	80%@$655 20%@$1,080	$1,126,110
Iceland	23 10 cats, 13 dogs	1,037	2%	$2,360/Cat $3,860/Dog	$73,780
UK	767	5,334	14%	$2,000	$1,534,000
Total	2,592	19,360	13%	$1,276	$3,306,490

Below (***Table 25***) we list several items that are, or have been suggested to be, covered under the COLA and compare them against the criteria for coverage discussed above. Application of these criteria suggests that the TV tax in the United Kingdom and car safety and winterization kits in Alaska be considered location-unique expenditures to be covered under the COLA program. Pet quarantine costs are more aptly related to PCS move expenditures, and therefore could more logically be reimbursed under the PCS program. Likewise, the cost of dependent student's overnight school trips are linked to dependent's educational costs and could more logically be considered for reimbursement under the Department of Defense Dependent Schools (DODDS) program (as discussed previously).

Table 25: Checklist: Coverage of Location-Unique Expenditures

Item	Environ-mental Condition	Not in Market Basket	Little Member Discretion	Other Program	Law or Mandate	Local Custom	Cover under COLA?
UK TV Tax	X	√	√	√	√	√	Yes
Safety Kits in Alaska	√	√	√	√	?	NA	Yes
Car Winterization Kits in Alaska	√	√	√	√	X	√	Yes
Pet Quarantine in HI, UK, Iceland, and Guam	√	√	X	X (PCS move program)	√	NA	No
Cost of dependent student's overnight school trips	X	√	√	X (DoDDS)	X	X	No

4.5 COLA Safety Net

Currently, members receiving COLAs at OCONUS locations can face dollar reductions in their COLA because of (1) declining prices at the OCONUS location, (2) prices rising faster in CONUS than at the OCONUS location, and (3) favorable exchange rate changes. If the COLA declines because local prices have declined or because the dollar is worth more in the local economy, it is reasonable that the COLA payment itself should decline to reflect the reduced cost-of-living, in dollar terms. However, it is possible that a reduced COLA may impose a short-term hardship on members for at least three reasons. First, if local prices decline, a member's cost of living might not decline if he or she has entered into longer-term arrangements at fixed prices. Second, the member's COLA might decline not because local prices have declined, but because prices in CONUS have risen. While it is true that, without an adjustment in COLA, the member may be better off than he or she would have been at now higher domestic CONUS prices, it is nevertheless clear that the member's cost of living at the OCONUS location has not declined when U.S. prices rise. Third, an apparent decline in living costs due to favorable movements in the exchange rate might be offset by a concomitant rise in local prices. Such a price rise would go unmeasured until the next annual price survey, under typical policies.

Other allowance systems, notably that of The World Bank and the military's Basic Allowance for Housing (BAH), include a "safety net" that

protects members from declines in income due to relative price changes under some circumstances. The World Bank safety net feature protects bank employees from a decline in the COLA, below the base amount for the year, due either to exchange rate fluctuations or an increase in prices at the comparison location (i.e., Washington D.C.). The BAH of an individual member is not permitted to decline for the member over the member's tour, recognizing the complications entailed by fixed commitments.

4.5.1 COLA Midpoint System

Both the State Department and the World Bank use a "COLA Midpoint" system that, presumably, requires less frequent adjustments to the COLAs. Under this system, the actual COLA payment does not change as long as the COLA index remains within a certain interval—typically five percentage points at the most relevant range of index levels. When the actual index moves outside of this range, the COLA does adjust to the payment implied by the new midpoint of the range.

Fewer adjustments may better allow members to manage their household budget. One major problem with this midpoint system, though, is that when COLA adjustments are required the percentage change in the COLA can be quite large. Hence, instead of frequent, small adjustments, the member would be subject to less frequent but large adjustments. Furthermore, as described in ***Section 2***, DoD currently uses an alternative approach to reduce the number of COLA adjustments that could result from minor fluctuations in exchange rates. The current approach uses cumulative measure of the difference between the market exchange rate, and the exchange rate being used to compute the current COLA. If this cumulative difference exceeds the threshold of 5%, then the COLA is adjusted. For these reasons, we do not pursue the approach of using a midpoint system.

4.5.2 Safety Net for COLA Declines Due to Changing Prices

One option for a DoD COLA "safety net" would be to guarantee the member against COLA decreases, apart from exchange rate adjustments, over the length of the members' tour. However, if local prices are declining, the member is not merely held harmless, but made better off. A second option is to protect the member, over the initial period of the assignment, for declines in the COLA that are due to rising CONUS prices, and not to declining local prices. This alternative recognizes that,

without a decline in local prices, a reduction in the COLA makes the member worse off in a real economic sense.[43]

The current pay system, however, cannot track members' transfer dates. Consequently, a safety net that is member-specific is not possible at this time. Therefore, until such time as the system is able to track member transfer dates, the safety net should apply to all at the location.

4.5.3 Safety Net for Large Exchange Rate Changes

Exchange rate changes occur almost continuously, and often have little effect on financial commitments made in local currency. However, major exchange rate fluctuations symptomatic of a distressed local economy may occur at the same time as rapid price inflation. Because the member would face significantly higher local prices for goods and services at the same time that the rapid decline in the exchange rate would reduce the COLA amount, the member would be made worse off until local prices are sampled and the COLA restored.

One solution to this problem is for the Command at the locality to initiate an out-of-cycle price survey. Another option is to freeze downward COLA adjustments at a level implied by, say, a 30% decline in exchange rate until the next price survey. For example, the maximum percentage decline could be set to 0.3x(portion of spending in the local economy). This would put an upper bound in the COLA decline until local prices can be formally measured.

For example, in Japan, where 52% of the goods are purchased in the local economy, the maximum allowable decline would be 0.3x0.52=0.156 (or 15.6%). Although such a system would not completely eliminate COLA reductions due to exchange rate fluctuations, it would limit adverse consequences by preventing further downward adjustment until the next price survey occurred. If prices rise during this period, the safety net would also allow time for command to initiate an out-of-cycle price survey in order to compensate members facing higher prices.

One drawback of this plan is the fact that the permissible level of decline in COLA is tied to spending patterns at the locale. A similar but simpler system may be to set the maximum decline in total COLA due to exchange rate changes between schedule price updates at 15% of total COLA. While these alternatives limit potential harm to COLA recipients, they potentially increase the costs of providing COLA, and increase the complexity of exchange rate calculations within the OCOLA process.

[43] Note, however, that relative to how the member would fare in the US economy, he or she is better off.

The tables below provide an indication of the budget cost associated with an overseas COLA "safety net". The first is an estimate of the "cost" of the safety net recently applied in Alaska. The second and third are illustrative budget costs associated with a safety net when the COLA would have declined due to a drop in local prices and with a rise in CONUS prices, respectively. Note that the "cost" is relative to the expenditure savings that would have accrued if the safety net were not in effect and the COLA would have declined. Note also that actual costs resulting from a "safety net" will depend on the particular circumstances associated with the price changes.

Table 26: Safety Net Cost Implications for Recent Index Changes in Alaska

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	2.65	0.10	5.61	0.03	0.07	0.003	NA	8.47
Additional Annual Benefit per Member ($)	428	1,330	588	1,422	76	2,669	NA	498

Table 27: Safety Net Cost Implications of 1% Increase in CONUS Prices, All Else Equal

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	15.60	9.48	12.47	3.28	0.77	0.00	NA	41.60
Additional Annual Benefit per Member ($)	189	187	199	143	211	310	NA	187

Table 28: Safety Net Cost Implications of 1% Decline in OCONUS Prices, All Else Equal

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	15.75	9.57	12.60	3.31	0.78	0.00	NA	42.01
Additional Annual Benefit per Member ($)	191	189	201	144	214	313	NA	189

5. RECRUITING AND RETENTION IMPLICATIONS OF THE COLA PROGRAM

The overseas COLA is a relatively modest component of members' total compensation. The COLA is intended to keep members and their families from suffering financially when assigned overseas and thus is not intended as a "real" increase in pay. Nevertheless, failure to adequately compensate members for the higher cost of living at OCONUS assignments would constitute a real decrease in compensation. COLA is paid purely on the basis of measured differences in cost of living between the continental United States and the OCONUS location. Consequently, the COLA is not likely to be an effective or efficient mechanism to address recruiting and retention problems, compared, for example, to selective reenlistment bonuses, in the sense that it is not readily targeted to specific recruiting or retention problems.[44]

To the extent that overseas assignments are viewed as a financial hardship, the overseas COLA can lessen the hardship or partially compensate for it. A COLA that is viewed as insufficient or inequitable will likely have a detrimental effect on recruiting and retention.[45]

[44] In a sense, OCONUS COLA is like the PCS reimbursement program. We would not expect increases in retention, over and above normal retention rates, for those who receive reimbursement for the cost of their PCS moves. However, we would anticipate adverse consequences for retention if compensation for the costs of moving were inadequate.

[45] In the private sector literature, Anderson (1990) notes that the failure to select the most interculturally suitable expatriates increases the risk of failure abroad in terms of attrition, turnover, separation and replacement costs, lowered productivity, and higher maintenance requirements (i.e., time and expense devoted to dealing with "problem"

While not structured as a retention tool, the overseas COLA will have a positive effect on retention, compared to a case where there is no cost of living adjustment. We estimated the retention effects of the COLA using the Annualized Cost of Leaving Model (ACOL) model. The ACOL model compares enlisted retention both with and without the overseas COLA. Eliminating the COLA would reduce the aggregate first reenlistment rate of members stationed OCONUS –those who would have received the payment by about 1.65 percentage points and would reduce the aggregate second term rate of members stationed OCONUS by about 1.28 percentage points. This is a 3% increase in the first term reenlistment rate, and a 1.7% increase in the second term reenlistment rate.[46]

The ACOL model also can be used to estimate the retention effects of increasing the COLA. For example, increasing the COLA by indexing the spendable income table that will be implemented in FY 2001 to the consumer price index would increase the aggregate first term reenlistment rate for members stationed OCONUS by about 0.27 percentage points. The aggregate second term reenlistment rates would increase by about 0.21 percentage points.

6. THE OCONUS COLA AND VOLUNTARY ASSIGNMENT

To some degree, each Service attempts to fill assignments voluntarily by matching members' preferences against available assignments. However, none of the Services currently has a completely voluntary assignment system. In many cases, members do not receive their "first-choice" assignments. The rationale for using a voluntary assignment system is that it will improve retention and readiness. In an all-volunteer force, all assignments are ultimately voluntary—if a member dislikes a particular assignment sufficiently, he or she may leave. The GAO reported that, in 1998, the Air Force conducted a survey of 633 departing personnel

expatriates). Within a year of repatriation, 25 percent of employees leave their company (Black, 1988). Organizations may lose almost half of their repatriates within three years of their return to the U.S. (Gregersen & Black, 1990; Carter, 1989). However, it is unclear whether the high separation rate for employees returning from abroad is the result of a negative overseas experience, increased job opportunities or earnings potential for an employee with overseas experience, or other factors.

[46] To put this in perspective, the effect on the first term reenlistment rate for those who would receive the COLA is about the same as a level 1 Zone A reenlistment bonus.

to determine their reason for separating (GAO, 1999).[47] The survey participants were asked if there was one single thing the Air Force could do to keep them in the service. Of the 35% of enlisted personnel and 48% of officers who responded in the affirmative, the most frequently cited change was more choice in assignments.

In addition, a voluntary assignment system is likely to reduce assignment turnover. Under the current system, there is the notion that one balances "good" assignments with "bad" assignments for members. There is a notion of "share the pain, share the gain" that induces rotation simply to achieve this form of equity.

Under a volunteer system, rotations simply to "share the pain, share the gain" would be reduced. Those who volunteer for an assignment are more likely to complete the assignment and, if relevant, volunteer for an extension. If so, this means lower permanent change in station (PCS) costs. It also may mean that the transient account could enjoy a significant reduction under a voluntary assignment system. Further, reduced turnover and longer tenure at an assignment is likely to improve performance or productivity of members at the assignment.

There are two potential sources for productivity improvement. First, if turnover is less, the relatively unproductive times at the beginning and end of a member's tour are reduced. Second, if there is assignment-specific factors affecting productivity, increased time on assignment will provide a longer period of productivity improvement through a "learning curve" effect.

Finally, under a more voluntary assignment system, the cost of particularly difficult-to-fill assignments will be more apparent to the Services. As we suggest below, incentives will be established within overall budget constraints, based on supply and demand, to fill difficult to fill positions. The cost of these incentives will make the cost of such positions more explicit to the Services. This, in turn, will provide a budgetary incentive for the Services to find innovative ways to meet mission demands while reducing or economizing on particularly onerous positions.

The OCONUS COLA is one tool for attaining a higher proportion of voluntary assignments at overseas locations. In order to understand the

[47] General Accounting Office (February 1999). *Military Retirement: Proposed Changes Warrant Careful Analysis*. Testimony of Mark E. Gebicke (Director, Military Operations and Capabilities Issues, National Security and International Affairs Division) before the Subcommittee on Military Personnel, Committee on Armed Services, House of Representatives.

role of the OCONUS COLA in encouraging voluntary assignments, it is important to first consider reasons that members prefer some assignments to others. These factors include:

- Differences in the cost of living,
- Environmental conditions (e.g., the climate, local culture),
- Type of duty,
- Family separation,
- Spouse employment opportunities,
- Nationality of spouse,
- Dependents' educational opportunities, and
- Cultural and other amenities.

The OCONUS COLA is only designed to address the first factor (cost of living). Some members may find certain differences between CONUS and OCONUS assignments appealing, while other members may find these same differences less appealing. A voluntary assignment system may provide a way to allocate overseas assignments to those qualified members who prefer them.

6.1 Comparison to Private-Sector Firms

Under the current system, the military assigns members for overseas assignments. Although members may submit a list of assignment preferences, there is no guarantee of a member receiving his or her first (or even second) choice. Although the military's assignment system is quite different than that used in the private sector by international companies, research on overseas assignment of private-sector employees provides useful information to evaluate the military's assignment system.

In many international companies, employees apply for overseas assignments or are hired with the expectation that they will be assigned overseas. In some international companies, employees are expected to take an overseas assignment as part of their career development. In other companies, employees are assigned to the overseas location to fill a special need. Since employment in private-sector firms is also voluntary, personnel managers with overseas positions to fill are also interested in the factors affecting employees' willingness to accept such assignments.

Not surprisingly, several studies show that employees are more willing to relocate overseas when they are single or their spouses support the

move. Also, concerns about spouse employment and dependent education and medical care play a large role in the decision.

Borstorff et. al. (1997) examine relationships of the following factors with employees' willingness to take expatriate assignments: 1) employee characteristics, 2) employee job and relocation attitudes, 3) spouse characteristics and attitudes towards relocation, and 4) organization relocation support activities. They find that employees more willing to accept overseas assignments tend to be: 1) single, 2) have prior international experience, and 3) be committed to their professional careers and to their employing organizations. Also, the careers and attitudes of spouses have a significant impact on employee willingness to move overseas.

In a 1994 survey conducted by the National Foreign Trade Council (NFTC), more than half the respondents considered the careers of their spouses as a major factor for turning down an overseas job assignment, and 81% felt family considerations to be a primary reason candidates turn down overseas assignments. The three main categories of concern were (1) career interruption of spouse, (2) special needs of children (e.g., educational, medical, or social), and (3) responsibility for parents or other relatives (Swaak, 1995).

Feldman and Thomas (1992) reported that free choice concerning expatriate assignments and realistic job previews were related to subsequent success and adjustment in expatriate assignments. Perceptions of care and fairness in selection decisions are salient to employees relinquishing control in a relocation; employees need to feel the organization has a rational selection procedure, rather than just sending anyone to fill a spot (Borstorff et al., 1997).

Brett, Stroh and Reilly (1992) report that over half of all U.S. married couples have dual career status, with the number expected to increase to almost two out of three by the year 2000. The authors report that research at Mobil Oil concluded that such a projected increase would lead to a 50% refusal rate as well as a 20% turnover rate among Mobil's employees seeking to avoid relocation.

6.2 Description of Voluntary Assignment System

The purpose of a voluntary assignment system is to better match the OCONUS staffing needs of the Uniformed Services and the preferences of their members. Because a voluntary assignment system is easily misunderstood, we clarify what it is not. First, the system we are

suggesting would not apply to deployments within an assignment. That is, if the unit to which members are assigned is deployed, those deployed would not be restricted to volunteers. Second, the voluntary system would be suspended in time of war or national emergency. Third, the system does not necessarily need to apply to first duty assignment of enlisted or officers; however, the nature of initial assignments should be made explicit to the recruit or potential officer, so that he or she makes an explicit, voluntary decision upon enlistment. Five principles underlie the concept of a voluntary assignment system:

1. The Services make a commitment to staff as many assignments as possible (including overseas positions) with volunteers.
2. The volunteers must be qualified for the positions.
3. Members are provided with full information on living and working conditions associated with assignments.
4. Within the limitations of an affordable budget, monetary incentives should be used to encourage qualified volunteers to staff hard-to-fill assignments
5. If necessary, traditional (non-voluntary) assignment practices will be used to preserve readiness as a last resort.

The system, therefore, matches members with jobs. Under such a voluntary system, members sort themselves across locations by their specific circumstances and tastes such as:

- Preference for warm or cold climates,
- Preference for rural or metropolitan areas,
- Desire to experience different cultures,
- Spouse employment circumstances/opportunities, and
- Dependents' education circumstances/opportunities.

Ideally, the set of qualified employees available within a time period just matches with the set of available assignments. In practice, of course, the match will be imperfect. Some jobs will have a surplus of applicants, while others will have no volunteers.

A voluntary assignment system would increase the use of monetary incentives to voluntarily fill assignments at difficult-to-fill locations. Examples of such monetary incentives in the Uniformed Services include the Career Sea Pay, the Army's location-specific SRB, the Navy's initiative for Distribution Pay and the new Hardship Pay. Such incentives

could help fill assignments that would not otherwise draw volunteers. This type of special pay could incorporate the non-pecuniary aspects of living overseas—such as loss of spousal income, educational opportunities for dependents and desirability of the location, as well as the arduousness of the duty.

Location-specific incentive pays could vary to adjust for discrepancies between supply and demand. They would not have to be based on differences in the cost of living. Pay rates could be increased for locations/assignments that are not being filled, and adjusted downward or eliminated for assignments with a surplus of applicants.

A voluntary assignment system employing a combination of COLAs and incentive pays could have a positive effect on retention and recruiting. Coupled with as much information as possible about the location, the incentive pays would compensate for non-pecuniary differences in locations that the COLA system does not consider.

6.3 THEORY UNDERLYING A VOLUNTARY ASSIGNMENT SYSTEM

The model introduced in ***Section 2*** provides a way to illustrate the theory underlying a purely voluntary assignment system. Assume we have two positions to fill, one in CONUS (C) and one in OCONUS (OC), and two qualified members to fill them, member "i" and member "j". Recall that we introduced the notion of the member's welfare or "utility function":

$$U_i = U_i(p_c, E_c, I)$$

which provides a (notional) measure of the member i's anticipated well-being at particular assignment location. In this instance, the member's well being with a CONUS assignment is a function of the prices in CONUS measured by price vector p, the environment in CONUS, measured by vector E, and income I.

Now, introduce a second, overseas assignment possibility for individual i:

$$U_i = U_i(p_{oc}, E_{oc}, I)$$

Member i will volunteer for the overseas assignment only if:

$$U_i(p_{oc}, E_{oc}, I) > U_i(p_c, E_c, I)$$

Similarly, member j would volunteer only if:

$$U_j(p_{oc}, E_{oc}, I) > U_j(p_c, E_c, I)$$

Let us suppose that the inequality is true for member j, but not for member i. Member j will volunteer for the position, while member i will not. By staffing with volunteers, we are able to assign members i and j to the positions that maximize their well-being, while an involuntary assignment system would have done so only by chance.

Now, assume that neither member would volunteer. That is, both members prefer the CONUS assignment to the OCONUS assignment. However, both would volunteer if the OCONUS assignment included an additional monetary incentive —a compensating differential. That is,

$$U_i(p_{oc}, E_{oc}, I + \Delta I_{i,OC}) = U_i(p_c, E_c, I)$$

and

$$U_j(p_{oc}, E_{oc}, I + \Delta I_{j,OC}) = U_j(p_c, E_c, I)$$

Now, with additional income, perhaps in the form of a special pay, both members would be willing to volunteer. Which should the Service accept? Again, as long as the members do not have the same tastes and circumstances, they should assign the volunteer for whom the compensating pay, ΔI, is smaller. This minimizes the cost of filling the position to the Service, and again makes both members at least as well off, and generally better off, than they would be under an involuntary assignment system.

With larger numbers of positions to fill and larger number of members to fill them, this simple model would suggest that the compensating payments, the ΔI's, should be set by supply and demand for each location. Pay differentials should be set at levels sufficient to attract the right number of members to keep the positions staffed with qualified volunteers. The actual differential at each location will be determined by the "marginal" volunteer, the ΔI just sufficient to attract the final volunteer required to fill all the positions at the location. For this member, the payment exactly compensates the member for the hardships associated with the assignment. That is, for the "last" volunteer, we are able to determine the dollar value of environmental and other factors that make this a less attractive assignment. These are factors for which a COLA, alone, cannot be expected to compensate. All of the "infra-marginal" volunteers—those who would have volunteered at lower increases in pay, will actually prefer that assignment to any other.

A voluntary assignment system, with compensating pay differentials set by supply and demand:

- Matches the preferences of members with assignments;

- Fully compensates members for the disamenities associated with various assignments; and
- Does so efficiently.

6.4 THE ROLE OF OCONUS COLA

Relative to other aspects that may make one location more or less desirable than another, cost-of-living differences can be measured relatively easily, albeit imperfectly. Hence, a solid location-specific COLA system is an important complement to a voluntary assignment system. Most members will not know how the cost of living differs across various locations. A policy that holds members harmless for most out-pocket expenses associated with assignments would make filling positions easier, reducing this aspect of uncertainty for the member and his or her family.

Voluntary selection of members into assignments reduces reliance on the COLA to compensate for other location-related disparities for which it is not well-suited, such as spouse employment or dependent education issues. Thus, the Services should see a greater degree of member "buy-in" on the COLA. Just as the voluntary assignment system requires active education of members with good information on different duty locations, DoD and the Services must continue to educate members about the OCONUS COLA program.

6.5 SUMMARY

A voluntary assignment system is a natural extension of the all-volunteer force. An explicit commitment to a volunteer assignment system can improve recruiting and retention and ease demands to extend the COLA program beyond its original charter. In addition, such a system could reduce the number of PCS moves and associated costs, reduce the transient account, and increase productivity.

To achieve a successful voluntary assignment system, the Services must:

- Provide members with good information on assignment locations,
- Guarantee a solid overseas COLA program,
- Provide commands with good information on qualified candidates,

- Develop a reliable system for matching members with assignments (an assignment "marketplace"), and
- Establish a long-term commitment to maximizing voluntary assignments.

Members find OCONUS assignments relatively attractive or unattractive for many reasons. Some members may find certain differences between CONUS and OCONUS assignments appealing, while other members may find these same differences unappealing. The overseas COLA is designed only to address differences in cost of living. A voluntary assignment system may provide an adjustment vehicle for the other differences between CONUS and OCONUS assignments.

Under the current system, the military assigns members for overseas assignments. Although soldiers may submit a list of preferences for assignment, the system is largely involuntary. The purpose of a voluntary assignment system is to better match the OCONUS staffing needs of the Uniformed Services and the preferences of their members. An underlying principle in such a system is to staff overseas positions, as much as possible, with volunteers. (The system does not necessarily need to apply to first duty assignment of enlisted or officers).

Although the military's assignment system is quite different than that used in the private sector by international companies, research on overseas assignment of private-sector employees provides useful information to evaluate the military's assignment system. The incentive pays for voluntary assignment would be more reflective of the purpose of pay allowances and premiums paid to employees of many international companies when the employees are transferred overseas. Private firms view these salary adjustments as compensation for both cost of living differences between CONUS and overseas assignments and compensation for the non-pecuniary aspects of overseas assignments.

A voluntary assignment system, combined with various incentive pays, could have a very positive effect on retention and, perhaps, recruiting. Coupled with as much information as possible about the location, these pays would compensate for non-pecuniary differences in locations that the COLA system does not consider.

A solid location-specific COLA system is an important complement to a voluntary assignment system. Policies such as a holding members harmless for most out-pocket expenses associated with assignments would makes filling positions easier. Cost-of-living differences at OCONUS locations are liable to be more volatile and unpredictable than other location-specific differences across time, which makes it more difficult for

the member to assess this aspect of an OCONUS assignment prior to assignment.

A volunteer force implies that the assignment system is voluntary in the long run. Thus, members will leave if assignments are consistently unpleasant. A voluntary assignment system would be a renewed commitment to filling spaces with volunteers.

7. ADMINISTRATIVE ISSUES

We consider two issues with regard to the administration of the OCONUS COLA. The first concerns its payment solely as a per diem rate. The second concerns who, administratively, should determine whether an expenditure issue associated with an OCONUS assignment is a COLA (i.e., cost of living issue) to be considered by the Per Diem committee in that context, or whether it should be directed, at least initially, to those who administer some other, more relevant program.

7.1 LUMP SUM PAYMENTS UNDER OCONUS COLA

By law, the overseas cost-of-living allowance must be paid as a per diem rate. The COLA, itself, is paid in semi-monthly pay checks. The payment made is the product of the number of days in the period and the per diem (per day) rate. This seems quite reasonably for items that are purchased almost continuously over the year, such as food and clothing. However, there are some expenditures that are clearly "lumpy". They are large expenditures that are made, perhaps once per year or even once per tour.

Currently, the cost of "lumpy" expenditure items is converted to an implied daily rate and amortized over the calendar year. An alternative would be to make periodic lump sum payments to members, at the appropriate time, for those expenditures that the members must pay out as a lump sum. Presumably, the time at which they are paid would coincide, as much as is practical, with the time at which they are typically paid by the member.

The current system has the administrative advantage that the payroll system does not have to track or adjust for these periodic special payments. Moreover, the constant per diem rate eliminates issues that may arise concerning the timing of the special payments and

arrivals/departures, or recoupment of payments for members who fail to complete a tour.

On the other hand, the member may have to finance some large expenditures out-of-pocket. While the member may recoup the payment over time through the semi-monthly COLA payment, the member will not recoup the implied interest. Moreover, financing the large expenditure may impose a significant hardship on the member and the member's family, at least until the COLA payments can catch up.

A special payment representing large expenditures that are covered under the OCONUS COLA at a particular location is likely to improve the welfare of the member and the member's family. If the payment were to come as the member begins the assignment, the payment itself would help to ease the financial hardship that undoubtedly occurs for many members, especially junior enlisted members with families, during the transition to the new location. There are likely to be additional payroll costs associated with such payments, particularly if the timing of special payments is customized to each member.

An important problem that immediately arises once one considers the special lump-sum payments for some types of expenditures is: which expenditures? One way to avoid this problem is to strictly limit the special, lump sum payment, at least initially, to substantial "lumpy" expenditures that are required by law or mandate. The automobile tax in Singapore is one example.

Any deviations from the "per diem" payment of OCONUS COLA would, of course, require legislation. The benefit to junior enlisted members could be substantial, especially of the special payment were made in the early days of a new assignment. Such a feature would be approximately budget neutral. There would be some additional payroll and other administrative costs associated with the feature, and there may arise some recoupment issues with members who do not complete a tour.

7.2 Administrative Determination of Program Jurisdiction

Members and their families incur numerous expenses that are, in some way, related to the member's OCONUS duty assignment. Issues routinely arise over time regarding the coverage of additional items or types of expenses as part of the OCONUS COLA program. Not surprisingly, many of these warrant the serious consideration of the Per Diem, Travel and Transportation Allowance Committee (PDTATAC) for coverage under

OCONUS COLA.[48] In other instances, however, the case for coverage under the OCONUS COLA program is much less compelling. We have found, however, that, for may items raised, initial consideration for coverage may more appropriately belong in some other program area. Examples include items that may be associated with a Permanent Change of Station (PCS) move, expenses related to the education of a dependent child, or items that are more appropriately considered as operations and maintenance (O&M) expenses of the commands under which the expenses arise.

Currently, there is no formal body or committee for making initial determinations of the appropriate "jurisdiction" for a given item and insuring follow-up and closure. By default, the PDTATAC is the ex-officio committee to do this. However, if one were to refer a particular item to the Department of Defense Dependent Schools (DoDDS) for consideration of coverage as a reimbursable expense, for example, there is no formal requirement for DoDDS to provide an opinion or recommendation with its justification and no clear process for coming to closure on the issue. Under the current system, an item may be simultaneously considered under two or more programs, with no program clearly assuming the lead.

One solution would be to give PDTATAC this mission, which they often assume by default. However, PDTATAC is the sponsor of one of the major programs for which jurisdictional coverage is often contended. Hence, it may be perceived as a less than neutral initial arbiter in some instances.

Instead, we suggest the formation of a different committee. The purpose of the committee would be to make an initial determination of the appropriate program under which a specific expense-related item is to be addressed, and coordination of an ultimate decision on the issue. The committee's initial recommendation of program jurisdiction would require that those who administer that program make a specific recommendation regarding coverage of that item, along with a rationale for that recommendation. The committee would then accept that recommendation, or ask for reconsideration. The committee itself would be responsible for ensuring closure—that the issue does not simply disappear into the bureaucratic mist.

There would be two categories of membership in the committee. The primary members would be the Directors of Compensation Policy for the Office of the Secretary of Defense and each of the Uniformed Services,

[48] In ***Section 4***, we have suggested some guidelines or criteria for coverage.

and the Chairman of the PDTATAC. The secondary members would be the directors of the relevant programs for which an item may eventually be referred. The Chair of the committee would be the Director of Compensation Policy for the Office of the Secondary of Defense. When a particular item arises, the primary members would quickly determine the likely applicable program(s) under which the item may be considered. The relevant secondary members would be asked to participate in the deliberations after that point. The intent would be to include in deliberations those who have a direct stake in the issue, and economize on the time of others.

8. SUMMARY AND RECOMMENDATIONS

We have reviewed the current system for determining and administering the OCONUS Cost of Living Allowance from several perspectives. Our most fundamental conclusion is that, conceptually, the CONUS market basket approach to determining the cost of living adjustment is sound and is similar to the approach used by many private sector multi-national firms and international organizations. The system can be improved in a number of dimensions, however.

There are a number of substantive issues regarding what is included in the market basket and how they should be included. We have made specific recommendations on these issues. We also addressed a large number of technical issues regarding how data is collected and used. Recommendations are also made in this important area. Finally, we have considered two issues associated with the administration of the OCONUS COLA: its payment as a per diem or daily rate, and the organization change to help in determining which issues are OCONUS COLA issues and which issues might better be considered under alternative programs.

Table 29 summarizes our findings and recommendations. The issues are organized by section, in the same way they are presented in the text. We include a brief description of the issue, reference the section of the text in which it is discussed, summarize the recommendation as appropriate, and present an estimate of its total annual cost, if relevant.[49,50]

[49] Note that cost estimates are of two types. The first is our best estimate of the annual budget cost of implementing a specific change, when there is, conceptually, a clear budget cost. The second type of estimate presents costs under a particular contingency or scenario. For example, the cost associated with the incorporation of a particular type of "safety net" depends on the scenario, while the cost of including a round-trip home to the United States per tour does not. We attempt to distinguish between the two types in the table.

[50] The table in ***Appendix B*** breaks out estimated costs by Service.

Table 29. Summary of Issues and Findings

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($Millions)	Benefit per Member ($)	
	Cost-of-Living Index Structure			
4.1.2	The Living Pattern Survey is currently used to determine the government facility/local economy expenditure shares. Alternatives to the current system include: ▪ Use CONUS expenditure shares at all OCONUS locations. ▪ Use expenditure shares that are a weighted average of OCONUS and CONUS estimates (e.g., 75% OCONUS and 25% CONUS). ▪ Use expenditure shares estimated using a multivariate regression model that predicts the expenditure share based on the characteristics of the location.	418.52 108.21 199.51	1,885[1] 488[2] 899[3]	We recommend commissary and exchange expenditure share estimates that are based on CONUS patterns, or on an explicit policy, rather than actual expenditures.
4.1.4	Exchange rate adjustment system	NA	NA	The new exchange rate threshold of 5% is a reasonable compromise between frequency of exchange rate adjustment and the potential cost to the member. However, we recommend that PDTATAC continue to explore the advantages of continuous (bi-weekly) adjustments for exchange rate changes.
4.1.5	Current program assumes no difference in CONUS and OCONUS prices for items in the 'Miscellaneous' category ▪ Assume ratio of OCONUS to CONUS prices for items in 'Miscellaneous' category reflects ratio of prices for the market basket as a whole.	78.64	354[4]	We recommend that actual prices be collected for the Miscellaneous category. In the interim, we recommend that prices in the Miscellaneous category at OCONUS locations be presumed to bear the same relationship to CONUS prices in that category as the expenditure-weighted average of the prices across the categories that are collected for that location bear. PDTATAC should study the implications of formally pricing the Miscellaneous category prior to a final decision to implement.

Note: Shaded rows indicate policies that may result in a COLA decline for members at some locations.

1 The COLA would actually decline, by an average of $783 per year, for approximately 8,245 members at 7 locations in our model.

2 The COLA would actually decline, by an average of $196 per year, for approximately 8,245 members at 7 locations in our model.

3 The COLA would actually decline, by an average of $846 per year, for approximately 43,252 members at 16 locations in our model.

4 If price data for items in the Miscellaneous category were collected, as recommended, then COLA amounts could decline at a location if OCONUS prices were lower than CONUS prices.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Market Basket Items				
4.1.6.1	Long distance phone calls and trips home are not included in the OCONUS COLA. These expenses typically are covered in the private sector. ▪ Include a trip home, per tour, for member and dependents ▪ Include 30 minutes/month of long-distance phone service	 167.20 10.36	 753 47	We recommend that (1) members and dependents be funded for one trip to the United States for each three-year OCONUS tour, and (2) the cost of 30 minutes of long distance service per month be included in the OCONUS COLA.
4.1.6.2	Dependents' schooling expenditures may not be fully covered when DoDDS schools are unavailable.	NA	NA	Refer issue to DoDDS.
4.1.6.3	The potential income loss for spouses during an accompanied overseas assignment could be substantial.	NA	NA	The Services should attempt to limit potential spouse losses through a more flexible, voluntary assignment program. In addition, the Services should consider making spouses eligible for the unused portion of the member's Tuition Assistance (TAP) benefit while the member is on an accompanied OCONUS tour, or consider "spouse transition assistance" in the form of one or two months of the member's basic pay. We suggest, however, that the payment be a function of the member's basic pay, to make administration tractable.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Data Collection				
4.2.1	Outsource collection of OCONUS price data .	NA	NA	We do not recommend that the Services outsource OCONUS data collection at this time. However, we do recommend that they continue to explore the issue.
4.2.2	OCONUS price data are gathered annually, or more frequently at command request. An alternative to out-of-cycle price surveys to update the COLA is to use local prices indices and information.	NA	NA	We recommend that the Services explore the possibility of using local price indices and information to update the OCONUS COLA on an interim basis—especially in countries with historically high rates of inflation.
4.2.3	CONUS prices for many items purchased in the local economy are estimated using data from the commissary and exchange services.	NA	NA	Because CONUS prices affect all OCONUS COLA payments, we recommend that the PDTATAC regularly validate these prices through independent sampling, independent external indices, and other forms of quality assurance.
4.2.4	The Living Pattern Survey is administered tri-annually to estimate government facility/local economy expenditure shares.	NA	NA	If the recommendation is accepted to set expenditure shares by policy, we recommend that the frequency for the administration of the LPS be scaled back. The actual survey results may be used as one piece of information to be considered in setting expenditure shares.
4.2.4	Small sample size when administering the Living Pattern Survey may result in imprecise estimates of commissary/exchange proportions	NA	NA	PDTATAC should produce scientifically based sample selection and administration guidelines for the locations, and should select sample sizes that meet requirements for desired precision of estimates.
4.2.5	Seasonal price fluctuations may result in a cost-of-living indices that over-or-understate the annual average cost of living difference between CONUS and OCONUS locations	NA	NA[5]	PDTATAC should begin to develop methods that would ensure that prices are not biased or suffer from high error rates due to seasonality. (We have suggested several approaches.)

Note: Shaded rows indicate policies that may result in a COLA decline for members at some locations.

5 The COLA could decline (increase) at some locations if the price survey is currently administered in a month when seasonal price fluctuations result in OCONUS prices that are higher (lower) than the country annual average, or if CONUS prices are lower (higher) than the CONUS annual average.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
	Spendable Income Calculation			
4.3.1	As currently calculated, the spendable income table is not updated frequently and is largely based on a non-military population, which may bias COLA amount ▪ Index 1988-1989 S.I. table to 1999 using the CPI ▪ Implement new (1994-1995) table in FY 2001[6] ▪ Index 1994-1995 S.I. table to 1999 using the CPI[6]	91.52 26.91 54.42	412 121 245	We recommend that the table be updated more frequently and that it be indexed for inflation in years in which it is not updated. We also recommend an alternative method for constructing the spendable income table—e.g., using data at the individual household level and an expanded set of covariates.
	Location Specific Compensation (COLA Uniques)			
	The current method of determining whether a particular item should be included in a location's COLA payment as a location-unique expenditure is less systematic than it could be.	NA	NA	We recommend a set of criteria or principles for determining location-unique items.
4.4.1	Pay the Uniformed Services the State Department "Hardship Allowance"	NA	NA	We recommend that the Uniformed Services continue to explore this issue as a means to improve staffing at hard-to-staff locations.
4.4.2.4	PDTATAC has been asked to consider covering car safety kits and winterization kits for members in Alaska, and pet quarantine costs under the OCONUS COLA ▪ Pay costs of car safety and winterization kits ▪ Pay pet quarantine costs	6.51 3.31	383/AK Member 15	We recommend that car safety kit and winterization costs in Alaska be expanded under the COLA as location-unique items. We recommend that pet quarantine be considered for coverage under the PCS move program, not the OCONUS COLA.
	Safety Net			
4.5.2	"Safety net" for COLA declines due to price changes ▪ Cost of protecting members from 1% increase in CONUS Prices	41.60	187	We recommend that a COLA "safety net" be established that keeps the COLA payment from declining for members on their current tour when the COLA payment would otherwise decline due to an increase in CONUS prices. Because the current pay system may not be able to track the timing of tours, the safety net should apply to all at the location on an interim basis.

6 Subsequent to conducting this analysis using the 1994-1995 Spendable Income table, PDTATAC announced that in FY 2001 a table based on 1997-1998 data will be used instead of 1994-1995 data as was previously anticipated.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Safety Net (continued)				
4.5.3	"Safety net" for COLA declines due to large and rapid exchange rate changes ▪ Initiate an out-of cycle survey ▪ Freeze downward adjustments at a fixed level (e.g., 30%)	NA NA	NA NA	We recommend that when the dollar appreciates by more than 30% since the last scheduled local price survey, a moratorium should be placed on further reductions in the dollar-denominated COLA payments. This "safety net" will prohibit further declines until the scheduled annual price survey validates the decline in the cost of living. In the interim, the command may request and conduct a price survey. If the survey reveals that local prices have increased, so that even the implied decline in COLA is incorrect, the COLA payment will be restored to the level implied by the price survey. If the survey reveals that the cost of living relative to CONUS has declined by more than that implied by the exchange rate changes, further declines in the COLA payments would not be implemented until the time of the scheduled annual price survey.
Voluntary Assignment System				
6	Voluntary Assignment System	NA	NA	We recommend that the Services attempt to move more strongly in the direction of a purely voluntary assignment system. A key element to such a system will be a solid OCONUS COLA. In addition, however, it should be supplemented, to the extent that budget realities permit, with a system of special pay incentives for difficult to fill OCONUS assignments. These special pay incentives will be set by supply and demand conditions for OCONUS positions. Potential advantages of moving toward such a system include: (1) a better match of the preferences of qualified members with assignments; (2) higher retention rates; (3) reduced turnover and greater productivity within an assignment; and (4) explicit budget costs of filling certain positions that more fully reflect the true economic cost of those positions.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Administrative Issues				
7.1	Lump sum payments under OCONUS COLA	*NA*	*NA*	PDTATAC should consider recommending that legislation be prepared that would permit lump sum COLA payments for certain items. Special consideration should be given to items that are legally required or mandated and for which a lump sum payment is required by the member early in the member's tour.
7.2	Administrative determination of program jurisdiction	*NA*	*NA*	We recommend that a committee be formed to ensure that the issues are formally addressed by the appropriate program. We recommend that the primary members of the committee should be the Compensation Directors for the Office of the Secretary of Defense and the Uniformed Services, and the chairman of the Per Diem committee. The Director of Compensation Policy for the office of the Secretary of Defense (FM&P) should chair the committee.

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APPENDIX A

COMMISSARY PROPORTIONS REGRESSION ANALYSIS

We conducted a preliminary analysis of shopping patterns of OCONUS members to determine what factors increase the propensity of members to shop at the commissary/exchange versus in the local economy. The data allowed us to test three hypotheses:

1. Commissary/exchange shopping proportions are higher, the better is the commissary and exchange;
2. Commissary/exchange proportions are lower for those who must travel to visit the commissary and exchange; and
3. Commissary/exchange proportions are higher, the higher are the prices in the local economy.

To test these hypotheses, we obtained data on the proportion of purchases that members make at the commissary/exchange for each item in the cost-of-living market basket for the largest (in terms of number of members) 64 OCONUS locations. We used the market basket weights to calculate the weighted average proportion of purchases at the commissary/exchange. We calculated two measures of propensity to purchase on base: (1) the weighted average proportion of purchases at the commissary; and (2) the weighted average proportion of purchases on base (i.e., at both the commissary and the exchange).

Next, we obtained data from the Defense Commissary Agency (DECA) on the location of OCONUS commissaries and the number of line items (i.e., distinct products/brands) sold at each commissary. The number of line items is an indication of the selection available at the commissary. Presumably, commissaries with a broader selection of goods are more attractive to members. Thus, one would expect the number of line items to have a positive effect on the proportion of members' spending that occurs on base.

We matched the commissary locations from the DECA list with the 64 OCONUS locations in this analysis. Forty-three of the 64 locations had a commissary at the location, and another 13 locations had access to a commissary at a neighboring installation. (For those 13 locations without a commissary we did not measure the distance to the commissary). For eight locations, we were unable to identify a commissary in the same geographic area.

We did not have data on exchanges. In the empirical analysis, we assume that locations with a commissary are likely to have an exchange. Also, we assume that the quality of the commissary, as measured by number of items stocked, will also be a proxy variable for the quality of the exchange. We conducted our analysis using both measures of government facility/local economy shopping proportions described above—(1) the proportion of spending at the commissary, and (2) the proportion of spending at both the commissary and the exchange. Our results were similar for both analyses which suggests that commissary location and quality are good proxies for exchange location and quality.

We analyzed the effect that the explanatory variables have on the proportion of spending at the commissary/exchange by estimating an Ordinary Least Squares (OLS) regression model. The database constructed for this analysis consisted of 64 observations—each representing a separate OCONUS location. Twenty-three of the locations were in Germany. The Germany locations often have similar values for some of the variables because locations in close proximity to one another are often

grouped for calculating COLA amounts and often share the same commissary. To control for this, we estimated a weighted regression where each of the 23 Germany locations was given a weight of 1/23. The other locations each received a weight of 1.

Two dependent variables were analyzed: (1) the proportion of purchases at the commissary, and (2) the proportion of purchases at the commissary and exchange. Four independent variables are included in the model.

1. **Line Items**. The number of line items at the commissary (in thousands) is included as a continuous variable.
2. **Have Commissary**. An indicator, or "dummy," variable was included that takes on the value of 1 if we were able to identify a commissary in the same geographic region as the 64 OCONUS locations which a cost-of-living index is calculated, and 0 otherwise. For locations without a matched commissary, the variable "Line Items" was set to 0.
3. **Same Location**. A dummy variable was included that takes on the value of 1 if the commissary is located at the location for which a cost-of-living index is calculated and 0 otherwise.
4. **Local Price Index**. An index that shows the price of goods in the local economy relative to CONUS prices.

Summary statistics for the dependent and explanatory variables and the estimates from the regression models are shown in ***Tables A-1 to A-3***. We only report the regression output for the analysis that uses the percentage of purchases at the commissary as the dependent variable. The results were similar when the percentage of purchases at both the commissary and exchange was used as the dependent variable.

Table A-1. Summary Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Percentage of purchases at commissary	69.97%	18.72	21%	88%
Percentage of purchases at commissary and exchange	63.41%	17.86	18%	80%
Number of Line Items (in thousands) (for 56 locations with this variable)	7.86	2.91	1.35	15
Have Commissary	0.86	0.35	0	1
Same Location	0.66	0.48	0	1
Local Price Index	149.2	20.27	113.72	209.17

Table A-2. Regression Output: Linear Model

Variable	OLS Coefficient	T-Statistic
Intercept	2.11	0.19
Number of Line Items (in thousands) (for 56 locations with this variable)	1.28	1.93*
Have Commissary	18.56	2.37**
Same Location	1.47	0.36
Local Price Index	21.2	3.00**

**Statistically significant at the 0.10 level.*
***Statistically significant at the 0.05 level.*

Table A-3. Regression Output: Log Model

Variable	Elasticities	T-Statistic
Intercept	0.51	0.64
Number of Line Items (in thousands) (for 56 locations with this variable)	0.21	1.94*
Have Commissary	0.26	1.03
Same Location	0.04	0.44
Local Price Index	0.58	2.69**

**Statistically significant at the 0.10 level.*
***Statistically significant at the 0.05 level.*

We present the results for two model specifications. The first is a linear model (***Table A-2***). The second is a log model that is used to calculate the "elasticity" of each variable (***Table A-3***). An elasticity is the percent change in the independent variable that results from a one percent change in the dependent variables.

The two regressions suggest that the proportion of spending on base increases with quality of the commissary (as measured by number of line items), proximity of the commissary, and relative prices in the local economy. The R-squared statistic for the linear model (R-squared=0.54) indicates that 54 percent of the variation in the dependent variable across locations is explained by the four explanatory variables.

Each 1,000 additional line items at the commissary cause the proportion of member's spending on base to increase by 1.28 percentage points (***Table A-2***). In terms of elasticity, a ten percent increase in the

number of line items increases the proportion of spending at the commissary by two percent (***Table A-3***).

Having a commissary in the geographic region increases the proportion of spending at the commissary by nearly 19 percentage points, and having the commissary at the same location where members are stationed increases the proportion of spending at the commissary by an additional 1.47 percentage points—although this later estimate is not statistically different from zero (***Table A-2***). This small effect suggests the possibility that the commissary-location match was imprecise, or that a better measure of commissary proximity is needed.

The coefficient on the variable Local Price Index indicates that each doubling prices in the local economy would increase cause the proportion of members' spending on base to increase by 21.2 percentage points (***Table A-2***). The point elasticity for this variable indicates that a 10 percent increase in prices would lead to a 5.8 percent increase in the proportion of purchases at the commissary (***Table A-3***).

In both regressions, the predicted proportion of spending at the commissary was within two standard deviations of the actual proportion at 59 of the 64 locations modeled. At two locations (Kodiak, Alaska and San Juan, Puerto Rico) the predicted proportion was more than two standard deviations above the actual proportion. At three locations (La Maddalena, Italy; Oahu, Hawaii; and London, England) the predicted proportion was more than two standard deviations below the actual proportion.

APPENDIX B Estimated Costs To Individual Services Of The Issues Analyzed

Section	Issue/Scenario Analyzed	OCONUS COLA Amount (in millions of dollars)							Change in COLA	
		Army	Navy	USAF	USMC	USCG	NOAA	PH	DoD (in $M)	Per Member (in $)
	Current OCONUS COLA Amounts	$252.32	$182.76	$234.65	$ 77.53	$10.67	$0.036	NA	$757.97	$3,414
		Increase or Decrease in COLA								
	Index Structure									
4.1.2	Use CONUS commissary/exchange proportions	165.18	70.26	142.14	39.37	1.55	0.02	NA	481.52	1885
4.1.22	Use weighted average of 75% OCONUS proportion and 25% CONUS proportion	41.92	17.5	937.97	10.12	0.6	0.01	NA	108.21	487
4.1.23	Use commissary proportions based on a regression model*	38.87	32.66	79.19	30.95	-2.17	0.01	NA	199.51	899
	Market Basket Items									
4.1.44	Presume prices in Miscellaneous category reflect ratio of OCONUS/OCONUS prices in other categories*	26.18	18.96	24.35	8.04	1.11	0.00	NA	78.64	354
4.1.5.1	Fund one plane trip home per tour	55.70	44.09	49.82	15.21	1.97	0.01	0.41	167.20	753
4.1.5.1	Fund 30 min. long distance phone service/month	3.54	2.59	2.89	1.18	0.14	0.00	0.02	10.36	47
	Spendable Income									
4.3.1	Index the 1988-1989 S. I. Table to 1999	30.52	22.42	27.94	9.40	1.23	0.004	NA	91.52	412
4.3.1	Index the 1994-1995 S. I. Table to 1999	9.01	6.53	8.29	2.72	0.36	0.00	NA	26.91	121
4.3.1	Index the 1994-1995 S. I. Table to 2001	19.16	13.69	15.30	5.65	0.62	0.003	NA	54.42	245
	Location-Unique Expenditures									
4.4.2.4	Alaska car safety kit and winterization expenses	2.36	0.003	3.65	0.01	0.37	0.00	0.09	6.51	412 per AK Memberr
4.4.2.4	Pet quarantine costs	NA	NA	NA	NA	NA	NA	NA	3.31	171
	Safety Net Issues									
4.5.3	Implications of Recent Alaska Safety Net	2.64	0.10	5.61	0.03	0.24	0.00	NA	3.15	479
4.5.3	Implications of 1% increase in CONUS prices	15.60	9.48	12.47	3.28	0.77	0.00	NA	41.60	187

*Denotes an open ended estimate (estimate may vary depending on specific service requirements.)
1 The COLA would actually decline, by an average of $783 per year, for approximately 8,245 members at 7 locations in our model.
2 The COLA would actually decline, by an average of $196 per year, for approximately 8,245 members at 7 locations in our model.
3 The COLA would actually decline, by an average of $846 per year, for approximately 43,252 members at 16 locations in our model.
4 If price data for items in the Miscellaneous category were collected, as recommended, then COLA amounts could decline at a location if the OCONUS prices were lower than the CONUS prices.

APPENDIX C

THE OCONUS COLA POLICY ANALYSIS MODEL

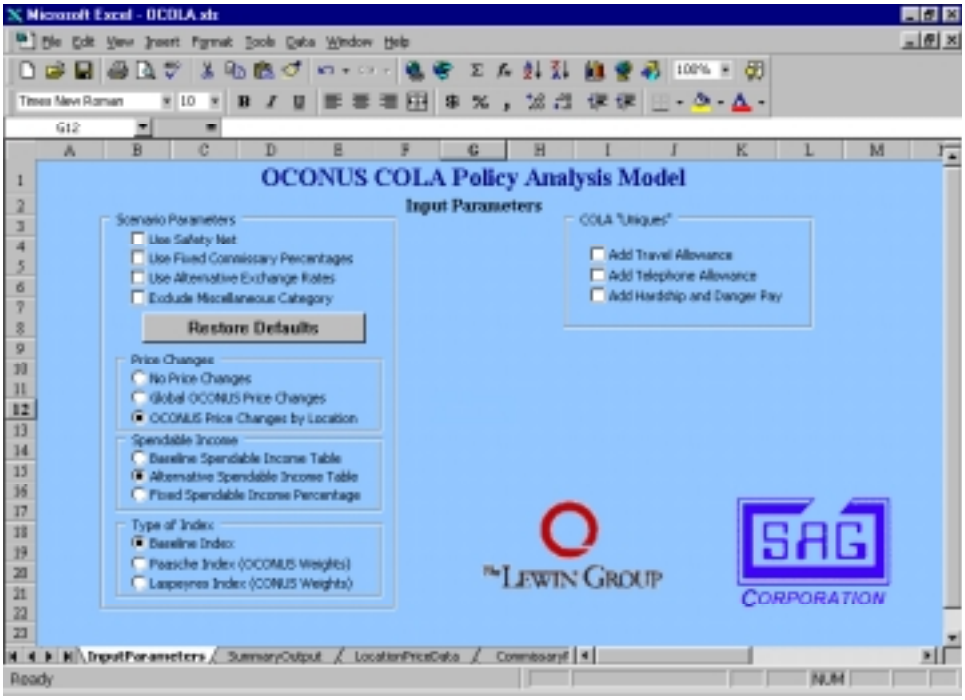
Estimates of the cost implications of various alternatives presented in this study were produced using the OCONUS COLA Policy Analysis Model (OCPAM), which was developed as part of this project. OCPAM is a Microsoft Excel based spreadsheet model that allows the user to manipulate several aspects of the OCOLA process and readily determine the impact of changes on the OCOLA budget and on the COLA amounts that individual members will receive. As its name suggests, the purpose of this model is to produce consistent, accurate estimates of the relative effects of changes to the OCOLA system for policy analysis. The estimates are not appropriate for budget projections.

Underlying the model is a set of worksheets with data that emulate the COLA calculation process. The model includes a total of 65 OCONUS locations that cover approximately 95% of the members stationed in OCONUS assignments. These worksheets contain the default (current) values for OCONUS and CONUS prices, market basket weights, spendable income, and the population of members at each covered location. Additionally, there are a number of sheets that calculate COLA indices and COLA amounts under the baseline and alternative schemes. The user can set switches to enable or disable various options and can quickly build scenarios to test different COLA features. Finally, the model provides summary and detailed information on the impact of user-modeled changes to the OCOLA system.

Figure C-1 shows the model's input parameter screen, which allows the user to implement alternatives like the safety net, simulated price changes by category, updated spendable income tables, and different weighting schemes for the index.

The spreadsheet environment means that model modification for extension to new policy questions is simple. Additionally, the summary output is easily exported or reformatted for display in tabular or graphical format.

Figure C-1: OCPAM Input Parameters Screen



CHAPTER V

WAGE GROWTH IN THE CIVILIAN CAREERS OF MILITARY RETIREES

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The views expressed in this paper represent those of the author and are not necessarily those of the Department of Defense.

SUMMARY

More than 20,000 individuals retire each year from the U.S. military who are eligible to receive a guaranteed annuity amounting to half or more of their basic military pay. Separating from the military at an average age of 43, the overwhelming majority of these retirees enter second careers in the civilian sector. For a variety of reasons, one might expect military retirees to enter the civilian labor force earning wages lower than what comparable civilians earn. The most frequently cited reason for this is that military training does not transfer perfectly to civilian occupations and therefore retirees must enter a period of training upon separation before their wages can be expected to catch up with those of their civilian peers. Whereas the post-service earnings of veterans in general have received a great deal of attention in the economics literature, much of this literature focuses on veterans serving for one or two terms of enlistment only. Comparatively little research, prior to this study, has examined the civilian labor market experience of military retirees who, by definition, have completed a minimum of 20 years of service.

STUDY QUESTIONS

This study seeks to answer three questions about the civilian labor market experience of military retirees: (1) How do the wages of military retirees upon separation compare with those of comparably experienced and educated civilians?; (2) Do military retirees enjoy higher relative wage growth over their second careers than their civilian peers?; and (3) Is the transition to civilian employment a difficult process for military retirees?

Obtaining answers to these questions is important for a variety of reasons. First, the success of military compensation policy hinges on the civilian earnings potential of prospective and active military personnel. This is particularly true in the case of the military pension system, one of the military's most significant force-shaping tools. By deferring some compensation, the military pension system creates an incentive for the most-talented individuals to stay in the military and seek promotion and for the least-talented individuals, those who doubt they can achieve the requisite rank and longevity, to separate voluntarily early in their careers. This deferred compensation also motivates work effort because up-or-out

rules require those who choose to stay in the military to continue advancing in rank.

The effectiveness of the military pension system in accomplishing this type of "self-sorting" depends on many factors. Chief among those factors is how additional years of service affect civilian earnings potential. In general, one can expect a given annuity to be less successful in retaining high-quality personnel if years of service (YOS) has a negative causal effect on civilian earnings. While this study does not definitively answer how military service affects the civilian earnings of military retirees, it does provide a more complete picture of the civilian experience of military retirees than was previously available.

STUDY RESULTS

As did earlier research, this study finds, using several data sets including the 1996 Survey of Retired Military Personnel (SRMP), that the relative civilian earnings of retirees in 1995 are substantially higher among those who separated in the 1970s than among those who separated in the 1990s. This study also finds, however, that the relative earnings of retirees upon separation from the military have fallen with successive cohorts. Together, these two facts imply a low level of relative wage growth for retirees over the course of their civilian careers.

This conclusion contrasts with the findings of earlier research suggesting that military retirees who enter the civilian labor market with below-average wages tend to catch up with their civilian peers after five to ten years in the civilian labor market (Borjas and Welch, 1986; Cardell et al., 1997). This difference in findings is attributed to the failure of earlier research to control for cohort effects, which can bias cross-sectional estimates of relative wage growth. The findings from this study are also contrary to the predictions of a simple human capital model in which high returns to investment in civilian skills among military retirees cause them to accumulate civilian skills at a faster rate than their civilian peers, thereby leading to higher relative wage growth. Assuming this lack of relative wage growth in the retiree population continues in the future, one can expect the wages of recent military retirees to lag behind those of their civilian peers throughout their civilian careers.

Whether one should be surprised that military retirees, especially those retiring most recently, earn substantially less than their civilian peers depends in large part on whether one believes that this study has chosen an appropriate peer group. It may be that, even conditional on observable characteristics, important differences remain in both the labor market

ability of retirees and civilians and the effort they expend in the civilian labor market that drive observed differences in civilian earnings. Formally controlling for unobserved differences in ability and effort is beyond the scope of this research.

Nevertheless, this research does make use of a variety of questions in the SRMP that seem to suggest that observed differences in wages between retirees and civilians are less a function of ability than they are a function of effort. For example, whereas 70 percent of the retirees separating between 1990 and 1994 earn wages below median civilian wages (conditional on age and education), only 30 percent reported feeling that their military career hindered their chance of earning wages comparable to those of their civilian peers. This suggests their peer group may also earn less than median wages. Moreover, 91 percent of respondents report being satisfied with their civilian life and 90 percent report being satisfied with their military career. It is doubtful that these retirees would report such high levels of satisfaction if they thought their civilian wages were lagging far behind those of their peers.

Also of note is the fact that restricting the comparison to retirees and other veterans does little to alter the results of the analysis. That is, the same pattern in relative retiree wages is observed if the civilian comparison group is restricted to just veterans. In so doing, one presumably controls for factors that led both retirees and veterans with less than 20 years of service to enlist in the military in the first place (for example, both populations perceived the military to be a better opportunity than the civilian labor market when they first enlisted). Clearly, there remain important unobserved differences between retirees and other veterans, but controlling for veteran status perhaps reduces the scope for large differences in labor market ability to drive the differences observed in civilian wages.

Military retirees' access to pension income could affect their supply of effort in the labor market. In theory, this pension income would tend to cause retirees to consume more leisure, whether it be in the form of fewer work hours or less effort on the job, than their civilian peers. Indeed, when pension income is added to retiree wages, the gap between retiree and civilian earnings disappears. This may help explain why nearly 80 percent of retirees report that they are doing as well or better economically than their civilian peers despite the fact that nearly 60 percent earn wages substantially below median civilian wages.

Differences in effort could also help explain why the study does not show the wages of retirees catching up with civilian wages as retirees gain civilian labor market experience. The availability of pension income, for example, might influence not only the type of job retirees initially select,

but also their motivation to excel in that job and advance beyond their civilian peers. Hence, pension income could affect not only the initial level of retiree wages but the relative growth in retiree wages as well.

Perhaps the most surprising and potentially troubling finding is that the relative wages of retirees have fallen across successive cohorts of retirees. There is little evidence that the quality of military retirees has changed dramatically over time, so declining worker quality does not seem to be a plausible explanation for the deteriorating relative position of retirees. Other possibilities are that the relative return to civilian experience vis-à-vis military experience increased between 1970 and 1994. Retirees separating in the early 1970s could secure jobs with wages that were comparable to civilian wages because their military experience earned the same return as civilian experience. By the early 1990s the same level of military experience earned a lower relative return and therefore one observes retirees separating at that time earning wages well below mean civilian wages.

Another possibility for the relative decline of retiree wages is that more-recent retirees are more likely to make civilian employment decisions in concert with the employment choices of their spouses. The rate of female labor force participation rose sharply between 1970 and 1994 and therefore the likelihood that a given retiree's labor market choices would be constrained by a spouse's career has no doubt risen as well. If a retiree is no longer viewed as a household's primary earner, the retiree may be more likely to settle for a relatively low paying job and contribute more time to household production. Spousal income might also generate a wealth effect that causes more-recent retirees to consume more leisure time. This report offers no direct evidence on either of these hypotheses, but suggests they may deserve more detailed consideration in future research.

IMPLICATIONS

In the end, this research does not say whether the military has set its current annuity at an optimal level, but it does suggest that retirees, at least, find it to be an adequate benefit. Total earnings (civilian wages plus pension income) of retirees is comparable to their prior military earnings and exceeds the mean earnings of their civilian peers. Whether the annuity is set too low in the sense that the military loses high-ability individuals early on to civilian careers, or too high in the sense that it overcompensates retirees relative to their civilian opportunities is a more complicated question that must await further research.

INTRODUCTION

Between 1990 and 1994, an average of 26,000 individuals retired each year from the U.S. military with 20 or more years of service. Separating from the military at an average age of 43, the overwhelming majority of these retirees are just entering their prime earning years. The civilian earnings of full-time employed males, for example, tend to peak when those individuals are in their early 50s. For a variety of reasons, though, we might expect military retirees to enter the civilian labor force earning wages that are lower than what comparable civilian workers earn. The most frequently cited reason for this wage difference is that military training does not transfer perfectly to civilian occupations and therefore retirees must enter a period of training upon separation before their wages can be expected to catch up with those of their civilian peers. Whereas the post-service earnings of veterans in general have received a great deal of attention in the economics literature, much of this literature focuses on veterans serving for one or two terms of enlistment only. Comparatively little research examines the civilian labor market experience of military retirees who, by definition, have served a minimum of 20 years.

Research on the post-service earnings of veterans is motivated in large part by the idea that the decision to enter and remain in the military is a function of outside civilian labor market opportunities. The success of military compensation policy hinges on the civilian earnings potential of prospective and active military personnel. This is particularly true in the case of the military pension system, which provides an immediate and guaranteed inflation-adjusted annuity to all military retirees. Currently, this annuity amounts to half or more of basic pay in the final years of service (an average of $16,500 in 1995).[1]

In aggregate terms, the military pension system is substantial. In 1995, roughly 1.6 million military retirees received military pension payments totaling more than $26 billion. These payments represented 9.5 percent of total U.S. defense spending and just under 40 percent of annual compensation paid to active and inactive duty personnel (Department of Defense, 1996).[2] While the number of new retirees entering the retirement system is not likely to rise appreciably in the coming years, the total number of retirees receiving pension payments is likely to continue its

[1] Computation of active-duty retirement pay varies by date of entry into military service (before September 8, 1980, between September 9, 1980, and July 31, 1986, and after July 31, 1986). In this study, all retirees entered prior to 1980.

[2] U.S. defense spending totaled $272 billion in 1995 and regular military compensation totaled $40 billion.

long-term trend upward given the general decline in mortality rates among older Americans.[3]

As Asch and Warner (1994) point out, the purpose of the military pension system is not so much to provide a vehicle for tax-sheltered savings or to facilitate a smooth transition to civilian life as it is a means of retaining high-quality personnel. The military is constrained by its inability to hire individuals from outside the organization to fill senior positions (the so-called lateral-entry constraint). The upper echelons of the military hierarchy must be filled by individuals moving up through the ranks. One way for the military to identify individuals with the requisite skills necessary to perform high-level tasks in the military is to create a compensation system that provides incentives for individuals to "self-sort" according to ability.

The military pension, by deferring a portion of compensation, creates an incentive for the most-talented individuals to stay in the military and seek promotion and for the least-talented individuals, those who doubt they can achieve the requisite rank and longevity, to separate voluntarily early in their careers. This deferred compensation also motivates work effort because up-or-out rules require those who choose to stay to continue advancing in rank (Asch and Warner, 1994). By encouraging self-sorting through deferred compensation, the military can avoid to a large extent the need to involuntarily separate individuals from the military. Involuntary separation, while entirely legal, could become quite costly by adversely affecting morale–individuals may perceive the prospect of involuntary separation as both risky and unfair–and encouraging individuals to lobby against the policy (Milgrom, 1988).

Other deferred compensation strategies, such as the use of retention bonuses, can also accomplish self-sorting. The pension system, however, may be a particularly desirable form of deferred compensation. One advantage of the pension system is that it creates increasingly strong incentives to leave the military after 20 years of service. The military wants to maintain a relatively youthful corps and keep the opportunity for advancement among junior personnel reasonably high by separating even the most-productive individuals soon after they are vested at 20 years of service.

At the time of vesting, individuals must weigh the benefits of separating and accepting an immediate annuity today against the benefits in terms of a higher future annuity of accruing additional years of service and possibly higher rank. Because years of service have a relatively small

[3] The total number of individuals receiving retired pay has increased steadily from 0.9 million in 1972 to 1.6 million in 1995.

impact on the value of the annuity and the prospects for further advancement diminish significantly with tenure, the financial value of remaining in the military beyond 20 years of service does not rise appreciably with additional years of service, and for some service members may actually fall. Indeed, 53 percent of eligible enlisted personnel accept retirement at 20 years of service; by 22 years of service, 52 percent of eligible officers accept retirement.[4]

Whereas the basic structure of the military pension system seems well designed, in theory at least, to encourage the type of self-sorting the military desires, it is not clear that the magnitude of the annuity is set at an optimal level. The optimal level of the annuity will depend on many factors. Chief among them is how additional years of service affect civilian earnings potential. In general, we can expect a given annuity to be less successful in retaining high-quality personnel if longer military service itself reduces future civilian earnings.

An extensive empirical literature in economics and elsewhere has attempted to estimate the effect of military service on subsequent civilian earnings with mixed results.[5] The ambiguity comes in modeling which individuals choose to reenlist or separate. Unobservable characteristics that determine both reenlistment and subsequent civilian earnings can bias our interpretation of the correlation between military service and earnings. A number of papers in the literature attempt to control for unobservable characteristics, such as labor market ability, using instrumental variables (IVs) and selection-correction methods. This evidence suggests that military service diminishes the civilian earnings potential of veterans (Angrist 1989, 1990, and 1998; Angrist and Krueger, 1994), although some studies looking at the post-Vietnam era have found modest wage premiums for specific groups of veterans (Gilroy et al., 1992; Bryant et al., 1993; Goldberg and Warner, 1987).[6]

This report makes no attempt to model the unobservable determinants of reenlistment and wages and therefore cannot say whether military service has a causal effect on earnings. My goal here is more descriptive in nature. Specifically, this study seeks to answer three questions: (1) How do the wages of military retirees upon separation compare with those of comparably experienced and educated civilians?; (2) Do military retirees enjoy higher relative wage growth over their second careers than their

[4] Officers tend to separate somewhat later because their opportunity for advancement is higher.

[5] See Warner and Asch (1995) for a review of this literature.

[6] Estimates of the effect of military service on civilian earnings range anywhere between negative 35 percent for white Vietnam-era veterans (Angrist, 1989) to positive 5 percent for non-Hispanic whites in the post-Vietnam era (Gilroy et al., 1992).

civilian peers?; and (3) Is the transition to civilian employment a difficult process for military retirees? This research can be viewed as in the same vein as recent research on immigrants that compares their earnings upon arrival in the United States and afterward to the earnings of native-born workers (for example, see Borjas, 1994).

As with the earlier research on military retirees, this study finds, using several data sets including the 1996 Survey of Retired Military Personnel (SRMP), that the relative civilian earnings of retirees in 1995 are substantially higher among those who separated in the 1970s than among those who separated in the 1990s. This study also found, however, that the relative earnings of retirees upon separation from the military have fallen with successive cohorts. Together, these two facts imply a low level of relative wage growth for retirees over the course of their civilian careers.

This conclusion contrasts with the findings of earlier research suggesting that military retirees who enter the civilian labor market with below-average wages tend to catch up with their civilian peers after five to ten years in the civilian labor market (Borjas and Welch, 1986; Cardell et al., 1997). This report attributes this difference in findings to the failure of earlier research to control for cohort effects, which can bias cross-sectional estimates of relative wage growth. Chapter Two presents these findings along with a general literature review. Chapter Two also explores the sensitivity of these main findings to alternative data and methodological assumptions.

Chapter Three argues that one should perhaps not be surprised that the wages of retirees do not catch up with those of civilians. First, by failing to control for the unobservable determinants of reenlistment, the study may be comparing retirees to an inappropriate civilian reference group. It may also be unreasonable to expect retirees, after they are in the civilian labor market, to develop a set of skills that catapults them beyond their initial civilian peers. Retirees may leave the military with such a well-established skill set that it is difficult for them to improve upon it.

Finally, one should also expect the high level of pension income that retirees receive to diminish the level of effort they are willing to expend once they enter the civilian labor market. More puzzling is the decline in relative retiree wages observed across cohorts; this report suggests several avenues for further research on this topic.

Chapter Three also presents evidence on the nature of the transition to civilian employment. Describing this transition is important because whereas the stated purpose of the pension system is largely to function as

a force-management tool,[7] it is frequently argued that the pension system also serves an important function in maintaining retirees' standard of living as they transition from military to civilian careers.

Using the SRMP, this report presents a variety of descriptive statistics derived from both quantitative and qualitative questions that seem to indicate that most retirees find the transition relatively painless. Retirees find civilian employment quickly and there is no evidence that they require an unusual level of training to accomplish those jobs. Perhaps most significant, retirees report being happy with their civilian life and few believe that their military service hampered the development of a satisfying civilian career. At a minimum, this suggests that the observed gap in earnings between retirees and civilians cannot be attributable to military service alone. Part of the gap in earnings must be attributable to unobserved differences between civilians and retirees, whether those differences are in terms of ability, effort, or the types of jobs and responsibilities military retirees select.

In the end, this research does not reveal whether the military has set its current annuity at an optimal level, but it does suggest that retirees, at least, find it to be an adequate benefit. On this point, Chapter Three presents evidence showing that total earnings (civilian wages plus retiree pay) of retirees is comparable to their prior military earnings and exceeds the mean earnings of their civilian peers. Whether the annuity is set too low in the sense that the military loses high-ability individuals early on to civilian careers or too high in the sense that it overcompensates retirees relative to their civilian opportunities is a more complicated question that must await further research.

COMPARING CIVILIAN AND RETIREE WAGE GROWTH

This chapter first reviews the previous literature on the civilian earnings of military retirees, focusing on both the empirical estimates of retiree-civilian earnings differentials and the theoretical explanation for these observed differences. I also discuss the importance of controlling for cohort effects in estimating earnings differentials over time, a point made forcefully in related literature on immigrant earnings.

[7] See, for example, the Hook Commission Report of 1948 (U.S. Government Printing Office, 1948).

In this chapter, I establish, using the SRMP, that retiree and civilian wages grow at about the same rate and that over time retirees have entered the civilian labor force at increasingly low relative wages. I also explore how relative starting wages and wage growth vary with retiree characteristics. I validate these findings using several alternative data sources. Finally, I show that declining real wages in the lower half of the civilian wage distribution is partly responsible for the low rate of relative retiree wage growth.

PREVIOUS LITERATURE

Cooper (1981) and Borjas and Welch (1986) first studied the civilian earnings of military retirees using data from the 1977 Department of Defense Retiree Survey (DRS) and a sample of veterans from the 1977 March Current Population Survey (CPS). Using similar methodologies, both studies concluded that military retirees earn less than their civilian counterparts upon separation, but that military retiree earnings catch up as retirees gain civilian experience.[8] The civilian wages of military retirees grow faster than the wages of comparable civilians. Borjas and Welch (1986), for example, found that officers working full-time year-round (FTYR) earned 27 percent less than comparable civilians at age 44–soon after the officers enter the civilian labor force–but by age 65 this difference had declined to 4 percent. For FTYR enlisted personnel, the wage differential was greater than 30 percent upon separation at age 41, but about 5 percent at age 65.[9] Two more recent studies–Pleeter (1995) and Cardell et al. (1997)–come to similar conclusions using 1990 census data and the 1996 SRMP, respectively.

Borjas and Welch (1986) explain this pattern with a simple model of human capital accumulation in which military retirees lacking civilian labor market skills engage in an intensive period of "retooling" upon separation. This explains both their relatively low wages upon retirement and the convergence with civilian wages over time. Military training is not necessarily transferable to the civilian sector, a point emphasized in much of the literature on the postservice earnings of veterans.

[8] Both studies control for civilian experience, educational attainment, race, and region of residence.

[9] Cooper (1981) finds a lower initial gap and therefore an earlier age at which the earnings path of military retirees intersects that of civilians. In an earlier paper, Borjas and Welch (1983) argue, however, that Cooper's methodology systematically biases retiree earnings upward.

Thus, it is natural to assume that military retirees will need additional training upon separation in order to compete in the civilian labor market. Convergence follows if one believes the marginal return to human capital accumulation for the average retiree is higher than that for the average civilian. This explanation seems plausible given that military retirees enter the civilian labor market after age 40. Most civilians by that age have entered long-term employment and have completed the bulk of whatever human capital investments they are going to make in their lifetime. Also, the comparatively low wages of retirees upon separation implies a comparatively low opportunity cost of human capital investment.[10]

A similar story emerges in the earliest papers written on the economic progress of immigrants in their host countries. Chiswick (1978), for example, found through using the 1970 census that immigrants at the time of their arrival to the United States earn 17 percent less than natives. Faster wage growth among immigrants, however, implies immigrant earnings overtake the earnings of native-born workers within 15 years of arrival, and within 30 years exceed native earnings by 11 percent. The immigration literature uses similar arguments to explain these observations; namely, upon arrival, immigrants have low levels of U.S.-specific skills (for example, English language proficiency), but as they accumulate these skills their human capital rises relative to natives and therefore the earnings of immigrant and native-born workers tend to converge.[11]

It was Borjas (1985) who first argued that the immigrant-native earnings comparisons in earlier research were potentially misleading due to the failure to control for cohort effects. (By *cohort,* I mean a group of individuals born at roughly the same point in time.) In a single cross-section (that is, a single year of data), such as the U.S. Census, the correlation between earnings and time-since-arrival could simply reflect differences among immigrants arriving in the United States at different times. In fact, there are good reasons to believe that the immigrants arriving in the United States in the 1960s and earlier came with skills more suitable to the U.S. economy of that time than those of immigrants arriving in the 1970s and later (LaLonde and Topel, 1990).

[10] An alternative explanation for convergence is the possibility that civilian employers are imperfectly informed about the match quality of retirees. Imperfect information of this sort could cause employers to hire retirees at wages below true marginal productivity. Over time as match quality is revealed, retiree wages rise relative to the wages of civilians. Warner and Simon (1992) provide evidence for this hypothesis using data on civilian scientists and engineers.

[11] Borjas (1994) points out that the human capital hypothesis is not enough to explain why immigrant earnings overtake native earnings. He argues that this high relative wage growth among immigrants is most easily explained by positive selection; only the most hard-working and motivated individuals choose to immigrate.

If one were to take a snapshot of immigrant earnings in 1980, it may appear that immigrant earnings grow relative to native earnings the more time an immigrant spends in the adoptive country, when in fact all that is being observed is a decrease in the ratio of immigrant-to-native earnings in succeeding cohorts of immigrants. The basic problem is that one cannot distinguish the effect on earnings of time-since-arrival from the effect of being in a particular immigrant cohort in a cross-sectional analysis. As Borjas (1994, p. 1672) writes, ". . . we cannot use the current labor market experiences of those who arrived twenty years ago to forecast the earnings of newly arrived immigrants."

Research on the postservice earnings of military retirees suffers from the same sort of criticism. Cardell et al. (1997), for example, predicts substantial convergence in earnings using cross-sectional data on retirees age 37 to 64 in 1995. There is little reason to suppose, however, that the earnings of retirees age 37 in 1995 will converge with the earnings of retirees age 64 in 1995. The labor market experiences of the 64-year-olds may be a poor proxy for the experiences of the 37-year-olds who will not turn 64 until 2023. These individuals joined the military in very different eras and perhaps for very different reasons and their earnings relative to civilians will likely reflect those differences.

In the SRMP, for example, the average 37-year-old observed in 1995 joined the military in 1974 and retired in 1994. On the other hand, the average 64-year-old retiree observed in 1995 joined the military in 1951 and retired in 1971. Among other differences, the 64-year-old was much more likely to have entered the military via the draft than the 37-year-old. They also entered the civilian labor market in very different eras and therefore may have been presented with different civilian opportunities upon separation. Ironically, Borjas and Welch (1986) fail to acknowledge the potential importance of cohort effects when they predict, based a single cross-section of data for 1976, that retiree wages converge with the wages of comparable civilians as retirees gain civilian labor market experience. Cooper (1981) and Pleeter (1995) also neglect to account for cohort effects when interpreting the results of their own studies.

Borjas' observation in 1985 inspired attempts to track immigrant earnings longitudinally using both panel data sets on individuals (that is, data sets with repeated observations on the same individuals) and by creating synthetic cohorts of individuals in repeated cross-sections such as the decennial censuses. Use of longitudinal data controls for cohort effects by following specific cohorts over time. These longitudinal studies showed substantially less convergence in earnings among immigrants arriving post-1970 than among immigrants arriving prior to 1970. Indeed, Borjas (1994) argues it is unlikely that the earnings of more-recent

immigrants will ever catch up with those of U.S. natives. The analysis of retiree earnings presented later in this chapter comes to a similar conclusion.

CONSTRUCTING THE ANALYSIS DATA SET

This report derives its main results from a comparison of retiree earnings recorded in the 1996 SRMP and civilian earnings recorded in various years of the March CPS. The SRMP surveyed 24,857 active duty personnel who retired between 1971 and 1994 with 20 or more years of creditable service. The sample excludes National Guard and Reserve retirees and retirees who resided outside the United States, took early retirement, or suffered from a severe disability. The sample includes roughly equal numbers of retirees from the 1971 to 1974, 1975 to 1979, 1980 to 1984, 1985 to 1989, and 1990 to 1994 retirement cohorts, and substantially overrepresents non-whites and officers. Whereas officers and non-whites constitute roughly 25 and 15 percent of the actual population of military retirees, respectively, they represent approximately 49 and 48 percent of the SRMP sample (Henry and Riemer, 1997). Marine Corps retirees were also oversampled, although to a much lesser degree than officers and non-whites.

The survey, conducted by mail by the Defense Manpower Data Center (DMDC) between March 1996 and July 1997, obtained 19,484 usable responses—a response rate of 80 percent. The CPS is a nationally representative survey of approximately 60,000 households conducted monthly. The March demographic supplement asks a wide range of questions including detailed questions on labor earnings in the past year.[12]

The SRMP asked respondents a wide range of questions concerning their separation from the military, experience in the civilian labor market, health and use of health services, use of military commissaries and exchanges, labor and non-labor income, spousal income, and basic demographics such as marital status and education. In addition, the DMDC matched administrative data from the Pension and Active Duty Military and Loss Edit Files that provide further details on items such as rank, military occupation, terms of separation, demographics, years of service, and pension income.

[12] See Riemer and Lamoreaux (1997) and Henry and Riemer (1997) for a more detailed description of the SRMP survey instrument and sampling design. Also see http://www.bls.census.gov/cps for more on the CPS sampling design.

The SRMP collected earnings data for two points in time: (1) earnings on the first full-time job following retirement and (2) earnings in 1995.[13] This longitudinal feature of the SRMP is instrumental to this analysis. Because of the wide range of age cohorts sampled in the SRMP, these data allow the calculation of the rate of growth in retiree wages among a variety of ages and over a variety of time periods. For example, one might observe the wages of a retiree surveyed at age 60 in both 1995 and when the retiree separated at age 41 in 1976. Likewise, wages are observed for a 50-year-old who separated at age 42 in both 1988 and 1995. The ability to observe wages longitudinally in the SRMP allows one to control for cohort effects which could bias purely cross-sectional estimates.

I impose a number of sample restrictions on the SRMP and CPS data (see Table 2.1 for an itemized list of restrictions and their marginal effect on sample size). I restrict samples in both data sets to non-disabled males age 38 to 64 with a high-school degree or more working full time, earning more than one-half the minimum wage but less than CPS topcoded wages, and not self-employed.[14] I define full-time workers as those working more than four months per year and 35 hours per week. I further restrict the SRMP sample to those individuals retiring between ages 37 and 50 with at least 20 years of service (YOS) and with rank E-5 to E-9, W-2 to W-4, or O-3 to O-6. After imposing sample restrictions and eliminating observations with missing data, I am left with 5,281 retirees and an average of approximately 7,200 observations per year in the CPS.

These restrictions are intended to eliminate outliers as well as focus the analysis on individuals with relatively strong attachment to the labor force. Also, the question on year of retirement earnings in the SRMP is for the respondent's first full-time job.

[13] I take up the issue of recall bias later in this chapter.
[14] I use the minimum wage in 1991 of $4.25 an hour.

Table 2.1. SRMP Sample Restrictions

Sample Restriction	Sample Size
Base Sample	24,993
Eligible, Non-disabled Males	18,449
Positive Earnings	11,688
Work > 35 hours/week, 16 weeks/year	8,321
Earn More Than Minimum Wage and Less Than CPS Topcoded wages	7,446
Age 38–64	7,338
High School or More	6,573
Not Self-employed	6,569
Retired Age 37–50	6,224
Rank E-5–E-9, W-2–W-4, O-3–O-6	6,207
No Missing Data	5,281

The largest reduction in the SRMP sample size comes from restricting the sample to retirees who worked full time in both their year of retirement and 1995. I impose this restriction so that the same set of retirees is observed in both years. Of the 18,449 non-disabled males in the SRMP, 11,688 reported positive earnings in both the year of retirement and 1995—63 percent of the eligible sample. By comparison, restricting the CPS sample to males with positive earnings leaves 78 percent of the original sample.

The comparatively large drop in sample size in the SRMP is due to a relatively high level of non-response to the earnings question and the restriction that SRMP respondents have positive earnings in both 1995 and year of retirement. The fact that hours and weeks worked conditional on full-time employment are equivalent in the SRMP and CPS in both 1995 and year of retirement, and unconditional hours and weeks worked are also equivalent in 1995, diminishes concern that this sample restriction seriously biases the results presented in the following sections. Age-specific 1995 employment hazards in the SRMP and CPS are also comparable.

POOLED REGRESSION ANALYSIS

Consider the following log wage equation in which retiree and civilian data are pooled in a given year, 1995:

$$\ln y_i = \beta_{95}^T X_i + AGE_i \alpha_{95} + MR_i \delta_{95} + \phi_{95}^T AGE_i \cdot MR_i + \varepsilon_i \qquad (1)$$

where y_i is the monthly wage of individual i, AGE_i represents a full set of age dummies, $MR_i = 1$ if the individual is a military retiree and equals zero otherwise, and X_i is a vector of standard demographic covariates. The sum of the coefficient vector $[\hat{\delta}_{95} + \hat{\phi}_{95}^T]$ provides estimates of the differences in wages between retirees and civilians at given ages.

I first estimate Equation 1 using data on 1995 wages in the SRMP and 1995 wages for civilians taken from the 1996 March CPS. In addition to age and retiree status, I am able to control for a number of individual characteristics, including education (four categories), race (black/white), marital status (married/not married), occupation (nine categories), employer type (private/public), and region (four categories). Table 2.2 presents the means of these covariates and the dependent variable (monthly wages) by retiree/civilian status.[15]

Civilian monthly wages are about 23 percent higher than retiree monthly wages in 1995. This is despite the fact that retirees are somewhat older, more educated, and more likely to be employed in professional occupations. On the other hand, the retiree sample has a disproportionate number of blacks and individuals who reside in the South which could account for part of the gap between retiree and civilian wages. In any case, the substantial differences in the observable characteristics of civilians and retirees that are evident in Table 2.2 suggest wage comparisons should be conditional on these characteristics.

In Figure 2.1, the vector $[\hat{\delta}_{95} + \hat{\phi}_{95}^T]$ is graphed from estimating Equation 1 by ordinary least squares (OLS) (full regression results are reported in Table 2.3). Retiree wages at age 38 appear to be substantially lower (about 37 percent less) than comparable civilian wages at that age. This initial gap then diminishes steadily with age. For most ages after age 56, the difference between retiree and civilian monthly wages is insignificantly different from zero at conventional levels. This essentially replicates the findings of Cardell et al. (1997) and is very similar in spirit to the results of earlier research on military retirees; the civilian wages of military retirees appear to converge with civilian wages as retirees gain increased civilian experience.

[15] I chose monthly wages because hourly and weekly wages cannot be constructed in the SRMP for earnings upon separation.

Table 2.2. 1995 Sample Means, by Retiree Status

Variable	Retiree	Civilian
1995 Monthly Wage	$2,958	$3,829
Age	51	47
Black	0.303	0.063
Married	0.874	0.792
Educational Attainment		
High School	0.147	0.353
Some College	0.372	0.287
College Degree	0.185	0.213
>College Degree	0.297	0.148
Civilian Occupation		
Manager	0.328	0.210
Professional	0.284	0.188
Clerical	0.085	0.057
Sales	0.060	0.115
Craft	0.096	0.022
Operator/Transport	0.045	0.243
Laborer	0.090	0.064
Service	0.090	0.071
Agriculture	0.003	0.029
Private Sector	0.631	0.811
Region		
East	0.059	0.218
Midwest	0.103	0.255
South	0.570	0.284
West	0.268	0.244
N	5,281	11,384

Notes: See text for sample restriction. N = number of observations.
Sources: 1996 SRMP and 1996 CPS.

With a single cross-section, as in Equation 1, one cannot distinguish between age and cohort effects because age in 1995 is strongly correlated with year of separation. This problem with the cross-sectional estimation of wage convergence is evident if one were to run a similar regression except with data on wages in year of retirement.

$$\ln y_{it} = \beta_s^T X_{it} + YEAR_{it}\,\alpha_s + MR_{it}\,\delta_s + \phi_s^T YEAR_{it} \cdot MR_{it} + \nu_{it} \qquad (2)$$

where y_{it} now represents civilian monthly wages in year t (1995 dollars), $YEAR_{it}$ is a full set of year dummies corresponding to the year of separation in the retiree sample, and X_{it} now contains age, but not region of residence.[16] The sum $[\hat{\delta}_s + \hat{\phi}_s T]$ reveals how the difference between retiree and civilian wages at the time of separation varies across cohorts.[17]

Figure 2.1—Retiree Log Wage Gap in 1995, by Age

SOURCES: 1996 SRMP and 1996 March CPS.

[16] I discount earnings using the CPI-U-X1 series. Following Boskin et al. (1998), I reduce the implied rate of inflation in the series by 1 percent annually. Region of residence upon retirement is not available in the SRMP.

[17] SRMP earnings are for the first full-time job held following separation. Strictly speaking, then, these earnings are not necessarily measured in the retirees' year of retirement. More than 75 percent of the retirees in the SRMP sample, however, entered a full-time job within 12 months of retirement.

Table 2.3 The Effect of Status and Age on 1995 Wages

Variable	Coefficient	Standard Error
Educational Attainment		
High School	–0.481	0.015
Some College	–0.366	0.013
College Degree	–0.217	0.014
Married	0.166	0.013
Black	-0.052	0.013
Occupation		
Manager	0.582	0.031
Professional	0.485	0.032
Clerical	0.251	0.034
Sales	0.322	0.032
Craft	0.189	0.036
Operator/transport	0.286	0.031
Laborer	0.206	0.035
Service	0.109	0.033
Region	0.037	0.011
East	0.054	0.013
Midwest	0.027	0.013
South	–0.033	0.011
Retiree	–0.095	0.104
Retiree x Age		
38	–0.272	0.151
39	–0.137	0.130
40	–0.158	0.125
41	–0.213	0.118
42	–0.228	0.117
43	–0.256	0.115
44	–0.217	0.113
45	–0.204	0.111
46	–0.153	0.112
47	–0.110	0.110
48	–0.118	0.112
49	0.010	0.113
50	–0.044	0.112
51	0.005	0.111
52	–0.008	0.112
53	0.031	0.113

Table 2.3 The Effect of Status and Age on 1995 Wages (continued)

Variable	Coefficient	Standard Error
Retiree x Age		
54	–0.002	0.112
55	0.024	0.114
56	0.076	0.114
57	0.039	0.115
58	0.000	0.116
59	0.084	0.116
60	0.104	0.119
61	0.170	0.121
62	0.095	0.127
63	0.019	0.135

Notes: Regression includes controls for age. Excluded categories include > college degree, agricultural occupation, residence in the West, and age 64.

Sources: 1996 SRMP and 1996 March CPS.

A graph of $[\hat{\delta}_s + \hat{\phi}_s^T]$ by year (see Figure 2.2) reveals that retirees who separated in the early 1970s earned wages comparable to, if not more than, those of civilians upon separation but that more-recent retirees earned substantially less. Consequently, over time, the wages earned by retirees when they first leave the military have declined substantially relative to civilian wages. These strong cohort effects imply that the age-earnings profile represented in Figure 2.1 is misleading. Figure 2.3 emphasizes this point by graphing $[\hat{\delta}_{95} + \hat{\phi}_{95}^T]$ and $[\hat{\delta}_s + \hat{\phi}_s^T]$ together.[18]

The solid line in Figure 2.3 represents relative 1995 wages of retirees by their age in 1995. Closely tracking this line is the dashed line representing relative wages of those same retirees in their first full-time job following retirement.

The implication of Figure 2.3 is that the relative wages of any given military retiree is roughly constant over the retiree's second career, implying little or no convergence in wages. A retiree age 50 in 1995, for example, earned 15 percent less in his first full-time job than a comparable civilian; but, this same individual was earning 16 percent less than a

[18] These estimates do not control for region of residence because this variable is not available for year of retirement in the SRMP. This could affect the estimated wage gap because retirees are more concentrated in the South where wages are lower. Including 1995 region of residence in the year-of-retirement regression did not affect the results, however.

comparable civilian in 1995 as well. Although not illustrated in the figure, the average 50-year-old retiree in 1995 had been retired for nine years. In contrast, an individual age 62 earned wages about 2 percent lower than those of his civilian peers in 1995.

Figure 2.2 Retiree Log Wage Gap in Year of Retirement

SOURCES: 1996 SRMP and 1972 to 1995 March CPS.

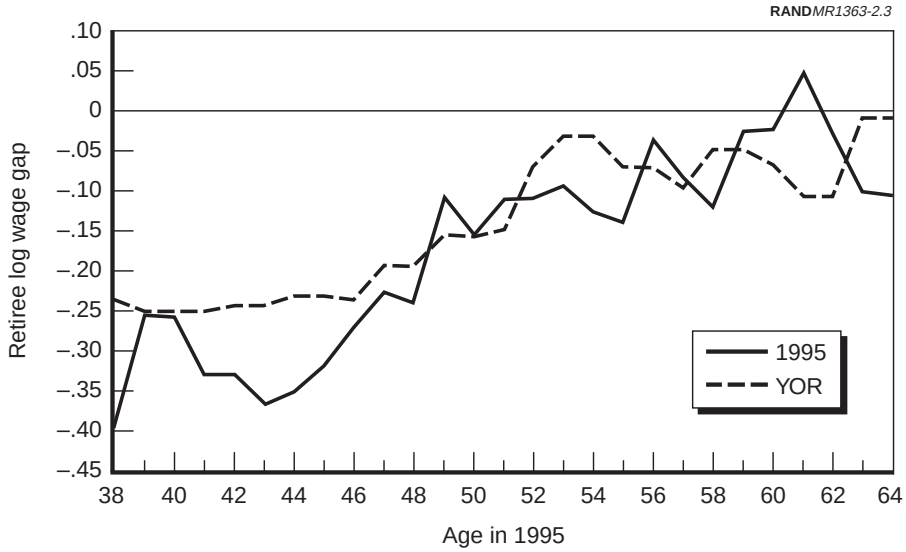
The retiree entered the civilian labor market 20 years earlier with wages comparable to those of his peers.

Table 2.4 summarizes Figure 2.3 by estimating Equation 1 and Equation 2 separately by retiree cohort: 1971 to 1974, 1975 to 1979, 1980 to 1984, 1985 to 1989, and 1990 to 1994. The column labeled YOR (for Year of Retirement) under the All Retirees column reports the relative log wages of all retirees in their first full-time civilian job and the column labeled 1995 under All Retirees reports relative log wages in 1995.

This cohort-specific analysis shows little evidence of the kind of wage convergence implied by the simple cross-sectional estimates in Figure 2.1. Relative wages improve slightly for older cohorts of retirees and remain essentially unchanged for more-recent cohorts. Individuals separating in 1975 to 1979, for example, earned about 7 percent less than their civilian peers in their first full-time civilian job. By 1995, that difference had log wage gap held steady declined to 2 percent. For individuals retiring between 1985 and 1989, the log wage gap held steady—from 12 to 14 percent between year of retirement and 1995. The most-recent retirees

(1990 to 1994) saw their relative wages decline by about 7 percentage points between year of retirement and 1995. Of course, it is important to note that neither the experience of the 1970 to 1974 cohort nor the experience of more-recent cohorts is necessarily a good barometer for what will happen to the relative wages of the 1990 to 1994 retirees in the future.

Figure 2.3 Retiree Log Wage Gap in 1995 and Year of Retirement, by Age



NOTE: YOR series consists of ($\delta_s + \phi_s$) from Figure 2.2 corresponding to the average year of retirement associated with each age in 1995.

SOURCES: 1996 SRMP and 1972 to 1996 March CPS.

Table 2.4 also presents estimates of the log wage gap for enlistees and officers separately. In general, the relative wages of enlistees in the year of retirement are less than those of officers. For example, enlisted personnel retiring in 1980 to 1984 earned 11 percent less than comparable civilians whereas officers earned 2 percent more. These differences beg the question whether enlisted personnel leave the military with skills less amenable to civilian employment than those of officers. In fact, enlisted personnel are substantially more likely to report a low level of skill transferability than are officers, especially among more-recent cohorts (see Chapter Three).

Table 2.4 Log Wage Gap in Year of Retirement and 1995, by Retiree Cohort and Rank

Retiree Cohort	All Retirees		Enlisted Personnel		Officers	
	YOR	1995	YOR	1995	YOR	1995
1971–74	0.007 (0.026)	0.080 (0.037)	0.027 (0.031)	0.084 (0.043)	–0.090 (0.024)	0.108 (0.069)
1975–79	–0.071 (0.014)	–0.020 (0.024)	–0.071 (0.019)	0.009 (0.030)	–0.043 (0.050)	–0.082 (0.037)
1980–84	–0.044 (0.013)	–0.048 (0.019)	–0.112 (0.018)	–0.017 (0.027)	0.020 (0.019)	–0.085 (0.027)
1985–89	–0.123 (0.013)	–0.135 (0.017)	–0.221 (0.020)	–0.175 (0.025)	–0.054 (0.018)	–0.129 (0.024)
1990–94	–0.248 (0.012)	–0.315 (0.017)	–0.365 (0.020)	–0.368 (0.025)	–0.181 (0.017)	0.303 (0.023)

Notes: Log wage gap represents coefficient on retiree dummy in regression of log monthly wages in age, education, race, marital status, occupation, and private/public employment. Regressions are estimated separately by retiree cohort.
Sources: 1996 SRMP and 1972 to 1996 March CPS.

Curiously, whereas officers fare better than enlisted personnel in the year of retirement relative to civilians, their wages tend to fall relative to civilian wages over time. Again looking at the 1980 to 1984 cohort, officers enter the civilian labor market earning wages 2 percent above those of civilians, but by 1995 their wages are 9 percent below the wages of civilians. The relative wages of enlisted personnel, on the other hand, seem to improve slightly.

One can test more systematically for differences in relative wages and relative growth rates among different groups of retirees by creating individual-level observations on relative wages and relative wage growth, as follows in Equations 3 and 4,

$$\Omega_i = \left\{ \left[\frac{y^r_{ix_i,95} - y^r_{ix_i,s}}{y^r_{ix_i,s}} \right] - \left[\frac{\bar{y}^c_{x_i,95} - \bar{y}^c_{x_i,s}}{\bar{y}^c_{x_i,s}} \right] \right\} \frac{1}{s} \qquad (3)$$

$$\Delta_i = \ln y^r_{ix_i,s} - \ln \bar{y}^c_{x_i,s} \qquad (4)$$

where the first term in Equation 3 is the wage growth of retiree i between 1995 and year of separation, s, with the set of characteristics x_i and the second term is wage growth for a comparable civilian. The second term in Equation 3 is calculated by taking the mean of the wages of individuals in the CPS with the same set of characteristics as the retiree. In effect, this

involves creating synthetic cohorts of individuals within the CPS as a proxy for true longitudinal data on civilians. A value of $\Omega_i < 0$ for a given retiree implies his wages grew more slowly than civilian wages between retirement and 1995 and a value of $\Omega_i > 0$ implies his wages grew more rapidly than civilian wages. In other words, a negative value of Ω_i means that the retiree's wages fell relative to civilian wages between retirement and 1995, while a positive value of Ω_i indicates his wages increased relative to civilian wages.

To achieve sufficient cell sizes in the CPS sample, I reduced the number of covariates in x_i by limiting the age categories to two-year intervals, reducing the occupational categories to white versus blue collar, reducing the educational categories to high school, some college, and college and above, and eliminating region altogether.

The term Δ_i (see Equation 4) is simply the difference in log wages upon separation between retirees and comparable civilians.[19] A negative value of Δ_i , for example, tells that a given retiree earned wages below what a comparable civilian earned in his year of retirement. The means of Δ_i and Ω_i (see Table 2.5) are consistent with the results of Table 2.4.

Table 2.6 reports the results of the following linear regressions aimed at highlighting how Δ_i and Ω_i vary across retirees with varying characteristics:

$$\Omega_i = X_i\beta + R_i\alpha + \varepsilon_i \qquad (5)$$

$$\Delta_i = X_i\delta + R_i\gamma + \nu_i \qquad (6)$$

where R_i contains characteristics of retirees, such as year of retirement, civilian experience, rank, tenure, and military and civilian occupation. I also include a variable indicating whether an individual obtained additional education following separation.

A number of interesting results emerge from the regression coefficients reported in Table 2.6. Consistent with results reported in Table 2.4,

[19] Because the CPS data do not follow specific individuals over time, it is not possible to make a precise mapping of CPS growth rates to SRMP growth rates. In the SRMP, the characteristics of individuals change between year of retirement and 1995. I experiment with several mappings including matching CPS wages to the SRMP retirees using both retiree characteristics in their year of retirement and in 1995 (see Panel B in Table 2.5) and matching CPS wages on the basis of year of retirement characteristics only (see Panel A in Table 2.5). Neither mapping is entirely satisfactory, but they are the best that can be done without a comparable longitudinal survey of civilians.

the coefficient estimates of the Δ_i regression (the left column under Dependent Variable in Table 2.6) indicate that enlisted individuals fare substantially worse than warrant and commissioned officers in their first full-time jobs ($\hat{\delta}_{Enlisted} = -0.212$). The results also indicate that individuals who report a high level of transferability between their military and civilian occupations fare better relative to their civilian peers than those who do not.

Table 2.5. Retiree-Civilian Difference in Log Wages and Growth Rates, by Retiree Cohort

Retiree Cohort	Δ	Ω
A. Match YOR Only		
1971–74	–0.075	–0.004
1975–79	–0.143	–0.0003
1980–84	–0.115	–0.014
1985–89	–0.247	–0.003
1990–94	–0.339	–0.081
B. Match 1995 and YOR		
1971–74	–0.075	0.005
1975–79	–0.143	0.005
1980–84	–0.115	–0.010
1985–89	–0.247	–0.005
1990–94	–0.339	–0.062

Notes: In Panel A, CPS wages are matched to SRMP retirees based on YOR characteristics only. In Panel B, CPS wages are matched to SRMP retirees based on both YOR and 1995 characteristics.
Sources: 1996 SRMP and 1972 to 1996 March CPS.

Table 2.6. The Effect of Retiree Characteristics on Relative Wages and Wage Growth

Retiree Cohort	Dependent Variable	
	Δ	Ω
Education		
High school	0.093 (0.029)	–0.010 (0.019)
Some college	0.023 (0.022)	–0.003 (0.013)
Change in education	-	0.002 (0.011)
Rank		
Enlisted	–0.212 (0.023)	0.009 (0.014)
Warrant officer	–0.103 (0.027)	0.032 (0.016)
Married	0.009 (0.014)	0.000 (0.015)
Black	0.170 (0.015)	–0.064 (0.010)
Region		
East	0.066 (0.029)	–0.007 (0.017)
Midwest	–0.030 (0.024)	–0.004 (0.014)
South	–0.038 (0.015)	0.003 (0.009)
White collar	0.069 (0.016)	–0.082 (0.010)
Public	–0.064 (0.015)	–0.045 (0.009)
Tenure	-	0.002 (0.001)
Years in grade	–0.018 (0.003)	–0.011 (0.008)
Transferable	0.151 (0.014)	0.003 (0.002)
Service		
Army	–0.008 (0.016)	0.013 (0.009)
Navy	0.054 (0.019)	–0.006 (0.011)
Marines	–0.010 (0.028)	–0.007 (0.016)
R^2	0.146	0.062

Notes: Both regressions include controls for year of separation and age at separation. Excluded categories include College, Officers, the West region, and the Air Force.
Sources: 1996 SRMP and 1972 to 1996 March CPS.

This result on transferability is consistent with a regression of Δ_i on military occupation (not shown in Table 2.6). Individuals in military occupations such as engineering, electronics, intelligence, and health care all fare better relative to civilians than do individuals who worked in occupations that one might think would develop less transferable skills (for example, combat arms). Navy personnel and those who remained in their last grade for fewer years also fared better.

The estimated coefficients on High school, Married, Black, White collar, and Public listed in the Δ column in Table 2.6 are also of interest. The coefficient of 0.093 on High school, for example, indicates that retirees with a high-school level education fare better relative to their reference group than do college graduates (the excluded category). Similarly, the coefficient of 0.170 on Black in this regression suggests black retirees fare better relative to their reference group than do white retirees, conditional on other individual characteristics such as education.

These results may indicate that military service serves as a relatively strong positive signal to civilian employers for minorities and less-educated individuals. Other results in the Δ column in Table 2.6 indicate that being unmarried, living in the Northeast, being a professional, or working in the public sector positively influence relative retiree wages in the first full-time job.

Turning now to the Ω_i regression (the right-hand column in Table 2.6), relative growth in wages was stronger among retirees who had high tenure in their 1995 job. Interacting tenure with retiree cohort reveals, though, that tenure has a positive effect on relative wage growth only among the most-recent retirees. This suggests that job churning depresses wage growth at first, but over the long run may have positive effects on relative wages. Few other covariates have a statistically significant effect on relative wage growth. Whereas blacks have comparatively high relative wages in their first job, their relative wage growth is substantially less than that of whites. Professionals and individuals working in the private sector also experience low relative wage growth. Curiously, individuals who pursued more education following separation (about 16 percent of the sample) did not experience higher wage growth than those who did not. Military occupation (not shown in Table 2.6) had little effect on relative wage growth.

ADDRESSING THE PROBLEM OF BIASED REPORTS ON EARNINGS

One of the more striking features of Table 2.4 is the strong downward trend in the relative earnings of retirees by year of retirement. The oldest cohort of retirees fared much better in their first full-time job relative to civilians than did the youngest cohort. This trend cannot be explained by observable factors such as occupational choice. Before considering potential explanations for a downward trend in relative retiree earnings, however, it is worth considering whether sample selection or the way in which the SRMP data were collected might be contributing to this apparent trend.

I lose nearly a quarter of the SRMP sample by imposing the restriction that respondents report positive earnings in both their initial full-time job and in 1995. This could account for the apparent downward trend in relative retiree earnings if the sample of individuals with missing data actually have lower earnings than the sample with complete data and if this difference is larger in older cohorts. That is, the problem of sample selection could be more severe in older cohorts.

To the extent this selection is based on unobservable characteristics, little can be done to document it. On observable characteristics, however, the samples with missing and non-missing earnings data look quite similar. For example, the distribution of rank is the same across samples. The proportion of the missing and non-missing samples reporting having comparable or better wages than their civilian peers, and the proportion who report military service diminished their ability to earn a fair civilian wage, are also the same. On observable grounds, at least, it does not appear that sample selection is driving the results shown in Table 2.4.

A weakness of the SRMP is that it relies on respondents to recall their earnings from their first full-time job following military retirement. For individuals separating in the early 1970s this requires recalling what they earned up to 25 years ago. This is a significant amount of time and one should be concerned about the ability of older retirees to make accurate estimates of these past earnings. By comparison, data on civilian earnings in the CPS come from reports of earnings in the last calendar year.

Of particular concern is the possibility that retirees systematically bias their estimates of distant earnings in one direction or the other.[20] Suppose that retirees tend to overestimate distant earnings. This might happen if individuals tend to recall past earnings in survey-year dollars, perhaps

[20] Random measurement error in earnings is of less concern because it does not, at least asymptotically, lead to a biased estimate of $[\hat{\delta}_s + \hat{\phi}_s]$, but only diminishes its precision.

because they think of past earnings relative to their earnings today. Regardless of the reason, a large upward bias in past earnings estimates could account for the strong negative trend in relative retiree earnings observed in Table 2.4 as well as the failure to find evidence that the relative wages of individual retirees improves with civilian labor market experience. Of course, retirees could also underestimate past earnings, in which case the true decline in relative retiree earnings is even more severe than what is reported in Table 2.4.

A number of studies have attempted to assess the extent of measurement error in longitudinal earnings data. These studies generally emphasize that while the extent of measurement error is small, the nature of the measurement error violates the classical errors-in-variables model which assumes the error is uncorrelated with the explanatory variables and, in the case of panel data, over time. Studies comparing earnings data reported in the CPS and Panel Study of Income Dynamics (PSID) to "true" earnings data obtained from other sources have found that measurement error (the difference between true and reported earnings) is negatively correlated with true earnings (Bound and Krueger, 1991; Bound et al., 1989; Pischke, 1995; Bollinger, 1998).[21] Of particular importance to this study is Bollinger's (1998) finding that this negative correlation between error and true earnings is driven largely by overreporting of earnings among low earners.

In an attempt to verify the accuracy of the SRMP earnings data, I explored four alternative sources of earnings data on military retirees. The first is the 1977 DRS used by Cooper (1981) and Borjas and Welch (1986). The 1977 DRS has a similar structure to the SRMP that asks retirees to report civilian earnings immediately following separation and in 1976. In Table 2.7, I report mean monthly earnings on the first full-time job following separation for respondents in both the 1977 DRS and 1996 SRMP who retired between 1971 and 1975. As can be seen in the table, enlistees in the 1977 DRS on average report earnings in their first full-time job that are almost 40 percent lower than those reported by enlistees who separated in the same years but were surveyed by the 1996 SRMP. For officers the gap is much less, but still substantial (about 12 percent). This gap persists at all points of the earnings distribution, although it appears to be most significant between the 50th and 75th percentiles.

[21] In the CPS validation study (Bollinger, 1998), reported earnings are compared with Social Security earnings. In the PSID validation study (Pischke, 1995), earnings reported from a sample of employees in a single large firm are compared with earnings reported by the employer. The PSID is a longitudinal survey of earnings beginning with a large sample of individuals in 1968.

Several issues exist in making comparisons between DRS and SRMP earnings reports, however. First, the SRMP asks for total earnings in the first 12 months of the respondent's first full-time job following separation. The DRS, on the other hand, asks respondents to report monthly earnings in the first full-time job with no restriction on the time period analyzed. If DRS respondents reported earnings in the first month of the first full-time job, it is possible that SRMP respondents would end up reporting higher average monthly earnings because of tenure effects. Selection bias may affect the comparison between DRS and SRMP earnings as well if SRMP respondents are healthier on average than DRS respondents by virtue of the fact that they are still alive and willing to participate in the survey 20 years later.

Table 2.7. Monthly Wages in First Full-Time Job Following Retirement, by Rank and Year Reported ($)

	Enlisted Personnel		Officers	
	1977 DRS	1996 SRMP	1977 DRS	1996 SRMP
Mean	783	1,283	1,401	1,600
Percentile				
10th	400	500	600	650
25th	544	667	80	971
50th	655	1,000	1,150	1,333
75th	900	1,417	1,540	2,000
90th	1,139	2,375	2,333	2,917
N	150	699	128	798

Notes: Sample is restricted as follows: male, active duty, voluntary, non-disability, age at retirement > 36, 1970 < YOR < 1976, YOS > 19, report working full time immediately following retirement, >dropout, not self-employed, 136 < monthly wages < 10,000. N = number of observations.
Sources: 1977 DRS and 1996 SRMP.

With the DRS, one can only verify earnings reports for retirees separating in the early 1970s. The only other direct evidence I have on the initial earnings of retirees comes from a special record of Social Security earnings of enlisted Army personnel separating between 1993 and 1995.[22]

[22] Social Security earnings data were also collected in 1982 on a large sample of veterans, including retirees, who separated between 1972 and 1980. This sample was known as the Post Service Earnings History File (PSEHF). The DMDC informed us that these data have since been lost.

The data include up to six years of civilian earnings data on 19,393 Army enlistees who separated with 20 or more years of service.[23]

Table 2.8 lists mean annual civilian Social Security earnings by year of retirement. For those separating in 1993, the mean Social Security earnings of $16,612 in 1994 (their first full year in the civilian labor market following retirement) are close to the mean annual earnings of $15,107 in the first full-time job reported by Army enlistees surveyed in the SRMP who also separated in 1993. The 1995 Social Security earnings of Army enlistees separating in 1994 are also close to those reported in the SRMP ($17,946 versus $15,070).[24] Thus, year of retirement earnings reported in the SRMP for the most-recent retirees do not appear to be seriously biased.

Table 2.8. Annual Social Security Earnings of Army Enlistees Retiring in 1993 to 1995 ($)

Earnings in	Year of Retirement		
	1993	1994	1995
1992	38,447	37,788	36,040
1993	20,545	38,519	36,723
1994	16,612	20,884	37,064
1995	19,838	17,946	21,092
1996	21,307	20,586	18,850
1997	23,142	22,600	22,323

Source: Army Social Security Data File.

Another source of data on the civilian earnings of military retirees is the CPS itself. In addition to reporting veteran status of respondents, the CPS indicates in the years 1976 and later whether a respondent is currently receiving military retirement income. Prior to 1976, the CPS indicates whether a respondent is receiving pension income from a government employee pension. Unfortunately, the CPS does not report when a respondent last served in the military or his years of service. One can therefore identify the civilian wages of military retirees in the CPS,

[23] As is typical with Social Security data, earnings are reported as group means to protect confidentiality. Thus, the figures in Table 2.11 represent weighted means across groups.

[24] Note that the SRMP and Social Security estimates may not be directly comparable because Social Security data is not conditional on full-time employment nor does it necessarily cover earnings in the retiree's first civilian job. The SRMP year of retirement earnings data is for the first 12 months of the retiree's first full-time job. How these discrepancies affect the comparison is unclear.

but not when in their civilian careers those wages are being earned. Consequently, an analysis comparable to that shown in Table 2.4 is not possible with the CPS.

Table 2.9. Log Wage Gap in Year of Retirement and 1995: Alternative Retiree Samples

Retiree Cohort/Age	1995		YOR	
	SRMP/CPS	CPS-alone	SRMP/CPS	CPS-alone
1971–74/ 58–64	–0.058 (0.026)	–0.086 (0.065)	–0.062 (0.017)	–0.224 (0.034)
1975–79/ 53–57	–0.089 (0.022)	–0.147 (0.055)	–0.087 (0.013)	–0.238 (0.023)
1980–84/ 48–52	–0.181 (0.020)	–0.231 (0.061)	–0.055 (0.014)	–0.203 (0.024)
1985–89/ 43–47	–0.307 (0.019)	–0.214 (0.059)	–0.156 (0.014)	–0.249 (0.032)
1990–94/ 38–42	–0.312 (0.029)	–0.316 (0.085)	–0.283 (0.014)	–0.300 (0.035)

Notes: *Log wage gap represents coefficient on retiree dummy in regression of log monthly wages on age, education, race, marital status, occupation, and private/public employment. Regressions are estimated separately by retiree cohort. YOR samples are restricted to individuals age 38 to 45 in year of retirement. 1995 CPS-alone sample employs 1994 and 1995 data.*

Sources: 1996 SRMP and 1972 to 1996 March CPS.

A consistency check can, however, be performed on relative retiree earnings using the SRMP/CPS and CPS-alone samples. Table 2.9 reports the results of such an analysis.[25] In the two columns under 1995, I report the 1995 log wage gap by age. These results suggest that in 1995, at least, SRMP respondents reported civilian earnings in line with those of the CPS retiree sample. Only for retirees age 43 to 47 in 1995 do the log wage gap estimates diverge significantly (–0.307 versus –0.214) between the SRMP/CPS and CPS-alone samples.

Looking now at the two columns under YOR in Table 2.9, estimates of the log wage gap in the year of retirement do diverge significantly. I restrict the sample here to individuals age 38 to 45 in hopes that the CPS-

[25] The reader should note that the samples in Tables 2.4 and 2.9 are not directly comparable. The retiree sample in Table 2.4 is restricted according to rank and age at separation. This is not done in Table 2.9 because this information is not available for retirees in the CPS.

alone retiree sample will be composed mostly of recent retirees.[26] Whereas the earnings for SRMP retirees are for their first full-time job after separation, many of the CPS retirees will have been in the civilian labor force for several years. The differences in the estimated log wage gaps in the two samples are striking. In the 1971 to 1974 cohort, the log wage gap is –0.062 based on the SRMP sample and –0.224 in the CPS-alone sample. This difference in estimated wage gaps persists through the 1980 to 1984 cohort. The estimated wage gaps are somewhat closer in the 1985 to 1989 cohort and are essentially the same in the 1990 to 1994 cohort.

The retiree earnings data from the DRS and CPS, then, seem to indicate that the oldest retirees in the SRMP overestimated year of retirement earnings by a substantial amount. Unfortunately, neither data set alone allows me to conduct a panel analysis of wage growth as with SRMP data. For purposes of comparison, then, I finally turn to data from the U.S. Census which allows me to create a synthetic panel of retirees. In each census year, respondents were queried about their current military status and whether they had served over one or more periods including 1950 to 1955 (Korean War), 1955 to 1964, 1964 to 1975 (Vietnam War), 1975 to 1980, and 1980 to 1990.

Combining data on current age and dates of military service, I am able to identify military retirees in the census who separated in the years surrounding 1970, 1980, and 1990 (see the Appendix for the precise derivation of the retiree status variable). The mapping is not perfect and the sample likely contains veterans who are not in fact retirees (that is, they have served less than 20 years). Without years of service (available only in the 1990 census), though, it is not possible to identify retirees with total certainty.

With the census data, I create a synthetic panel of retirees across three census years with which to compare a similarly constructed synthetic panel of civilians. The idea behind a synthetic panel is to be able to track a cohort of individuals over time. For example, I assume that the 40- to 44-year-olds in the 1970 census are the same individuals in a statistical sense as the 50- to 54-year-olds in the 1980 census and the 60- to 64-year-olds in the 1990 census. It is not a true panel, however, because the same individuals are not surveyed in each year. I impose the same sample restrictions on the census data in terms of labor supply and other characteristics as I impose on the SRMP/CPS data.

Table 2.10 reports the coefficients on retiree status in a linear regression of log weekly and annual wages on retiree status and covariates

[26] I assume veterans receiving government pension income between 1971 and 1975 are retirees.

(age, race, marital status, number of children in residence, education, census region, and employment sector) using a sample of males age 40 to 44 in 1970, 50 to 54 in 1980, and 60 to 64 in 1990. The coefficient on retiree status reveals how retiree wages compare in percentage terms to the wages of comparable civilians.

Table 2.10 Coefficient on Retiree Indicator for Cohorts of Individuals Observed in the 1970, 1980, and 1990 Census

Sample/Dependent Variable	Census Year		
	1970	1980	1990
A. Age 40–44 in 1970 (retired 1965–69)			
In Weekly Wages	–0.120 (0.018)	–0.172 (0.016)	–0.100 (0.029)
In Annual Wages	–0.145 (0.019)	–0.174 (0.017)	–0.102 (0.030)
B. Age 40–44 in 1980 (retired 1975–79)			
In Weekly Wages	—	–0.216 (0.021)	–0.123 (0.025)
In Annual Wages	—	–0.253 (0.021)	–0.122 (0.026)
C. Age 40–44 in 1990 (retired 1980–90)			
In Weekly Wages	—	—	–0.219 (0.023)
In Annual Wages	—	—	–0.235 (0.024)

Notes: *See text for sample restrictions and the Appendix for the definition of retiree. Regression coefficients are conditional on the following controls: age, race, marital status, number of children in residence, education, census region, and employment sector.*

Sources: 1970, 1980, and 1990 Public Use Micro Sample.

The first item of note in Table 2.10 is that relative earnings of retirees in the 1970 census (Panel A in the table) are far below those estimated for the 1971 to 1974 SRMP cohort. According to the census estimates, these retirees earn weekly wages 12 percent below those of comparable civilians when they first enter the civilian labor market. In contrast, the 1971 to 1974 SRMP cohort earned wages 15 percent higher than comparable civilians. The initial relative earnings of retirees separating around 1980 (Panel B) are also much lower than wages estimated using the SRMP/CPS data. The weekly earnings of the 1980 census retirees fall about 22 percent below those of comparable civilians. The SRMP/CPS data for the 1980 to 1984 cohort showed no difference in the wages of retirees and civilians in the year of retirement. The census data therefore provide additional evidence that older retirees in the SRMP overestimated their YOR

earnings. The relative wages of the 1990 census cohort (Panel C) are reasonably close to those estimated using the SRMP/CPS data.

The second item of note in Table 2.10 is the improvement in the relative wages of the 1980 cohort between 1980 and 1990. The difference between civilian and retiree weekly wages falls from 22 to 12 percent between 1980 and 1990. This convergence in retiree and civilian wages between 1980 and 1990 is at odds with the SRMP/CPS analysis presented earlier which shows little or no movement in relative wages between 1980 and 1995. The 1980 census figures, however, could be affected by the recession of the early 1980s. Retirees entering the civilian labor market at that time may have been particularly likely to take jobs with low wages. The fact that the relative weekly wages of the 1970 cohort falls to –0.17 in 1980 and then increases to –0.100 in 1990 also suggests that retirees (and perhaps other individuals with low job tenure) may have been particularly vulnerable to economic downturns.

To summarize, the data on retiree earnings available in the DRS, CPS, and U.S. Census seem to indicate that the oldest retirees in the SRMP overestimated their YOR earnings. SRMP earnings estimates made for more-recent years of retirement and in 1995, on the other hand, are generally consistent with those found in these other data sources. This implies that Table 2.4 may exaggerate the decline in relative retiree earnings over time. Based on the earnings reports of the SRMP retirees, one would conclude that relative retiree earnings in the year of retirement fell by 22 percentage points between the 1971 and 1974 and 1990 and 1994 cohorts. Based on the CPS-alone sample, however, one would conclude that relative retiree earnings fell by only 8 percentage points.

The recall bias evident in the SRMP also draws into question whether the SRMP data is underestimating the relative wage growth of retirees. Only the census permits a comparable analysis of relative wage growth, however, and the findings there also suggest retirees' wages gain little relative to civilian wages over time.

A NON-PARAMETRIC ANALYSIS OF RELATIVE WAGE GROWTH

So far, this analysis of relative retiree-civilian wages has proceeded by essentially comparing the mean wages of retirees and civilians conditional on various characteristics such as age and education. Focusing on a comparison of means can obscure the degree to which retirees move up or down the civilian wage distribution if the civilian wage distribution itself is changing at the same time. The 1970s and 1980s in fact witnessed a dramatic change in the civilian wage distribution as the difference

between earnings at the top and those at the bottom of the distribution widened substantially. Many potential explanations exist for the sharp rise in civilian wage inequality over these decades, although increasing returns to skills, both measurable and immeasurable, are thought to be an important factor (Juhn, Murphy, and Pierce, 1993).

In an environment of rising civilian wage inequality, retirees entering the civilian labor market in relatively low-paying jobs could see their wages fall relative to the mean, even if their relative position within the distribution remains the same. Similarly, retirees entering the civilian labor market in relatively high-paying jobs could see their wages rise relative to the mean even in they did not advance at all within the distribution. This point has been made in the immigration literature by LaLonde and Topel (1990) and most recently by Lubotsky (1999).[27]

A comparison of mean wages over time is certainly instructive and provides one measure of how retirees fare relative to their civilian counterparts. But, the question posed in the literature to a large extent has been to what extent do retirees advance within the civilian wage distribution over time. That is, if they first enter the civilian labor market at the 30th percentile of the wage distribution, do they tend to move upward toward the median (50th percentile) of the distribution as they gain civilian labor market experience?

It is conceivable that the pooled regression analysis earlier in this chapter understates this movement because it does not account for increasing civilian wage inequality. Take, for example, a retiree who enters the civilian labor market at the 30th percentile of the civilian wage distribution and ten years later has advanced to the 40th percentile. By this measure, I would argue that the retiree improved his relative position in the civilian labor market over those ten years. If the difference in wages between the mean of the civilian wage distribution and the 40th percentile increased markedly over that time, however, it could be the case that the retiree's position relative to mean wages did not change at all. In this case, the preceding analysis would indicate no movement in relative retiree wages over the ten-year period when in fact the retiree moved up in the distribution by ten percentile points. Relative to civilians with wages at the mean of the distribution, the retiree is no better off than he was ten

[27] Another way of stating this point is that the comparison of wage growth over time based on observable characteristics does not account for the possibility that the price of both observable and unobservable characteristics (or omitted variables) may be changing over time. To the extent that observable and unobservable characteristics differ between civilians and retirees, this misspecification can bias these estimates of wage convergence.

years ago, but relative to civilians with wages below the 40th percentile of the distribution, he is better off.

An alternative way to examine the civilian wage growth of military retirees is to compare their position within the civilian wage distribution both in the year of retirement and in 1995. To do this, I pare down the pooled regression model presented earlier by conditioning wages only on year, age, and education. I divide age at retirement (37 to 50) into seven categories, age in 1995 into 14 categories, and education into three categories. Table 2.11 reports the proportion of retirees who fell (–), stayed in the same place (No change), or rose (+) within their respective civilian wage distributions between year of retirement and 1995 by cohort.[28]

Table 2.11 indicates a substantial amount of movement within the civilian wage distribution over time, movement that is masked in the regression analyses presented earlier in this chapter. The monthly wages of more than half of retirees separating between 1971 and 1974, for example, fell within the civilian wage distribution, while the monthly wages of 44 percent of these retirees rose within the civilian wage distribution (see Panel A in Table 2.11). The average decline within the distribution was 33 percentile points, while the average rise was 29 percentile points (see Panel B). Subsequent cohorts exhibit a similar pattern, although fewer retirees in these cohorts move up or down in the distribution and, for those that do, the magnitude of this movement is less pronounced. Consistent with earlier results, the overall average movement within the distribution is less than five percentile points for all cohorts.

[28] Each retiree is assigned to a specific civilian wage distribution based on his year of retirement, education at retirement, age at retirement, and age in 1995. The civilian wage distribution is divided into five percentile increments.

Table 2.11 Change in Retiree's Position Within the Civilian Wage Distribution Between Year of Retirement and 1995

Retiree Cohort	Change in Percentile			All
	(-)	No Change	(+)	
A. Frequency				
1971–74	0.51	0.04	0.44	—
1980–84	0.43	0.10	0.48	—
1985–89	0.40	0.15	0.46	—
1990–94	0.43	0.24	0.33	—
B. Magnitude of Change				
1971–74	–0.33	0	0.29	–0.04
1975–79	–0.32	0	0.29	–0.03
1980–84	–0.26	0	0.25	0.01
1985–89	–0.19	0	0.22	0.02
1990–94	–0.14	0	0.17	—

Notes: *Civilian wages are distributed in five percentile increments. Civilian distribution is defined by year, age, and education.*
Sources: 1996 SRMP and 1972 to 1996 March CPS.

In order to capture the effect of growing dispersion in the civilian wage distribution, I conducted the following thought experiment: What would retirees earn on average in 1995 if they maintained the same relative position within the civilian wage distribution that they had upon retirement?[29] In Table 2.12, I report the mean difference in retiree and civilian log wages by cohort calculated as follows: For all possible combinations of the set of characteristics defined by year of retirement, age, and education, I calculate

$$\Psi = \sum_k \left(f_k^r - f_k^c \right) \cdot y_k \qquad (7)$$

where f_k^r is the density of retirees at the k^{th} percentile of the civilian wage distribution, f_k^c is similarly defined for civilians, and y_k is the monthly log wage at the k^{th} percentile of the civilian wage distribution. Thus, Ψ is the difference in the weighted average of retiree and civilian wages given a civilian wage distribution defined by year, age, and education. I then take a weighted average of Ψ where the weights represent the frequency of retirees with a given set of characteristics. I use a similar procedure in

[29] This is the same thought experiment conducted by LaLonde and Topel (1990). Table 2.12 is organized in the same way as Table 7 in their study.

calculating Ψ using 1995 wages of retirees and civilians (see the column labeled Actual in Table 2.12).

Table 2.12 Mean Difference in Retiree-Civilian Log Wages, by Retiree Cohort: Accounting for the Effect of Wage Inequality

Retiree Cohort	YOR (1)	1995		Rate of Relative Growth (2)–(3)
		Actual (2)	Counterfactual (3)	
1971–74	–0.06	–0.05	–0.10	0.05
1975–79	–0.11	–0.07	–0.20	0.13
1980–84	–0.08	–0.10	–0.12	0.02
1985–89	–0.15	–0.15	–0.20	0.05
1990–94	–0.23	–0.24	–0.27	0.03

Sources: 1996 SRMP and 1972 to 1996 March CPS

Columns (1) and (2) of Table 2.12 reveal a pattern similar to that found in Table 2.4. Relative wages of recent retirees are far lower both in 1995 and in year of retirement than those of earlier retiree cohorts. Some differences exist in the results shown in Tables 2.4 and 2.12, which most likely reflect differences in controls (Table 2.4 controls for a wider range of covariates) and the fact that the results shown in Table 2.4 impose strong functional form assumptions on the relationship between retiree status and wages (that is, linearity). The results of Table 2.12 are derived non-parametrically and therefore are free of such assumptions.

Column (3) in Table 2.12 reports estimates of the difference between retiree and civilian wages assuming retirees remained at the same point of the civilian wage distribution in 1995 as when they first entered the civilian labor market. The results indicate that changes in the civilian wage distribution between YOR and 1995 affected the measure of relative wage growth between retirees and civilians. The 1971 to 1974 cohort, for example, entered the civilian labor market with wages 6 percent lower than civilian wages. By 1995, that difference was essentially unchanged at 5 percent. Column (3) shows, however, that had these retirees maintained their relative position within the civilian wage distribution between year of retirement and 1995, they would have earned wages 10 percent lower than mean civilian wages.

Thus, accounting for changes in the wage distribution, the wages of retirees actually grew relative to civilian wages by 5 percentage points. The same is true of later cohorts. Failing to account for changes in the civilian wage distribution causes an understatement of the wage growth of

retirees of between four and ten percentage points. Taken together, these results imply greater movement in relative retiree wages than is suggested by the analysis of Table 2.4. This movement, though, is still much lower than that implied by earlier research on military retirees.

SUMMARY

Three principle observations emerge from the analyses presented in this chapter: (1) the civilian wages of military retirees generally lie below the wages of observationally similar civilians; (2) the civilian wages of military retirees grow relative to the wages of observationally similar civilians over the course of the retirees' second careers but not nearly as much as that implied by earlier research; and (3) civilian wages of military retirees upon separation have declined relative to civilian wages over time.

Recall bias in the SRMP probably exaggerates the extent to which relative retiree earnings have fallen across cohorts. It may also lead to underestimating the degree to which the wages of retirees grow relative to civilian wages with years in the civilian labor market. The analysis using census data, though, also points to low levels of retiree wage growth. Finally, the analysis in this chapter finds that rising civilian wage inequality partially masks the advances retirees make over the course of their second care

ACCOUNTING FOR LOW RETIREE EARNINGS

How the data on relative retiree earnings presented in Chapter Two are interpreted depends critically on whether one believes the appropriate comparison is being made between civilians and retirees. For example, whether it is surprising that the wages of recent retirees lie 32 percent below mean civilian wages conditional on age, education, race, marital status, occupation, and geographic location depends upon whether this conditional mean of the civilian wage distribution is thought to be an appropriate reference point for retiree wages. It may be that, even conditional on these observed characteristics, differences in the abilities of military retirees and their civilian counterparts, and in the effort retirees and their counterparts expend in the civilian labor market, drive observed differences in civilian earnings.

This chapter explores a number of possible reasons why one might expect military retirees to earn relatively low earnings in their second

careers. The discussion does not rely on formal tests, but rather presents an array of evidence using survey responses to a variety of subjective questions posed in the SRMP.

DO RETIREES THINK THEY EARN FAIR WAGES?

While formally controlling for unobserved differences in ability and effort is beyond the scope of this report, one can nevertheless make use of the answers to a number of subjective questions asked in the SRMP about the civilian labor market experiences of retirees to address this issue. One such question in the SRMP is as follows: "Overall, how much has being a military retiree helped or hindered your chances of getting a wage or salary comparable to civilian peers?" This question effectively asks retirees to compare themselves with a peer group of their own choosing rather than a peer group defined by the researcher.

The percentage of retirees who claim that being a military retiree hindered their chances of earning a wage comparable to their civilian peers ranges from a low of 17 percent in the 1971 to 1974 cohort to a high of 30 percent in the 1990 to 1994 cohort (see Table 3.1).[30] This strongly suggests that retirees do not view the mean of the civilian wage distribution as their reference point. For example, 70 percent of the 1990 to 1994 cohort earn wages below median civilian wages (conditional on age and education). The fact that only 30 percent of retirees think that their military career hindered their chance of earning a comparable wage suggests that their peers for the most part also earn wages below the median. Moreover, 91 percent of respondents report being satisfied with their civilian life and 90 percent report being satisfied with their military career. It is doubtful that these retirees would report such high levels of satisfaction if they thought their civilian wages were lagging far behind those of their peers.

[30] All statistics on subjective well-being, schooling, training, and transferability reported in this chapter are for the sample of retirees as presented in Table 2.4 in Chapter Two.

Table 3.1. Subjective Assessments of Well-Being Among Retirees (Percentage of Respondents)

Retiree Cohort	Military Career Hindered Chance of Earning Comparable Civilian Wages	Satisfied with Civilian Life	Satisfied with Military Career	Standard of Living Better Now than When in Military	Doing as Well as or Better than Civilian Peers	Proportion with 1995 Wages Below Median Civilian Wages[a]
1971–74	17	97	91	95	59	48
1975–79	22	95	90	92	83	49
1980–84	25	93	89	90	80	51
1985–89	25	91	91	85	76	58
1990–94	30	86	89	75	69	70

[a] *Proportion conditional on age and education.*

Note: Sample is as defined as in Table 2.4.
Source: 1996 SRMP.

CONTROLLING FOR VETERAN STATUS

It is of considerable interest that controlling for veteran status in the civilian population does not significantly alter the results of these analyses (see Table 3.2). That is, one observes the same pattern in relative retiree wages if the civilian comparison group is restricted to just veterans. In so doing, one presumably controls for factors that led both retirees and veterans with less than 20 years of service to enlist in the military in the first place (for example, both populations perceived the military to be a better opportunity than the civilian labor market when they first enlisted). Clearly, there remain important unobserved differences between retirees and other veterans, but controlling for veteran status perhaps reduces the scope for variation in ability to drive the differences observed in civilian wages.

Table 3.2. Log Wage Gap in Year of Retirement and 1995, by Retiree Cohort: Veterans Only

Retiree Cohort	All Retirees	
	YOR	1995
1971–74	0.002 (0.026)	0.031 (0.041)
1975–79	–0.084 (0.014)	–0.065 (0.027)
1980–84	–0.059 (0.013)	–0.071 (0.022)
1985–89	–0.145 (0.013)	–0.145 (0.020)
1990–94	–0.255 (0.013)	–0.302 (0.020)

Notes: Civilian population restricted to veterans only. Log wage gap represents coefficient on retiree dummy in regression of log monthly wages on age, education, race, marital status, occupation, and private/public employment. Regressions are estimated separately by retiree cohort. Source: 1996 SRMP and 1972 to 1996 March CPS.

THE EFFECT OF RETIREE PENSION INCOME ON EFFORT EXPENDED IN THE CIVILIAN LABOR MARKET

Military retirees' access to pension income could affect their supply of effort in the labor market. In theory, this pension income would tend to cause retirees to consume more leisure, whether it be in the form of fewer work hours or less effort on the job, than their civilian peers. In the SRMP data, retirees report working about the same number of hours and weeks as civilians, but it is possible that retirees deliberately choose jobs that require less effort and responsibility than they are capable of and therefore earn lower wages by choice. More generally, retirees may choose jobs with a bundle of characteristics that emphasize non-pecuniary over pecuniary returns.[31]

Whereas on average the wages of retirees in their first civilian job fall below their military wages in their final year of service, the addition of pension income brings their total civilian compensation above military compensation in most cases. As shown in Figure 3.1, civilian earnings plus pension is equal to or exceeds basic pay plus special pays in every case except for officers retiring between 1971 and 1979.[32] Only 20 percent of retirees claimed their standard of living in 1996 was worse than just before retiring from the military (see Table 3.1).

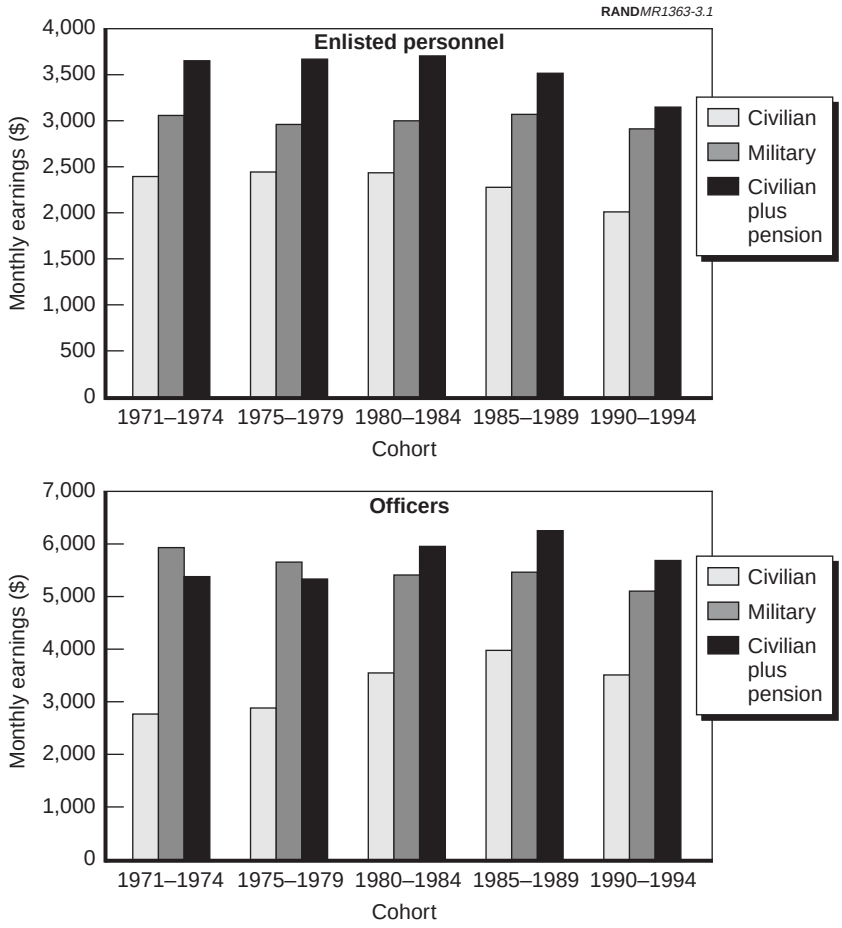
If we add pension income to retiree civilian wages, the 1995 wage gap as reported in Table 2.4 turns positive for all cohorts. Thus, even for the most recent retiree cohorts, total retiree earnings exceed average earnings of observationally comparable civilians. This may help explain why nearly 80 percent of retirees report that they are doing as well or better economically than their civilian peers despite the fact that nearly 60 percent earn wages substantially below median civilian wages.

Differences in effort could also help explain why one does not observe the wages of retirees catching up with civilian wages as they gain civilian labor market experience. The availability of pension income, for example, might influence not only the type of job retirees initially select but also their motivation to excel in their jobs and advance beyond their civilian peers. Hence, pension income could affect not only the initial level of retiree wages but the relative growth in retiree wages as well.

[31] More-detailed analysis of the occupational choice of military retirees would be a fruitful avenue for future research.

[32] Total military compensation could be higher than what is estimated here because the value of on-base housing and federal and state tax advantages are not included in these estimates.

Figure 3.1—Military and Civilian Earnings upon Separation, by Retiree Cohort (1995 Dollars)



NOTES: Military pay includes basic pay plus special pay plus allowances. Between 1983 and 1994, special pay and allowances are calculated within rank and year of service cells. Between 1971 and 1982, special pay and allowances are approximated using the average ratio of special pay plus allowances to basic pay for the period 1983 to 1987. Military pay does not include the value of on-base housing and federal and state tax advantages.

SOURCES: 1996 SRMP, Department of Defense (1996), and 1983 to 1996 JMPS data.

SKILL TRANSFERABILITY AND CIVILIAN WAGES

It may also be the case that the assumptions underlying the theory of why retiree wages might be expected to converge with civilian wages over time do not hold. The principal hypothesis of wage convergence assumes first that the reason retirees enter the civilian labor market with relatively low wages is because their military skills do not transfer completely to the civilian sector. The hypothesis then assumes that retirees respond to this skill deficit by acquiring civilian labor market skills at a faster rate than up second civilians so that their wages gradually catch with the wages of their peers. In regard to the point, some evidence exists in the SRMP that retirees enter a period of relatively intense skill acquisition when they first separate from the military.

In terms of formal schooling, 14 percent of SRMP respondents report attending school full time or part time as their main activity immediately following separation. According to self-reports, 52 percent of retirees with a high-school-level education upon separation attended some college in the subsequent years, and 8 percent completed a four-year degree or more. Among those with some college upon separation, 20 percent went on to complete a four-year degree, and among college graduates, 20 percent completed a higher degree. There is some evidence on training as well; 20 percent of SRMP respondents reported that they pursued training of some variety in order to qualify themselves for their first civilian job and another 20 percent received training while employed in their first job. This schooling and training apparently did not result in substantially higher wage growth for retirees, however.

The idea that military skills do not necessarily translate well to the civilian sector has been emphasized in much of the empirical work addressing the civilian wages of veterans (Warner and Asch, 1995). Goldberg and Warner (1987), for example, find that veterans who trained in military occupations that *a priori* appear to offer transferable skills (electronics or medical training versus combat arms) earn wages more comparable to those of civilians. The SRMP, though, does not offer much evidence of a large skill mismatch between military and civilian occupations.

More than three-quarters of SRMP respondents (77 percent) stated that their military experience was valuable or very valuable to their civilian careers and only 25 percent of SRMP respondents felt that their military career had hampered their civilian career (see Table 3.1). The SRMP also asked what percentage of military skills were useful in the retirees' first

job; 55 percent of respondents reported percentages higher than 50 in the first job, although it is notable that enlistees report lower levels of transferability than retirees (see Table 3.3). The relatively short job search of most retirees (57 percent had full-time jobs lined up before they actually separated and over half of those who did not have jobs lined up found full-time work within the first six months of separation) is also inconsistent with the notion of a civilian labor market that does not value military skills.

Lastly, fewer than 15 percent of the SRMP sample indicated that military service hindered their ability to find full-time civilian employment (see Table 3.3). So, although it is certainly plausible that many retirees develop specific skills while in the military, it does not appear that this particular kind of skill development is a major limitation in finding gainful employment in the civilian sector.

Wage convergence is most frequently studied in the literature on immigration and job displacement. The parallels between the experience of immigrants and military retirees in the civilian labor market are dubious at best, primarily because whereas retirees may lack certain skills that are beneficial in the civilian labor market, this skill deficiency cannot be as significant as the challenge most immigrants face of acquiring a new language. The parallel with displaced workers, though, is more plausible. The literature on job displacement generally concludes that displaced workers experience wage losses on the order of 15 to 20 percent, even three to five years after displacement.

Jacobson, LaLonde, and Sullivan (1993) list a variety of reasons why the wages of displaced workers might fall permanently following displacement. In addition to the possibility that displaced workers lose firm-specific capital in the transition, the influence of union rules, efficiency wages, and deferred compensation could all act to depress the wages of middle-age individuals with low tenure. For example, it is commonly argued that firms pay older workers wages above their marginal product in an effort to retain workers in which the firm invested in earlier years. With no prior investment to protect, firms would be unwilling to pay comparable wages to retirees. Firms may also be unwilling to invest significant training resources in these individuals because the period over which such an investment could be recouped is relatively short.

Table 3.3 Transferability of Skills by Rank and Year of Retirement (Percentage of Respondents)

Retiree Cohort	Less than 25% of Military Skills Relevant to First Civilian Job		Less than 50% of Military Skills Relevant to First Civilian Job		Military Experience Not Valuable to Civilian Career		Military Career Hindered Chance of Finding Full-Time Employment	
	Enlistees	Officers	Enlistees	Officers	Enlistees	Officers	Enlistees	Officers
1971–74	38	37	50	49	26	27	6	11
1975–79	39	32	54	49	25	22	9	11
1980–84	34	22	48	38	25	17	9	10
1985–89	38	21	51	37	29	17	12	15
1990–94	43	23	59	38	39	19	16	19

Note: Sample defined as in Table 2.4.
Source: 1996 SRMP.

DECLINING WAGES ACROSS SUCCESSIVE RETIREE COHORTS

There are a number of reasons, then, why retiree wages might not converge with civilian wages as a simple human capital model might predict. Perhaps a bigger puzzle is why the relative wages of retirees have fallen across successive cohorts. The SRMP analysis probably overstates this decline due to overreporting of initial earnings by older retirees, but the CPS and U.S. Census data on retirees also show a decline. Answers to two subjective questions in the SRMP are also suggestive of a potential decline in the relative position of retirees. The proportion of retirees who feel they are doing as well or better than their civilian peers fell from 0.89 to 0.69 between the 1971 to 1974 and 1990 to 1994 cohorts, and the proportion who feel their standard of living is better now than while in the military has fallen from 0.95 to 0.75 (see Table 3.1).

Two potential explanations for the decline in relative retiree wages immediately come to mind: (1) the overall quality of retirees has declined over time and (2) wages earned in the types of jobs available to retirees have declined over time. Upon closer examination, though, neither explanation is particularly satisfying. Scores on the Armed Forces Qualifying Test (AFQT) may be the best measure of quality. If nothing else, they are highly correlated with civilian earnings (see, for example, Neal and Johnson [1996]). But, by this measure, there was little change in the distribution of quality among enlistees in the SRMP. The proportion of enlistees scoring in AFQT categories I, II, and III ranged between 78 and 85 percent across cohorts.[33] To my knowledge, there is no other evidence that the quality of military personnel declined over this period.[34]

Even with constant quality, it could be that the decline in real wages in the lower half of the civilian wage distribution over the 1970s and 1980s depressed relative to retiree wages. If it is assumed that retirees entered the same types of civilian jobs in the early 1970s as in the early 1990s, but the wages paid for those jobs declined relative to mean civilian wages,

[33] A substantial amount of AFQT data is missing in the SRMP, although this is not correlated with year of retirement. Historical data on the AFQT scores of male accessions between 1958 and 1972, which roughly corresponds to the accession period of retirees in the SRMP, shows a small increase in the percentage of accessions with AFQT scores in categories I through III (59 percent in 1958 to 1963 to 73 percent in 1971 to 1972) (Karpinos, 1975).

[34] The most well-known decline in the quality of military recruits occurred between FY 1976 and 1980, when the DoD badly misnormed the AFQT and therefore mistakenly admitted large numbers of category IV enlistees (Angrist, 1998). This error, of course, occurred well after the SRMP population would have joined the military.

then one would observe declining relative retiree wages over that period. This is essentially the point made in Table 2.12 in Chapter Two, but in terms of levels not growth rates. This is a plausible explanation for the magnitude of the decline in relative retiree wages observed in the U.S. Census (about 10 percentage points). It is not a satisfactory explanation, however, if the SRMP/CPS analysis is taken as the baseline. There, the magnitude of the decline is nearly 25 percentage points.

Other potential explanations for the decline in relative retiree earnings include increasing returns to civilian experience and the rising importance of spousal income. It could be that the relative return to civilian experience vis-à-vis military experience increased between 1970 and 1994. Retirees separating in the early 1970s could secure jobs with wages comparable to those of civilians because their military experience earned the same return as civilian experience. By the early 1990s, the same level of military experience earned a lower relative return, so retirees are observed separating at that time earning wages well below mean civilian wages.

Another possibility for the decline in relative retiree earnings is that more-recent retirees are more likely to make civilian labor market decisions in concert with the labor market choices of their spouse. The rate of female labor force participation rose sharply over this period and therefore the likelihood that a given retiree's labor market choices would be constrained by a spouse's career has no doubt risen. If the retiree is no longer viewed as the household's primary earner, he may be more likely to settle for a relatively low-paying job and contribute more time to household production. Spousal income might also generate a wealth effect that causes more-recent retirees to consume more leisure, if not in fewer work hours then in less responsibility or stress on the job.

CONCLUSIONS

This report highlights several important features of the civilian labor market experience of military retirees. Contrary to a simple model of human capital accumulation and recent empirical research, the wages of military retirees do not grow appreciably faster than the wages of observationally similar civilians over the course of their civilian careers.

The research for this study, like the recent research on the earnings of immigrants, has emphasized the importance of controlling for cohort effects when making inferences about relative wage growth. The analysis in this report shows that, in fact, cohort effects are quite strong in the

retiree population; more-recent retirees earn civilian wages that are considerably lower than those of retirees who separated from the military in the 1970s. Despite earning comparatively low wages, however, retirees seem to find the transition to civilian life to be fairly painless; they find full-time work quickly and report a high level of satisfaction with their civilian lives. Among the findings in this report, the apparent decline in relative retiree wages over the 1970s and 1980s is perhaps the most puzzling and deserving of future research.

Although this report offers a more-accurate depiction of the post-service earnings experience of military retirees than was previously available, it does not answer the important question of whether the military's current pension system is an efficient component of overall compensation in the sense that it accomplishes desired retention objectives at least cost. On observable grounds, it appears that military personnel suffer a considerable decline in wages upon separation, although they are more than compensated for that decline by their military pension. Borjas and Welch seem to think that this finding alone justifies a pension system with high payouts: "If retirees do not do very well during their second career, as the findings in this paper suggest, high-quality potential recruits will find a full-time civilian career more beneficial unless either the pension payment or earnings while in the service are adjusted upward to compensate for the relatively low postservice earnings" (Borjas and Welch, 1986, p. 312).

This conclusion is premature, I believe, without a deeper understanding of the true civilian labor market opportunities of military personnel. It is simply not known whether military service per se harms post-service earnings. Researchers have yet to credibly model the unobservable determinants of accession and reenlistment decisions in this population and therefore one cannot be certain what the civilian wages of retirees would have been had they separated at an earlier age or never joined the military at all. Moreover, one does not know the degree to which retirees curtail labor supply or personal effort as a result of their pension income. These are important questions that deserve further attention.

Of course, the design of an efficient pension system requires more than just an understanding of these two unknowns. Even if it turns out that most military personnel would have earned relatively low wages in the civilian labor market regardless of service, and that pension income has strong negative effects on post-service labor supply or effort, current pension expenditures can be justified on other grounds. Deferred compensation motivates work effort and creates appropriate incentives for high-quality personnel to reenlist and low-quality personnel to separate.

Additionally, the pension system may reduce costs associated with involuntary and uncompensated separations that harm morale.

APPENDIX

DERIVATION OF RETIREE STATUS FROM CENSUS DATA

The 1970, 1980, and 1990 U.S. Census includes questions on military service. Unfortunately, only the 1990 census specifically asked respondents to report years of service. Consequently, the analysis in Table 2.10 in Chapter Two uses information on periods of service, in combination with current military status and age, to code individuals as either a retiree or civilian.

Beginning with the 1970 census, I code all individuals between the ages of 40 and 44 not currently on active duty service but who reported serving during the Korean conflict (1950 to 1955) and the Vietnam era (1964 to 1975) as retirees.[35] It is unlikely that many of these individuals separated with less than 20 years of service because, by serving in both of these periods, they would have served a minimum of nine years and would have forgone a substantial amount of delayed compensation (pension income) by separating early.

I start with a group age 40 to 44 in 1970 because I want individuals who are likely to be recent entrants into the civilian labor market. I then code individuals between the ages of 50 and 54 in the 1980 census as retirees if they served between 1950 and 1955 and 1964 and 1975, did not serve between 1975 and 1980, and were not currently on active duty service. Finally, I code individuals age 60 to 64 in the 1990 census as retirees if they served between 1950 and 1955 and 1964 and 1975, did not serve between 1975 and 1990, and were not currently on active duty service.

The aim with these sample restrictions is to create a synthetic cohort of retirees age 40 to 44 in 1970, age 50 to 54 in 1980, and age 60 to 64 in 1990. In addition to the problem that some of these individuals may have separated with fewer than 20 years of service, some of the age 50 to 54 and age 60 to 64 cohorts will have served between 1970 and 1975 whereas

[35] There is no indicator variable for service between 1955 and 1964 in the 1970 U.S. Census.

none of the age 40 to 44 cohort will have served in that period.[36] Thus, I cannot be certain that the 1980 and 1990 group is composed of the same individuals as the 1970 group. In fact, it is likely that average years of service are higher among individuals in the 1980 and 1990 groups because they could have served as many as five years after 1970.

These definitions yield retiree populations totaling 3.0, 4.9, and 5.2 percent of the male veteran population in 1970, 1980, and 1990, respectively. These percentages are comparable to the proportion of the veteran population receiving military pension income in the CPS.

I also examine a cohort of retirees age 40 to 44 in 1980. These individuals are coded as retirees if they served between 1955 and 1964, 1964 and 1975, and 1975 and 1980, but were not currently on active duty service. Individuals age 50 to 54 in 1990 who did not serve between 1980 and 1990 were then coded as retirees using the same criteria. This analysis is less likely to suffer from the problems noted in using the 1970 data, as mentioned earlier, because by serving in all three of these periods, the individuals' minimum years of service are somewhat higher (11 years versus 9 years) and there is no ambiguity about post-1980 service.

Finally, I examine a cohort of veterans age 40 to 44 in 1990 who are coded as retirees if they served between 1964 and 1975, 1975 and 1980, and 1980 and 1990, but were not currently on active duty service.

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