

*National Defense Research Institute*

**AN  
EVALUATION  
OF HOUSING  
OPTIONS FOR  
MILITARY  
FAMILIES**

**Richard Buddin ♦ Carole Roan Gresenz  
Susan D. Hosek ♦ Marc Elliott  
Jennifer Hawes-Dawson**

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**RAND**

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## PREFACE

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In 1996, the Deputy Secretary of Defense directed the Under Secretary of Defense (Personnel and Readiness) to conduct a new study of military family housing. Previous studies concentrated on comparing the costs of military-owned housing with housing allowances that are provided to personnel who rent or purchase civilian housing. This study complements previous efforts by investigating the preferences of military families for different kinds of housing, the methods they use to find housing at new locations, and the factors that are important in their choice of housing.

The data for these investigations were collected through a survey of families assigned to 12 bases with varying housing situations. The analyses and the survey data should be of interest to policymakers and analysts concerned with military housing programs, the support of active-duty families, and the role of housing benefits in the compensation package. Readers interested only in the findings of the study should focus on the first two chapters. The other chapters will be of interest to readers interested in the analytic methods and detailed results.

This research was conducted for the Assistant Secretary of Defense for Force Management Policy by the Forces and Resources Policy Center of RAND's National Defense Research Institute (NDRI). NDRI is 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.



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## CONTENTS

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Preface .....	iii
Figures .....	ix
Tables .....	xi
Summary .....	xv
Acknowledgments .....	xix
Chapter One	
INTRODUCTION .....	1
Background .....	1
Costs of Military Housing .....	3
Purpose and Scope of Study .....	4
How This Report Is Organized .....	6
Chapter Two	
OVERVIEW OF STUDY .....	7
How and Why Do Families Choose the Housing They Live In? .....	10
Housing Choices .....	10
Reasons for Housing Choice .....	11
Housing Preferences and Economic Value .....	13
What Are Families' Attitudes Towards Living in Military Communities? .....	18
Differences in Survey Responses by Service and Base ..	21
What Are the Cost Differences? .....	23
How Do the Housing Decisions of Military and Civilian Families Compare? .....	26
Conclusion .....	28

Chapter Three	
HOUSING PREFERENCES OF MILITARY FAMILIES . . . . .	31
Introduction . . . . .	31
Description of Survey . . . . .	31
A Description of Housing Choices and Preferences . . . . .	33
Current Housing . . . . .	33
The Process of Finding Housing . . . . .	34
Characteristics of Current Housing . . . . .	35
Satisfaction with Current Housing . . . . .	38
Reasons Behind Current Housing Choice . . . . .	40
Comparing the Value of Military Housing and Housing Allowances . . . . .	46
Housing Preferences . . . . .	55
Chapter Four	
HOUSING CHOICES AMONG MILITARY FAMILIES . . . . .	59
Model of Housing Choice . . . . .	59
Method 1: Preferences for Military Housing Under Existing Policies . . . . .	61
Results . . . . .	65
Individual Effects . . . . .	68
Base Effects . . . . .	71
Method 2: Housing Choices Under Alternative Housing Options . . . . .	76
Results . . . . .	79
Housing Quality, Wait Time, and Allowance Effects . . . . .	82
Individual Effects . . . . .	85
Base Effects . . . . .	86
Method 3: Characteristics of Members with Strong Preferences for Military Housing . . . . .	88
Results . . . . .	88
Willingness to Wait for Military Housing . . . . .	91
Willingness to “Pay” for Military Housing . . . . .	93
Summary and Conclusions from Housing Survey . . . . .	94
Chapter Five	
A COMPARISON OF THE HOUSING CHOICES OF MILITARY AND CIVILIAN FAMILIES . . . . .	97
Introduction . . . . .	97
Data . . . . .	98
Housing Record . . . . .	98



Person Record . . . . .	99
Sample Selection . . . . .	99
Analysis and Results . . . . .	101
Comparing Civilian and Military Housing Markets . . . . .	101
Comparing Civilian and Military Housing Stock . . . . .	103
Military Premiums in Civilian Rental Housing . . . . .	105
Comparing Housing Decisions Between Civilian and Military Families . . . . .	108
Appendix	
A. Selection of Bases for the Housing Survey . . . . .	115
B. Sample Selection and Survey Distribution for the Housing Survey . . . . .	119
C. Housing Survey Questionnaire . . . . .	123
D. Survey Response and Weighting Issues . . . . .	155
E. Hedonic Rent Equation Adjusted for Self-Selection of Renters . . . . .	159
References . . . . .	163



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## FIGURES

---

1.1.	Costs of Military Versus Civilian Housing . . . . .	4
2.1.	Location of Bases Chosen for Housing Survey . . . . .	8
2.2.	Housing Choices of Families in Housing Survey . . . . .	10
2.3.	Reasons for Choosing Current Housing Option . . . . .	12
2.4.	Satisfaction with Overall Quality of Housing . . . . .	14
2.5.	Percentage of Survey Respondents Who Would Prefer Military Housing . . . . .	15
2.6.	Value of Military versus Civilian Housing Benefit by Pay Grade . . . . .	16
2.7.	Percentage of Survey Personnel Preferring Military Housing . . . . .	17
2.8.	Percentage Reporting Problems in Military Versus Civilian Neighborhoods . . . . .	18
2.9.	Survey Respondents' Attitudes About Family and Community Contributions of Military Housing . . . . .	19
2.10.	Percentage of Respondents in Mostly Civilian, Military, or Mixed Neighborhoods . . . . .	20
2.11.	Percentage of Families Receiving a Lot of Support, Some Support, or No Support from Neighbors . . . . .	21
2.12.	Cost per Unit of Military Housing at 12 Study Bases . .	24
2.13.	Home Ownership Rates for Military Versus Civilian Families, from 1990 Census . . . . .	27
2.14.	Percentage of Income Spent on Rent, Military Versus Civilian Families in the 1990 Census . . . . .	28
3.1.	Differences Between the Implicit Rent of Military Housing and the Housing Allowance . . . . .	54
4.1.	Housing Decision Framework . . . . .	60



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**TABLES**

---

1.1. Dimensions of Housing Alternatives . . . . .	5
2.1. Housing Conditions at Bases in Study Sample . . . . .	9
2.2. Amenities and Costs of Housing for Military Families . . . . .	11
2.3. Relative Ranking of 12 Survey Bases by Family Preferences for Military Versus Civilian Housing . . . . .	22
3.1. Current Housing by Rank . . . . .	33
3.2. Housing Characteristics by Housing Type . . . . .	36
3.3. Housing Satisfaction by Housing Type . . . . .	39
3.4. Satisfaction with Housing Costs by Type of Housing . . . . .	40
3.5. Reasons for Choosing Current Type of Housing: Percentage of Residents Listing Factor as 1st or 2nd Most Important in Decision . . . . .	41
3.6. Reasons for Having Military Housing . . . . .	42
3.7. Reasons for Not Purchasing a Home at Current Location . . . . .	44
3.8. Members Who Did Not Purchase a Home at Their Current Location Because They Owned a Home Elsewhere . . . . .	45
3.9. Members Who Own Homes Either at Their Current Location or Elsewhere . . . . .	46
3.10. Estimates from the Hedonic Rent Equation . . . . .	50
3.11. Implicit Rent and Housing Allowance by Rank Group . . . . .	52
3.12. Demand for Military Housing Under Alternative Waiting Times . . . . .	55

3.13.	Demand For Military Housing Under Alternative Housing Allowances . . . . .	56
4.1.	Multinomial Logit Model of Tenure Choice . . . . .	66
4.2.	Relative Risk Ratios for Coefficients in Multinomial Logit Model of Tenure Choice . . . . .	67
4.3.	Relative Risk Ratios and Standard Errors for Base Effects in Specification 3 . . . . .	74
4.4.	Relative Ranking of 12 Survey Bases by Family Preferences for Military Versus Civilian Housing . . . . .	75
4.5.	Alternatives in Low-Quality Hypothetical Option . . . . .	78
4.6.	Alternatives in High-Quality Hypothetical Option . . . . .	78
4.7.	Probit Regression Results for Choosing Civilian Instead of Military Housing Under Alternative Housing Options . . . . .	80
4.8.	Predicted Effects of Changes in Member Characteristics and Housing Options on the Probability of Choosing Civilian Housing . . . . .	81
4.9.	Predicted Percentage Choosing Civilian Housing When Offered Low-Quality Military House Under Different Options . . . . .	82
4.10.	Predicted Proportion Choosing Civilian Housing When Offered High-Quality Military House Under Different Options . . . . .	83
4.11.	Proportion Less Likely to Choose Military Housing When the Unit Is Located Off-Base . . . . .	85
4.12.	Predicted Probability of Choosing Civilian Over Military Housing . . . . .	87
4.13.	Probit Regression Results for Members with Strong Preferences for Military Housing . . . . .	89
4.14.	Predicted Effects of Changes in Member Characteristics on Strong Preferences for Military Housing . . . . .	90
5.1.	Military and Nonmilitary Market Comparison . . . . .	102
5.2.	A Comparison of Military Housing Characteristics to Civilian Housing Characteristics . . . . .	104
5.3.	Estimates from the Hedonic Rent Equation . . . . .	107
5.4.	Home Ownership Rates Among Civilians and Military Members . . . . .	109
5.5.	Share of Income Devoted to Rent by Education Level for Military and Civilian Families . . . . .	110

5.6.	Housing Demand for Civilian and Military Renters . . .	111
A.1.	Descriptions of Housing Clusters . . . . .	117
A.2.	Bases Used for Housing Survey . . . . .	118
B.1.	Ideal Primary Sample Sizes . . . . .	120
E.1.	Probit Estimates for Rent Relative to Military Housing . . . . .	160
E.2.	Estimates from the Hedonic Rent Equation Adjusted for Selectivity . . . . .	161





**BACKGROUND AND APPROACH**

Military family housing is a significant benefit provided to military members. It is also expensive, costing the Department of Defense (DoD) nearly \$10 billion annually. A number of studies have been done on military housing, but most have focused on the relative costs of that housing compared with allowances provided to military members who rent or own homes off-base. This report complements previous efforts by investigating the preferences of military families for types of housing and the factors that influence their choices.

The data for this report were gathered from two primary sources. The first was a survey administered to about 4400 military members at 12 military bases. These bases were located across the United States, and each of the services was represented. The survey was designed to collect unique information on how military members selected housing and how they decided where to live, as well as information about how members might respond to changes in housing policies and options.

The second source was the 1990 U.S. Census. While this information did not focus specifically on military families, we were able to extract data from it about them. The Census enabled us to compare housing decisions of military families with those of their civilian counterparts. In addition, the Census data provided a snapshot of a more diverse military population than at the 12 bases in our housing survey. Of course, the Census was a multipurpose survey, so the information on

housing choices was less comprehensive than in our military housing survey.

## **FINDINGS**

A number of findings emerge from our analysis, but three seem especially noteworthy. First, military members view the economic benefit of military housing as greater than that of the various housing allowances. This finding explains why most installations have a queue of people waiting for housing, which sometimes can be as long as a year. Second, the benefit gap—the difference in value between military housing and the allowance given for occupying civilian housing—is what drives the high demand for military housing. All the other perceived benefits to military housing run a distant second to the economic one. Third, service personnel do not seem to view many of the benefits that have traditionally been associated with on-base housing—e.g., acculturation of junior personnel, support for families whose military member is deployed or simply gone a lot, fostering military values—as critical. Having military neighbors was the least frequently cited reason for living on-base. Furthermore, members believe that their families are as well supported off-base as they are on-base. In other words, without the economic benefit, most military members see no compelling reason to live on-base. In contrast, many members believe that military housing contributes to the well-being of families in general and the military community.

The reported cost of housing military families on-base is high, and this cost far outstrips the allowance that members are offered for living off-base. Many members value on-base housing at more than the amount of the allowance, but few members value military housing as much as the cost of providing those housing services. On the margin, members and the military services would both benefit from higher housing allowances and less military housing.

## **IMPLICATIONS**

DoD should consider encouraging more military families to live off-base. Military members see few unique benefits to living on-base, so there may be little merit in large capital outlays to revitalize and re-

place the aging housing stock. Our research suggests two initiatives that could be expected to encourage more families to live off-base:

- *Make the value of on-base housing and off-base housing more equivalent, especially for junior enlisted personnel.* This could be done in one of two ways. First, the housing allowances could be increased to allow families to rent or buy housing off-base that is equivalent to on-base housing. These increases in allowances could ultimately be tied to cost savings in operating fewer units on-base and avoiding the expense of replacing some of the existing housing stock. Another possibility for encouraging members to live off-base would be to charge for on-base utilities and use this revenue to enhance the housing allowance. This policy would help balance the on- and off-base housing benefit, but the policy would be perceived by members as a reduction in the housing benefit.
- *Enhance programs that assist members in finding civilian housing.* Relocated families place a substantial premium on convenience and would benefit from programs that more quickly match them with appropriate civilian housing. Some bases have sophisticated housing referral programs, and DoD should expand these programs.



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## **BACKGROUND**

Military family housing is a significant benefit provided to military members. It is also expensive, costing the Department of Defense (DoD) nearly \$10 billion annually. In 1996, the Deputy Secretary of Defense requested a study of the preferences of military families for different types of housing and the factors that influence their choices. A number of studies have been done on military housing, but most of them have focused on the relative costs of that housing compared with allowances provided to military members who rent or own homes off-base. This report complements previous efforts by examining members' housing preferences.

The current strategy for housing military families has two components. The first component is military housing, owned and operated by the military services. This housing, located on or near military bases, is provided free of charge to qualifying families. The second component consists of monetary allowances, which families use to rent or purchase civilian housing in the communities surrounding the bases. The allowances differ by military rank, duty location, and dependency status and equal about four-fifths of the average expenditures on civilian housing by the personnel at each rank assigned to each base (as determined by an annual survey).<sup>1</sup> For

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<sup>1</sup>Congress recently authorized a change in the structure of housing allowances, to be implemented in FY98. Allowances will be based on the price of standardized housing units in each area and will be phased in over a five-year time period. The effect of this change will be to increase allowances in high-cost areas, where military families have

housing of the same cost, therefore, current policy is to finance 100 percent of military housing and only 80 percent of civilian housing.<sup>2</sup> As a result, most bases have an excess demand for military housing and ration their stock of military housing through wait time in a queue. Separate queues are maintained by military rank groups, and members are assigned priorities in the queue as a function of their arrival date at their current base. In rare circumstances, members are moved ahead in the queue because of military necessity (their job requires that they live *on-base*), financial distress, or special family needs (an exceptional family member that needs access to base facilities). The wait for this housing varies from a few weeks to two years.

The military housing component faces major challenges over the next several years, because the stock of military housing is old and in poor repair. DoD estimates that the average age of the housing stock is 33 years and that much of the housing stock has reached the end of its projected life (DoD, 1995). Many of these homes need either major renovation or replacement. In addition, maintenance and remodeling efforts have been inadequately and inconsistently funded, so nearly half of the existing homes do not meet current suitability standards (GAO, 1996). The DoD study concluded that the cost of remedying these problems in military housing is more than \$20 billion dollars.

As DoD considers the costs of upgrading the military housing stock, policy makers should reassess the traditional housing program and consider whether alternative housing policies or options would provide a more cost-effective housing alternative for military families. A Congressional Budget Office report (CBO, 1993) has argued that military housing is more costly than civilian alternatives and has encouraged DoD to shift families from military housing to housing in the civilian economy. The General Accounting Office (GAO, 1996) has concurred with the CBO and called for greater reliance on private

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tended to choose a lower standard of housing, and to decrease the allowances in low-cost areas, where the typical family chooses better housing.

<sup>2</sup>Current policy is that the military will pay 85 percent of the housing costs (i.e., rent plus utilities) for military families living off-base. This policy goal has not been achieved for budgetary reasons, and the military share of off-base housing expenses is about 80 percent.



sector housing. A recent DoD task force (DoD, 1995) argued that greater private sector involvement in both the construction and management of military housing would reduce cost and improve housing quality. The task force also recommended that more members be encouraged to live in off-base housing.

Before making large investments in military housing, DoD needs to assess not only the costs of housing families on-base but also the benefits to these families. If military housing is more expensive than off-base alternatives, the cost might be warranted by extra benefits that military families accrue in on-base housing. Our study assesses these member preferences for on- and off-base housing options.

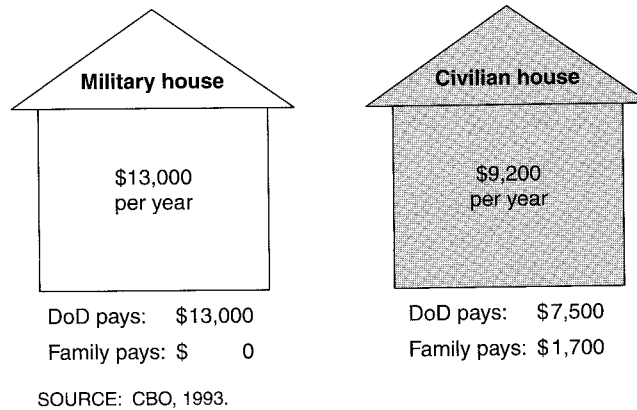
## COSTS OF MILITARY HOUSING

Prior to the Deputy Secretary's request, there had been several studies of this military housing program, most of them focusing on the relative costs of directly provided housing ("military housing") versus subsidizing the purchase or rental of housing in the local community ("civilian housing"). The first of these studies was done by the CBO (1993). A key finding, illustrated in Figure 1.1, was that military housing is far more costly overall to DoD than civilian housing. No attempt was made to adjust for differences in the quality of the housing in the two sectors. Several later studies confirmed the difference in cost, although the estimates differ from the CBO's (GAO, 1996; DoD, 1994; CNA, 1996).

The CBO study evaluates several alternatives to the current arrangement that would narrow the gap shown in Figure 1.1 and lead to greater reliance on civilian housing, including: (1) increasing the allowances and (2) giving allowances to all families and charging "market rents" for military housing. A full evaluation of these or other alternatives would require information on the relative *value to families* in military and civilian housing as well as their relative costs. Families place value on their housing based on the housing itself as well as on other factors related to its location, such as schools, community, security, and convenience.

The military services also may prefer one type of housing over another. In other words, military housing has *institutional value* to the military services. For example, in early discussions about this project

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**Figure 1.1—Costs of Military Versus Civilian Housing**

with senior DoD officials, several reasons were given for preferring to have at least some military housing. The most common reasons were that military housing communities foster military culture and cohesion, accelerate the acculturation of junior personnel, and facilitate support of families of deployed personnel.

#### **PURPOSE AND SCOPE OF STUDY**

The Deputy Secretary's study request asked for an analysis of alternatives for housing military families. The alternatives for housing military families are defined along four dimensions: ownership, location, type of benefit, and cost to family. Table 1.1 lists the alternatives for each dimension and indicates which are provided by the current housing program. New options are being tried in selected locations (e.g., the military is leasing privately owned housing as an alternative to traditional military housing), but these options are too new for evaluation. Therefore, to evaluate a wide range of alternatives to the current program, we focused our effort on determining families' preferences within each dimension and understanding what determines housing choices under the current program and selected modifications of the program.

**Table 1.1**  
**Dimensions of Housing Alternatives**

Dimension	Alternatives	Current Program	
		Military Option	Civilian Option
Ownership	Military/private	Military	Private landlord or family owned
Location	On-base/off-base	Usually on-base	Off-base
Benefit type	In-kind/cash	In-kind	Cash
Family cost	Variable	None	Approx. 15%

This study addresses four questions:

- How and why do families choose the housing they live in?
- What are families' attitudes toward living in military communities?
- What are the cost differences?
- How do the housing decisions of military and civilian families compare?

We use two approaches to answer these questions. The first approach relies on a new housing survey of military families. The survey collects unique information housing choices and conditions. The survey collects a comprehensive set of housing-related information, but the survey was conducted at a selected set of military bases. The second approach utilizes information from the 1990 Census and allows us to compare housing decisions of military families with those of comparable civilians. The Census information lacks the housing detail of our new housing survey, but it covers the full spectrum of locations where military families live in the United States. By combining these two approaches, we are able to develop a comprehensive picture of the housing situation for military families and answer the study questions.

By design, this study is restricted to housing issues facing military families who are assigned to bases in the United States. Our focus includes married couples and single parents who have a dependent living with them. These service members are eligible for military family housing. Single military members, typically housed in bar-

racks or dormitory-style housing, have somewhat different housing issues and require a separate analysis. Overseas housing policies are somewhat different than those for personnel stationed domestically, and our analysis does not address the problems of housing military families in foreign countries.

### **HOW THIS REPORT IS ORGANIZED**

This report has five chapters. The next chapter provides an overview of the major issues addressed by the survey. The overview does not provide substantial detail on the research methodology, since this detail is provided in subsequent chapters. Chapter Three describes the housing preferences of military members from the military housing survey. Chapter Four develops a model of the demand for military housing. Survey data are used to estimate how the demand for military housing would be affected by changes in military housing options and policies. Chapter Five compares housing choices of military families with those of comparable civilian families. The analysis is based on the 1990 U.S. Census data.

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**OVERVIEW OF STUDY**

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This chapter contains an overview of our major research findings. The results address four questions about military families:

- How and why do families choose the housing they live in?
- What are families' attitudes toward living in military communities?
- What are the cost differences?
- How do the housing decisions of military and civilian families compare?

We used the following approach to answer these questions. We identified 12 installations for more intensive study (see Figure 2.1).<sup>1</sup> They were chosen purposely to represent the range of housing situations military families face in the Continental United States (CONUS), as defined by general quality of base housing, amount of new construction, civilian housing costs, fraction of area population that is military, and fraction of military families living off-base.<sup>2</sup> Using these variables, we carried out a cluster analysis to identify

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<sup>1</sup>A more detailed description of the administration of the housing survey is provided in Appendices A, B, C, and D.

<sup>2</sup>Although the Navy in particular locates some of its housing off-base, we use the terms "military housing" and "base housing" interchangeably, and we identify families in civilian housing as living "off-base." Data sources included the 1992 Survey of Enlisted and Officer Personnel, Defense Manpower Data Center (DMDC) 1996 Active Duty Family Database, 1996 City County Databook, and 1996 Guide to Military Installations in the United States.

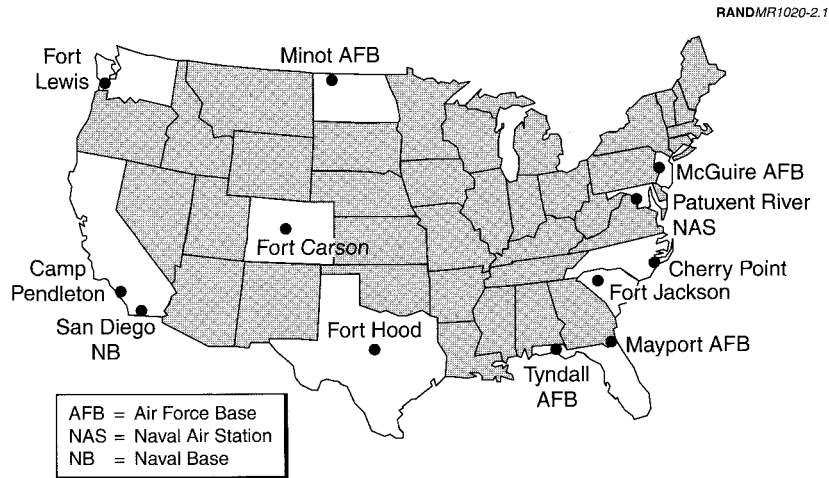


Figure 2.1—Location of Bases Chosen for Housing Survey

bases with similar characteristics and selected samples from each group according to the numbers of bases in the group, ensuring balance by service and region.<sup>3</sup>

Table 2.1 lists the characteristics for the seven groups of bases that we defined for these sampling purposes and the individual bases selected from each group.

At these 12 locations, we fielded a self-administered survey to collect information on current housing, hypothetical choices in different situations, housing preferences, satisfaction with current housing and neighborhood, and family characteristics. To develop and test the survey instrument, we conducted focus groups at four of these installations: Fort Hood, San Diego Naval Base, Camp Pendleton, and Tyndall AFB. The sample included approximately 4400 members who were eligible for family housing. The sample was stratified by base, grade, and type of housing, i.e., military or civilian. We over-sampled junior enlisted personnel (in the grade of E3) because

<sup>3</sup>A more complete description of the base selection procedure is in Appendix B.

**Table 2.1**  
**Housing Conditions at Bases in Study Sample**

Group	Housing Quality	Local Costs	Base Presence	Members Off-base	New Mil Housing	Total Bases	Bases in Sample <sup>a</sup>
A	Medium	Low	Low	High	High	34	Lewis (A) San Diego(N) Tyndall (F)
B	Low	Low	Low	High	Low	27	Jackson (A) Mayport (N)
C	Mixed	High	High	Mixed	Mixed	19	Hood (A) Cherry Pt (M)
D	Mixed	High	High	Mixed	Mixed	6	Pendleton (M)
E	Medium	Low	Low	Low	Low	14	Patuxent (N) McGuire (F)
F	Low	Low	Low	Low	Low	5	Minot (F)
G	High	Medium	Medium	Medium	Medium	8	Carson (A)

<sup>a</sup>The service to which each base belongs is indicated in parentheses after the base name: Air Force (F), Army (A), Marine Corps (M), and Navy (N).

housing for their families is seen as a particular problem.<sup>4</sup> All data presented in this report have been reweighted to represent the population of military personnel with families at each base and to give the results from each base equal weight, regardless of base size.<sup>5</sup>

To complement the analysis of these survey data, we also analyzed housing information from the 1990 Census, specifically the Public Use Microdata Area (PUMA) file. The Census data allowed us to conduct a more limited set of housing choice analyses for a representative sample of military families in the CONUS as a check on our ability to draw general conclusions from our analyses of the survey data. It also allowed us to compare the housing choices of military and civilian families in similar circumstances and living in the same geographic areas.

<sup>4</sup>The survey instrument and sample selection procedure are documented in Appendices B and C, respectively.

<sup>5</sup>Survey response and weighting issues are discussed in greater detail in Appendix D.

This chapter is divided into five parts. The first four parts address our four key research questions. The chapter ends with a discussion of the major findings of the study.<sup>6</sup>

## HOW AND WHY DO FAMILIES CHOOSE THE HOUSING THEY LIVE IN?

### Housing Choices

Figure 2.2 shows the average fraction of families across the 12 survey bases who lived in military housing, civilian rental housing, or civilian housing they owned. Each base contributes equally to the average in this figure and all subsequent ones. About half of junior and mid-grade personnel lived in military housing, whereas about one-

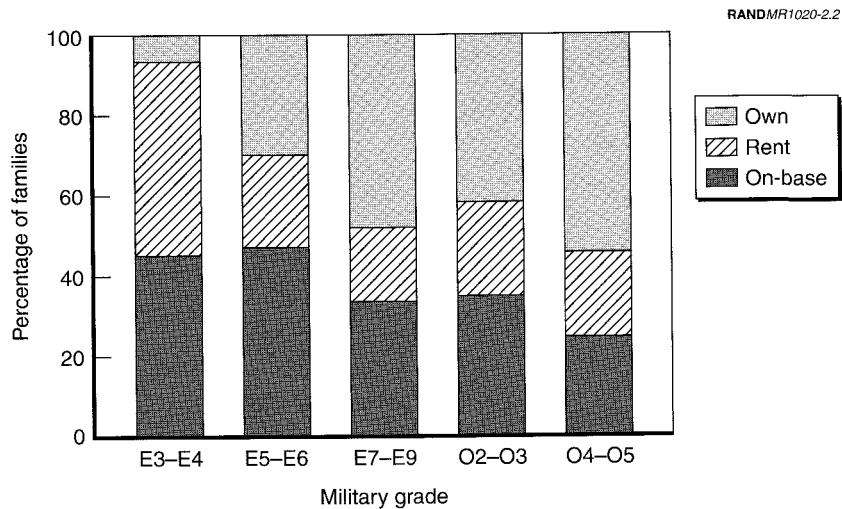


Figure 2.2—Housing Choices of Families in Housing Survey (average across 12 bases)

<sup>6</sup>For brevity, the results in this summary do not display standard errors. The survey and census results are measured with great precision, so the differences displayed in the figures are statistically significant at the 0.05 percent confidence level. A more formal statistical presentation of the results is provided in Chapters Three and Four.



third of senior enlisted and officers did so. Almost all junior personnel in civilian housing rented, but more owned than rented in the other three groups.

Where families live and whether they own or rent in the community makes a noticeable difference in the amenities of the housing and its cost (Table 2.2). Most military housing is relatively old; as a result, it tends to be smaller and in less good condition than civilian housing. Within the community, almost all military families who own their homes are in houses rather than townhouses or condominiums. Controlling for base and rank, owner-occupied housing is newer, larger, and almost always in good condition. The trade-off between quality and cost that families make is seen clearly in Table 2.2, as the choice with the best housing also involves the highest out-of-pocket cost.

**Reasons for Housing Choice**

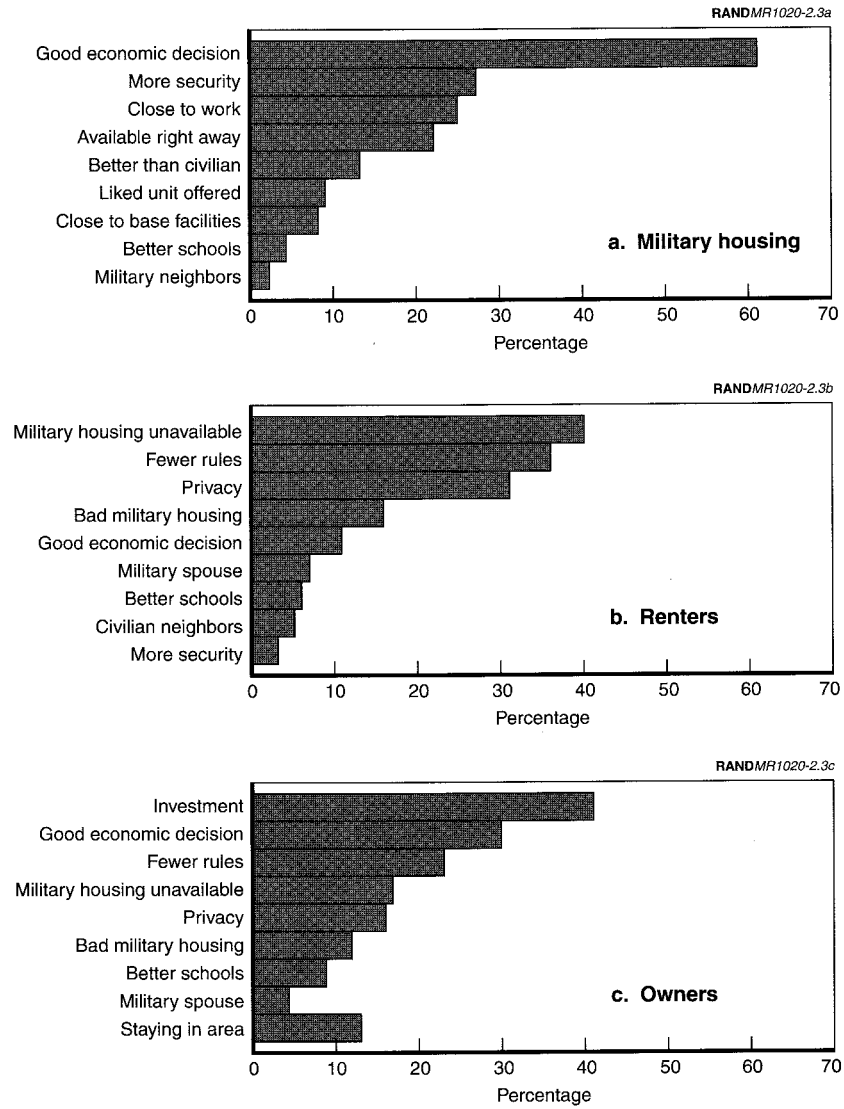
To determine what other factors influence family housing choices, we asked respondents to list the reasons for choosing their current housing. Figure 2.3 shows the percentage of respondents listing the indicated factors as being first or second most important.

Most families living in military housing (Figure 2.3a) indicated that the primary reason was economic. Security, convenience for work, and availability were the next most common reasons for choosing to live on-base. These results are consistent with what we heard in fo-

**Table 2.2**  
**Amenities and Costs of Housing for Military Families**  
**(housing survey)**

Characteristic	Military Housing	Civilian Rentals	Owner Occupied
Age of dwelling (years)	31	20	15
Size of dwelling (sq. ft.)	1,257	1,336	1,728
Condition (% good)	65	79	95
Out-of pocket cost (\$/month)	\$0	\$167	\$356

NOTE: Data have been adjusted for differences by base and rank.



**Figure 2.3—Reasons for Choosing Current Housing Option  
(percentage listing the reason as first or second most important)  
(average across 12 bases)**

cus groups. Interestingly, having military neighbors was not considered important.

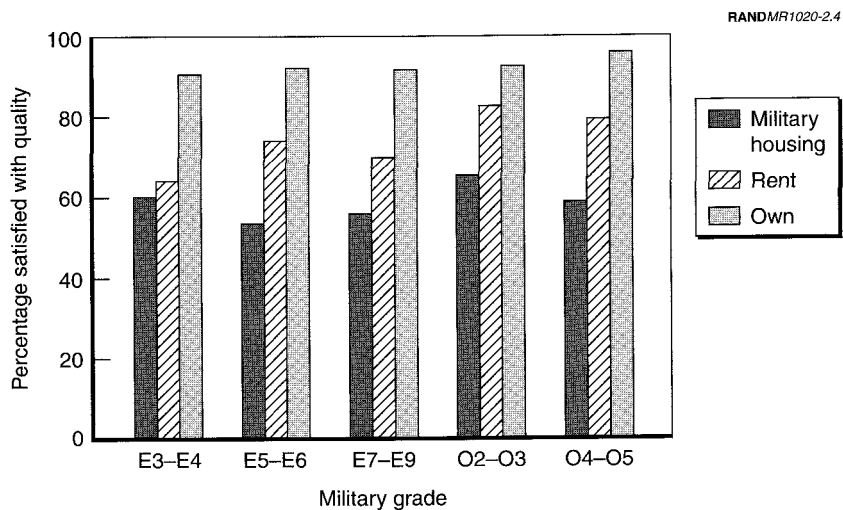
In contrast, 40 percent of all renters said they chose this option because they could not get into military housing (Figure 2.3b). Another group preferred to avoid the rules, lack of privacy, and poor housing associated with living on-base. Only 10 percent indicated that renting in town was a good economic decision, and even fewer chose civilian rental housing for other neighborhood factors.

Those who bought in the community cited investment and general economic motives first (Figure 2.3c). They also mentioned some of the same factors that motivated civilian renters. About 13 percent bought their own home because they planned to stay in the area after leaving the military.

Figure 2.4 shows that homeowners are the most satisfied with the quality of their residence and members in military housing are the least satisfied. Nonetheless, about 58 percent of those members in military housing report that they are satisfied with their housing as compared with about 70 percent of renters and 93 percent of homeowners. The figure shows little relationship between rank and satisfaction with housing—more senior members have more housing amenities on- and off-base, but they probably have higher expectations as well.

### **Housing Preferences and Economic Value**

The reasons given for choosing housing suggest that many families now living in civilian rentals and some families who own homes would prefer military housing if it were available. In fact, most installations have a waiting list for all but the least desirable housing. Potential demand for military housing combines two groups. The first is those members currently residing in military housing. This group has chosen military housing over civilian housing options that can be purchased with the housing allowance. The second group is the many members who reside in civilian housing who would have preferred military housing if it had been available when they arrived at the base. Table 2.5 shows that about 70 percent of members would prefer military housing to civilian alternatives. Junior and middle-grade enlisted personnel are much more likely to prefer mili-

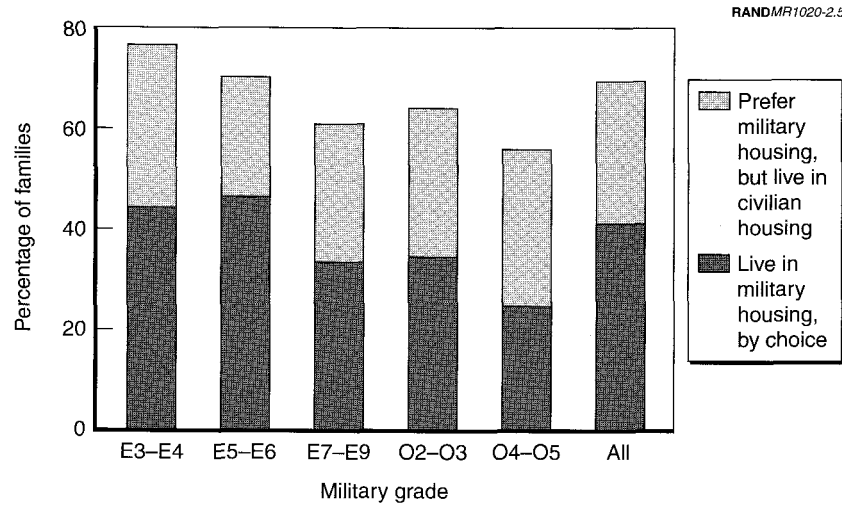


**Figure 2.4—Satisfaction with Overall Quality of Housing (average across 12 bases)**

tary housing than senior enlisted personnel and officers, but even in the latter group over half prefer to live on-base.

The results in Figure 2.5 show a strong excess demand for military housing. Because existing housing is fully occupied, excess demand for military housing is simply the percentage of those who would have preferred military housing if it were available when they arrived at the base. The survey shows that a 50 percent increase in the military housing stock would be needed to meet this potential demand. Excess demand exists across all pay grades, even though the overall preference for military housing is less for senior enlisted and officer grades. Much of our analysis was directed at understanding the reasons for the strong interest in living on-base.

The participants in the focus groups we conducted for this study emphasized cost-effectiveness as the major reason for preferring military housing. Other factors clearly were secondary. To explore cost-effectiveness from the perspective of the families in the survey sample, we wanted to compare the value of the housing benefit when it is provided in-kind as base housing versus as an allowance for

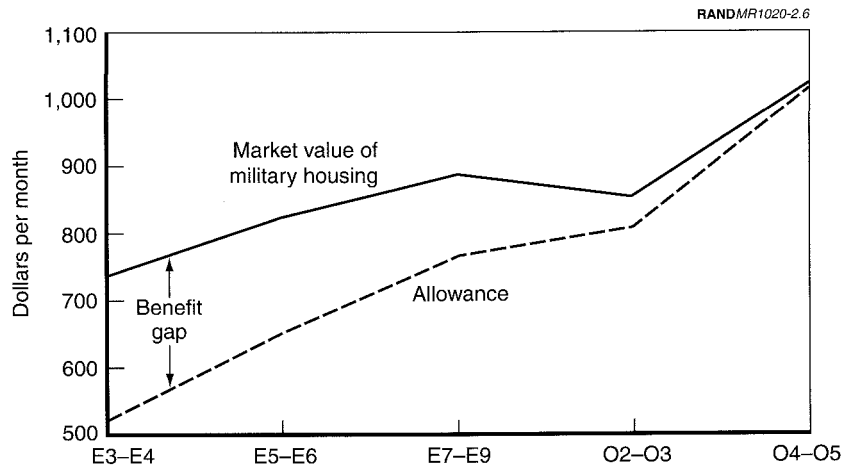


**Figure 2.5—Percentage of Survey Respondents Who Would Prefer Military Housing**

civilian housing. The value of the military housing benefit was estimated as the local market value of each housing unit, based on its size and features.

Figure 2.6 compares our estimate of the military housing benefit with the allowance provided in each location. For junior personnel with families, the value of the housing allowance is 30 percent less than the value of military housing. Since these families live on a limited income (median income for these families in the survey is \$20,000), it is hardly surprising that most prefer the substantially higher benefit associated with base housing. The senior leadership at the installations we visited and in the housing offices at service headquarters were also most concerned about housing for junior enlisted families. Military housing becomes less valuable relative to the allowance at higher enlisted and officer ranks. For senior officers, the relatively small houses common on-base provide no additional value over the allowance.

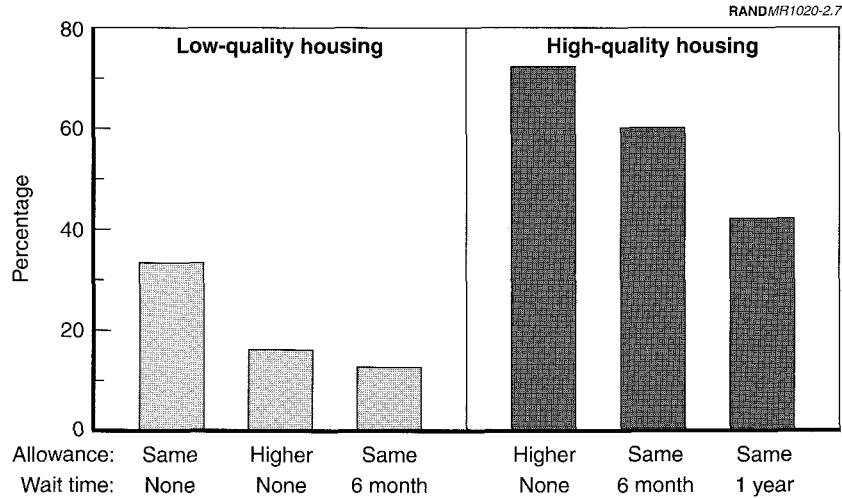
The estimated market values shown in Figure 2.6 are for the most common types of base housing, which were constructed in the 1950s



**Figure 2.6—Value of Military Versus Civilian Housing Benefit by Pay Grade (average across 12 bases)**

and 1960s and are now often quite run-down. In recent years, Congress has increased funding for new construction, and the new units are considerably larger and nicer. To understand how families trade off quality and cost in choosing between military and civilian housing, the survey included hypothetical choice questions. These questions offered a choice between a particular military housing unit, which was described in some detail, and living in the civilian community. The questions varied the quality of the military housing unit offered, the waiting time to move into that unit, and the amount of the allowance for civilian housing.

Figure 2.7 shows how the respondents' preferences varied for different combinations of military housing quality, waiting time, and the size of allowance. These data are taken from a multivariate analysis that controlled for family characteristics affecting preferences: single parent versus two parents, number of children, spouse employment, expectations about deployment of the military member, family income, and military member's education, race, and gender. Preferences are highly sensitive to the quality of the housing offered on-base. Over 40 percent of all families would choose high-quality housing (similar to the housing being built now) over civilian hous-



**Figure 2.7—Percentage of Survey Personnel Preferring Military Housing**

ing even if they had to wait a year to move in. On the other hand, only about 30 percent would take low-quality housing even if it were free and available immediately. Preferences are also sensitive to both waiting time and the size of the allowance. More families switch their preference to civilian housing if they face a long wait for military housing (six months) than if their allowance increases. The allowance increase specified in the questions differed by rank—a \$150/month increase for E3–E5 and \$225/month increase for other ranks. These amounts represent an increase of approximately 35 percent in the Basic Allowance for Quarters (BAQ) provided in these locations.<sup>7</sup>

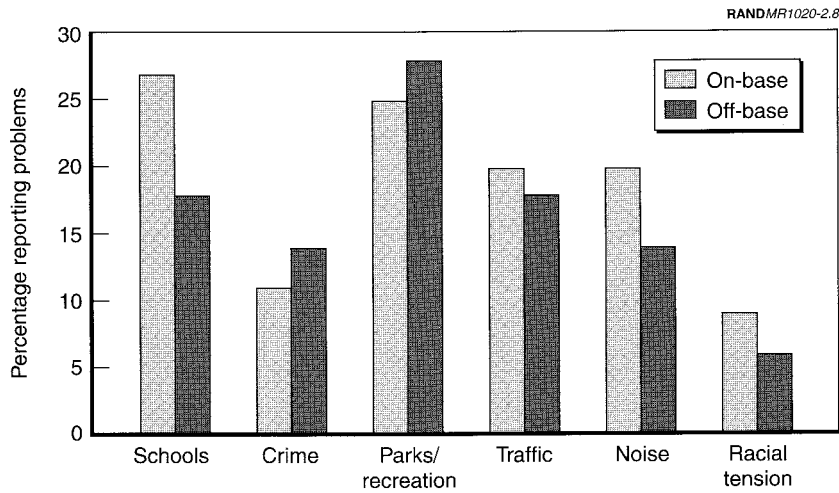
Few of the family characteristics we considered had a major impact on preferences. Joint-military couples were 14 percent more likely to prefer living in the civilian community, where they can combine their two allowances to afford good housing. Similarly, personnel

<sup>7</sup>At the time of the survey, the housing allowance for military families consisted of a BAQ that was determined by the member’s rank and dependent status (with or without) and a Variable Housing Allowance (VHA) that was a cost-of-living adjustment for areas with high housing costs. The VHA also differed by member rank and dependent status.

with spouses who work full-time were 8 percent more likely to prefer the civilian alternative. These families also can afford better housing in the community and may want to live nearer the spouse’s work. Larger families showed a slight preference for military housing because they qualify for a larger unit on-base.

**WHAT ARE FAMILIES’ ATTITUDES TOWARDS LIVING IN MILITARY COMMUNITIES?**

The survey asked respondents to rate their current neighborhood along a number of dimensions. Figure 2.8 compares the ratings of those who live in military versus civilian housing, again controlling for differences by base and military grade. Most respondents reported no problems in any of these areas, regardless of where they were living. For those reporting some problems (usually minor), the pattern of military-civilian differences is mixed. Few respondents reported problems with crime and parks/recreation on-base, but more reported problems with schools and noise. Traffic and racial/ethnic tension were greater problems for those living on-base than those living in the civilian community.

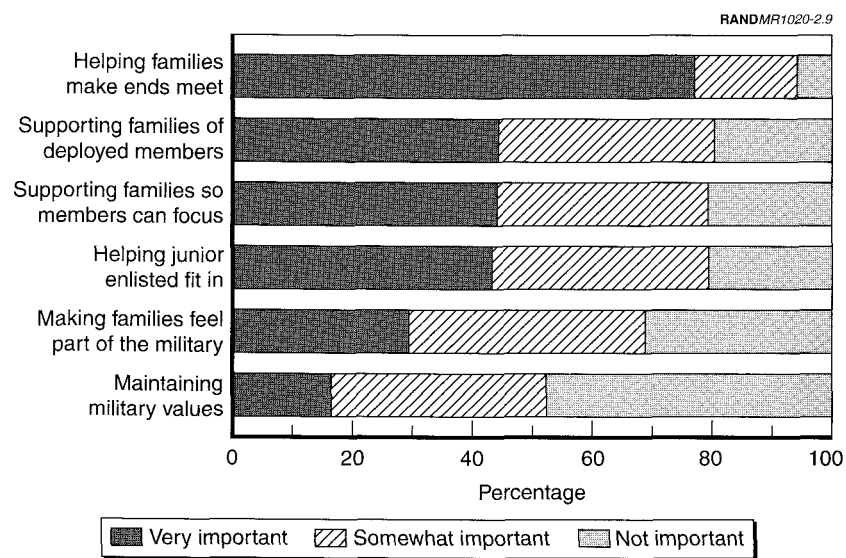


**Figure 2.8—Percentage Reporting Problems in Military Versus Civilian Neighborhoods**



A common rationale for maintaining military housing is that it facilitates the support of families, especially when the military member is deployed, away for other reasons, or simply too busy with work to tend to family matters. Military communities on-base are also thought to promote military values, strengthen cohesion of military personnel, and help junior personnel mature and fit in. Objectively measuring the contribution of military housing to these outcomes is difficult, so we asked the survey respondents to provide their subjective judgments of these “social contributions” (Figure 2.9).

Overall, the survey respondents felt that military housing contributes to the well-being of families and to a sense of community and military values. Even the least important contribution—“maintaining military values”—was thought to be at least somewhat important by half of the respondents. The most important contribution was again thought to be economic—“helping families make ends meet.” Almost everyone thought this was important to some degree and 80 percent rated it very important. Helping families in other ways also was valued to some degree by a large fraction of the respondents.



**Figure 2.9—Survey Respondents’ Attitudes About Family and Community Contributions of Military Housing**

Family support may be better in military housing because the proximity and concentration of families in a single neighborhood facilitates the work of the military’s numerous family-support programs. The structured assistance offered by these programs can be supplemented by the more informal support offered by military neighbors, who share similar circumstances. Some participants in our focus groups pointed out that sometimes military families concentrate in certain civilian neighborhoods and so these community features may be available off-base as well as on-base. Figure 2.10 shows, as expected, that the vast majority of families in military housing have military neighbors; those with civilian neighbors are in Navy housing areas located in the community. Two-fifths of the survey respondents who lived in civilian housing had mostly civilian neighbors. The same fraction lived in mixed military-civilian neighborhoods and only one-fifth lived in primarily military neighborhoods.

In addition to asking how well military housing supports families *in general*, the survey also asked respondents to indicate how well *their families* were supported. Although, as we showed above, 80 percent of respondents felt military housing made some contribution to supporting families in general, there were no differences in how well those in military versus civilian housing thought their own neighbors look after their families when they are gone (Figure 2.11).

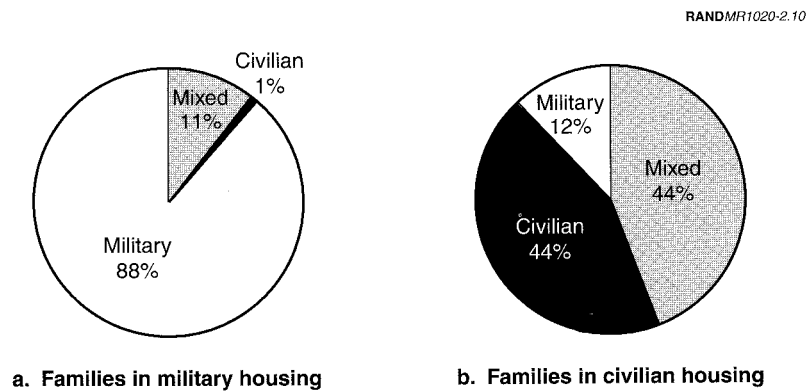
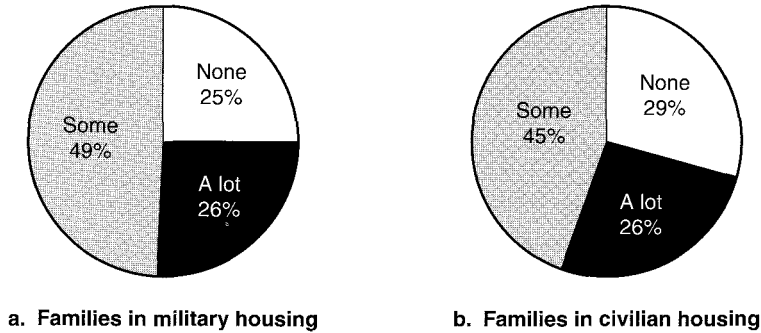


Figure 2.10—Percentage of Respondents in Mostly Civilian, Military, or Mixed Neighborhoods

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**Figure 2.11—Percentage of Families Receiving a Lot of Support, Some Support, or No Support from Neighbors**

Altogether, the evidence from the survey does not point to a critical role for military housing in supporting families. Military neighbors were the least frequently cited reason for choosing to live on-base and members believe their families are equally well supported on and off-base. Other neighborhood differences are also modest and families appear equally well satisfied with their housing. The big difference is economic. For many service members, the value of the housing benefit is larger if they can get into military housing, and this difference weighs heavily in their preferences.

**Differences in Survey Responses by Service and Base**

As we described above, the survey bases were chosen intentionally to vary the housing situation. As expected, we found differences across the 12 bases in the preferences for military versus civilian housing. These are illustrated below in Table 2.3, which lists the bases in order according to the fraction of families that would prefer to live in military housing, if it were available to them, rather than rent or own civilian housing. The estimates of average preferences at each base that underpin Table 2.3 come from a multivariate analysis that adjusts for any differences across the bases in family characteristics. Underlying housing preferences are similar across most bases (the center group in the table), while preferences for military housing

**Table 2.3**  
**Relative Ranking of 12 Survey Bases by Family Preferences**  
**for Military Versus Civilian Housing**

	Rent Compared to Military Housing	Own Compared to Military Housing
<b>Prefer Military Housing</b>	Minot (F) Tyndall (F) McGuire (F)	Lewis (A)
	Hood (A)	Minot (F)
	Lewis (A)	Pendleton (M)
	Cherry Point (M)	McGuire (F)
	San Diego (N)	San Diego (N)
	Jackson (A)	Hood (A)
	Carson (A)	Jackson (A)
	Patuxent River (N)	Patuxent River (N)
	Mayport (N)	Carson (A)
		Tyndall (F)
		Cherry Point (M)
<b>Prefer Civilian Housing</b>	Pendleton (M)	Mayport (N)

NOTE: The service to which each base belongs is indicated in parentheses after the base name: Air Force (F), Army (A), Marine Corps (M), and Navy (N).

differ somewhat from the cluster for the shaded areas at the top and bottom of the table.<sup>8</sup>

The base ordering is not explained by military housing quality and new construction, local housing costs, military presence in the community, the fraction of military families living off-base—the factors we used to select the bases. It is clear that a number of unmeasured factors are important in family preferences.

In Table 2.3, the service affiliation for each base is indicated in parentheses after the base name. There is no obvious pattern of service differences in preferences for owning civilian housing, but there is a pattern in the preferences for renting civilian housing. Families at Air Force bases appear to prefer military housing to civilian rental housing, whereas families at Navy bases seems to prefer renting. Families at Army and Marine bases are in the middle. Nevertheless, the results suggest that families prefer military housing to renting

<sup>8</sup>The construction of Table 2.3 is discussed in more detail in Chapter Four.

under a range of local conditions. With only about three bases per service in the sample, these results should not be generalized to service-wide conclusions.

Despite these base differences in preferences, we did not find significant differences across bases (or services) in families' attitudes towards their housing and their neighborhoods. Nor was there any single base that consistently ranked high or low on the attitude measures. Most of the systematic differences in these measures were due to rank or whether the family lived on-base or off-base.

### WHAT ARE THE COST DIFFERENCES?

Estimating housing costs was not a primary purpose of this study. However, we did collect cost information for the 12 bases where the survey was fielded. Figure 2.12 shows the per-family costs of military housing for each base, in order of increasing costs (the bars), plotted on the same scale as the average allowance that would have been paid to the families in military housing if they had chosen civilian housing instead (the line). The costs consist of three components:

- Operations and maintenance (O&M) costs, which basically reflect the short-term costs of utilities, repairs (except major repairs), and housing administration
- Capital costs, which rely on an assumption that initial construction cost are \$100,000 per unit and the life of the unit is fifty years. The unit is expected to undergo a major revitalization after 30 years at a cost of \$65,000. These cost are amortized over the life of the unit at an interest rate of 2.75 percent.<sup>9</sup>
- Impact aid cost, which is the average amount of money paid to the local school district by the Department of Education for families living in military housing.

Our results show that DoD pays far more for base housing at these 12 installations than it does to defray the cost of civilian housing. The gap between the average cost of housing and the average allowance ranges from three to ten thousand dollars per year. At many bases,

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<sup>9</sup>This methodology for computing capital cost is similar to CBO (1993).

the housing allowance barely exceeds the per-unit O&M cost for military housing. By DoD policy, the allowance is intended to pay 85 percent of the housing expenditures for off-base families, but budget considerations have held the allowance to 80 percent of housing expenditures. Even if we adjust the allowance line to reflect civilian housing expenditures including these out-of-pocket expenses, the cost of housing military families is still much greater in military housing than in the civilian community. This result is consistent with earlier studies (CBO, 1993; GAO, 1996; CNA, 1996).

Figure 2.12 also shows that O&M costs vary nearly two-fold across the bases in our study. These large differences seemed unlikely to reflect “true” cost differences at the bases, so we discussed these differences with base and service housing officials. These officials offered the following explanations for the differences across bases:

- variations in the upkeep of housing
- differences in the range of other housing-related services that are included in the housing budget

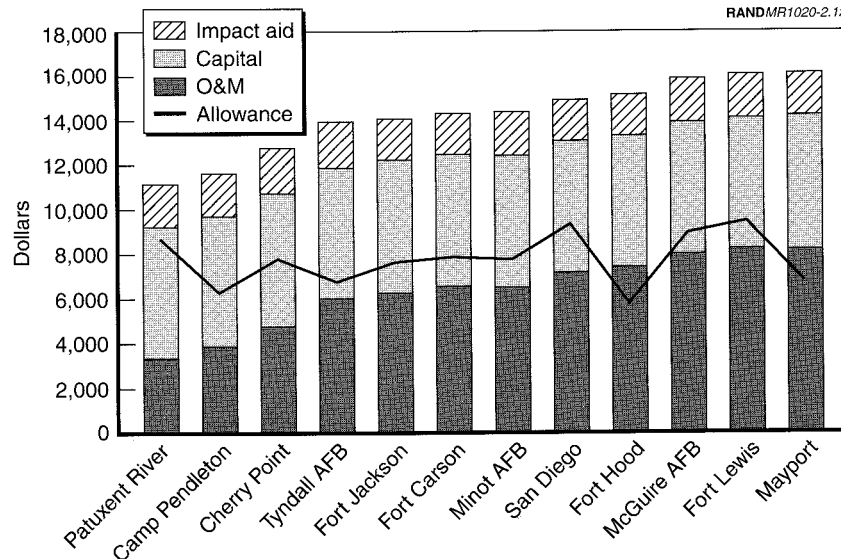


Figure 2.12—Cost per Unit of Military Housing at 12 Study Bases

- differences in accounting practices
- the funding source of the housing program (whether it is a Defense Business Operating Fund).

Some variations in upkeep costs are real: Some structures are older than others, so utility and maintenance costs are higher at bases with an abnormally old housing stock. Similarly, utility costs are higher at bases in cold weather climates than at bases where temperatures are more moderate. Nevertheless, much of the variation in O&M costs may reflect accounting issues and not the actual operating costs of the housing itself.

DoD has also initiated programs to privatize military housing (DoD, 1995; CBO, 1998). These efforts are intended to reduce the cost of military housing. While it is too soon to judge the success of these measures, privatization may reduce the cost of military housing below those reported in Figure 2.12.<sup>10</sup>

Military housing might be worth some extra cost to the military if the extra cost is reflected in an extra benefit to military members. For example, if military housing fostered support of families or strengthened commitment to the military, then the extra cost might be offset by better military performance or retention. Our survey evidence shows that military members are drawn to the economy of on-base living and not by other features of military housing. Similarly, our focus group discussions showed that most members scoffed at the idea that military housing helped members do a better job. This evidence suggests that the military culture might change little if more members lived in the civilian community. In addition, service members would feel few adverse effects if the allowance were increased modestly to offset some out-of-pocket expenses. On the margin, these higher allowances would be a bargain as compared with the higher costs of housing families in on-base facilities.

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<sup>10</sup>A recent GAO report (1998) has shown that privatization is off to a slow start. The report also questions whether DoD should enter into long-term leasing arrangements with private contractors, because GAO believes that these arrangements will save the government little money.

## HOW DO THE HOUSING DECISIONS OF MILITARY AND CIVILIAN FAMILIES COMPARE?

To compare housing for military and civilian families, we used the 1990 Census Public Use File. Our analysis compared the housing choices of military families with those of non-farm civilian families with a head of household between the ages of 18 and 55 and with at least \$10,000 in annual income.

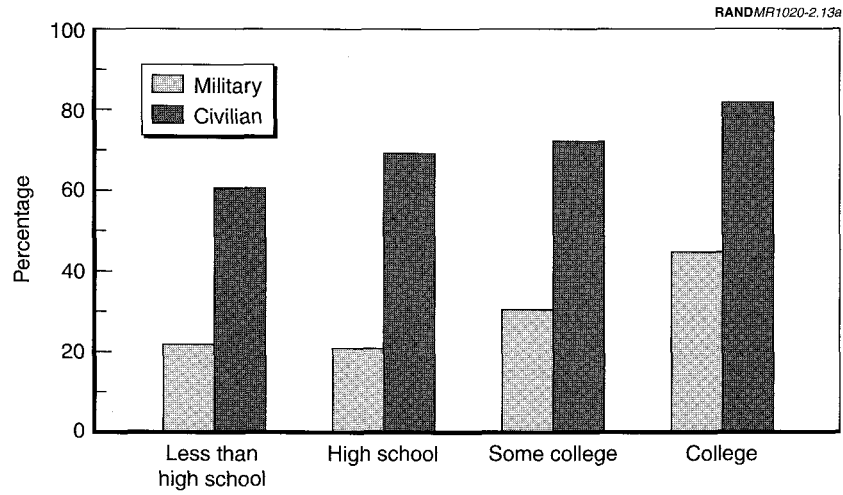
Military families are much less likely to own their own homes than civilian families (Figure 2.13). This may not be surprising: military families move approximately every three years, and one-third live in military housing, which many of them appear to find most cost-effective. Also, the low-income group is dominated by first-term members who may have little interest in remaining in the military as a career and little reason to establish a permanent residence near their current military base.<sup>11</sup> The differences in Figure 2.13 are inflated, however, by the fact that many military members own homes at other locations (presumably where they previously resided). Among members not owning their current residence, our survey results showed that 15 and 39 percent of senior enlisted personnel and officers, respectively, owned a home at a different location (see Chapter Three).

If we look only at renters, we see from Figure 2.14 that their rent accounts for about the same fraction of income for military and civilian families. This comparison includes an adjustment to military families' income to account for the nontaxability of housing allowances. However, we could not adjust for the fact that more military than civilian families legally reside in a state with no income tax. Multivariate analysis, which allowed us to control for other factors, confirmed that military renters pay about the same as civilian renters.

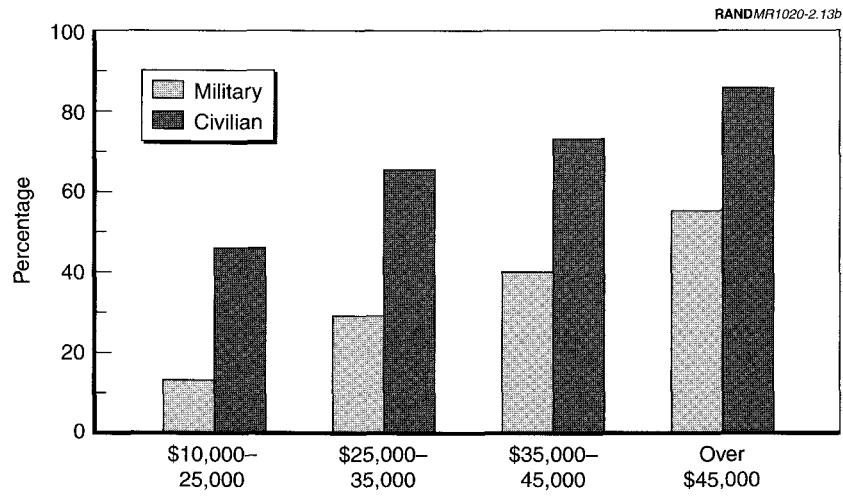
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<sup>11</sup>First-term retention rates are about 40 percent. Most members leaving the military will either return to the hometown or seek employment in an area away from their military base. As a result, it may make little economic sense for these members to purchase a home, even if ownership were economically feasible.



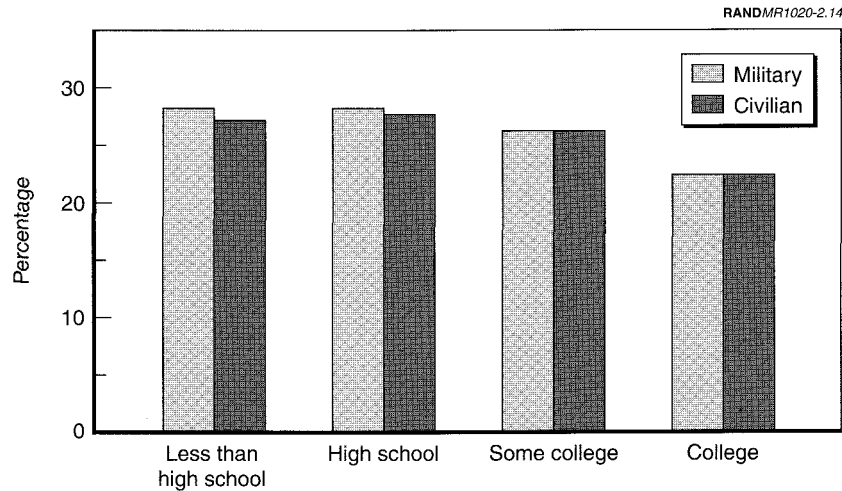


a. By education



b. By income

Figure 2.13—Home Ownership Rates for Military Versus Civilian Families, from 1990 Census (percentages)



**Figure 2.14—Percentage of Income Spent on Rent, Military Versus Civilian Families in the 1990 Census**

In comparison with their civilian counterparts living in the same areas, military families are losing out on the financial and other benefits of home ownership, but overall the housing allowance is sufficient to ensure that they spend about the same fraction of their income when they rent. The losses from the lower rate of home ownership are at least partly offset by the availability of military housing, which most families seem to prefer. Whether, overall, military families come out ahead or behind their civilian counterparts is impossible to determine.

## CONCLUSION

There are three major findings of this study. First, military families assess the value of military housing higher than the value of the housing allowance. Second, the strong demand for military housing is largely due to this “benefit gap”; the other benefits of military housing, such as having military neighbors, appear to be relatively unimportant in family housing choices. Although many service members believe that families in base housing are better supported,

families who live in this housing do not report more support than families living in civilian neighborhoods. Third, service personnel do not seem to view many of the benefits that have traditionally been associated with on-base housing (e.g., acculturation of junior personnel, support for families whose military member is deployed or simply gone a lot, fostering military values) as critical. Having military neighbors was the least frequently cited reason for living on-base. Furthermore, members believe that their families are as well supported off-base as they are on-base. In other words, without the economic benefit, most military members see no compelling reason to live on-base.

Compared to the civilian housing affordable under the current allowance system, military housing is particularly desirable for junior enlisted families. This is clearly the case for updated or new housing, but junior enlisted families prefer even the older, less well-kept housing that is most often available. Senior enlisted personnel and officers can often do as well in the civilian community because the base housing for them is comparatively small.

Relatively few military families would retain a strong preference for military housing if this benefit gap were eliminated. The gap could be closed by charging a modest rent for base housing or increasing allowances. Since this study and previous studies find military housing to be considerably more expensive than paying allowances, DoD could consider phasing out its housing program and redirecting the savings to increase the current allowance level.

In the early stages of our research, we sought reactions to the idea of charging a modest fee for base housing (e.g., to cover utility costs), which would equalize the benefit for most personnel. The reactions were uniformly strongly negative because of the decline in benefit levels. Proposals to use the proceeds to raise allowances were no more popular, in part because service members believed that the allowances would eventually fall back to old levels. The alternative of raising allowances would be received positively by service members, but the cost is unacceptable in an era of tight defense budgets. In the meantime, the increasing pace of new construction of base housing is gradually widening the benefit gap and increasing the demand for this housing.



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## **HOUSING PREFERENCES OF MILITARY FAMILIES**

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### **INTRODUCTION**

In this chapter, we present results from an analysis of the 1997 Survey of Military Members' Housing Choices and Preferences. The survey was designed by RAND to assess the direct and indirect benefits of military housing as well as the process and factors that determine military families' housing choices. Housing preferences and choices are evaluated for military members in the Army, Navy, Air Force, and Marine Corps. Survey data were collected at twelve bases (four Army, three Navy and Air Force, and two Marine Corps) from about 4500 respondents.

The chapter is divided into three subsections. In the next subsection, we describe the 1997 Survey. The third subsection describes results from the survey: we characterize the current housing of military families, describe the process of their finding housing, report on their satisfaction with their housing, review the reasons they chose their current housing, and summarize their housing preferences.

### **DESCRIPTION OF SURVEY**

Detailed discussion of survey administration and design issues are in the appendices. Appendix A describes the selection of bases for the survey. Appendix B examines the selection of individual military members for inclusion in the survey sample. The survey instrument is shown in Appendix C. Finally, survey response and the construction of sample weights are discussed in Appendix D.

Twelve bases were chosen to represent a broad range of housing options available to military families. Key factors in picking the bases were the cost of living in the area, the ratio of military to civilian population, the share of military members in military housing, the perceived quality of military housing, and the level of new military housing construction. After an analysis of these types of factors, we selected four Army Bases (Fort Carson, Fort Hood, Fort Lewis, and Fort Jackson), three Navy bases (Mayport NS, Patuxent River NAS, and the San Diego Naval Complex), three Air Force bases (McGuire AFB, Minot AFB, and Tyndall AFB), and two Marine Corps bases (Cherry Point MCAS and Camp Pendleton).

The survey sample was designed to be representative of the base population at each of the 12 bases. Our goal was 400 completed surveys from each base. The sample excluded members in initial training (paygrades E1, E2, and O1), because these members have temporary housing arrangements. Also, senior officers were excluded because our sample was insufficient for inferences for this small population group. The sample was balanced equally between members living in military housing and those living in civilian housing that was either rented or owned by members. The sample was further partitioned by pay group: one-sixth was E3, one-half was E4 to E9, and one-third was O2 to O5.

Sample weights were constructed to reflect sample nonresponse and adjust the survey responses to be representative of the corresponding base-level population. Weighting was based on a twenty-four cell design that controlled for differences in response rates across four groups of factors: military rank group (E3–E5, E6–E9, and O2–O5), ethnicity (African American and all others), military housing status, and combat or ship status. Initial inverse weights were based on the ratio of respondents to population in each cell. These weights were then adjusted to correct for patterns of nonresponse across bases. The analyses presented below are based on these weighted responses and are representative of the underlying populations at the survey bases.

The survey data include detailed information about members' housing choices and preferences, experience with military housing waiting lists, housing characteristics, neighborhood characteristics, and preferences for hypothetical housing alternatives.

## A DESCRIPTION OF HOUSING CHOICES AND PREFERENCES

In this section, we describe respondents' current housing, the process by which they found housing, the characteristics of their housing, their satisfaction with their housing, reasons why they chose their housing, and their preferences for housing given alternative scenarios.

### Current Housing

Overall, about 43 percent of the sample is in military housing, and just over half is in civilian housing, with 30 percent of the sample renting civilian housing, and 27 percent owning their home (see Table 3.1). About 47 percent of E3–E6s were in military housing, compared to 35 percent of senior enlisted members and 36 percent of junior officers. Only about 25 percent of senior officers resided in military housing.

Correspondingly, more officers than enlisted rented or owned civilian sector housing. Senior enlisted and senior officers were much more likely than junior enlisted, and somewhat more likely than junior officers, to own their own homes. The rise in home ownership among E5s and E6s compared to E3s and E4s is striking; only 6 percent of the most junior enlisted owned their home, compared to 29 percent of E5s and E6s.

**Table 3.1**  
**Current Housing by Rank**  
**(percentages)**

	Military Housing	Rented Housing	Owned Housing
Enlisted			
E3–E4	46.1	48.1	5.8
E5–E6	47.8	23.0	29.2
E7–E9	34.6	17.4	48.0
Officer			
O2–O3	35.5	23.4	41.1
O4–O5	25.6	20.4	54.0
Overall	42.5	30.2	27.3

## The Process of Finding Housing

Military members are frequently re-stationed, and thus frequently must change their residence. How do military members go about finding housing in an unfamiliar area? What do military housing offices do to help, and what actually helps?

Some military members begin their search for housing before arriving at the new base. Of those in the sample, 56.3 percent report that they looked for housing at the new base before actually moving there. Also, about half received an information packet about the new base before arriving.

Once at the new base, 77.6 percent stopped in at the housing office. The services they received there varied tremendously:

- information packet about housing at the new base—approximately 50 percent
- information about rental opportunities in the civilian market—62 percent
- information tailored to their needs, such as through a computerized program that allows searches for particular types of rental units—37 percent
- access to a fax or phone to assist them in their housing search—29 percent
- assistance in getting a “military clause” signed by their prospective landlord that would allow them to leave the unit if military housing became available—26 percent
- information about local neighborhoods such as crime statistics and test scores at nearby schools—22 percent.

An ironic factor was that the services most often ranked as helpful by those who received them were the ones that were least often received. The most helpful services were (1) help in getting the military clause signed, (2) fax or phone access, (3) neighborhood statistics on crime, schools, etc., and (4) information about rentals tailored to the family’s needs. Yet only about a quarter of military members received the first three services (25 percent, 22 percent, and 29 percent, respectively), and only 37 percent received the fourth service. While



the housing office on-base may be at fault for not providing the service, it may also be the case that the service was available but not accessed by members.

Members were asked about the perceived usefulness of housing services that were not available when they arrived at their current assignment. The greatest demand was for an information packet about the base delivered to the member before arrival at the base: 46.3 percent of those who did not get a welcome packet before arriving thought that would be helpful. Crime and other neighborhood statistics and tailored rental information were also in high demand among those who did not receive those services: 39 percent thought the former and 31 percent thought the latter would be useful.

Information-gathering outside of the housing office played a significant role in the search for housing. About 44 percent of members received help from other military members at the new base. Bases sometimes assign a “sponsor” to a new arrival to help them with housing and other issues associated with relocation. In focus groups at several of the bases, the sponsor program received high praise, though the quality of the program varied with the individual sponsor. The sentiment was that when the sponsor program worked, it worked quite well. About 40 percent of members also sought information from local newspapers, and 30 percent worked with a private location service or real estate agent.

In the end, about 37 percent of service members found a place at the new base for themselves and their family within a week. Among those who did not find housing within a week, the median length of time the housing search took was three weeks. About 71 percent of members moved their families to the base with them. The remaining third of members had their families wait a few weeks before coming to the new base. The median length of time that families waited was six weeks.

### **Characteristics of Current Housing**

Table 3.2 shows that military housing is older, smaller, and of poorer quality compared to the housing in which members reside in the civilian sector. On the other hand, military housing is much closer to work, has greater access to recreational facilities (compared to

**Table 3.2**  
**Housing Characteristics by Housing Type**  
 (percent unless otherwise noted)

Characteristic	Military Housing	Rental Housing	Owned Housing
Type of residence			
Mobile home or trailer	1	3	9
Detached house	20	41	83
Attached house	71	14	5
Apartment/condo	8	42	3
Age of residence (years)	31	21	15
Size of residence (sq. ft.)	1257	1336	1728
Playground nearby	94	59	61
Pets allowed	88	72	99
10 minute work commute	58	21	9
30 minute work commute	97	85	77
Serious pest problem	23	8	6
Good overall housing condition	66	79	95
Good school quality	26	29	49
Good parks/recreational facilities	35 <sup>a</sup>	33 <sup>a</sup>	49
Neighborhood problems			
Traffic	6 <sup>a</sup>	5 <sup>a</sup>	4
Noise	7	5	2
Crime	3	5	2
Racial tension	2 <sup>a</sup>	3 <sup>a</sup>	1
Any of these problems	14 <sup>a</sup>	12 <sup>a</sup>	6
Feel can count on neighbors	26	19	34

NOTE: The entries are adjusted for characteristic differences across base and pay groups. The differences between table entries for each characteristic are statistically significant ( $\alpha=0.05$  confidence level) in all cases *except* those annotated (a). The annotation means that the marked entries for that characteristic are not significantly different from one another although each is significantly different from the unmarked category.

rentals), and residents are more satisfied with the reliability of their neighbors. Military housing also offers far more attached houses compared to the civilian sector, where most military members who rent are in apartment complexes. Military housing and civilian rental neighborhoods are quite similar, while owners have fewer problems with traffic, noise, crime, and racial problems, have better quality schools, parks and recreational facilities, and find their neighbors much more reliable. Owners, however, have much longer commutes.

The estimates in Table 3.2 have been adjusted to hold constant the effects of base and the military member's rank.<sup>1</sup> This adjustment prevents the differences from being dominated by effects for a particular base or pay group. For instance, officers are more likely than junior enlisted to own, and are able to afford comparably larger units. Thus, some of the difference in square footage between housing that is owned and military housing, for instance, reflects the larger income of officers compared to enlisted members. We adjusted the means for differences across bases and in the characteristics of those residing in each of the three types of housing (owned, civilian rental, and military housing) and checked for significant differences between the means by housing type.

Military housing is about 80 square feet smaller and 10 years older than civilian rental housing. Military housing has problems with pests and overall condition. Pests are a serious problem for 23 percent of families in military housing as compared with about 7 percent in civilian housing. About 66 percent of members in military housing rank the condition of their housing as good or very good compared to 79 and 95 percent of those living in rental and owned housing, respectively.

Commuting time is a big advantage of military housing. Most military housing residents have a commute of less than 10 minutes, and virtually all commute less than 30 minutes. Few renters or owners are within 10 minutes of work, but about 80 percent commute 30 minutes or less. Owners have somewhat longer commutes than do renters.

Owners are much more satisfied with their neighborhoods than residents of military or rental housing. Owners are more satisfied with neighborhood schools and the quality of nearby parks and recreational facilities than others. Owners also report lower levels of neighborhood problems like crime, noise, traffic, and racial tensions compared to both military and rental housing residents.

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<sup>1</sup>The adjustment is based on a regression of each housing characteristic on indicator (dummy) variables for housing type, rank, and base. The predicted level for each characteristic is then the predicted effect at the mean proportions of the rank and base variables for each housing type.

Policymakers have often argued that military housing allows military members to rely on similar military families for support during stressful times and deployments. Our data shows that most members are hesitant to “count on their neighbors.” Renters are less satisfied than others with the reliability of neighbors. Only 19 percent of renters felt able to “count on their neighbors” as compared with 26 of military housing residents. About 34 percent of homeowners were confident about getting assistance from neighbors. Taken as a whole, only about 25 percent of members are willing to count on their neighbors, and the percentage differs little between military and civilian (renter and owners combined) housing alternatives.

While these evaluations of housing and neighborhood characteristics are informative, they reflect subjective judgments of members and perhaps rationalizations of prior decisions. For example, owners may indeed live in better neighborhoods than renters, but they may not be completely objective in rating their situations. Since owners have a greater stake in their community through their investment, they may be more reluctant to recognize neighborhood faults or shortcomings. In addition, groups of members may have discounted the importance of some factors in their housing decision. For example, members who don’t use park facilities may not be well-informed about the adequacy of available parks in their neighborhood.

### **Satisfaction with Current Housing**

Respondents were asked about their satisfaction with their current housing, including their satisfaction with the quantity, quality, and costs of their current housing. Respondents indicated whether they were very dissatisfied, dissatisfied, neither dissatisfied nor satisfied, satisfied, or very satisfied.

We compared individuals’ satisfaction across tenure groups by looking for differences in the percentage of individuals in each housing type (owned housing, civilian rental housing, and military housing) who were satisfied or very satisfied with each housing characteristic. In doing so, we held constant rank and base effects on satisfaction (see Table 3.3).

**Table 3.3**  
**Housing Satisfaction by Housing Type**  
**(percentages)**

Member is Satisfied or Very Satisfied Characteristic	Military Housing	Rental Housing	Owned Housing
Number of rooms	71 <sup>a</sup>	70 <sup>a</sup>	88
Size of rooms	52	57	81
Yard	53	44	80
Landlord services	49	61	NA
Overall quality	59	68	92
Ability to improve unit	53	60	NA
Rules governing unit	56	71	NA
Housing costs	65 <sup>a</sup>	42	63 <sup>a</sup>

NOTES: The entries are adjusted for characteristic differences across base and pay groups. The differences between table entries for each characteristic are statistically significant ( $\alpha=0.05$  confidence level) in all cases *except* those annotated (a). The annotation means that the marked entries for that characteristic are not significantly different from one another although each is significantly different from the unmarked category.

Owners were more satisfied with their current housing than either renters or those in military housing in every regard but housing costs. About 64 percent of homeowners and military housing residents are satisfied with their housing costs; owners have greater housing amenities than those in military housing, but they also absorb substantially greater out-of-pocket expenses for housing.

Renters were no more satisfied with the number of rooms in their current housing than those in military housing, but renters were more satisfied with the size of their rooms (by about 5 percent), the services the landlord provided (by about 12 percent), the overall quality of their housing (by about 9 percent), their ability to upgrade their housing as they like (by about 7 percent), and the rules governing their housing unit (by about 15 percent).

On the other hand, those in military housing were more satisfied with their yard than renters (by 9 percent). In part, that may reflect the fact that military housing is more likely to be an attached house, which allows for a yard, as opposed to an apartment in a complex, which precludes a private yard.

Most important, military housing residents are more satisfied with their housing costs than renters in the civilian market. Controlling for rank and base effects, renters were 23 percent less likely to be satisfied with their housing costs.

Table 3.4 shows the percentage of each type of housing resident (owner, renter, resident in military housing) reporting different levels of satisfaction with the cost of housing. About 67 percent of those in military housing indicated that they were satisfied or very satisfied with their housing costs, compared to only 44 percent of renters, and 62 percent of owners.

### Reasons Behind Current Housing Choice

Military members were asked what factors influenced their choice of where to live, and what factors were either the most important reason or the second most important reason for choosing their current housing type. The results are shown in Table 3.5.

Residents of military housing prefer it primarily for economic reasons, i.e., because living in military housing saves money relative to living off-base. About 61 percent of military housing residents indicated that they chose military housing because it was a “better economic decision.” Other reasons are much less common: about 27 percent like the security of living on-base, 26 percent liked being close to work, and 23 percent chose military housing because it was

**Table 3.4**  
**Satisfaction with Housing Costs by Type of Housing**  
**(percentages)**

	Military Housing Residents	Renters in Civilian Sector	Owners
Very dissatisfied	5	12	6
Dissatisfied	6	26	16
Neither satisfied nor dissatisfied	22	18	16
Satisfied	36	34	40
Very satisfied	31	10	22

**Table 3.5**  
**Reasons for Choosing Current Type of Housing: Percentage of Residents**  
**Listing Factor as 1st or 2nd Most Important in Decision**

Housing Attribute	Percent
<i>Military Housing Residents</i>	
Living in military housing was a better economic decision	61.1
Liked the security of living in military housing	27.2
Liked being close to work	25.5
Military housing was available when needed	22.7
Did not like the civilian housing that was available and affordable	12.7
Like the military housing that was offered	8.9
Liked being close to base facilities, such as exchange and commissary	7.8
Thought schools were better on-base than off-base	4.2
Like having military neighbors	2.2
<i>Renters</i>	
Military housing not available when needed	40.2
Liked the freedom from military housing rules and regulations	35.9
Like the privacy of living in a civilian community	31.0
Did not like the military family housing that was available	15.7
Renting civilian housing was a better economic decision	11.0
My spouse is military, so it is not worth it to live in military housing	6.5
Thought schools were better off-base than on-base	6.0
Like having civilian neighbors	5.6
Like the security of living in civilian housing	2.6
<i>Owners</i>	
Owning my own home provided a good investment and tax advantage	40.5
Owning a home was a better economic decision	30.0
Liked the freedom from military housing rules and regulations	23.2
Military family housing was unavailable when needed	16.9
Liked the privacy of living in a civilian community	16.5
Expect to live in this area when I leave the military	13.3
Did not like the military family housing that was available	12.4
Liked the ability to change my house/condo	10.6
Thought schools were better off-base than on-base	9.5
My spouse is military, so it is not worth it to live in military housing	4.3
Didn't want to deal with a landlord	2.6
Liked having civilian neighbors	1.7
Liked the security of living in civilian housing	0.8

available when they needed it.<sup>2</sup> Fewer than 10 percent of members picked military housing because either they liked the housing offered, liked military neighbors, preferred on-base schools, or wanted to be near base facilities.

Economic factors also drive the decision to own. About 40 percent of owners said that the investment benefit and tax advantage that purchasing a house provides led them to buy. Similarly, 30 percent saw owning as a better economic decision than living on-base or in rental housing. Freedom from military rules and regulations also factored into nearly one-fourth of owners' decisions.

Among service members in rented housing in the civilian sector, 41 percent indicated they chose to rent because military housing was unavailable. About 36 percent indicated that civilian housing gave them freedom from "military rules and regulations" and 30 percent liked the privacy of being in a civilian community.

The survey also collected information on what members perceive to be the key reasons for having military housing (see Table 3.6). Consistent with the finding that economic factors were behind the decisions of many to live in military housing, many members be-

**Table 3.6**  
**Reasons for Having Military Housing**  
**(percentages)**

Reason	Very Important	Somewhat Important	Not Important
Helping families make ends meet	77.22	17.41	5.37
Helping junior enlisted fit in	43.17	36.24	20.59
Maintaining military values	16.21	35.93	47.86
Supporting families of deployed members	44.24	36.22	19.54
Supporting families so members can focus on their jobs	44.09	35.40	20.52
Making families feel part of military	29.14	39.80	31.07

<sup>2</sup>We often refer to military housing as "on-base" housing. While we use the terms interchangeably through the document, it is important to note that not all military housing is necessarily on the base. Military housing may be housing owned by the military that is located in the civilian community.



lieved that an important role of military housing is to help military families make ends meet. About 77 percent of members cited this as a very important reason for having military housing. The feeling was common across all ranks, enlisted and officer.

However, military housing was also seen as serving other functions: supporting the families of deployed military personnel, helping service members focus on their jobs by keeping families safe, and helping junior enlisted personnel fit into the military. These were seen as very important roles of military housing by over 40 percent of service members.

The perceived importance of those alternative roles varied somewhat by rank. Senior enlisted personnel and senior officers, for example, were more apt to think that military housing was important for helping junior enlisted fit in. About 57 percent of senior officers and 50 percent of senior enlisted personnel thought that role of housing was very important, compared to only about 42 percent of junior officers and 40 percent of junior enlisted. In fact, nearly a quarter of E3s and E4s thought that military housing was not at all important in helping them fit in.

Officers were more inclined than enlisted personnel to see support of families as important. About 57 percent of senior officers and 50 percent of junior officers cited support of families as very important, compared to 45 percent of senior enlisted and 42 percent of junior enlisted personnel.

Enlisted personnel were also not as convinced that military housing has a role in helping military members feel a part of the military community. About 62 percent of E3s and E4s, 63 percent of E5s and E6s, and 61 percent of senior enlisted personnel felt that military housing was important in building community, compared to 74 percent of junior officers and 81 percent of senior officers who felt that it was somewhat or very important.

A somewhat surprising result of the survey is that few members thought that military housing was very important in maintaining military values. Participants in our focus groups echoed this theme: service members do not think that living in military housing makes members more committed to the service or more productive at their

military jobs. There was a great consensus that military values were acquired in workplace settings and not in housing arrangements. Many members remarked that they did not often interact with military neighbors when they lived in military housing. Finally, many members remarked that their civilian housing area was dominated by military families, so military neighbors were common in off-base areas. Thus, any benefit of having military neighbors could be and was achieved in nonmilitary housing.

A major concern of policy makers has been the ability of military members to purchase homes (DoD, 1995). Frequent military moves may make it unprofitable for members to purchase a home, because frequent real estate transactions as they move from assignment to assignment would limit their ability to accumulate equity. The survey results confirmed that mobility was a major deterrent to ownership, although affordability was also an important impediment to ownership. Those in military housing and civilian rental housing were asked why they chose not to own (see Table 3.7). Among those in military housing, about half felt they could not afford to own, but also extremely important was that they expected their stay at the base to be short. Half of those who could afford to purchase housing cited the short time at the base as affecting their decision not to own. Similarly, of the 54 percent of renters who felt they could afford to own housing, 68 percent said that they were at the base for too short a time to make owning worthwhile.

**Table 3.7**  
**Reasons for Not Purchasing a Home at Current Location**  
**(percentages)**

Reason	Military Housing	
	Residents	Renters
Already owned elsewhere	6.6	6.8
Could not afford to buy	49.6	46.1
Not a good investment/too risky	24.9	18.7
Prefer to live in military housing	17.3	NA
Only expected to be here a short time	45.1	52.3

NOTE: Percentages do not sum to 100 percent, since members were asked to "check all that apply."

On average, few nonowners (at the current location) were dissuaded from buying because they owned at another location. This percentage differs substantially by rank, however.<sup>3</sup> Table 3.8 shows that nearly 40 percent of senior officers who don't own at their current location owned property at another location. About 10 and 15 percent of junior officers and senior enlisted members, respectively, own property at another location.<sup>4</sup>

Table 3.9 shows that ownership either at the current location or elsewhere is common for all but the junior enlisted ranks.<sup>5</sup> Over 70 percent of senior officers are homeowners. About 46 and 55 percent of junior officers and senior enlisted members, respectively, own a home somewhere. Among midgrade enlisted personnel, the ownership rate is about 32 percent. Only about 8 percent of junior enlisted personnel own homes. This low ownership rate reflects the young

**Table 3.8**  
**Members Who Did Not Purchase a Home at Their Current Location**  
**Because They Owned a Home Elsewhere**  
**(percentages)**

Military Grade	Military Housing Residents	Renters	All Nonowners
E3-E4	1.8	2.3	2.1
E5-E6	6.1	2.8	5.0
E7-E9	12.0	20.9	15.0
O2-O3	7.6	13.7	10.0
O4-O5	34.0	45.8	39.2
Average	6.6	6.8	6.7

<sup>3</sup>Higher ranking members earn more income, but they are also older and may want different housing amenities than younger members. In addition, these members may also have working spouses whose earnings increase family income well beyond that of the military member separately.

<sup>4</sup>Our estimates of ownership elsewhere should be treated as a lower bound. Our question asks whether owning a home elsewhere was a reason for not buying at the current location. Some members may own property elsewhere but not have considered that to be a deterrent to purchasing a home at their current location.

<sup>5</sup>In Chapter Five, we will compare the ownership rates of military personnel with those of their civilian counterparts using data from the 1990 Census.

**Table 3.9**  
**Members Who Own Homes Either at Their Current Location**  
**or Elsewhere (percentages)**

Military Grade	Owner at Current Location	Own Elsewhere, but Not at Current Location
E3–E4	5.7	2.0
E5–E6	28.7	3.5
E7–E9	47.2	8.0
O2–O3	40.6	5.8
O4–O5	53.7	17.9
Average	26.8	4.9

age and low income of this group as well as the fact that most of these members are still in their first enlistment term and unlikely to remain in their current location for long.<sup>6</sup>

### **Comparing the Value of Military Housing and Housing Allowances**

As a first means of learning about the potential role of economic factors in determining individuals' decisions to live in military or private sector housing, we impute an economic value, or "implicit rent," to military housing based on the price that individuals pay for housing attributes in the private sector market. We then describe how the implicit rent of military housing compares to the housing allowance.

Previous studies have compared the economic value of the military housing benefit to the housing allowance using different methodologies (CBO, 1993; GAO, 1996). The GAO, for instance, employed two approaches to the comparison. First, the GAO compared the out-of-pocket expenditures of those in military housing to those in nonmilitary housing. The GAO found that those in nonmilitary housing

<sup>6</sup>First-term retention rates have traditionally been about 40 percent. Since most of the junior enlisted group will be leaving the military in the next few years, they are unlikely to remain at their current location very long, and a home purchase may be unprofitable.

spend more of their own money on housing than those in military housing. However, the housing allowance is *designed* to cover 85 percent of housing expenditures, with the remaining 15 percent to be covered by the military member.<sup>7</sup> In addition, some members in nonmilitary housing have greater out-of-pocket expenses because they prefer to consume more housing—they may choose higher quality or larger places. Those living on-base may have a preference for consuming less housing. Thus, the amount spent out-of-pocket is not an accurate measure of the difference between the value of military housing and the housing allowance.

The second approach that the GAO took is to compare the amount that the government spends on a military housing unit to the amount it spends on an individual's allowance. The report found that military housing is by far the more expensive of the two. However, this method of developing a measure of the difference in value of the two benefits is flawed for two reasons. First, compared to the private sector, the government is likely to be a relatively inefficient producer of housing services, because government officials lack a profit incentive to make efficient economic decisions (Commission, 1995; Camm, 1996). That is, \$100 spent by the government is likely to yield fewer housing goods than \$100 spent by the private sector. As a result, the benefit yielded to military-housed and nonmilitary-housed members may be more equal than the absolute difference between expenditures would suggest. The second problem with the expenditure measure stems from the difficulties that exist in accounting for costs of military housing. There is substantial heterogeneity across services and within services across different bases in accounting practices. For instance, at some bases, a particular group of personnel have responsibility for maintenance of all base structures, so that the cost of housing maintenance is not accounted for separately from the cost of maintenance of other structures on the base. At other bases, however, housing maintenance is outsourced, and the costs of the outside contract are directly attributed to housing operations and maintenance.

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<sup>7</sup>As discussed earlier, the actual out-of-pocket expenses for off-base military families average about 20 percent of housing expenses.

We take a different approach to comparing the two housing benefits, military housing and the housing allowance: We determine what rent the military unit would command in the civilian market using estimates from a hedonic equation of rent on housing attributes and compare that to the housing allowance. The hedonic regression provides estimates of the effect of particular housing attributes on overall rent, or the “marginal prices” of each attribute. The regression is run using the sample of individuals in civilian rental housing for whom rent is observed. We use the estimated prices of each housing attribute and information on the attributes of military housing to impute the “implicit rent” of military housing; that is, the rent that the military member living in the unit would have to pay for the unit were it in the private sector.

The more complete the specification of the hedonic equation the better the estimate of the implicit rent of military housing. The 1997 Survey has detailed information, covering both quantity and quality, on civilian and military housing units. We experimented with a large number of housing and neighborhood characteristics in determining the specification that best fit the data. Our specification includes the type of unit (mobile home, detached or attached house, apartment unit); the age of the unit; the number of rooms, bathrooms and bedrooms; estimated square footage; conveniences that came with the unit such as refrigerator, dishwasher, air conditioning, garbage disposal, laundry facilities; existence of a yard; parking facilities; whether the unit allows pets; the condition of the unit; the quality of neighborhood schools and whether there is a park or recreational facility in the neighborhood; and distance of the unit from the military base. In addition, the hedonic specification includes a dummy variable indicating whether the tenant has been there for less than one year. New tenants are likely to be charged higher rents than tenants who have been in the housing unit for longer periods of time; many landlords do not change existing tenants’ rent, or change only slightly, regardless of price changes in the local housing market. The value of military housing that we impute should include these length-of-tenancy price effects, because they determine what the military member would have had to pay for the same unit in the private market. The hedonic equation also includes fixed effects to control for price differences in housing markets associated with different bases.

Table 3.10 shows the results of the hedonic rent equation. As expected, houses and attached houses (condominiums) demand higher rents than apartments, and detached houses demand higher rents than condominiums. Bigger houses, in terms of the number of bathrooms, bedrooms, and other rooms, demand higher rents. Laundry and parking facilities also affect rent. The coefficient on the dummy variable, indicating that the individual is a relatively new tenant, is positive; this is consistent with the theory that there are price discounts for long-term tenants, but this coefficient is not significant. The coefficient on the variable indicating a commute that is less than 10 minutes, is likewise positive; this is in line with our expectation that individuals trade off a longer commute for lower priced housing, but it is insignificant as well. The model controls for base-specific fixed effects that reflect a variety of location-specific factors that are not specifically measured in the survey but affect local rents. We experimented with many different right-hand-side specifications and found some fluctuations in the significance of certain variables, but little fluctuation in the predicted value of military housing based on the specification.

We also explore a potential sample-selection bias in the parameter estimates in Table 3.10. The concern is that the prices paid by renters might not be representative of what members living in military housing would be willing to pay for housing amenities. This misrepresentation might reflect the fact that renters had selected civilian housing and may have valued civilian amenities differently than their counterparts living on the base. As a result, the predicted value of military housing based on these estimates might distort the value of military housing.

We estimate a two-equation selection model to test whether the renter-assessed values of housing amenities is representative of the value of military-owned amenities. The approach parallels that of Ihlanfeldt and Martinez-Vazquez (1986), who were concerned that hedonic price estimates based on recent housing sales might not reflect how a broader sample of homeowners valued housing amenities. In our case, suppose that the probability of a family renting civilian housing instead of living in military housing is  $z_j\gamma + \varepsilon_{1j}$ , where  $z_j$  is a vector of independent variables that affect the tenure choice for observation  $j$ ,  $\gamma$  is a vector of estimated parameters, and  $\varepsilon_{1j}$  is a normally distributed error term with zero mean and unit variance.

**Table 3.10**  
**Estimates from the Hedonic Rent Equation**  
**(sample includes members in civilian rentals units)**

Dependent Variable: Log Rent	Coefficient	Standard Error
Mobile home	-0.074	0.050
Attached house	-0.062 <sup>a</sup>	0.031
Apartment	-0.076 <sup>a</sup>	0.037
Year house was built	-0.049	0.070
Year built squared	0.004 <sup>a</sup>	0.002
Number of other rooms	0.031 <sup>a</sup>	0.007
Number of bedrooms	0.084 <sup>a</sup>	0.014
Number of full baths	0.091 <sup>a</sup>	0.020
Number of half baths	0.048 <sup>a</sup>	0.019
Square feet (in thousands)	0.000	0.000
Dummy variable indicating missing square feet	-0.009	0.026
Refrigerator included	-0.089 <sup>a</sup>	0.025
Dishwasher included	0.129 <sup>a</sup>	0.022
Garbage disposal included	0.003	0.020
Central air	0.015	0.022
Other air	-0.033	0.020
Cable	-0.035	0.027
Private yard	0.012	0.028
Pets allowed	-0.004	0.017
Laundry machine in unit	0.132 <sup>a</sup>	0.028
Laundry hook up	0.109 <sup>a</sup>	0.024
Shared, free laundry facilities	0.056	0.035
Coin operated laundry facilities	0.014	0.026
One car garage	0.031	0.024
Two car garage	0.096 <sup>a</sup>	0.031
Carport	0.020	0.025
Off-street parking lot	-0.016	0.020
Driveway	-0.016	0.021
Playground nearby	-0.018	0.017
Schools good quality	0.034	0.019
Commute within 10 minutes	0.021	0.020
Tenant less than 1 year	0.009	0.016
Good condition	-0.019	0.017
Constant	6.175 <sup>a</sup>	0.065
R-square	0.614	
Sample size	970	
Root mean-square error	0.228	

NOTES: Coefficients with asterisks are significant at the  $\alpha=0.05$  percent confidence level in all cases except those annotated (a). The annotation means that the marked entries for that characteristic are not significantly different from one another although each is significantly different from the unmarked category. The coefficients on "Year Built" and "Year Built Squared" are multiplied by 100. The model controls for base-level fixed effects.



The hedonic equation is  $y_j = \mathbf{x}_j\beta + \sigma\varepsilon_{2j}$ , where  $y$  is the log of gross rent,  $\mathbf{x}_j$  is a vector of housing attributes,  $\beta$  is a vector of estimated hedonic prices,  $\sigma$  is a formalization factor to adjust for the variance in  $y_j$ , and  $\varepsilon_2$  is a normally distributed error term with zero mean and unit variance that is potentially correlated with  $\varepsilon_1$  with correlation  $\rho$ .

The selection model is estimated by maximum-likelihood methods and shows that the correlation between the error terms was not significantly different from zero. As a result, the selection-adjusted parameter estimates and predicted value of military housing are similar to those based on the simpler one-equation hedonic specification as reported in Table 3.10. For simplicity, we rely on the results from the one-equation specification, and the results from the selection model are reported in Appendix E.

We use the estimated coefficients in Table 3.10 and information on the characteristics of military housing reported by those residing in military housing at the twelve bases to assign an average economic value (by rank) to military housing.<sup>8</sup> The economic value can be thought of as the implicit rent of military housing—that is, the price that military members would have to pay for the military unit were it in the civilian market.

Table 3.11 reports the implicit rents of military housing and the corresponding average allowance for service members of different ranks. The reported allowances control (as we did in the hedonic equation) for differences across bases in the housing allowance.

Comparing the implicit rent of military housing to the housing allowance shows that there is a “benefit gap” between housing itself and the allowance, which is especially large for junior enlisted members and diminishes with rank seniority. That there is a difference between the implicit rent of military housing and the housing allowance is not necessarily surprising, but the magnitude of the difference for the junior enlisted and the pattern of diminishing differences with rank are important findings.

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<sup>8</sup>The dependent variable in the regression is the natural log of gross rent. The predicted rent ( $R$ ) is therefore  $R = \exp(\mathbf{X}\beta + 0.5\sigma^2)$ , where  $\mathbf{X}$  is the vector of military housing characteristics, and  $\sigma^2$  is the variance in the regression prediction.

**Table 3.11**  
**Implicit Rent and Housing Allowance by Rank Group**  
**(dollars)**

Group	Implicit Rent	Average Allowance
E3-E4	735	519
E5-E6	824	650
E7-E9	886	766
O2-O4	854	803
O5	1020	1012

The housing allowance is designed to cover 85 percent of an individual's housing costs. The 15 percent target absorption rate in part reflects the previously un-estimated but perceived value of the military housing benefit: if military housing is in general not as nice as private sector housing, then giving individuals the full cost of their private sector housing would be a greater benefit (in terms of direct costs) than the provision of military housing. Thus, the result of a 100-percent allowance would be that no one desired military housing.

However, nonmonetary costs and benefits of living in military housing also affect the true value of the military housing benefit, and thus the difference between the value of military housing and the housing allowance. The housing allowance is designed to provide less money than the implicit rent of military housing to account in part for the value of the flexibility and choice that those living off-base have about where they live. Those in military housing do not have a choice, or have only a limited choice, about in which unit they will reside.

Other factors determine the benefit of military housing at the individual level, which in turn affects their decision about where to live. Some individuals value living with other military neighbors and feel they can count on their neighbors when they are deployed. Others value the security of the military base, especially when the base is closed to the public. On the other hand, some find that living in military housing impinges too much on their personal life. These types of preferences affect individuals' valuation of military housing, but are not reflected in simple price measures of the benefit.

In addition, it is important to note that the difference in the housing benefits is misstated to the extent that the hedonic equation fails to completely capture differences between military and private sector housing. For instance, individuals in military housing may find that maintenance work is done quickly and efficiently, while those in private sector housing may have trouble getting the cooperation of their landlord.

Keeping all those factors in mind, our analysis shows that for the most junior enlisted, the implicit rent of military housing exceeds the housing allowance on average by about \$200. The implicit rent is about 30 percent higher than the allowance. Some of the difference reflects the value of the choice that members have in the private sector, and some may reflect unmeasured negative aspects of military housing. However, our analysis suggests that even after accounting for these differences, a significant difference remains between the value of the two housing benefits.

One of the sources of the inequality may be that larger military housing units are provided for families with more children, while the housing allowance does not increase with the number of children in the family. As a result, the value of military housing is likely to be greater than the value of the housing allowance in correspondence with the size of the family.

Among E5s and E6s, the mean difference is about \$170, so military housing was 26 percent more economically valuable than the allowance. The average difference among senior enlisted falls to about \$120, a 16 percent difference. The difference narrows to 3 percent among junior officers, and the allowance nearly equals the value of military housing for senior officers.

After the completion of our survey in 1997, DoD introduced a new housing allowance plan that was designed to tie housing allowances more directly to rental prices in local housing areas. The new plan relies on a canvas of local rents to establish housing rents for members by rank and dependent status. The plan replaces the old approach, which relied on actual prices paid by military members of various ranks. This reliance on member rents tended to distort price differences across locations, because member rental choices were constrained by the level of allowances set in the previous year. For

example, if the economy boomed in an area and civilian rents rose, members would be able to afford fewer housing services (small apartments or apartments in worse areas), because their allowance would be based on the pre-boom rental prices. Since members' purchases would have been restricted by the allowance, a subsequent survey of member rents would show less increase in their rents than occurred in the local economy. As a result, the allowance would not be adjusted upward (or not adjusted upward as fast as prices), and members would be pressured to accept lower quality housing than was available to other members before the boom period. Under the new allowance scheme, the allowance is set by changes in local rental prices, so this bias or distortion is eliminated from the allowance system. The new allowance system is being phased in over the next five years.

How does the new allowance system affect the pattern observed in Figure 3.1? The new system improves the way that price adjustments are made across local rental markets, but it does not alter how military housing benefits and allowances vary by military rank. The figure controls for differences across location, so the benefit gap is an

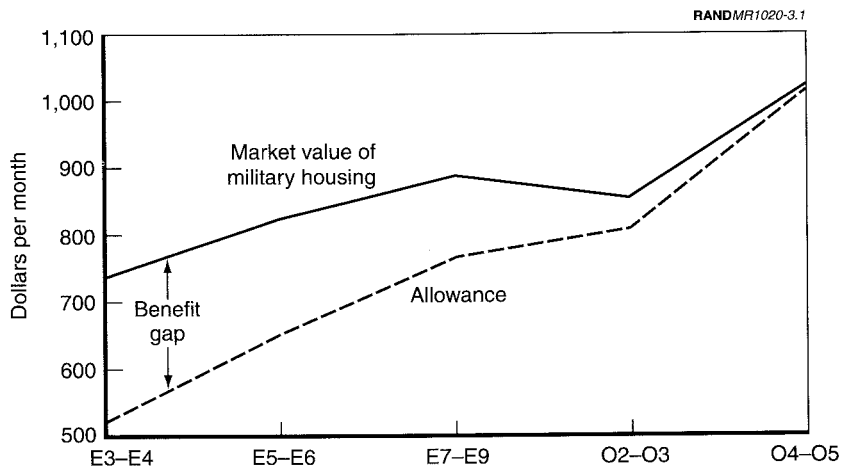


Figure 3.1—Differences Between the Implicit Rent of Military Housing and the Housing Allowance

average across different bases. The new allowance system, like the old one, contains provisions for a relatively steep increase in allowance by military rank. The amenities of military housing vary much less by rank than does the allowance. In short, the aspects of military housing and the allowance system that drive Figure 3.1 remain in place.

### Housing Preferences

In considering alternative housing policies, it is useful to know how military members value military housing. Under current policies, military housing is rationed by waiting lists, and members may wait over a year until a military housing unit becomes available. The survey provides information on how the demand for military housing is affected by the length of time members must wait for housing and the size of the housing allowance that is available for living in the civilian community.

Table 3.12 shows that 63 and 44 percent of renters and owners, respectively, would have preferred military housing to their civilian alternative if it had been available with no wait. The table also shows that members are very sensitive to wait times, however. If the wait time is six months long, then 76 and 90 percent of renters and owners, respectively, would prefer their civilian alternative. The reality of the current system is that few members face waiting times shorter than six months.

Table 3.13 shows how the demand for military housing varies with the size of military allowances. We asked members whether they

**Table 3.12**  
**Demand for Military Housing Under Alternative Waiting Times (percent preferring military housing)**

Waiting Time	Renters	Owners
No wait	63	44
1 month wait	48	31
2 month wait	35	21
6 month wait	24	10
1 year wait	18	4

**Table 3.13**  
**Demand For Military Housing Under Alternative Housing Allowances (percentage preferring military housing)**

Change in Allowance	Military Housing Residents	Renters in Civilian Market
Same	100	46
\$50 more BAQ	94	40
\$100 more BAQ	83	33
\$150 more BAQ	63	27
\$200 more BAQ	35	22
\$250 more BAQ	18	20

would choose military housing over civilian alternatives if the Basic Allowance for Quarters (BAQ) were increased by amounts from \$50 to \$250. As we saw in our wait-time results, many renters would prefer military housing to their rental situation: 46 percent of renters said that they would move to military housing if a unit became available immediately, and the housing allowance was unchanged. The percentage who would move into military housing falls as the allowance is increased: 33 percent of renters would take military housing if the allowance were increased by \$100 per month, and only 20 percent of renters would switch to military housing if the allowance were increased by \$200 per month.

Among military housing residents, the “taste” for military housing is also quite sensitive to the allowance level. If the allowance were increased by \$100 per month, then 17 percent of residents would leave military housing. With a \$200 per month increase in allowance, 65 percent of those in military housing would switch to civilian housing, leaving only 35 percent of those in military housing who would be willing to forgo the higher allowance.

The results in Tables 3.12 and 3.13 reveal that member preferences for military housing are highly heterogeneous. Members can be classified into three groups. First, there is a core of military members who prefer military housing regardless of cost and availability: Nearly 20 percent of renters are willing to wait a year for military housing and about 20 percent of renters and military housing residents would choose the military housing alternative even if the allowance increased by \$250 per month.

The second group of members is “on the margin.” The decisions of these individuals are largely dictated by the wait time and housing allowance at the base. Changes in these factors induce large swings in the preferences of this group, since they are not strongly committed to the military or civilian housing options.

Finally, many members have strong preferences for civilian housing and rarely or never want military housing. Even with no wait time for military housing, these members would prefer civilian alternatives.

Why do some individuals always desire military housing and some individuals never desire it? Are those who always desire military housing located at bases in high cost of living areas? Are they from a particular demographic group, such as junior enlisted? Do they have large families? What determines whether a member owns a house or lives in military housing? What determines the decision to rent or live in military housing? We take up these questions in the next chapter.





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**HOUSING CHOICES AMONG MILITARY FAMILIES**


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In this chapter, we develop a theoretical model of military members' housing decisions. We then use three alternative methods to estimate housing demand with the survey data and report our results. The chapter concludes with a summary of the results.

**MODEL OF HOUSING CHOICE**

Military members choose whether to own a home, rent in the civilian market, or reside in military housing. The choice of where to live is often referred to as the "tenure" choice. In addition, military members in the civilian market also choose a "quantity" of housing; that is, they choose how much to spend on a house or how much rent to pay for an apartment. The decisions are shown diagrammatically in Figure 4.1.

Individuals first choose a housing tenure that maximizes utility. Let the tenure alternatives ( $t_i$ ) be denoted  $t_1$  (own),  $t_2$  (rent civilian housing), and  $t_3$  (reside in military housing). Then, individuals choose a particular tenure alternative  $j$  if the utility of  $j$  exceeds the utility of each other alternative  $i$ .

$$\text{Choose } j \text{ if } U(t_j) \geq U(t_i) \forall i = \{1,2,3\} \quad (1)$$

The utility of each alternative depends on its price, on the individual's income, and on household and demographic variables. Thus, the tenure decision is determined by the relative prices of owning, renting, and living in military housing, by income, and by demographic/household variables.

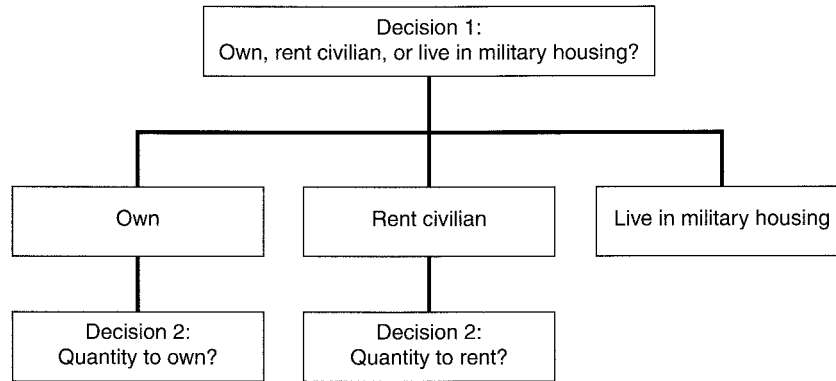


Figure 4.1—Housing Decision Framework

$$t = f_1(P_o, P_r, P_m, Y, D) \quad (2)$$

The quantity decision reflects the price of owning or renting (whichever tenure the individual has chosen), the price of other goods, income and demographic variables.

$$(Q_o | t=1) = f_2(P_o, P_g, Y, D) \quad (3)$$

$$(Q_r | t=2) = f_3(P_r, P_g, Y, D) \quad (4)$$

We focus in this chapter on the first choice: individuals' tenure decisions. As described below, we employ three different estimation methods to analyze individuals' tenure choices. The first method looks at the housing preferences of military families under current housing policies. The second method examines the sensitivity of housing choices to changes in housing options, i.e., the wait for military housing, the size of the allowance, and the quality of military housing. Finally, we look at a group of members with strong preferences for military housing. This analysis examines why some members would prefer military housing over civilian alternatives even if the wait for military housing was long or the housing allowance was much greater than current levels.

## METHOD 1: PREFERENCES FOR MILITARY HOUSING UNDER EXISTING POLICIES

Our first estimation procedure is a model of the three-pronged tenure choice. We estimate the effects of the prices of each alternative, income, and demographic characteristics as specified in equation (2), on an individual's decision to own, rent in the civilian market, or reside in military housing.

The econometric model we employ is a multinomial logit type model.<sup>1</sup> Letting  $\beta$  represent a vector of parameter estimates and  $X$  a vector of independent variables, the multinomial logit model assumes that the probability of an individual  $i$  choosing a particular alternative  $j$  out of  $J$  possible alternatives is:

$$P_{ij} = \frac{\exp(X_i\beta_j)}{\sum_{k=1}^J \exp(X_i\beta_k)}$$

The specification of the dependent variable, an individual's housing choice, is complicated by the constraints that exist on individuals' housing choices. In previous housing studies of civilians (Venti and Wise, 1984; Dynarski, 1985; Edin and Englund, 1991), analysts have been concerned with the equilibrium status of those renting or owning. Individuals may be in disequilibrium with respect to housing because costs of moving prevent individuals from continually changing their housing choices to maximize utility. This type of equilibrium problem is not likely to be an issue for our sample of military members because they typically move quite frequently. Most service members are required to move on the order of every two to three years. As a result, their housing choices are more likely to closely reflect their current situation, i.e., to be a utility-maximizing choice. However, the housing choices that we observe among military members may be disequilibrium choices for another

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<sup>1</sup>While the multinomial logit model provides ease in estimation, it does so at the cost of imposing the restrictive independence of irrelevant alternatives, or IIA, assumption. The model assumes that the ratio of the probabilities of any two alternatives is independent of the probability of any alternative; or, that the choice between a particular set of two alternatives is independent of the choice between another pair of alternatives.

reason—namely, that the availability of military housing is constrained. Individuals often must wait long periods of time, sometimes longer than one or two years, for a military unit to become available. In the meantime, individuals either rent or own in the civilian market. Thus, an individual's current housing situation may not be his or her preferred one.

As a result, the dependent variable that we employ in estimation is not in all cases an individual's current housing choice. Rather, we use a dependent variable that modifies respondents' current housing choices in accordance with their answers to questions about their true housing preferences. Respondents who are in military housing are coded as such; those who are in civilian rental housing or who own their homes are coded as such only if they state that they would not have taken military housing had it been available when they arrived at the base.<sup>2</sup>

The vector of independent variables ( $X$ , above) includes the characteristics of the individual. We control for individuals' race, education, and gender, as well as for the number of children in the family, annual family income, and whether a spouse is present and/or working full-time, part-time, or for the military. The independent variables also include a measure of respondents' deployment expectations. Survey respondents answered the question, "What are your chances of being continuously deployed for 30 days or longer in the next 12 months?" Their answer to this question was coded into a five-value variable (0–4), with three indicating a very likely chance of deploying and four indicating a certainty of deploying. The "deploy" variable is a dummy variable equal to one if the individual had a very likely chance or a certainty of deploying.

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<sup>2</sup>The survey question asked renters and owners to reassess their housing decision if the availability of military housing had been different when they arrived at the current base. The survey question reads as follows:

Think back to when you first arrived for your current tour at this base. Suppose the housing office at this base had guaranteed your waiting time to move into a military family housing unit at this base. Would you have moved into military housing when it became available?

Members were asked about various guaranteed waiting times. In method 1, we coded renters and owners as preferring military housing if they responded that they would have chosen military housing if it had been available right away when they arrived at the base.

The specification of price in the housing decision is more complex than in studies of civilian tenure choices. Three prices need to be measured: the price of owning, price of renting, and the price of military housing. Each price is somewhat complex to estimate.

What individuals pay for a rental unit in the civilian sector is observed, but the rent charged reflects both quantity and price of the unit. To estimate the pure price component, we use several approaches. First, some studies (Goodman and Kawai, 1984; Kim, 1992; DiPasquale and Wheaton, 1996) have estimated a hedonic equation of rent, using rent as the dependent variable, and using housing characteristics and dummy variables for location as explanatory variables. Estimated coefficients on the location dummy variables provide a measure of the pure price variation across locations. Other studies (Gillingham and Hagemann, 1983; Dynarski, 1985; Haurin et al., 1994) have used already available price indices created in a similar fashion by the Bureau of Labor Statistics and the Runzheimer International Corporation, among others, as measures of housing prices in the civilian market.

In our analysis, we tried both methods to control for price variation across locations. First, we use hedonic price estimates derived from the equation reported above in Table 3.10. Second, we use the fair market rent for each base location as an index of local prices. The fair market rent is a measure of local prices that is used by the U.S. Department of Housing and Urban Development. For our 12 bases, we found that these two estimates of local prices were highly correlated, so our results were insensitive to which measure of prices was used. In our reported results, we rely on the fair market rent measure of prices.

The price of owning has also been measured in various ways. Some studies (Haurin et al., 1994; DiPasquale and Wheaton, 1996) have tried to directly estimate the (monthly) cost of owning by taking individuals' mortgage payments and adjusting for such factors as the tax savings from the deductibility of interest, the costs of maintenance and repair of the home, and the opportunity cost of investing the down payment in the home as opposed to other investment vehicles. Besides the formidable task of estimating such adjustments well, one of the difficulties in the direct approach to measuring the price of owning is the imputation of that price for nonowners. It is

difficult to predict both how much housing renters would own, if they owned, and what financing arrangements would be used. To skirt these difficulties, a second approach to controlling for the price of owning has been employed: a reduced form approach, where variables affecting the tax schedule and other costs of owning are entered as independent variables (Gillingham and Hagemann, 1983). We use age, income, number of dependents, and an inter-area index of price differences across locations as the independent variables in this reduced-form approach.

The final price measure is that of military housing. To live in military housing, military members forgo receipt of the housing allowance to which those who reside in the civilian sector are entitled. The forgone allowance can be thought of as the cost of military housing. However, just as rents charged in the civilian sector reflect both price and quantity, so the forgone allowance represents both price and quantity. All military housing units are not equal in value; some units are old while others are modern, and some are well-maintained while others are not. There is variation in the quality of military housing both across units at the same base and across bases. As a result, military members often give up the same allowance for vastly different quantities of housing.

To control for differences in the quantity of housing that members at different bases receive, we experiment with two different sets of variables. One set included a variable indicating the average condition of housing at the base by rank group (E3–E4, E5–E7, E7–E9, O2–O4, O4–O6). We measured housing condition with individuals' responses to the question "In general, how would you rate the condition of the following items in your current housing?... Overall condition of your housing?" Respondents answered on a five-point scale, from 1 (poor) to 5 (excellent). We constructed a variable indicating whether a respondent in military housing had excellent or very good condition housing, and assigned the mean of that dummy variable among those in military housing by rank and base to all individuals in the rank-base group. In addition, we constructed base and rank group-specific averages of the extent of problems with common household pests. Individuals were asked, "In the past six months, have there been any signs of rats, mice, termites, roaches, spiders,

ants or other pests in your current housing? If yes, how serious a problem was this in the past six months?" Respondents answered on a five-point scale, from 1 (very serious problem) to 5 (not a serious problem). Again, a dummy variable was created indicating whether an individual in military housing had a very serious or serious pest problem. The mean of that dummy variable among rank- and base-specific sets of military housing residents was assigned to all individuals in the base-rank group.

The second set of variables were base-specific, rather than base- and rank-specific. A quality index is constructed from members' satisfaction with the quality of on-base housing in the 1992 Department of Defense Survey of Enlisted and Officer Personnel. Three of the bases are identified as having poor quality housing (Jackson, Mayport, and Minot), and a dummy variable to indicate this is created. In addition, three of the bases are known to have large amounts of new construction (Lewis, San Diego, and Tyndall). A second dummy variable is created to indicate this. These two base-specific dummy variables are used in lieu of the base- and rank-specific variables in some specifications.

A final specification omits controls for housing quality and prices and adjusts for those factors with a dummy variable for each base. In this specification, we could not identify specific effects of prices or the quality of military housing. The coefficients of on-base indicators reflect the net effects of these factors on tenure choice after controlling for member characteristics.

## Results

Table 4.1 reports results from estimation of the first tenure choice model (described under Method 1). The coefficients represent the change in the log-odds ratio of either renting or owning relative to the option of choosing military housing. Since these coefficients are somewhat difficult to interpret, we also report the relative-risk ratio for each variable in the multinomial logit model (see Table 4.2). The relative-risk ratio is the exponentiated value of the coefficient in the multinomial logit model and represents the effect of a one-unit

**Table 4.1**  
**Multinomial Logit Model of Tenure Choice**  
**(standard errors in parentheses)**

Variable	Specification 1 (Base-Rank Vars)		Specification 2 (Base Vars)		Specification 3 (Base Dummy Vars)	
	Rent	Own	Rent	Own	Rent	Own
Log family income	0.7260 <sup>a</sup> (0.1433)	1.4333 (0.1448)	0.7108 <sup>a</sup> (0.1427)	1.4132 <sup>a</sup> (0.1446)	0.2860 <sup>a</sup> (0.1039)	1.7976 <sup>a</sup> (0.1033)
Single parent	1.0203 <sup>a</sup> (0.1835)	0.3684 (0.2449)	1.0511 <sup>a</sup> (0.1833)	0.3980 (0.2453)	1.0492 <sup>a</sup> (0.1850)	0.3677 (0.2467)
Spouse full-time	0.0030 (0.1416)	0.4763 <sup>a</sup> (0.1330)	-0.0005 (0.1413)	0.4773 <sup>a</sup> (0.1327)	0.1232 (0.1369)	0.2950 <sup>a</sup> (0.1279)
Spouse part-time	-0.0959 (0.1519)	0.3605 <sup>a</sup> (0.1422)	-0.1108 (0.1516)	0.3619 <sup>a</sup> (0.1420)	-0.0452 (0.1514)	0.3108 <sup>a</sup> (0.1419)
Spouse military	1.0018 <sup>a</sup> (0.1787)	1.1244 <sup>a</sup> (0.1839)	0.9838 <sup>a</sup> (0.1776)	1.1151 <sup>a</sup> (0.1835)	1.2547 <sup>a</sup> (0.1741)	0.9624 <sup>a</sup> (0.1776)
One child	-0.8225 <sup>a</sup> (0.1302)	-0.2071 <sup>a</sup> (0.1441)	-0.8223 <sup>a</sup> (0.1297)	-0.2176 (0.1438)	-0.8527 <sup>a</sup> (0.1305)	-0.2026 (0.1445)
Two children	-1.1578 <sup>a</sup> (0.1401)	-0.1425 (0.1376)	-1.1582 <sup>a</sup> (0.1395)	-0.1498 (0.1371)	-1.2472 <sup>a</sup> (0.1395)	-0.1053 (0.1375)
Three or more children	-1.3174 <sup>a</sup> (0.1657)	-0.1326 (0.1486)	-1.3036 <sup>a</sup> (0.1651)	-0.1345 (0.1484)	-1.4330 <sup>a</sup> (0.1645)	-0.0621 (0.1484)
Expect to deploy	-0.1137 (0.1096)	-0.2366 <sup>a</sup> (0.1057)	-0.1242 (0.1088)	-0.2490 <sup>a</sup> (0.1053)	-0.1381 (0.1137)	-0.2996 <sup>a</sup> (0.1099)
Female	-0.6222 <sup>a</sup> (0.1537)	-0.3085 <sup>a</sup> (0.1548)	-0.6525 <sup>a</sup> (0.1535)	-0.3052 (0.1545)	-0.5658 <sup>a</sup> (0.1551)	-0.3051 <sup>a</sup> (0.1549)
Hispanic	-0.3502 <sup>a</sup> (0.1605)	-0.2335 (0.1536)	-0.2980 (0.1596)	-0.2049 (0.1530)	-0.3598 <sup>a</sup> (0.1616)	-0.2493 (0.1562)
Black	0.1972 (0.1308)	-0.3276 <sup>a</sup> (0.1403)	0.2425 (0.1304)	-0.3056 <sup>a</sup> (0.1402)	0.1436 (0.1348)	-0.3509 <sup>a</sup> (0.1448)
Other	0.2694 (0.1811)	0.1007 (0.1755)	0.2730 (0.1801)	0.1119 (0.1756)	0.2483* (0.1823)	0.1319 (0.1768)
Housing allowance	-0.0024 <sup>a</sup> (0.0005)	0.0013 <sup>a</sup> (0.0005)	-0.0021 <sup>a</sup> (0.0005)	0.0016 <sup>a</sup> (0.0004)		
Housing price index	0.0043 <sup>a</sup> (0.0007)	-0.0018 <sup>a</sup> (0.0006)	0.0044 <sup>a</sup> (0.0007)	-0.0013 <sup>a</sup> (0.0006)		
Pests are problem	1.6533 <sup>a</sup> (0.3758)	1.1311 <sup>a</sup> (0.3264)				
Good condition	-3.3638 <sup>a</sup> (0.9264)	-1.8885 <sup>a</sup> (0.8740)				
Poor quality			0.1563 (0.1451)	0.1730 (0.1265)		
New construction			-0.1879 (0.1147)	-0.2314 <sup>a</sup> (0.1122)		
Base Dummy Variables	No	No	No	No	Yes	Yes
Constant	-4.5372 <sup>a</sup> (0.5133)	-6.7653 <sup>a</sup> (0.5404)	-4.6352 <sup>a</sup> (0.5298)	-6.9962 <sup>a</sup> (0.5454)	-1.8905 <sup>a</sup> (0.3879)	-8.0136 <sup>a</sup> (0.4253)

NOTES: The omitted reference group is white non-Hispanic, male members with no children, a spouse not in the labor force, and not expecting to deploy in the next year. Annotated entries (a) are significant at the  $\alpha=0.05$  confidence level. The sample size is 4236. The  $\chi^2$  for the three specifications are 814.8, 778.8, and 884.1, respectively.



**Table 4.2**  
**Relative Risk Ratios for Coefficients in**  
**Multinomial Logit Model of Tenure Choice**

Variable	Specification 1 (Base-Rank Vars)		Specification 2 (Base Vars)		Specification 3 (Base Dummy Vars)	
	Rent	Own	Rent	Own	Rent	Own
Family income	1.0241 <sup>a</sup>	1.0481 <sup>a</sup>	1.0236 <sup>a</sup>	1.0474 <sup>a</sup>	1.0094 <sup>a</sup>	1.0607 <sup>a</sup>
Single parent	2.7740 <sup>a</sup>	1.4454	2.8607 <sup>a</sup>	1.4888	2.8554 <sup>a</sup>	1.4445
Spouse full-time	1.0030	1.6101 <sup>a</sup>	0.9995	1.6117 <sup>a</sup>	1.1311	1.3432 <sup>a</sup>
Spouse part-time	0.9086	1.4341 <sup>a</sup>	0.8951	1.4361 <sup>a</sup>	0.9558	1.3645 <sup>a</sup>
Spouse military	2.7232 <sup>a</sup>	3.0782 <sup>a</sup>	2.6745 <sup>a</sup>	3.0500 <sup>a</sup>	3.5068 <sup>a</sup>	2.6179 <sup>a</sup>
One child	0.4393 <sup>a</sup>	0.8129	0.4394 <sup>a</sup>	0.8044	0.4262 <sup>a</sup>	0.8166
Two children	0.3142 <sup>a</sup>	0.8672	0.3141 <sup>a</sup>	0.8609	0.2873 <sup>a</sup>	0.9000
Three or more children	0.2678 <sup>a</sup>	0.8758	0.2716 <sup>a</sup>	0.8741	0.2386 <sup>a</sup>	0.9398
Expect to deploy	0.8925	0.7893 <sup>a</sup>	0.8832	0.7796 <sup>a</sup>	0.8710	0.7411 <sup>a</sup>
Female	0.5367 <sup>a</sup>	0.7346 <sup>a</sup>	0.5207 <sup>a</sup>	0.7369 <sup>a</sup>	0.5679 <sup>a</sup>	0.7370 <sup>a</sup>
Hispanic	0.7046 <sup>a</sup>	0.7918	0.7423	0.8147	0.6978 <sup>a</sup>	0.7793
Black	1.2180	0.7207 <sup>a</sup>	1.2744	0.7366 <sup>a</sup>	1.1545	0.7041 <sup>a</sup>
Other	1.3092	1.1059	1.3139	1.1184	1.2818	1.1409
Housing allowance	0.9979 <sup>a</sup>	1.0018 <sup>a</sup>	0.9982 <sup>a</sup>	1.0021 <sup>a</sup>		
Housing price index	1.0043 <sup>a</sup>	0.9982 <sup>a</sup>	1.0045 <sup>a</sup>	0.9987 <sup>a</sup>		
Pests are problem	5.2240 <sup>a</sup>	3.0992 <sup>a</sup>				
Good condition	0.0346 <sup>a</sup>	0.1513 <sup>a</sup>				
Poor quality			1.1691	1.1889		
New construction			0.8287	0.7934 <sup>a</sup>		
Proportion	0.1310	0.1596	0.1310	0.1596	0.1310	0.1596

NOTES: The omitted reference group is white, non-Hispanic, male members with no children, a spouse not in the labor force, and not expecting to deploy in the next year. Annotated entries (a) are associated with coefficients that are significant at the  $\alpha=0.05$  confidence level. The sample size is 4236. The  $\chi^2$  for the three specifications are 814.8, 778.8, and 884.1, respectively.

change in the corresponding variable.<sup>3</sup> For example, if a member's spouse works full-time as compared with a nonworking spouse, then the log odds of owning versus living in military housing is increased by about 0.48 (see Table 4.1). This change means that if the member's spouse is employed full-time the probability of choosing

<sup>3</sup>For convenience, we have evaluated the relative risk ratio in Table 4.2 for a unit change in family income (measured in thousands of dollars) evaluated at mean family income. Also, the relative risk ratio for the monthly housing allowance has been adjusted to reflect that an increase in allowance would also increase family income.

ownership relative to living in military housing is 1.61 times greater than if the member's spouse did not work. If military housing was readily available, as we assume in this model, then the average probability of choosing ownership is about 16 percent. Thus, the net change in the probability of owning would be increased by about 10 percentage points, i.e.,  $0.61 \times .16 \approx .10$ .

The results in Tables 4.1 and 4.2 show that several factors are important determinants of individuals' tenure choices. First, we discuss the individual demographic factors that appear to significantly affect tenure decisions.<sup>4</sup> We then turn to discussion of base level effects.

### Individual Effects

Greater family income increases the probability of renting versus living in military housing and owning versus living in military housing. The effect of income is especially pronounced for the own versus military housing decision. Holding constant other factors, a \$5000 increase in income (at the mean) increases the probability of owning compared to living in military housing by about 30 percent, or 5 percentage points. With additional income, military members may want to consume more housing (live in a nicer place) than is available in military units. The important effect of income evident in Table 4.1, combined with the comparative descriptive statistics from Table 3.2, suggests that military housing may fill a unique niche. While military housing is inexpensive, it still allows military members to live in a good community. The tradeoff comes in quality of housing, which is usually not on the high end, and for some, in having to further integrate the military into their personal lives. In comparison, inexpensive civilian housing may be available, but it may only be available in less accommodating neighborhoods. Military members may feel especially concerned about neighborhood quality because of the likelihood of having to deploy and leave their families alone.

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<sup>4</sup>Coefficients on these individual-level variables were robust to the specification of base level effects. In the discussion, the coefficients referred to are from Specification 3 (base dummy variables).

Family income has a much weaker effect on the rental versus military housing decision than on the ownership versus military housing decision. A \$5000 increase in family income increases the probability of renting compared to living in military housing by about 5 percent or 0.6 percentage points. The implication is that increases in family income lead members out of military housing, but these income effects are more likely to lead people to own rather than rent.

A spouse's participation in the work force is likewise a significant factor in the decision to own but it is not a significant factor in the decision to rent. Having a spouse employed either full-time or part-time increases the probability of owning by 5 percentage points. At the mean probability of owning, this represents about a 35-percent increase in the probability of owning. Because we control separately for family income, these spouse employment effects reflect the influence of employment *other than through the additional income* the employment generates. There are several nonmonetary aspects of spouse employment that affect the tenure decision. First, having a spouse employed may mean that the home must be situated in a location convenient to both the base and the spouse's place of employment. As a result, military housing may be less attractive. At the same time, a spouse who works may have a network of friends through his or her workplace, so that he or she feels less reliant on the military community as a source for personal relationships. That may also decrease the spouse's interest in living in military housing.

Families in which both husband and wife are in the military are very unlikely to choose military housing: they are 3.5 and 2.6 times as likely as other couples to choose rental or ownership over the military housing alternative. Joint military families receive two housing allowances. As a result, living in military housing is more costly for these families because they forgo about 1.7 times as much allowance as single-military-member couple for the same military housing unit.<sup>5</sup> On the other hand, the convenience of immediate availability still attracts some joint military families.

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<sup>5</sup>For housing purposes, a spouse is counted as a dependent, so married couples where one spouse is not in the military are eligible for a housing allowance "with dependents." The rules for joint military couples are somewhat complex in the way that they account for dependents. If couples have no children, then each is eligible for the allowance for their respective paygrade "without dependents." If a couple has a

Children decrease the probability of renting compared to living in military housing, but have no significant effect on the probability of owning compared to living in military housing. Setting other variables at their means, the model predicts that 65 percent of families with no children would choose military housing, compared to 77, 79, and 80 percent of families with one, two, and three or more children, respectively. One of the reasons families with children may prefer military housing over the allowance is that in the military housing unit they are eligible for increases in size with a greater number of children, but the allowance does not increase with the number of children. The allowance is greater for families with dependents than it is for those without dependents, but there is no marginal increase with each additional child.

Single parents were nearly three times as likely as married couples without children and two-parent families to prefer civilian rental housing. Being a single parent increased the probability of renting compared to living on-base by 14 percentage points relative to married members with no children. This partial effect is, of course, largely offset by the fact that single parents are frequently in lower income categories and female members are more likely to be single parents than male members. The unconditional preference for military housing is 71 percent for single parents compared to 70 percent for married members.<sup>6</sup>

Deployment expectations do not significantly affect the decision to rent versus live in military housing, but they do affect the decision to

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child, then one parent is eligible for the allowance with dependents and the other gets the allowance at the single rate. The amount of allowance received by joint military families relative to couples with only one military member varies by location and rank as well as whether the couple has children. On average, the allowance for joint couples is about 1.5 and 1.75 times greater for members with no children and those with children, respectively, as compared with couples where only one member serves in the military. About 70 percent of the joint military couples in our data have children.

<sup>6</sup>Single members with no dependents were not included in our study, since they were ineligible for military family housing. The unconditional difference in the preference for military housing is measured as the simple tabulated difference in the percentage of single parents and married members who are observed in military housing. The simple tabulation does not control for differences in income, gender, or other variables between single parents and married members.

own versus live in military housing. Those who were very likely or certain to deploy over the next 12 months were much less likely to own their home. Being certain or likely to deploy decreases the probability of owning compared to living on-base by 1.6 percentage points, which is about a 26-percent decline at the mean probability of owning. Those who deploy often or who expect to deploy in the near future may appreciate that other military families in similar situations are nearby who understand the issues surrounding deployment and who may be there to offer assistance. In addition, the military member may be concerned about the spouse's ability to cope with home maintenance while he or she is deployed, so may prefer military housing for that reason as well.

Hispanics were more likely to prefer military housing over rental housing, while blacks were more likely to prefer military housing over owning. Hispanics were about 30 percent less likely to rent versus live in military housing compared to nonminorities; blacks were 30 percent less likely to own versus live in military housing compared to nonminorities.

### **Base Effects**

Specifications 1 and 2 contain controls for the rank- and base-specific housing allowance, and a measure of price differences across the bases. In addition, Specification 1 contains a rank- and base-specific measure of pest problems, and a rank- and base-specific measure of overall housing conditions. These measures were created using the assessments of survey respondents who live in military housing.<sup>7</sup> Specification 2 contains, instead, a base-specific measure of housing quality and an indicator of whether there is a significant level of new housing construction at the base.

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<sup>7</sup>These subjective assessments are not necessarily based on a thorough or complete analysis of pest problems or housing conditions. Members may have a distorted view of these attributes of military housing because they have limited or inaccurate information. Nonetheless, we attempted to use this information to control for these attributes of the military housing stock at each base, while recognizing that these controls are not ideal.

The housing allowance and price index variables were designed to control for differences in the cost of military versus civilian housing.<sup>8</sup> Lower allowances and higher civilian rental prices make living in civilian housing more expensive compared to living in military housing. As a result, we hypothesized that the allowance should have a positive effect on living in civilian housing compared to living in military housing, and that prices should have a negative effect on living in civilian housing compared to military housing. A potential problem for estimating these effects, however, was that the Variable Housing Allowance (VHA) is specifically designed to offset the effects of differences in housing costs across locations. As a result, we are unlikely to observe variation in the housing allowance that is independent of variation in housing price.

The allowance and price index variables had small and contrasting effects on the rent and own decisions relative to choosing military housing. As hypothesized, members are more likely to own if the housing price index is high and less likely to own if the allowance is low. The rent results are the opposite, however, where an increase in the price index *increases* the probability of renting and an increase in allowance *reduces* the probability of renting. The rent and own effects of the allowance and price index variables offset one another, so the probability of living on- or off-base is left unaffected. The net effect of an increase in the allowance on the probability of living off-base is not significantly different from zero in either Specification 1 or 2. We ran logistic regressions for whether the member preferred on- or off-base housing. In these equations, the coefficients of the allowance and price variables were both insignificantly different from zero.

The small and inconsistent effects of the allowance and price variables suggest that demographic factors, as opposed to base factors, largely determine individuals' preferences for military or nonmilitary housing. Such a result is not surprising given that the VHA component of housing allowances is designed to counter the differences in

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<sup>8</sup>The housing allowance variable reported in the regressions is the monthly BAQ and VHA that the members could receive at their current locations if they did not live in military housing. Joint military couples receive an additional housing allowance for the second service member, and we control for this additional allowance with the indicator variable for whether the spouse is in the military.

prices across areas. The fact that we observe no net effect of the allowance on the decision to live on- or off-base suggests that the allowance system may be doing a good job of offsetting differences in local housing costs. However, our results also reflect that we have limited variation in allowances and the price index across the 12 bases. Our base selection process was designed to capture a wide range of housing conditions, but a larger number of bases would be useful for identifying these allowance and price effects.

Another approach to estimating the effect of the housing allowance on housing choice is to consider choices of families where the husband and wife are both in the military. In this situation, the family receives a housing allowance for each service member, or approximately 1.7 times the housing allowance of an otherwise comparable service member. The representative joint military family receives a monthly allowance of \$1009 as compared with the \$607 that they would receive if one spouse were not in the military. Other things equal, our estimates show that about 52 percent of joint military couples prefer military housing (assuming that it is immediately available when they arrive at the base) as compared with 74 percent of couples with only one military member. As a crude measure of the allowance effect, we can linearize over the range of our estimates and predict that a “pure” housing allowance increase of \$100 per month (i.e., an increase that was over and above the cost of local housing) would reduce preferences for military housing by about 5.5 percentage points.<sup>9</sup>

The housing quality and condition variables in Specifications 1 and 2 work well, even given their limited variation. In the first specification, pest problems and better quality decrease and increase, respectively, the probability of living in military housing compared to renting and owning. Similarly, in the second specification, poor quality measured at the base level decreases the probability of living in military housing compared to renting, while individuals at bases with newer construction are more likely to live in military housing versus owning compared to those at bases without new construction.

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<sup>9</sup>We should be cautious about extrapolating from the behavior of joint military couples to that of other military couples. These groups may differ in some way that we have not measured in our survey, and these unobserved differences could bias our results.

The implication of these results is that members' preferences for military housing are quite sensitive to the overall quality of military housing.

Specification 3 substitutes base dummy variables for the allowance, price, quality, condition, and construction variables. One of the problems with the first two specifications is that there are likely to be omitted base-level variables that may or may not be correlated with the base variables included in the specification. The base dummy variable specification has an advantage over the other two specifications in that it controls for unmeasured or unobserved base characteristics.

The relative-risk ratios for base effects show that housing preferences differ little across bases (Table 4.3). After controlling for other factors, Air Force members at all bases are more likely to choose military

**Table 4.3**  
**Relative Risk Ratios and Standard Errors for Base Effects in**  
**Specification 3**

Base	Rent Relative to Military Housing		Own Relative to Military Housing	
	Ratio	Standard Error	Ratio	Standard Error
<i>Army Bases</i>				
Carson	1.1342	0.2285	1.1667	0.2397
Hood	0.6714	0.1470	1.0057	0.2086
Jackson	1.1274	0.2434	1.1592	0.2422
Lewis	0.6907	0.1566	0.3222 <sup>a</sup>	0.0989
<i>Navy Bases</i>				
San Diego	1.0000	NA	1.0000	NA
Mayport	1.4175	0.3002	2.5055 <sup>a</sup>	0.4807
Patuxent River	1.4021	0.2802	1.1604	0.2291
<i>Air Force Bases</i>				
McGuire	0.6155 <sup>a</sup>	0.1351	0.9748	0.1969
Minot	0.2626 <sup>a</sup>	0.0713	0.7719	0.1578
Tyndall	0.5364 <sup>a</sup>	0.1260	1.2020	0.2329
<i>Marine Corps Bases</i>				
Pendleton	1.5954 <sup>a</sup>	0.3043	0.9165	0.2036
Cherry Point	0.7170	0.1680	1.3997	0.2899

NOTES: The omitted base group was San Diego, so relative risk is computed with that of members based in San Diego. Annotated entries (a) are associated with multinomial logit coefficients that are significant at the  $\alpha=0.05$  confidence level.



housing than are Naval service members in San Diego, and Marines at Pendleton are less likely to choose military housing than Naval service members in San Diego. Other differences in the rental/military housing decision are not significant across bases. For owners, the base effects are also small. The only significant base effects are that soldiers at Lewis are less likely to own than sailors in San Diego, and Naval service members in Mayport are much more likely to own than Naval service members in San Diego. These small base effects reflect, at least in part, that the military housing allowance offsets cost-of-living differences across locations, so members' abilities to purchase civilian housing amenities is somewhat comparable across locations.

Table 4.4 ranks the bases according to members' preferences for living in military housing versus renting or owning at each base. The underlying preferences for military housing versus civilian rental or owning differ little across most of the bases in our analysis. Our sample only contains these 12 bases, so it is possible that underlying preferences differ more widely across bases not included in our study. On the other hand, we chose bases that were divergent in housing opportunities, so it is worth noting that among these diver-

**Table 4.4**  
**Relative Ranking of 12 Survey Bases by Family Preferences**  
**for Military Versus Civilian Housing**

	Rent Compared to Military Housing	Own Compared to Military Housing
Prefer Military Housing	Minot	Lewis
	Tyndall	
	McGuire	
	Hood	Minot
	Lewis	Pendleton
	Cherry Point	McGuire
	San Diego	San Diego
	Jackson	Hood
	Carson	Jackson
	Patuxent River	Patuxent River
	Mayport	Carson
		Tyndall
	Cherry Point	
Prefer Civilian Housing	Pendleton	Mayport

gent sites, we find small differences in preferences for military housing, renting, and owning after controlling for the characteristics of the service members.

In the next section, we employ another estimation methodology to estimate the effects of changes to the waiting time, housing allowance, and quality of housing on individuals' preferences for military and nonmilitary housing.

## **METHOD 2: HOUSING CHOICES UNDER ALTERNATIVE HOUSING OPTIONS**

The estimation procedure outlined in Method 1 is especially useful for ascertaining how demographic characteristics affect individuals' decisions to own, rent, or live in military housing. To some extent, we can also observe how changes in the relative prices of owning, renting, and living in military housing affect individuals' decisions. However, the variation in relative prices across bases is limited. We deliberately included bases in lower cost-of-living areas and higher-priced areas, and bases known for better quality housing as well as bases notorious for poor military housing. However, the variation across bases in those variables that we can use for identification of their effects is necessarily limited simply by the number of bases in the sample.

In response to the limitations posed by having only 12 bases in the survey, we included in the questionnaire hypothetical housing options. The hypothetical options vary the housing allowance and wait time for military housing, and ask the respondent to indicate for each alternative set of wait time and allowance whether they would live in military housing or not. We use the hypothetical variations in allowance and wait time that we created to identify the effects of those factors on individuals' decision to live in military or nonmilitary housing.

We were also interested in member response to changes in the quality of military housing. If base amenities were important, then members might be willing to trade off on-base housing quality in exchange for these amenities. Also, DoD needs some assessment of how much members value new, modern housing as it decides how to

allocate funds between the military housing and allowance programs.

Two hypothetical options questions examined the responsiveness of members to the quality of military housing. In one of the options questions, low quality, old military housing was depicted verbally and visually (with a photograph).<sup>10</sup> In the other, newly constructed, good quality military housing was likewise depicted. The low-quality housing was intended to be representative of housing currently available to military members, and the high-quality alternative represented housing that is currently being built at a few bases. In our pre-testing of the survey questionnaire, members agreed that the low-quality housing was the option that they typically faced and that the new high-quality option was rarely available. We predicted the value of the low- and high-quality option from the hedonic regression specification above: the results confirmed that the low-quality option was comparable with the average value of housing available to military members and the high-quality option was worth about 15 percent more than the current average. The quality of military housing varies considerably from base to base, and within the housing stock at a particular base, so these hypothetical questions were useful for identifying whether members were attached to military housing per se or whether they simply liked (or disliked) the currently available housing options.

Five alternative combinations of wait time and allowances were given in the low-quality option; six in the high-quality option. The question reads:

Imagine you were offered the military housing unit pictured below when you arrived at this base for your current tour: Do you think that you would have decided to move into this military housing unit or civilian housing if it had been offered to you under each set of conditions?

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<sup>10</sup>The survey includes a picture of unit as well as a verbal description of unit, including age, number of rooms, storage space, parking availability, and laundry amenities.

The low-quality housing option was offered for the options described in Table 4.5, and the high-quality housing options are described in Table 4.6.

**Table 4.5**  
**Alternatives in Low-Quality Hypothetical Option**

	Housing Allowance	Guaranteed Wait Time
Offer 1	Same	No wait
Offer 2	\$100 more: JE \$150 more: SE \$150 more: O	No wait
Offer 3	\$150 more: JE \$200 more: SE \$225 more: O	No wait
Offer 4	Same	2 months
Offer 5	Same	6 months

NOTE: JE, SE, and O signify junior enlisted, senior enlisted, and officer, respectively.

**Table 4.6**  
**Alternatives in High-Quality Hypothetical Option**

	Housing Allowance	Guaranteed Wait Time
Offer 1	\$100 more: JE \$150 more: SE \$150 more: O	No wait
Offer 2	\$150 more: JE \$200 more: SE \$225 more: O	No wait
Offer 3	\$200 more: JE \$250 more: SE \$300 more: O	No wait
Offer 4	Same	6 months
Offer 5	\$100 more: JE \$150 more: SE \$150 more: O	6 months
Offer 6	Same	12 months

NOTE: JE, SE, and O signify junior enlisted, senior enlisted, and officer, respectively.

We analyzed responses to the low-quality option separately from those to the high-quality option. Each individual's answer to each alternative was an observation; thus, for each individual, there were five observations used in the low-quality hypothetical option analysis and six observations used in the high-quality hypothetical option analysis. Standard errors were then corrected for the use of multiple observations on each individual.<sup>11</sup>

The specification of the regression was similar to that in Method 1. We include demographic variables, as well as the allowance and wait time variables and interactions between those variables.

## Results

The second method analyzes members' choices between military and civilian housing under several hypothetical scenarios. The method has three advantages. First, this method allows us to focus members on a *particular* military housing alternative, i.e., the house that is pictured and described in the housing survey. A weakness of the first method is that we had a limited ability to control for the quality of military housing. Secondly, this method is used to estimate the effects of changes to the housing allowance and changes to wait times for military housing on individuals' preferences for military or civilian housing. These estimates show how strongly members value military housing, and this "value" is a critical variable in designing new housing policy. In comparison, there is limited price variation in the first approach from which to identify price effects. Finally, the survey questions ask members to weigh the tradeoff between traditional, old military housing and new modern housing alternatives. This tradeoff information is critical to policymakers as

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<sup>11</sup>Standard regression models are based on the assumption that the regression residuals are independent of one another. This assumption is tenuous in this case, because we have multiple observations per member and unobserved factors related to a member's housing choice would probably have a similar (i.e., correlated) effect on their choice of housing under different housing options. The estimation procedure relaxes the assumption of independence across all observations (where we have multiple observations per service member) and relies on the weaker assumption of independence across all military members in our sample. These revised estimates are based on Huber (1967) and White (1980, 1982).

they assess the benefits from making large fiscal expenditures on upgrading and replacing the military housing stock.

Table 4.7 displays the probit regression results from Method 2, and Table 4.8 reports how changes in member characteristics or housing options affect the probability that a member chooses civilian hous-

**Table 4.7**  
**Probit Regression Results for Choosing Civilian Instead of Military Housing Under Alternative Housing Options**

	Low-Quality Military Housing		High-Quality Military Housing	
	Coefficient	Standard Error	Coefficient	Standard Error
Housing Option:				
25% more BAQ	0.2978 <sup>a</sup>	0.0203	0.2148 <sup>a</sup>	0.0163
35% more BAQ	0.5472 <sup>a</sup>	0.0302	0.4227 <sup>a</sup>	0.0261
45% more BAQ	NA	NA	0.7788 <sup>a</sup>	0.0321
2 month wait	0.4197 <sup>a</sup>	0.0208	NA	NA
6 month wait	0.7136 <sup>a</sup>	0.0261	0.7648 <sup>a</sup>	0.0244
12 month wait	NA	NA	1.2299 <sup>a</sup>	0.0324
Log family income	0.2416 <sup>a</sup>	0.0440	0.5279 <sup>a</sup>	0.0409
Single parent	0.1171	0.0891	0.2958 <sup>a</sup>	0.0803
Spouse full-time	0.1678 <sup>a</sup>	0.0506	0.0182	0.0478
Spouse part-time	0.0606	0.0526	0.0039	0.0492
Spouse military	0.4338 <sup>a</sup>	0.0836	0.2741 <sup>a</sup>	0.0715
One child	-0.0923	0.0601	-0.0890	0.0519
Two children	-0.1939 <sup>a</sup>	0.0600	-0.2383 <sup>a</sup>	0.0525
Three or more children	-0.2976 <sup>a</sup>	0.0654	-0.1913 <sup>a</sup>	0.0583
Expect to deploy	-0.0276	0.0437	-0.0608	0.0405
Female	0.0687	0.0697	-0.1063	0.0612
Hispanic	-0.0505	0.0606	-0.0293	0.0594
Black	-0.1378 <sup>a</sup>	0.0609	-0.0994	0.0563
Other	0.0859	0.0709	0.0574	0.0737
Paygrade=E3	-0.1817 <sup>a</sup>	0.0576	-0.1950 <sup>a</sup>	0.0556
Paygrade=E7	-0.1442 <sup>a</sup>	0.0686	0.2665 <sup>a</sup>	0.0634
Constant	-0.1755	0.1779	-2.6911 <sup>a</sup>	0.1663
Sample Size	20192		24082	
$\chi^2$	1048.93		1806.11	

NOTES: The omitted reference group is white non-Hispanic male members with no children, a spouse not in the labor force, not expecting to deploy in the next year, no wait for military housing, and the current level of BAQ and VHA. The equations also include dummy variables for base effects, and these results are described below in Table 4.11. Annotated entries (a) with are significant at the  $\alpha=0.05$  confidence level. Standard errors are corrected for the use of multiple observations for each individual (Huber, 1967; White, 1980 and 1982).

ing. This method focuses on the tradeoff between military and civilian housing without distinguishing between rent and own decisions.

**Table 4.8**  
**Predicted Effects of Changes in Member Characteristics and Housing Options on the Probability of Choosing Civilian Housing**

	Low-Quality Military Housing	High-Quality Military Housing
Housing Option:		
25% more BAQ	0.0775 <sup>a</sup>	0.0827 <sup>a</sup>
35% more BAQ	0.1326 <sup>a</sup>	0.1655 <sup>a</sup>
45% more BAQ		0.3029 <sup>a</sup>
2 month wait	0.1054 <sup>a</sup>	
6 month wait	0.1644 <sup>a</sup>	0.2940 <sup>a</sup>
12 month wait		0.4586 <sup>a</sup>
Family income	0.0019 <sup>a</sup>	0.0058 <sup>a</sup>
Single parent	0.0316	0.1160 <sup>a</sup>
Spouse full-time	0.0462 <sup>a</sup>	0.0070
Spouse part-time	0.0168	0.0015
Spouse military	0.1047 <sup>a</sup>	0.1071 <sup>a</sup>
One child	-0.0264	-0.0338 <sup>a</sup>
Two children	-0.0562 <sup>a</sup>	-0.0895 <sup>a</sup>
Three or more children	-0.0895 <sup>a</sup>	-0.0717 <sup>a</sup>
Expect to deploy	-0.0078	-0.0231
Female	0.0189	-0.0401
Hispanic	-0.0144	-0.0112
Black	-0.0403 <sup>a</sup>	-0.0376
Other	0.0234	0.0221
Paygrade = E3	-0.0534 <sup>a</sup>	-0.0731
Paygrade = E7	-0.0425 <sup>a</sup>	0.1042 <sup>a</sup>
Probability of choosing off-base	0.7808	0.3961

NOTES: Entries reflect the change in the probability of choosing off-base housing. For indicator variables, the entry reflects the effect of a change from zero to one in the particular characteristic. The omitted reference group is white non-Hispanic, male members with no children, a spouse not in the labor force, not expecting to deploy in the next year, no wait for military housing, and the current level of BAQ and VHA. The coefficient on family income (measured in thousands of dollars) is evaluated at the mean of family income (\$35,000). The equations also include dummy variables for base effects, and these results are described below in Table 4.11. Annotated entries (a) are associated with coefficients that are significant at the  $\alpha=0.05$  confidence level.

### Housing Quality, Wait Time, and Allowance Effects

Members are quite sensitive to the quality of military housing: about 78 percent would choose civilian housing over the low-quality military house, while only 40 percent would pick civilian housing if they were offered the high-quality military house. These overall averages reflect representative military members and a blending of the various allowance/wait times that the survey presented to members. The probability of a member choosing civilian housing varies considerably with housing options as well as member characteristics.

Both changes to the allowance and to the wait time for military housing have large effects on members' tradeoffs between military and civilian housing alternatives. The greater the allowance, and the greater the wait time, the more likely are individuals to desire non-military housing.

Table 4.9 shows that 67 percent of members would choose civilian housing in lieu of the low-quality military housing even if the housing had been immediately available when the members arrived at their current bases. This percentage increase rises sharply if the allowance increases or if members must wait for the military housing. A 25 and 35 percent increase in BAQ increases the proportion of members preferring civilian housing choice to 77 and 84, respectively. Alternatively, if BAQ remained at its current level and the wait for military housing was two months, then 80 percent of members

**Table 4.9**  
**Predicted Percentage Choosing Civilian Housing When Offered**  
**Low-Quality Military House Under Different Options**

Option	Housing Allowance	Guaranteed Wait Time	Percentage Choosing Civilian Housing
Offer 1	Same	No wait	66.7
Offer 2	\$100 more: JE \$150 more: SE	No wait	76.7
Offer 3	\$150 more: JE \$200 more: SE \$225 more: O	No wait	83.7
Offer 4	Same	2 months	80.3
Offer 5	Same	6 months	87.4



would have rejected military housing and stayed in civilian housing. If the wait was six months, then 87 percent would have rejected military housing. The results reflect the strong premium that members place on quick availability of military housing: a two-month delay in availability is a larger deterrent to military housing than a 25-percent increase in BAQ.

As expected, service members have a stronger preference for high-quality military housing, but members remain sensitive to the housing allowance and wait for military housing. If the high-quality house were available when the member arrived at the base with no wait and the housing allowance were 25 percent greater, 79 percent of members would have chosen military housing while only 21 percent of members would have chosen civilian housing. With a 45 percent increase in BAQ, 60 percent of members would still choose the high quality military housing, while 40 percent of members would choose civilian housing. Many members would prefer the modern, high-quality military house over civilian options, but this is predicated on the immediate availability of military housing. If the al-

**Table 4.10**  
**Predicted Proportion Choosing Civilian Housing When Offered High-Quality Military House Under Different Options**

Option	Housing Allowance	Guaranteed Wait Time	Percentage Choosing Civilian Housing
Offer 1	\$100 more: JE \$150 more: SE	No wait	20.7
Offer 2	\$150 more: O \$150 more: JE \$200 more: SE	No wait	27.2
Offer 3	\$225 more: O \$200 more: JE \$250 more: SE	No wait	40.1
Offer 4	\$300 more: O Same	6 months	39.5
Offer 5	\$100 more: JE \$150 more: SE \$150 more: O	6 months	56.2
Offer 6	Same	12 months	57.9

allowance were unchanged and the wait for military housing were 6 months, 60 percent of members would wait for the military housing. If the wait were 12 months, the percentage who would take military housing falls to 42 percent. An indication of the tradeoff between the allowance level and the wait time is that about the same percentage of members would choose military housing if BAQ were 45 percent higher and there was no wait as would choose military housing if BAQ were the same and there was a six-month wait.

The survey also asked members whether they were less likely to accept low- and high-quality military housing if the housing was actually physically located off-base.<sup>12</sup> This issue has policy salience, because ongoing options to privatize military housing envision military-leased housing units located in the civilian community (DoD, 1996; GAO, 1998). Military members might prefer on-base military housing because it is close to work and eases access to base facilities and programs. At some bases, comparable-quality on-base housing might be preferred because the local community is unattractive.

The results in Table 4.11 show how member preferences for on- and off-base housing vary with the quality of military housing. First, consider the group of members who would accept the low-quality housing option with no wait time and the current level of allowance (Option 1 in Table 4.9). About half of these members would be less likely to accept military housing if it were located in the civilian community. These members seem to value the amenities of living on the military base and are reluctant to be separated from the on-base community. Officers are less likely than enlisted members to accept military housing off-base: 64 and 80 percent of junior and senior officers, respectively, are less likely to accept low-quality military housing off-base than if it is located on-base, compared to between 40 and 51 percent of junior and senior enlisted members, respectively.

The preference for on-base living is weaker if we look at the preferences for high-quality military housing. In this case, we looked at the group of members who would accept high-quality military housing

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<sup>12</sup>Throughout most of the report, we have assumed that military housing was located on-base. Here, we make the distinction between military housing that is located on-base and off-base.

**Table 4.11**  
**Proportion Less Likely to Choose Military Housing**  
**When the Unit Is Located Off-Base**

	Low-Quality Military Housing		High-Quality Military Housing	
	Proportion	Standard Error	Proportion	Standard Error
Junior enlisted	0.4862	0.0248	0.0486	0.0069
Midgrade enlisted	0.5123	0.0263	0.0714	0.0087
Senior enlisted	0.4092	0.0381	0.0875	0.0183
Junior officers	0.6361	0.0262	0.1415	0.0136
Senior officers	0.7955	0.0328	0.1805	0.0196
Overall	0.5157	0.0146	0.0796	0.0049

NOTE: Results are adjusted to hold constant the effects of base.

with no wait and a 25 percent increase in the BAQ (Option 1 in Table 4.10). The results show that only 8 percent of members would be less likely to accept high-quality housing if it were located off-base. Again, junior and senior officers are 14 and 18 percent less likely, respectively, to accept off-base military housing than housing on-base, compared with 4 to 8 percent of enlisted personnel.

### Individual Effects

Family income has a small effect on members' choices between military and civilian housing. A \$10,000 increase in family income increases the probability of choosing civilian housing by 2 and 6 percentage points, respectively, for the low- and high-quality military housing. These small effects of family income are roughly comparable with those observed in Method 1 above and reflect two factors. First, military housing amenities increase with member rank, so members who earn more are also offered better military housing. In the survey, we offered better low- and high-quality alternatives to senior enlisted members and officers than to junior enlisted members. Second, family income is taxed, but the housing allowance is not. Therefore, allowance increases have much larger effects on housing choice than do income increases.

Spouse employment status has some effect on housing choice over and above its effect on family income. Part-time employment has no significant effect on housing choice, but members are 5 percent less

likely to accept low-quality housing if the spouse is employed full-time. This may reflect greater attachments of working spouses to the local civilian community. Spouse employment does not affect the decision to accept high-quality military housing.

Joint military couples have a higher probability of choosing civilian housing than other couples. If the member's spouse is in the military, they are about 11 percent more likely to choose civilian housing than members whose spouses are not in the labor force.

As we saw in Method 1, single parents tend to prefer civilian housing to military housing. With other things equal, single parents are 12 percent more likely to prefer civilian housing than the high-quality military housing options in the survey. Single parents made choices comparable to those of married members with non-working spouses when they were offered low-quality military housing.


Civilian housing alternatives become less attractive as family size increases. Members with one child are about 3 percent less likely to choose civilian housing than those with no children. The effect rises to about 8 percent if the members have three or more children.

Other individual factors have little effect on housing choice. Blacks are about 4 percent less likely than white non-Hispanics to choose civilian housing over high-quality military housing. Hispanics and members of other race/ethnic groups make similar choices to those of white non-Hispanics. Housing choices did not differ significantly across gender groups or across members' expectations of deployment.

### **Base Effects**

Table 4.12 summarizes the base effects estimated under Method 2. The table reports the predicted probability of choosing military housing at each base for a representative (average) member under an average of the wait time and allowance options discussed above. The results show that, if offered low-quality military housing, about 70 percent of members at McGuire would choose civilian housing, while 86 percent of members at Pendleton would choose civilian housing. This suggests that the underlying preferences for military housing are stronger at McGuire and bases near the top of Table 4.12 than at

**Table 4.12**  
**Predicted Probability of Choosing Civilian Over Military Housing**  
**(standard error of prediction in parentheses)**

	Base	Low-Quality Military Housing	Base	High-Quality Military Housing
Prefer Military Housing 	McGuire	0.7024 (0.0196)	Lewis	0.3325 (0.0232)
	Carson	0.7462 (0.0201)	McGuire	0.3676 (0.0209)
	Lewis	0.7474 (0.0208)	Carson	0.3786 (0.0219)
	Hood	0.7541 (0.0199)	Tyndall	0.3946 (0.0222)
	Jackson	0.7783 (0.0225)	Jackson	0.3996 (0.0243)
	Cherry Point	0.7869 (0.0174)	San Diego	0.4132 (0.0161)
	Tyndall	0.8015 (0.0184)	Patuxent River	0.4288 (0.0213)
	Minot	0.8019 (0.0167)	Minot	0.4359 (0.0192)
	Mayport	0.8169 (0.0198)	Hood	0.4418 (0.0225)
	San Diego	0.8221 (0.0127)	Cherry Point	0.4439 (0.0215)
	Patuxent River	0.8399 (0.0176)	Pendleton	0.4488 (0.0236)
	Prefer Civilian Housing	Pendleton	0.8575 (0.0175)	Mayport

Pendleton and bases near the bottom of the table. Since we are holding constant the quality of military housing, this ranking largely reflects member satisfaction across bases with the quality of civilian housing that is available and affordable at different bases. In addition, however, members may prefer military to civilian housing options for better access to base programs and facilities or if maintenance is better in military housing compared to civilian rental housing. If these amenities differ across bases, then the base effects would also reflect these preferences.

The base effects in Table 4.12 have several key features. First, the differences are generally modest in magnitude. The range is 16 percentage points across bases for low- and high-quality military housing, but most bases cluster close together, and most probabilities do not differ significantly from one another. Second, the ranks for low- and high-quality military houses are fairly consistent (as we would expect), i.e., the correlation between predicted probabilities is 0.64. Finally, both the small magnitude of base effects and the ranking of housing preferences across bases is similar to that observed in Method 1.

### **METHOD 3: CHARACTERISTICS OF MEMBERS WITH STRONG PREFERENCES FOR MILITARY HOUSING**

In a third estimation procedure, we identify the characteristics of individuals who have especially strong preferences for military housing. In Table 3.13, we noted that 18 percent of those who were living in military housing would stay there even if the housing allowance were increased \$250, which is a 30–40 percent increase in the housing allowance (depending on rank). In addition, 20 percent of those renting in the civilian market said they would still like to move into military housing if the allowance was \$250 greater. About 20 percent of renters also said that they would still prefer military housing even if they had to wait a year. About 4 percent of owners said likewise.

To determine the characteristics of this “core” group of individuals who strongly prefer military housing, we created a set of dichotomous dependent variables using the hypothetical options questions. The first dependent variable was set equal to “one” if the individual would take the low-quality housing with a six-month wait; the second variable was set equal to “one” if the individual would take the low-quality housing with an increase of approximately 25 percent in the housing allowance; the third was set to “one” if the individual would take the high-quality housing after a one-year wait; the fourth if the individual would take the high-quality housing with a 35 percent increase in the housing allowance.

We then looked at the determinants of those dependent variables, using a similar specification to the one that we employed in Method 1, which incorporates personal characteristics (e.g., marital status, number of children, race) and controls for base level effects. In lieu of family income, we included dummy variables indicating individuals’ ranks, so that we could investigate differences across ranks in military housing preferences.<sup>13</sup>

### **Results**

Table 4.13 displays the estimation results for Method 3. The estimation procedure was designed to identify the characteristics of the

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<sup>13</sup>It is impossible to include both rank and family income because the variation in income across individuals is largely driven by rank.

**Table 4.13**  
**Probit Regression Results for Members with Strong Preferences for Military Housing (standard errors in parentheses)**

Variable	Would Wait 6 Months for Low-Quality Military Housing	Would Wait 1 Year for High-Quality Military Housing	Would Forfeit 25% More BAQ for Low-Quality Military Housing	Would Forfeit 35% More BAQ for High-Quality Military Housing
Junior enlisted (E3–E4)	0.1155 (0.0964)	0.7272 <sup>a</sup> (0.0818)	0.0505 (0.0942)	0.5555 <sup>a</sup> (0.0793)
Midgrade enlisted (E5–E6)	-0.0887 (0.0931)	0.3788 <sup>a</sup> (0.0773)	-0.0869 (0.0898)	0.3005 <sup>a</sup> (0.0747)
Junior officers (O2–O3)	-0.1901 (0.1018)	0.0190 (0.0852)	-0.0090 (0.0979)	0.2483 <sup>a</sup> (0.0818)
Senior officers (O4–O5)	-0.6967 <sup>a</sup> (0.1203)	-0.4150 <sup>a</sup> (0.0932)	-0.3034 <sup>a</sup> (0.1071)	-0.0054 (0.0853)
Single parent	-0.0924 (0.1181)	-0.3623 <sup>a</sup> (0.0967)	-0.0498 (0.1120)	-0.0861 (0.0968)
Spouse full-time	-0.2344 <sup>a</sup> (0.0714)	-0.1285 <sup>a</sup> (0.0572)	-0.2433 <sup>a</sup> (0.0655)	-0.0614 (0.0557)
Spouse part-time	-0.0588 (0.0741)	-0.0311 (0.0608)	-0.0786 (0.0699)	0.0190 (0.0602)
Spouse military	-0.4359 <sup>a</sup> (0.1175)	-0.4258 <sup>a</sup> (0.0884)	-0.4446 <sup>a</sup> (0.1100)	-0.3796 <sup>a</sup> (0.0835)
One child	0.2090 <sup>a</sup> (0.0874)	0.1834 <sup>a</sup> (0.0666)	-0.1261 (0.0787)	-0.0005 (0.0643)
Two children	0.1932 <sup>a</sup> (0.0894)	0.2981 <sup>a</sup> (0.0680)	-0.0871 (0.0785)	0.1713 <sup>a</sup> (0.0652)
Three or more children	0.4012 <sup>a</sup> (0.0955)	0.3295 <sup>a</sup> (0.0741)	-0.0606 (0.0865)	0.0881 (0.0713)
Expect to deploy	0.0009 (0.0625)	0.0863 (0.0498)	0.0072 (0.0575)	-0.0420 (0.0487)
Female	0.0132 (0.0967)	0.0628 (0.0748)	-0.1523 (0.0928)	0.1125 (0.0737)
Hispanic	0.0162 (0.0855)	-0.0243 (0.0669)	0.0233 (0.0788)	-0.1197 (0.0654)
Black	0.0593 (0.0813)	0.1202 (0.0669)	0.2979 <sup>a</sup> (0.0741)	-0.0525 (0.0663)
Other	-0.1938 (0.1174)	-0.0328 (0.0880)	-0.0236 (0.1031)	0.0352 (0.0856)
Constant	-1.2869 <sup>a</sup> (0.1383)	-0.7930 <sup>a</sup> (0.1136)	-0.9089 <sup>a</sup> (0.1345)	-0.1479 (0.1107)

NOTES: The omitted reference group is junior enlisted, white non-Hispanic, male members with no children, a spouse not in the labor force, and not expecting to deploy in the next year. The equations also include dummy variables for base effects, and these results are described below. Annotated entries (a) are significant at the  $\alpha=0.05$  confidence level. The sample size is 4389. The  $\chi^2$  for the four equations are 154.20, 371.43, 109.40, and 121.19, respectively.

core group of individuals who desire military housing—those who prefer military housing despite large increases in the housing allowance and long wait times for military housing. The predicted effects associated with the regression coefficients are reported in Table 4.14.

We also estimated the four models with the other two specifications employed in Method 1 (base-rank variables and base variables). The

**Table 4.14**  
**Predicted Effects of Changes in Member Characteristics on Strong Preferences for Military Housing**

Variable	Would Wait 6 Months for Low-Quality Military Housing	Would Wait 1 Year for High-Quality Military Housing	Would Forfeit 25% More BAQ for Low-Quality Military Housing	Would Forfeit 35% More BAQ for High-Quality Military Housing
Junior enlisted (E3–E4)	0.0227	0.2799 <sup>a</sup>	0.0121	0.2133 <sup>a</sup>
Midgrade enlisted (E5–E6)	-0.0167	0.1459 <sup>a</sup>	-0.0204	0.1176 <sup>a</sup>
Junior officers (O2–O3)	-0.0332 <sup>a</sup>	0.0073	-0.0021	0.0962 <sup>a</sup>
Senior officers (O4–O5)	-0.0914 <sup>a</sup>	-0.1472 <sup>a</sup>	-0.0628 <sup>a</sup>	-0.0021
Single parent	-0.0169	-0.1300 <sup>a</sup>	-0.0116	-0.0342
Spouse full-time	-0.0429 <sup>a</sup>	-0.0487 <sup>a</sup>	-0.0556 <sup>a</sup>	-0.0243
Spouse part-time	-0.0111	-0.0119	-0.0183	0.0075
Spouse military	-0.0675 <sup>a</sup>	-0.1517 <sup>a</sup>	-0.0877 <sup>a</sup>	-0.1505 <sup>a</sup>
One child	0.0423 <sup>a</sup>	0.0707 <sup>a</sup>	-0.0292	-0.0002
Two children	0.0387 <sup>a</sup>	0.1152 <sup>a</sup>	-0.0204	0.0673 <sup>a</sup>
Three or more children	0.0878 <sup>a</sup>	0.1282 <sup>a</sup>	-0.0142	0.0347
Expect to deploy	0.0002	0.0331	0.0017	-0.0166
Female	0.0025	0.0241	-0.0342	0.0442
Hispanic	0.0031	-0.0092	0.0056	-0.0476
Black	0.0116	0.0464	0.0779 <sup>a</sup>	-0.0208
Other	-0.0335	-0.0125	-0.0056	0.0139
Mean	0.1255	0.3927	0.1629	0.5512

NOTES: The omitted reference group is junior enlisted, white non-Hispanic, male members with no children, a spouse not in the labor force, and not expecting to deploy in the next year. The equations also include dummy variables for base effects, and these results are described below. Annotated entries (a) are associated with coefficients that are significant at the  $\alpha=0.05$  confidence level.



coefficient estimates were robust to the various specifications. We report the base fixed-effect model because it captures more base-level variation than the other two specifications.

The discussion focuses on how particular factors change the average probability of choosing military housing. While the percentage point changes tend to be larger in absolute terms for specification 2 (the willingness to wait one year for high-quality housing) and specification 4 (the willingness to forgo a 35 percent increase in BAQ for high-quality military housing) than for the other two specifications, it is important to interpret them in the context of how they change (at the mean) the probability of the decision to live in military housing. The overall probabilities of choosing military housing under the scenarios in specifications 2 and 4 are much higher than under the other two scenarios. Thus, the effect of variables on the decision is less pronounced than the percentage point difference suggests.

### **Willingness to Wait for Military Housing**

The two measures of strong preferences for military housing based on willingness to wait that are used as dependent variables are: (1) willingness to wait one year for good quality housing, and (2) willingness to wait 6 months for poor quality housing. Overall, about 13 percent of military members were willing to wait six months for the low-quality military housing, and about 39 percent of members were willing to wait one year for the high-quality housing.

Willingness to wait a year for high-quality military housing decreased with rank: E3s–E6s were more likely and senior officers less likely to wait a year for high-quality housing than were senior enlisted personnel and junior officers. In fact, the most junior enlisted members were 28 percent more likely to wait a year for high-quality housing than were senior enlisted personnel, while officers were 15 percent less likely to wait a year than senior enlisted personnel.

Junior and senior officers were 3 and 9 percent, respectively, less likely than senior enlisted personnel to wait six months. The willingness to wait did not differ significantly among the enlisted ranks.

Having children increased the probability of members waiting for housing. One child raised the probability of a member waiting a year

for high-quality by 7 percent, and more than one child raised the probability by about 12 percent. Likewise, having one child increased the probability of waiting six months for low-quality military housing by 4 percent, and having three children increased the probability by 9 percent.

Family situation had a substantial effect on the willingness to wait for military housing. Single parents were 13 percent less likely to wait a year for high-quality housing than married members with a non-working spouse. Among married members, those with full-time working spouses were 4 and 5 percentage points less likely to wait six months or a year, respectively, for military housing. As before, the results show that joint military couples have little interest in military housing. Members with a military spouse are 7 percent less likely than members with nonworking spouses to wait six months for low-quality military housing, and they are 15 percent less likely to wait one year for high-quality military housing. On the other hand, being a single parent decreased the probability of waiting a year for high-quality military housing by 31 percent, having a spouse that worked full time decreased the probability of waiting six months and a year by 35 percent and 18 percent, respectively, and being in a dual military family cut the probability of waiting one year for high-quality housing by more than half.

The willingness to endure long waits for military housing does not differ across other factors in the model. Members who expect to deploy in the next year are not significantly more likely to wait for military housing. Gender and race/ethnic effects are also insignificant.

Members' preferences for waiting differ little across bases, i.e., most base effects are insignificantly different from one another. In the low-quality specification, members at McGuire and Lewis are 9 and 6 percent more likely, respectively, than those at San Diego to wait six months for military housing. Controlling for other factors in the model, the willingness to wait does not differ significantly among the other bases.

Willingness to wait a year for high-quality housing does differ somewhat across bases. Members at McGuire and Lewis are again willing to wait. Tyndall residents are 8 percent more likely to wait for high-quality housing than at the reference base of San Diego. Mayport

residents are 10 percent less likely than those of San Diego to wait the year for high-quality military housing.

### **Willingness to “Pay” for Military Housing**

Two measures of willingness to pay were employed as dependent variables. The measures captured individuals’ willingness to “pay” for military housing; that is, the extent to which they were willing to give up greater housing allowances for the same military unit. One measure of willingness to pay was whether the individual preferred low-quality military housing even when the allowance was about 25 percent higher; a second measure indicated whether the individuals preferred high-quality military housing even when the allowance was about 35 percent higher.

For high-quality military housing, there was increasing willingness to pay among lower ranks. Junior and mid-grade enlisted personnel were 21 and 12 percent more likely, respectively, than senior enlisted to choose military housing. Junior officers were about 10 percent more likely than senior enlisted personnel to prefer the military option, but senior officers had preferences comparable with those of senior enlisted personnel.

For low-quality housing, there was little variation across ranks in the willingness to pay. The only significant difference was that senior officers were 6 percent less likely than the others to forfeit 25 percent more in BAQ for low-quality military housing.

As was the case with willingness to wait, having a spouse who worked full-time and being in a joint military family decreased individuals’ willingness to pay more for military housing. The effects of those variables were much stronger (in percentage terms) in the low-quality housing equation.

Other member characteristics have little effect on the willingness to forgo a larger allowance. In our other models, the presence of children was associated with a stronger attachment to military housing, but these variables are mostly insignificant in the willingness-to-pay equations. As in the willingness-to-wait equations, willingness to pay does not differ significantly across deployment status (likely to deploy or not), or by gender or race. An exception is that black

members are 8 percent more willing to forgo a 25 percent increase in BAQ for military housing than are their white non-Hispanic counterparts.

Controlling for member characteristics, the willingness to pay for military housing does not differ much across bases. None of the base effects differs significantly from those of the San Diego reference base in the high-quality specification. Residents at three Army bases (Carson, Hood, and Lewis) are between 8 and 9 percent more likely than San Diego residents to prefer low-quality military housing with a 25 percent increase in BAQ.

## **SUMMARY AND CONCLUSIONS FROM HOUSING SURVEY**

The survey results show that military members have a weak preference for military housing. Most would prefer military housing over civilian alternatives, but those preferences are sensitive to the quality of military housing, the availability of on-base accommodations (length of waiting list), and the size of the housing allowance. In short, the evidence suggests that the long queues for military housing reflect the relative imbalance between the value of the housing allowance and the value of on-base housing. This imbalance is particularly strong in the junior ranks and results in junior enlisted members waiting over a year for what is frequently old, small, and poorly maintained housing.

The survey also shows that most members pay little heed to some traditional rationales for military housing. We find little evidence that members choose military housing to support their families during deployments, to acculturate junior members and their families, or to maintain military values. Members value a sense of community and a commitment to the military, but they don't see military housing as a critical linkage between the two. Of course, it is possible that there is some military benefit (i.e., support or acculturation) that is subtle and largely unnoticed by military members. Nevertheless, the preponderant motives in members' housing choices are economic.

The demand for military housing is not driven by base-specific factors, such as the cost of living. While the housing allowance does not work perfectly, the evidence suggests that the relative tradeoff between military and civilian alternatives are rather well-balanced

across bases. Of course, we did not survey all military bases, but these small base effects were surprising, since we deliberately selected bases to span a wide range of housing situations. We find that demographic characteristics are the main factors affecting the demand for military housing at all bases. The group of members preferring military housing consists of military members with lower income (especially those in junior enlisted ranks), those whose spouses do not work, and those who have a greater number of children.<sup>14</sup> These demographic effects are consistent across all three analytic methods.

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<sup>14</sup>The preference of large families for military housing reflects a disparity in the way housing benefits are awarded in military housing as compared with the allowance system. An additional child qualifies a family for a bigger residence in military housing, but the housing allowance for living off-base remains the same. On the margin, this extra benefit encourages military families with large families to prefer military housing over off-base housing. Of course, the extra financial burden of supporting the large family may also contribute to the preference of these families for on-base housing with no out-of-pocket housing expenses.



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**A COMPARISON OF THE HOUSING CHOICES OF  
MILITARY AND CIVILIAN FAMILIES**

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**INTRODUCTION**

In this chapter, we explore the housing decisions of military families using 1990 U.S. Census data. Analysis of the 1990 Census data is a useful complement to analysis of the 1997 Survey of Military Members' Housing Choices and Preferences data, mainly because the Census data allow us to compare the housing decisions of military families to those of civilian families.

The chapter proceeds in the following way. In the next subsection, we describe the 1990 Census data and summarize our methodology for picking a sample of the Census for analysis. The third subsection provides results from our empirical analysis. First, we characterize aspects of the housing markets in which military members operate. We describe the demographic characteristics of markets where military bases are located, then compare these markets to other housing markets that do not have a significant (if any) military presence. Second, we compare and contrast military housing to housing rented or owned by military members, and to housing rented or owned by civilians. We also determine whether military members and civilians are treated differently in civilian housing markets. Specifically, we investigate whether empirical evidence exists of civilian landlords charging a premium to military renters. Finally, we compare the housing decisions of military families to like civilian families.

## DATA

Decennial United States Census data are released by the U.S. Department of Commerce, Bureau of the Census. The data we use in this analysis are drawn from a 5 percent sample of the 1990 U.S. Census known as the Public Use Microdata Sample (PUMS-A). The data consist of housing and person records. We describe the contents of each type of record in turn.

### Housing Record

For each housing unit, information is collected on characteristics of the housing, including number of bedrooms, number of bathrooms, age of the unit, whether the unit is rented or own, and the amount of rent charged or mortgage paid. Military members have the option of living in military housing. We identified members living in military housing as those who indicated that they were renting but also responded that no cash rent was paid. Some military members may have been living with family members without paying rent and may be falsely coded as living in military housing, but it is difficult to distinguish such individuals from those truly in military housing.

The Census data also do not contain information on the housing allowance that military members are paid. Neither BAQ nor VHA is available. As a result, we imputed a BAQ and VHA for each military member. BAQ is the same for all members of the same rank regardless of location. We imputed (methodology described below) a rank for each member, and assigned the appropriate BAQ to each individual. The VHA, as its name implies, is designed to counteract the differences in the cost of living across areas. The amount of VHA members receive depends on rank, duty location, and whether the member has dependents. The VHA differs by military housing area, or MHA. Census geography is defined as the Public Use Microdata Area (PUMA)—a PUMA corresponds to a contiguous geographic area of approximately 260,000 people. For each PUMA, we weighted the VHA in each MHA by the population in the MHA to come up with a weighted-average VHA amount. We then took the PUMA-level VHAs and assigned them to military members in each of the PUMAs.

The housing record also contains household information, including household type, household income, and number of children in the



household. For each individual in the household, there is a corresponding person-level record.

### **Person Record**

The person record contains information on an individual's education, race, work status, income, occupation, place of birth, and other characteristics. Information specific to military members is somewhat limited: The data contain information on an individual's branch of service (Army, Air Force, Navy, Marines, Coast Guard, Reservist, or National Guard). There is some broad information about rank. In response to a question about occupation, some military members chose one of the available military occupation options (commissioned or warrant officer, noncommissioned officer, or other enlisted personnel, or military occupation rank not specified), but others responded according to their actual military duties (i.e., vehicle and mobile equipment mechanics and repairers, material recording, scheduling and distributing clerks, communications equipment operators).

As a result, we developed a methodology to impute each service member's rank. We first determine whether the individual was likely to be an officer or an enlisted member. We assume that members with a college education were officers. We then compiled statistics on the average number of years to promotion by race, gender, and service for officers and enlisted members. We compare each individual's years of military experience (provided in the Census) with their race, gender, service, and officer/enlisted-specific average promotion time table, and impute a rank based on that comparison.

### **Sample Selection**

An analytic file was created from the PUMS-A Census file in a two-stage process. First, we separated geographic locations into two types, those with a significant military presence and those without. In breaking down locations, we used the smallest geography available on the PUMS-A file, which is the PUMA.<sup>1</sup> A PUMA is a geo-

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<sup>1</sup>For confidentiality reasons, the specific location of individuals is not available on the Public Use tapes.

graphically contiguous segment of a state that contains approximately 260,000 individuals, or about 100,000 families. Because a PUMA is defined by population, the size of the geographic area in miles that a PUMA covers varies widely. For instance, a large metropolitan area can be comprised of many PUMAs. On the other hand, a PUMA may contain several counties in less populated rural areas.

We decided to eliminate some observations because the military members were relatively isolated from other military personnel. Military recruiter and special assignments may lead military members to live in areas with a very low military presence. While the housing problems of these members may be significant, we were concerned that these problems might have unusual characteristics that were not representative of housing issues faced by most military members. Therefore, we separated PUMAs into those that contained a *significant* military presence and those that did not. Our criteria for having a military presence was that the PUMA must contain at least one military family for every 500 civilian families, a 0.2 percent presence. Thus, in the PUMS-A file, we identified what we hereafter refer to as “military” and “nonmilitary” PUMAs according to whether at least 10 military families were observed in the PUMA in the PUMS-A file. Of the 1726 PUMAs in the 1990 Census, 391 PUMAs satisfied our criteria for having a military presence. The exclusion of these isolated military members reduced our sample of military members by about 2 percent, but our dataset contained information on nearly 33,000 military members and their families (about 320 observations per PUMA area).

For comparison purposes, we randomly selected three civilian families for each military family in the PUMAs with a significant military presence. This civilian sample was designed so we could compare the housing decisions of military members with those of civilians in the same geographic areas and housing markets. The total sample size for the analysis was about 125,000 families (military and civilian combined).

In our first analysis, we compare the 391 military PUMAs to the 1335 nonmilitary PUMAs. In a later analysis, we compare the housing characteristics of those in military housing to those in civilian housing. In that analysis, we use data from the military families who

reside in one of the 391 military PUMAs in addition to a sample of civilian families residing in the military PUMAs. Our definition of a family is based on military eligibility for family housing, i.e., it includes married couples without children, unmarried heads of household with children, and married couples with children. We included only families where the head of household is between 18 and 55, inclusive. To ensure comparability of the military and civilian families, we sampled only non-farm civilian families with at least \$10,000 in income.

## **ANALYSIS AND RESULTS**

This section describes the characteristics of military- and civilian-occupied housing and analyzes the tenure choices of these families. In the first subsection, we characterize aspects of the housing markets in which military members operate. We first describe the demographic characteristics of markets where military bases are located. We compare the markets where military members are to other housing markets in which there is only a small military presence if any. The second subsection compares and contrasts military housing to housing rented or owned by military members, and to housing rented or owned by civilians. We determine whether military members and civilians are treated differently in civilian housing markets in the third subsection. In the last subsection, we compare the housing decisions of military families to like civilian families.

### **Comparing Civilian and Military Housing Markets**

To understand military members' housing decisions, it is useful to place their decisions in the context of the markets in which they are operating. The most refined market we can describe is the PUMA-level market because that is the smallest geography available on the Census. Recall that a PUMA represents about 260,000 individuals, or 100,000 households.

Of the 1726 PUMAs in the Census, 391 were identified as having a significant military presence. The criteria for this identification was that at least one family in 500 must be a military family. The remaining 1335 PUMAs did not have a significant military presence.

Table 5.1 offers some descriptive statistics about the 391 military PUMAs and the 1335 nonmilitary PUMAs.

By construction, the percentage of active military members in military and nonmilitary PUMAs varies significantly. But, the distribution of active military percentages within the 391 military PUMAs is

**Table 5.1**  
**Military and Nonmilitary Market Comparison**

Characteristic	Military PUMAs	Nonmilitary PUMAs	All PUMAs
<i>Median Gross Rent (dollars)</i>			
Mean	495	456	464
25th percentile	373	336	346
Median	464	425	431
75th percentile	589	547	559
<i>Active Military (percent)</i>			
Mean	3.2	0.13	0.8
25th percentile	0.6	0.08	0.1
Median	1.4	0.11	0.1
75th percentile	4.0	0.16	0.3
<i>Vacant Housing Units (percent)</i>			
Mean	9.3	8.6	8.8
25th percentile	5.6	4.9	5.1
Median	8.2	7.3	7.5
75th percentile	11.2	10.7	10.8
<i>Urban Area (percent)</i>			
Mean	66.7	61.9	63.0
25th percentile	39.9	8.4	20.3
Median	81.4	83.5	82.5
75th percentile	98.5	99.9	99.8
<i>Owning Home (percent)</i>			
Mean	63.9	64.8	64.6
25th percentile	58.7	59.0	58.8
Median	65.8	69.6	68.5
75th percentile	71.1	74.6	73.9
<i>Median Household Income (dollars)</i>			
Mean	32,855	31,231	31,599
25th percentile	25,432	23,568	24,000
Median	31,167	29,150	29,429
75th percentile	37,985	36,757	37,282
<i>No High School Education (percent)</i>			
Mean	22.1	26.1	25.2
25th percentile	15.6	18.2	17.5
Median	20.9	24.9	24.1
75th percentile	27.9	32.7	31.4

noteworthy: in half of military PUMAs, the military's share of the population was less than 1.5 percent, while only 25 percent of PUMAs had even a 4 percent military share of the population.

Other than the constructed differences in the share of the population in the military, Table 5.1 shows quite limited differences between military and nonmilitary PUMAs. Rents and median household income are somewhat higher in military PUMAs (9 percent and 5 percent, respectively), and military PUMAs are more likely to be urbanized.

### **Comparing Civilian and Military Housing Stock**

We also explore how military housing compares to housing available in the civilian market. Table 5.2 shows how characteristics of military housing differ from characteristics of housing that military members rent in the civilian sector, that military members own, that civilians rent, and that civilians own.

The type of housing available through the military differs quite dramatically from the type of housing available in the civilian sector. Attached houses comprise a much larger share, and big apartment complexes and detached homes a much smaller share, of military housing than civilian rental housing. Military housing is also far older than civilian rental housing. About 70 percent of military housing was built before 1960, compared to 41 percent of the civilian housing in which military members reside and 47 percent of the housing in which civilians reside. Conversely, about 29 percent of the civilian rental housing was 10 years old or less in 1990, compared to only 14 percent of military housing.

Those in military housing are only slightly more likely to have homes with four or more bedrooms compared to military members in civilian housing, but are much more likely to have homes with four or more bedrooms compared to civilians. In the sample, the number of children is similar for both military and civilian families (1.3 per family), and about 15 percent of each group has three or more children. Since family sizes are comparable, it is surprising that military families have homes with more bedrooms than their civilian counterparts.

**Table 5.2**  
**A Comparison of Military Housing Characteristics to Civilian Housing Characteristics (percentages)**

Housing Characteristic	Military Housing Residents	Military Renters	Military Home Owners	Civilian Renters	Civilian Home Owners
Type of residence					
Detached house	17	28	91	44	93
Attached house	49	21	7	10	5
Nine or fewer units	32	32	a	29	a
Ten or more units	3	20	a	18	a
Date of construction					
Built before 1950	16	10	6	19	13
Built 1950s–1960s	54	31	17	28	25
Built 1970s	16	26	23	24	26
Built early 1980s	5	15	19	14	15
Built 1985–1990	9	18	35	15	21
Number of bedrooms					
Two	31	38	8	42	38
Three	50	35	58	34	35
Four	15	12	28	7	12
Five or more	a	a	4	a	a
Less than 1 year at current residence	52	65	27	49	13
Within 10 minutes from work	64	35	16	30	24

<sup>a</sup>Less than 1 percent.

Table 5.2 also shows that military members have shorter tenure in their housing compared to civilians. In part, the result reflects that military members are often reassigned to different bases every two to three years.

This geographic mobility puts military members at a disadvantage in the local housing market in two ways. First, military members have less information about the local housing market, since they do not have an established network of friends and acquaintances to assist them in finding housing, although other military members already living at the base can sometimes be helpful.<sup>2</sup> Second, military

<sup>2</sup>This information problem is enhanced by the fact that many members need to find a place quickly at the new location. Military members also have less incentive to invest

renters may pay higher rents than civilians, because landlords do not consistently raise rents for established residents, and military renters may have less time in the rental units.

Finally, Table 5.2 shows that those in military housing are more likely than others to have a short commute to work. This is not surprising, given that most military housing is located on-base (some is interspersed in the local community). Indeed, proximity to work among military members essential to operations is given as one reason for the provision of military housing. Only 35 percent of military members who rent civilian housing and 16 percent of those who own housing are as close to work as those in military housing.

### **Military Premiums in Civilian Rental Housing**

Some military members have questioned whether landlords charge them the same rent that they charge civilian renters. A landlord may have one of several reasons for raising rental prices just for military renters. First, landlords may charge higher rent to military personnel to compensate for the risk they bear in agreeing to the terms of a military clause, which allows military renters to leave a rental unit without financial penalty before the lease is up in the event of deployment or reassignment or if military housing becomes available.<sup>3</sup> Second, landlords may charge military members higher rents to compensate for the more frequent turnover likely among military renters compared to civilian renters, since military members are, in general, reassigned every few years. Third, landlords may simply discriminate against military members.

To investigate whether civilians and military members are treated differently in the market, we analyzed rental prices using Census data. We explored whether, holding all else constant, military renters are charged more than civilian renters. The methodology was to compare rents charged to civilians with rents charged to military

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in search activities than civilians, since they will move again in a few years. The military housing office assists the military members in finding suitable housing when they relocate. Military members are also entitled to temporary military housing for a short period while they search for housing.

<sup>3</sup>The type of clause that a landlord signs varies; different clauses allow the member to leave cost-free under different circumstances.

members after controlling for as many characteristics as possible of the rental unit that affect price. We estimated what is known as a “hedonic” rental price equation. On the left-hand side of the equation was rent. On the right was a set of variables determining rent and a dummy variable for whether the renter is military or civilian.<sup>4</sup> The coefficient on the military/civilian renter variable was our estimate of the rent premium or discount applied to military members.

Determinants of rent include the type of unit, number of bedrooms, number of bathrooms, age of the unit, and location of the unit. All the housing characteristics that may affect rental prices, and which are available in the Census, are included. In addition, right-hand-side determinants include some individual characteristics, such as race/ethnicity. We included race/ethnicity to control for possible discrimination and to avoid confounding race/ethnic discrimination with discrimination against military members. We also included the length of time the individual has rented the apartment. New tenants are likely to be charged higher rents than tenants that have been in the housing unit for longer periods of time because many landlords do not change, or change only slightly, existing tenants’ rent, regardless of price changes in the local housing market. In addition, the hedonic specification included a dummy variable indicating whether the householder’s commute to work is less than 10 minutes. The commuting time variable was a proxy for the distance to the central city. Dynarksi (1985) noted the importance of controlling for distance because housing-unit prices change with distance from the central city, or “central business district.” Prices may also vary across geographic locations. To control for those price differences, we included dummy variables for each PUMA, or PUMA-fixed effects.

The above variables were a fairly, but not completely, exhaustive set of determinants of rental prices. We were unable to observe, for instance, “quality” of housing. Does the unit have a garbage disposal, two parking spaces, or air conditioning? Is the unit bright and airy, or in the basement of someone’s house? Is the neighborhood good or bad? Is the unit on a busy street or quiet *cul de sac*? If any of these

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<sup>4</sup>Ideally, the hedonic equation would include all characteristics of the housing unit. The Census does not include a comprehensive set of housing attributes, so we were unable to adjust for some factors that may affect rental prices.



omitted determinants of price are correlated with whether individuals are in the military, then the estimate of the military rent premium will be biased.

Table 5.3 shows the results from estimation of the hedonic rent equation. We found that rents are slightly higher among military members compared to civilians. Military members are charged a premium of about 2 percent. With the median gross rent among civilians and military members in the PUMAs in the sample at \$463, the 2 percent premium represents only a \$9 differential in actual rental prices per month.

**Table 5.3**  
**Estimates from the Hedonic Rent Equation**  
**(dependent variable: ln rent)**

Independent Variables	Coefficient <sup>a</sup> (Standard Error)
House	.176 <sup>a</sup> (.0058)
Attached house	.022 <sup>a</sup> (.0064)
Less than 9 unit apartment complex	-.010 <sup>a</sup> (.0052)
Condominium	.132 <sup>a</sup> (.0082)
Built in 1980s	-.044 <sup>a</sup> (.0061)
Built in 1970s	-.114 <sup>a</sup> (.0055)
Built in 1960s	-.164 <sup>a</sup> (.0061)
Built in 1950s	-.211 <sup>a</sup> (.0065)
Built in 1940s	-.251 <sup>a</sup> (.0077)
Built in 1930s or earlier	-.239 <sup>a</sup> (.0078)
Number of rooms	.051 <sup>a</sup> (.0021)
Number of bedrooms	.051 <sup>a</sup> (.0036)
Military renter	.019 <sup>a</sup> (.0036)
Tenant less than 1 year	.073 <sup>a</sup> (.0035)
Within ten minutes of work	-.040 <sup>a</sup> (.0037)
Black	-.078 <sup>a</sup> (.0047)
Hispanic	-.094 <sup>a</sup> (.0079)
Other	-.054 <sup>a</sup> (.0084)
R-squared	0.485
Sample size	33,751
Root mean-square error	0.303

<sup>a</sup>Significant at the 5 percent level. The model also controls for PUMA-specific fixed effects.

We hypothesized that the premium charged to military members might be larger in smaller housing markets where landlords have more market power and a greater ability to discriminate against military members. We investigated whether the military-civilian rent differential varied across more and less populated areas. We ran the hedonic rent equation with the military/civilian dummy variable separately for military members in Metropolitan Statistical Areas (MSAs) and for those in non-MSAs, but did not find that the premium varied across the two equations.

The other possibility is that the small differential between military and civilian rents reflects some unmeasured housing attributes that are relatively more attractive to military than civilian renters. For example, since military families move frequently, they may seek rental properties with small penalties for moving before the end of the lease. Higher rents may be necessary to compensate landlords for apartment vacancies between tenants. In this case, the rental “premium” that we observe for military families might be partially or entirely offset by cost differences in housing these families. Since the Census data provides limited information about housing attributes, many attributes were omitted, and this will distort for the military coefficient in the regression if the omitted information is correlated with the military variable. Nonetheless, the Census data provide no evidence for the proposition that military families are paying extra for relatively comparable housing.

### **Comparing Housing Decisions Between Civilian and Military Families**

Our final empirical task was to compare housing decisions between civilians and military members. First, we compared the housing *tenure* decision, or the decision to own housing or rent housing. Renting housing in the case of military members includes renting housing in the civilian sector or “renting” military housing. We also compared civilian and military members’ decisions about the *amount* of housing purchased, usually measured in terms of the purchase price of an owned home or the monthly amount paid on a rented residence.

Civilians either own or rent housing, while military members own, rent housing in the civilian market, or live in military housing. Pleeter (1996) documented much lower rates of home ownership among military members compared to civilians. Using a subset of military members in 14 geographic areas with relatively large military concentrations, Pleeter found that the average home ownership rate among military members was 30.2 percent, while for civilians it was 54.4 percent. Home ownership rates were lower among military members across all income groups. In Table 5.4, we show similar results for a larger sample that includes military members and civilians in the 391 military PUMAs. Home ownership rates are lower among military members across education and income groups.

To some extent, the lower home-ownership rates reflect that military members have an additional housing option—military housing—besides the standard own-or-rent choice that civilians face. However, lower ownership rates among military members also reflect the shorter lengths of time military members live in any given location. Veterans Administration (VA) loans help to compensate for some of the increased costs of home buying because of the frequent moves by (usually) eliminating the need for a down payment and by providing low interest rates.

The second housing decision we compared between military members and civilians is the housing expenditure decision. Pleeter (1996)

**Table 5.4**

**Home Ownership Rates Among Civilians and  
Military Members (percentages)**

	Military	Civilian
Education		
Less than high school	22	60
High school	21	69
Some college	30	72
College	44	81
Annual income		
\$10,000–\$25,000	13	46
\$25,000–\$35,000	29	65
\$35,000–\$45,000	40	73
More than \$45,000	55	86

found that, controlling for demographic differences and differences in rental prices across areas, military members spend about \$13 more per month than civilians do. The author also found that military renters spend about 26 percent of their income (inclusive of housing allowance) on housing expenditures, while civilian renters spend 23 percent of their income. Similarly, military owners spend 5 percentage points more of their income on housing than civilians—30 percent compared to 25 percent.

The share of income devoted to rent may be overstated for military members, however, because of the special tax provisions that apply to (a) military pay and (b) housing allowances. States have different policies regarding taxation of military pay. Some states completely exempt military pay from taxation, some tax military pay according to federal tax rules, and others exempt thousands of dollars of military pay from taxation. In addition, housing allowance income is completely exempt from taxation. Thus, military income must be adjusted for these tax advantages before it is comparable to civilian income. As a result, the share of income devoted to rent is actually overstated to some extent for military members.

Table 5.5 compares the share of income devoted to rent, controlling for the non-taxation of military housing allowances, between military members and civilians. We did not adjust military income for states' special tax rules because the Census data do not include information on individuals' legal state of residence, which can be—and often is, among military members—different from the current state of residence. Because rules of taxation with regard to military pay vary so widely across states, there was no one overall adjustment we could

**Table 5.5**  
**Share of Income Devoted to Rent by Education**  
**Level for Military and Civilian Families**  
**(percentages)**

Variable	Military	Civilian
Less than High School	28	27
High School	28	26
Some College	26	26
College	22	22

make to best proxy the tax advantage. As a result, real income among military members is understated to some extent.

With the tax adjustment for housing allowance, we found that military members with a high school education or less spend 1–2 percent more than their civilian counterparts. Military members and civilians with at least some college education spend about the same share of income on rent.

We further explore the comparison of housing expenditures between civilian and military members by looking at whether the differential remains the same after controlling for demographic and inter-area price differences. Table 5.6 shows housing demand estimates for civilian and military renters. The dependent variable is the log of rental expenditures, or the flow of housing services demanded. On the right-hand side of the regression equation, we control for individual characteristics. The model estimates a constant elasticity demand function, so the coefficients on P and Y correspond to price and income elasticities, respectively.

**Table 5.6**  
**Housing Demand for Civilian and Military Renters**

Characteristic	All Renters		Civilian Renters		Military Renters	
	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. error
Age	0.0032*	0.0002	0.0023*	0.0003	0.0074*	0.0004
Family size	0.0235*	0.0014	0.0307*	0.0018	0.0055*	0.0021
Married	0.0215*	0.0059	0.0225*	0.0076	-0.0131	0.0125
Less than high school	-0.0879*	0.0060	-0.0917*	0.0072	-0.0136	0.0166
Some college	0.0356*	0.0042	0.0475*	0.0061	0.0133*	0.0054
College	0.1272*	0.0054	0.1136*	0.0076	0.1384*	0.0075
Spouse works	-0.0401*	0.0046	-0.0371*	0.0069	-0.0341*	0.0059
Black	-0.0987*	0.0048	-0.1192*	0.0069	-0.0704*	0.0062
Hispanic	-0.1164*	0.0077	-0.1506*	0.0099	-0.0541*	0.0125
Other	-0.1405*	0.0078	-0.1699*	0.0097	-0.0862*	0.0137
ln family income	0.2286*	0.0041	0.2211*	0.0052	0.2093*	0.0069
ln price index	-0.2008*	0.0076	-0.1483*	0.0107	-0.2697*	0.0102
Military family	0.0119*	0.0040				
Joint military family	0.0351*	0.0091			0.0405*	0.0079
Constant	0.0992*	0.0489	-0.2067*	0.0685	0.5842*	0.0662
R-square	0.2209		0.2014		0.2750	

NOTE: Entries with asterisks are significant at the  $\alpha=0.05$  confidence level.

The first specification shows that civilian and military families have similar housing demand. After controlling for price, income, and family characteristics, military families consume about 1 percent more housing amenities than civilian families. Joint military families have housing demand that is 4 percent higher than other military families.

While military families purchase comparable quantities of housing overall, the separate civilian and military demand equations in Table 5.6 show that different factors affect housing demand in the two groups. The effects of family characteristics on housing demand vary substantially between civilian and military renters. These differences may reflect that military renters are atypical renters—they may be similar to homeowners in many ways, but they remain renters because military mobility limits their ability to recoup the fixed costs of purchasing a home. Similarly, military renters may take rentals on a short-term basis that are not well-suited for their family situations, because they expect to move into military housing when it becomes available. We control for several key measures of family characteristics to capture these taste differences for renting versus owning, but military families may still differ in unmeasured ways from their civilian counterparts.

The income elasticities are about 0.2 for both civilian and military families. These estimates are similar to those in Goodman and Kawai (1984) and Kim (1992), but other studies have found higher income elasticities (Quigley, 1979; Mayo, 1981; Gillingham and Hagemann, 1983). These differences in estimates may reflect that our data is newer (the world may have changed), that many prior studies rely on aggregate data (aggregation problems may produce biased regression coefficients), or other factors.

The estimates of price elasticity vary somewhat in the literature, but our estimate is low compared to most studies. Our civilian price elasticity is only  $-0.15$ . Price estimates do vary somewhat, depending on the research approach for estimating the housing price (Mayo, 1981; Goodman and Kawai, 1984). Military renters are twice as sensitive to fluctuations in the price of housing amenities as civilians.

Family characteristics have similar qualitative effects for civilian and military housing demand, but the magnitude of the effects are sub-

stantially different. The age coefficient is about 30 percent smaller for civilian than for military families, but the family size coefficient is nearly six times larger for civilians than for the military. With other things equal, civilian high school dropouts demand about 9 percent fewer housing services than civilians who graduate from high school, but military high school dropouts demand only 1 percent less housing services than military high school graduates.





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**SELECTION OF BASES FOR THE HOUSING SURVEY**

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We undertook a systematic procedure to select bases for survey and focus group work that well represent the variety of housing markets and situations in the military. We considered all U.S. bases with at least 2000 active-duty members, excluding the service academies, the Naval Postgraduate School, and posts in the Washington, D.C. metropolitan area. The analysis focused on Military Housing Areas (MHAs), such that if several bases within the same service were located within a single MHA, they were combined for the purpose of this analysis. We did not combine bases across services, however, since these are less often colocated within an MHA.

There were six variables relating to base characteristics that we considered most relevant to housing issues among the base information available to us:

1. **Base size:** The number of active duty members assigned to the base.
2. **Off-base:** The proportion of active duty members living off-base.
3. **Military presence:** The proportion of the local population that was military. This variable is the ratio of the number of active members, plus their family members, associated with the base in 1992 to the population of the city most clearly associated with the base (all such cities are within 30 miles of the base).
4. **Price:** The Department of Housing and Urban Development's Fair Market Rent for the MHA was used as an index of rental prices.

5. **Construction:** The relative amount of construction at the base in the last three years. This variable reflects dollar amounts spent on family housing in the last three years, divided by the number of family housing units on the post.
6. **Quality:** Member satisfaction with the quality of on-base housing from the subjective ratings of military members in the 1992 Department of Defense Survey of Enlisted and Officer Personnel.

In order to ensure good coverage of the natural range and distribution of these characteristics in our selected bases, we first performed a cluster analysis on the 113 bases under consideration. This allowed us to identify groups of bases that are similar to one another in many ways. Since we considered the six variables mentioned above to be of equal importance, we standardized these variables and gave them equal weight in the cluster analysis.

The analysis suggested that the bases were best represented by seven clusters. These clusters are described in Table A.1. Clusters B, D, E, and F represent areas where there are likely to be more concerns about the cost, quality, availability, or age of military housing, whereas Clusters A, C, and G are less likely to be problematic.

We began the selection process by determining the number of bases to be selected from each cluster and from each service. The number of bases within each cluster was proportionate to the size of the cluster; the number within each service was approximately equal in order to ensure a range of bases within each service. We then selected specific bases within the cluster/service groups.

To make these selections, five additional secondary variables were examined: relative deployment levels (subjectively rated by officers from the appropriate service who were at RAND), local population density, city revenues per capita, crime rates, and poverty rates. An effort was made to achieve good coverage of these characteristics. We also sought balance in terms of base mission and geographical location. Based on these criteria, we selected twelve bases for the housing survey.

In a subsequent round of analysis, several small bases, such as Meridian NAS and Memphis NAS, were found to have too few offi-

**Table A.1**  
**Descriptions of Housing Clusters**

Cluster	Description	Total Bases	Army Bases	Navy Bases	AF Bases	MC Bases
A	Average quality on-base housing; small presence in mid-priced communities; many members off-base; much recent construction	34	7	5	22	0
B	Similar to A, except for somewhat poorer housing, somewhat cheaper markets, and very little recent construction	27	5	5	15	2
C	Larger posts with a high presence in very inexpensive communities	19	13	1	3	2
D	Similar to C, except in very expensive communities	6	1	3	0	2
E	Small bases with average-quality on-base housing used by most members; located in expensive communities; very little new construction	14	1	5	6	2
F	Similar to E, except in inexpensive communities and service members unhappy with quality of on-base housing	5	0	2	3	0
G	Typical in most respects, except very high satisfaction with quality of on-base housing	8	4	1	3	0

cers to meet our statistical power objectives. These bases were then eliminated from consideration and replaced by bases that were otherwise similar.

The final 12 selected bases appear in Table A.2. Project staff made intensive visits to one base from each service (Hood, San Diego, Tyndall, and Pendleton). These visits included meetings with base officials and housing managers to discuss housing problems and review member housing options. The visits also included focus groups with service members on housing issues and a field test of our initial housing questionnaire.

**Table A.2**  
**Bases Used for Housing Survey**

Service	Base	State	Cluster
Army	Hood	Texas	C
Army	Carson	Colorado	G
Army	Lewis	Washington	A
Army	Jackson	South Carolina	B
Navy	San Diego	California	A
Navy	Mayport	Florida	B
Navy	Patuxent River	Maryland	E
Air Force	Tyndall	Florida	A
Air Force	Minot	North Dakota	F
Air Force	McGuire	New Jersey	E
Marines	Camp Pendleton	California	D
Marines	Cherry Point	North Carolina	C

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**SAMPLE SELECTION AND SURVEY DISTRIBUTION  
FOR THE HOUSING SURVEY**

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**SAMPLE SIZE GOALS**

For each of the 12 bases, we set a goal of 400 completed surveys per base, 200 on-base and 200 off-base, with 1/6 of each group of E3 rank, 1/2 of ranks E4–E9, and 1/3 of ranks O2–O5. This resulted in initial goals of 33.3 E3s, 100 E4–E9s, and 66.7 O2–O5s in each of the on- and off-base cells. This defines six target cells for each of the 12 bases. For two of the Naval bases (San Diego and Mayport) we further divided each of the six cells into two subcells based on whether the person was assigned to a ship. The split within each of the six cells at these bases was proportionate to the naturally occurring ratios within that cell.

In order to deal with nonavailability of service members, we decided upon a structure of a primary sample with two backups specifically matched and assigned to each primary sample member. Matching was done on the basis of variables that were anticipated to be related to availability (combat or noncombat occupational category, as defined by AFSC code), response rate (black or other ethnicity), or simple similarity (more exact grade matching: E3s match only with each other, E4s and E5s match, E6s match only with each other, E7–E9s match, O2s and O3s match, and O4s and O5s match). The idea was to avoid ad hoc substitutions that altered the constitution of the sample in important ways. About 99.4 percent of first backups and 98.9 percent of second backups matched on all three characteristics.

We then determined the primary sample size that would be drawn for each cell, assuming the availability of enough eligibles for both a

primary sample and two backups for each member thereof. This was calculated on the following basis: A recent RAND military health survey (Hosek et al., 1995) reported nonresponse rates by service and rank that included nonavailability. We used a regression model that considered service, rank, age, race, and gender from that survey, applied it to the six cells for each of our 12 bases, and predicted nonresponse rates for each of our cells. We then assumed 20 percent nonavailability for ranks E4–E9 and O2–O5 and 25 percent nonavailability for E3s. From this, we calculated estimated nonresponse rates for those actually available and receiving surveys of:

- 15 percent for non-Army E4–E9 and O2–O5
- 35 percent for Army E4–E9 and O2–O5, Air Force E3
- 55 percent for non-Air Force E3.

Assuming sufficient eligibles for two backups for each primary sample member, and assuming that two backups will result in only a small number of cases in which a “slot” of three service members would produce no available members, the anticipated nonresponse rates would suggest the primary sample sizes for each on- and off-base cell shown in Table B.1.

### REALLOTMENT OF SAMPLE

Unfortunately, only three bases (Camp Pendleton, Cherry Point, and Fort Hood) had sufficient eligibles in all six cells to provide primary members and two backups for each of the cells as prescribed above. On-base officers were the most common shortcoming.

**Table B.1**  
**Ideal Primary Sample Sizes**

Service	E3	E4–E9	O2–O5
Air Force	51	120	80
Navy	76	160	80
Marines	76	160	80
Army	100	160	107

When insufficient eligibles were available within a cell, the first strategy was to increase the number of expected responses within that cell by increasing the size of the primary sample within that cell, at the expense of backups. This was done under the assumption that the probability of an assigned backup being present when the corresponding primary sample member was absent was 67 percent. The fact that this is lower than the generally assumed nonavailability rate reflects an assumption of correlation in availability of matched service members. These assumptions lead to the calculations that, compared to a “slot” with two backups, a slot with one backup is worth .93 slots for an E3 and .95 slots for others, whereas a slot without backups is worth .80 slots for an E3 and .84 slots for others. When necessary, these values were used to guide reallocation of samples between backups and primaries in order to achieve the desired number of responses.

When this did not produce the desired expected numbers of responses, the shortfall was added to the corresponding on- or off-base cell within the same rank category at the base. For example, imagine that a base had enough off-base officers to achieve the desired 66.7 expected responses without any alteration of the backup structure, but had so few on-base officers that only 55.2 expected responses could be achieved, even after allocating the entire sample to primary slots. In this case, we would have allocated additional samples to the off-base officer cell, so that it would now have 78.2 expected responses, enough to at least preserve the desired 133.4 expected responses from officers at that base. On the three occasions in which this was also not sufficient, additional samples were allocated from E3s at a base to its E4–E9s.

### **CHECKING AVAILABILITY AND USING BACKUPS**

All bases other than San Diego, Mayport, and Fort Jackson were sent a roster of primary sample members and first backups to check for continued availability and eligibility. For these nine bases the first sample was determined as follows:

- All available primary sample members were included.
- Available first backups were included if their corresponding primary members were unavailable.

- Unverified second backups were included if corresponding primary members and first backups were both unavailable.

Fort Jackson was sent a roster of primary sample members and first backups, but only eliminated ineligible (training oriented) Unit Identification Codes (UICs). After a sample redraw, the first sample from Jackson consisted of all primary members and first backups. Rosters were not checked at Mayport or San Diego. At Mayport, the first sample consisted of all primary members. At San Diego, the first sample consisted of all primary members, first backups, and second backups.

## THE SECOND MAILING

Initial results suggested that all bases other than McGuire and San Diego were likely to fall somewhat short of the desired number of responses, so it was decided to add a second mailing. First, all members of the first mailing who had not responded were recontacted. Second, a number of backups who were in still-unfilled slots were added to the second mailing. In order to determine which respondents should be targeted in the second mailing, 288 cells were defined by crossing base (12 levels) with on- or off-base status, combat or ship versus nonship or noncombat status, E3–E5 versus E6–E9 versus O2–O5, and black or nonblack ethnicity. For each of these cells a measure was computed to convey the amount of precision of estimates lost by the shortfall in that cell compared to what had been expected. Since ethnicity and combat status had not been previously used explicitly to predict expected responses, proportionate-to-size assumptions were used for these splits of previously defined cells. The measure for each cell was simply the square root of the expected number of responses minus the square root of the number of responses received. This criterion was also computed for 4-way, 3-way, 2-way, and 1-way combinations of the five factors. Cells that revealed the greatest potential for efficiency loss were selected for inclusion in the second mailing. In these cases, the number of individuals selected was 3.5 times the shortfall for cells involving E3–E5s and 3.0 times the shortfall for other cells.



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**HOUSING SURVEY QUESTIONNAIRE**

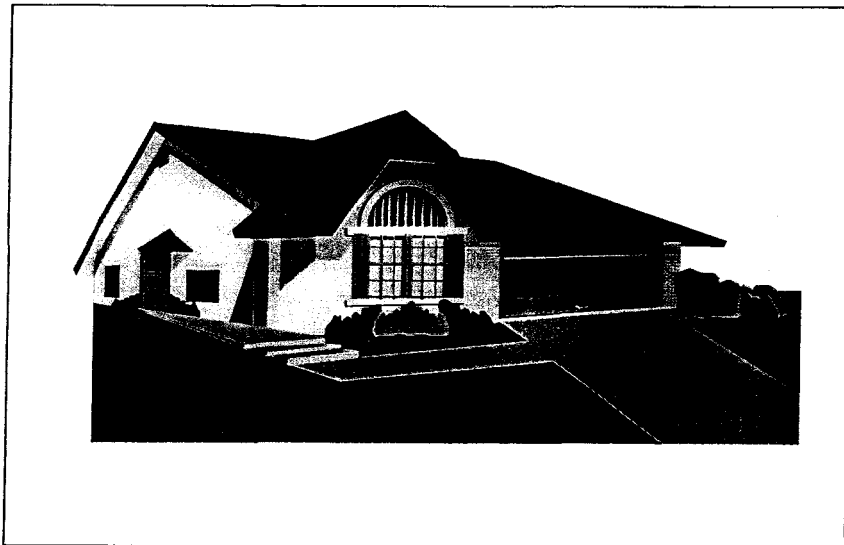
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Three versions of the housing survey were distributed to military members. The difference between versions was the quality of housing offered to members in a set of hypothetical questions about whether the member would prefer military or civilian housing under various housing options. Since the quality and size of military housing differs by military rank, the alternative versions of the questionnaire displayed and described different military houses for junior enlisted (E3–E5), senior enlisted (E6–E9), and officers (O2–O5). A complete version of the junior enlisted questionnaire follows. Replacement pages for the senior enlisted and officers are also provided.

RCS No. DD-P&R (OT) 2017  
Expires: March 25, 1998

CARD 01 8-9/

**1997**  
**Department of Defense**  
**Survey of Military Members'**  
**Housing Choices and Preferences**



BAR CODE ID LABEL

1-71

VERSION:

101

BATCH #:

11-131

## ABOUT THIS QUESTIONNAIRE

### WHAT IS THE PURPOSE OF THE SURVEY?

- This survey will help the Defense Department to understand how it can do a better job housing military personnel with families.
- The survey is sponsored by the Deputy Secretary of Defense, who asked RAND, a non-profit civilian research center in Santa Monica, California to administer and analyze it.
- The survey asks you about the kind of housing you live in; how you obtained your housing; what you look for in military and civilian housing, and how family circumstances and local housing conditions influence your choice of housing.

### WHY SHOULD I TAKE PART IN THIS SURVEY?

- You were selected at random to represent a larger group of soldiers, sailors, airmen and Marines so that we can draw conclusions about military families' housing needs and preferences at 12 installations in the United States--four Army forts (Carson, Hood, Jackson, and Lewis), three Navy facilities (San Diego Naval Complex, Mayport NAVSTA, and Patuxent River NAS), two Marine Corps bases (Cherry Point and Camp Pendleton), and three Air Force bases (McGuire, Minot, and Tyndall). *If you don't respond, your views may not be considered in the review of housing policies.*
- The survey results will help the Defense Department make housing policies more efficient and responsive to service members' needs. The survey will also reveal issues of immediate concern to service members, and as a result help DoD officials figure out which housing issues they need to address first.

### WILL MY SURVEY RESPONSES BE KEPT PRIVATE?

- **Yes. RAND will treat your answers as strictly confidential.** In presenting results from this survey, your answers will be combined with data from other military personnel and reported only as aggregated statistics.
- **RAND will not release data that could identify you to anyone.** No supervisors or other officials will see your questionnaire, nor will RAND release any data that could identify you to anyone in your service, the Department of Defense, or anyone else, except as required by law.
- We may combine your survey responses with information provided to us by the Department of Defense from your administrative files, such as your military occupational specialty, your duty assignments, your reenlistment status, and so forth.
- This study is completely voluntary. There is no penalty if you choose not to respond. However, RAND and the Department of Defense strongly encourage you to participate. If you prefer not to answer a specific question for any reason, you may just leave it blank. If you don't want to take this survey, just hand it in blank. To protect your privacy, please seal your questionnaire in the privacy envelope provided before you turn it in.
- If you have any questions regarding this survey or your participation, please feel free to contact Jennifer Hawes-Dawson, Survey Director at RAND, (888) 242-9599, or via e-mail to [hawes@rand.org](mailto:hawes@rand.org).

### PRIVACY NOTICE

In accordance with the Privacy Act of 1974 (Public Law 93-579), this notice informs you of the purpose of the survey and how findings will be used. Please read it carefully.

**AUTHORITY:** 10 United States Code, Sections 136 and 2358.

**PRINCIPAL PURPOSE:** Information collected in this survey will be used to assist in formulating housing policies that affect military members and their families. Reports will be provided to the Secretary of Defense and each Military Service. Results will be used in reports and testimony provided to Congress. Some results may be published by RAND, the Defense Manpower Data Center (DMDC), professional journals, or reported in manuscripts presented at conferences, symposia, and scientific meetings. In no case will the data be reported or used to identify individual respondents.

**DISCLOSURE:** Your participation in this survey is voluntary. There is no penalty if you choose not to respond. However, since only a representative sample of officers and enlisted members are being asked to participate in this survey, we hope you will respond. All questionnaires will be kept confidential, except as required by law. Identifying information will be used only by persons engaged in, and for purposes of, the survey research. Only group statistics will be published.

**ROUTINE USES:** None



**Section 2**  
**YOUR FIRST HOUSING SEARCH AT THIS BASE**

6. Is this your first tour at this base? 51/  
(Check One)  
 <sub>1</sub> Yes  
 <sub>2</sub> No
7. Think about when you began your current tour at this base. Did you or someone else investigate housing in the area before you moved to your current location? 52/  
(Check One)  
 <sub>1</sub> Yes  
 <sub>2</sub> No
8. Did you visit the military housing office at your current base when you began your current tour? 53/  
(Check One)  
 <sub>1</sub> Yes  
 <sub>2</sub> No
9. How many full weeks were you at this base before you found a place for your family to live? 54-55/  
(If less than 1 week, enter "00" in the boxes)  
# OF WEEKS:
10. How many full weeks were you at this base before the first member of your family moved here? 56-57/  
(If your family arrived at this base the same time that you did, or before you did enter "00" in boxes)  
# OF WEEKS:

11. Did you receive the following services from the military housing office at this base when you began your current tour? For each service you received, please rate how helpful the service was.

HOUSING SERVICES	Services Received From Military Housing Office?		IF YES: How helpful was the service?			
	Yes	No	Not Helpful	Somewhat Helpful	Very Helpful	
A. Information packet about housing <u>before</u> you moved to this location	<input type="checkbox"/> 1	<input type="checkbox"/> 2 10/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 11/	
B. Information packet about housing <u>after</u> you moved to this location	<input type="checkbox"/> 1	<input type="checkbox"/> 2 12/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 13/	
C. Information regarding waiting time to get military housing	<input type="checkbox"/> 1	<input type="checkbox"/> 2 14/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 15/	
D. Help in getting landlord to sign a "military clause" protecting you from losing your security deposit if you are re-stationed and/or receive military housing	<input type="checkbox"/> 1	<input type="checkbox"/> 2 16/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 17/	
E. Information about available rentals	<input type="checkbox"/> 1	<input type="checkbox"/> 2 18/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 19/	
F. Information about available rentals tailored to your family needs (for example, computerized database with search capabilities)	<input type="checkbox"/> 1	<input type="checkbox"/> 2 20/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 21/	
G. Information about homes for sale	<input type="checkbox"/> 1	<input type="checkbox"/> 2 22/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 23/	
H. Referral to a real estate agent	<input type="checkbox"/> 1	<input type="checkbox"/> 2 24/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 25/	
I. Crime statistics, school statistics, or other neighborhood information	<input type="checkbox"/> 1	<input type="checkbox"/> 2 26/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 27/	
J. Access to fax or phone service to help you look for housing	<input type="checkbox"/> 1	<input type="checkbox"/> 2 28/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 29/	
K. Other services you received from the military housing office: Please Describe: _____	<input type="checkbox"/> 1	<input type="checkbox"/> 2 30/	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3 31/	

32/

12. Look at the housing services that you marked as "No" in Question 11. Which of these housing services would have been most helpful if you had received it when you began your current tour at this base? (Write the letters from Question 11 in the boxes below)

1st Choice	2nd Choice	33/
<input type="text"/>	<input type="text"/>	34/

13. Are there other housing services not listed in Question 11 that you wish you had received from the military housing office when you began your current tour at this base?

(Check One)

1 Yes → Please Describe: \_\_\_\_\_ 35/

2 No 36/

14. Did you get help from other sources to find housing when you began your current tour at this base?

(Check All That Apply)

- 1 Advice from other military members, including a "sponsor" 37/
- 2 Help from relatives 38/
- 3 Private real estate agent or private housing location service 39/
- 4 Newspapers 40/
- 5 Other: Please Describe \_\_\_\_\_ 41/

15. Have you ever put your name on a waiting list for military family housing at this location during your current tour?

(Check One) 43/

- 1 Yes, before I arrived here → Go to Question 16
- 2 Yes, after I arrived here → Go to Question 16
- 3 No → Go to Question 23

16. Are you currently on a waiting list for military family housing at this base?

(Check One) 44/

- 1 Yes
- 2 No

17. How many months have you been on the waiting list for military family housing at this base? If less than 1 month, enter the number of weeks. (If you are no longer on the waiting list, indicate how long you were on the list)

Months 45-47/

-OR-

Weeks 48-49/

18. Have you ever been offered military family housing at this base during your current tour?

(Check One) 50/

- 1 Yes → Go to Question 19
- 2 No → Go to Question 23

19. Were you given an opportunity to look at the military family housing that was offered to you during your current tour before you decided whether to accept it?

(Check One) 51/

- 1 Yes
- 2 No

20. How many days were you given to decide whether you wanted to move into the military family housing that was offered during your current tour?

# of Days  52/

-OR-

- 0 Less than 24 hours

20A. Did you feel that the amount of time given was adequate to decide whether you wanted to move into the military family housing that was offered during your current tour?

(Check One) 53/

- 1 Yes
- 2 No

21. How many different military family housing units were you offered at this base during your current tour?

(Check One) 54/

- 1 One unit
- 2 Two units
- 3 Three units
- 4 Four or more units

22. Did you accept a military housing unit at this base during your current tour?

(Check One) 55/

- 1 Yes
- 2 No - I rented civilian housing
- 3 No - I bought civilian housing

**Section 3  
CHARACTERISTICS OF YOUR  
CURRENT FAMILY HOUSING**

23. Where do you currently live?  
(Check One) 10/
- 1 Military family housing
- 2 Civilian housing that you rent
- 3 Civilian housing that you own (or are buying)
24. Which of the following best describes your family's current housing?  
(Check One) 11/
- 1 Mobile home or trailer
- 2 A one-family house detached from any other house
- 3 A one-family house attached to one or more houses (for example, duplex, triplex, row house)
- 4 An apartment or condominium
- 5 Other: Please Describe 12/
25. Please write in the zip code where you and your family live now. 13-17/
- ZIP CODE:
26. In what month and year, did your family move into your current housing? 18-19/  
20-21/
- 19    
Month Year
27. In what year was your current housing built? (Just your best guess) 22-23/
- YEAR: 19
28. How many rooms do you have in your current housing? Do not count bathrooms, porches, balconies, foyers, halls, closets or half-rooms. 24/
- # OF ROOMS:

29. How many bedrooms do you have; that is, how many bedrooms would you list if your current housing were on the market for sale or rent? 25/
- # OF BEDROOMS:
30. How many complete baths and half-baths do you have in your current housing? (See definition below) 26/
- # Complete baths:
- # Half-baths:
- A complete bath is one room with piped water, a flush toilet, bathtub or shower, and a wash basin for the use of people in your housing unit only.*
- A half bath has a flush toilet or a bathtub or shower but does not have all of the facilities of a complete bath.*
31. How many square feet are there in your current housing? (Just your best guess) 28-31/
- # SQUARE FEET:
- OR
- D Don't know/No idea 32/
32. Did your current housing come with the following things? (Do not include things that you purchased) (Check Yes or No for Each Item)
- |  | Yes                        | No                         |     |
|--|----------------------------|----------------------------|-----|
| a. Refrigerator?                               | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 33/ |
| b. Dishwasher?                                 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 34/ |
| c. Garbage disposal?                           | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 35/ |
| d. Central air conditioning?                   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 36/ |
| e. Air conditioning room unit?                 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 37/ |
| f. Cable t.v. hookup (not the service itself)? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 38/ |



33. Did your current housing come with the following laundry facilities? (Do not include facilities that you purchased)

- (Check All That Apply)
- 1 Washing machine and dryer in your house or apartment 39/
  - 2 Hookups for a washing machine and dryer in your house/apartment, but no machines 40/
  - 3 Washing machine and dryer on the property that you share with other tenants (not coin operated) 41/
  - 4 Coin operated washing machine and dryer somewhere on the property 42/
  - 5 Other: Please Describe \_\_\_\_\_ 43/

34. Do you have your own yard at your current residence? 45/

- (Check One)
- 1 Yes
  - 2 No

35. Are you allowed to have a dog or cat at your current residence? 46/

- (Check Yes or No for Each Item)
- |        | Yes                        | No                         |     |
|--------|----------------------------|----------------------------|-----|
| a. Dog | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 46/ |
| b. Cat | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 47/ |

36. How important is it to you to live in a unit that allows pets? 48/

- (Check One)
- 1 Not important
  - 2 Somewhat important
  - 3 Very important

37. Do you have the following parking facilities at your current residence?

- (Check All That Apply)
- 1 1 car indoor garage 49/
  - 2 2 car indoor garage 50/
  - 3 Covered parking space outdoors, such as a carport 51/
  - 4 Off-street parking lot 52/
  - 5 Driveway 53/
  - 6 Only parking is on the street 54/
  - 7 Other: Please Describe \_\_\_\_\_ 55/

38. Are there any playgrounds or other recreation areas that children can use within walking distance of your current residence? 57/

- (Check One)
- 1 Yes
  - 2 No

39. In the past six months, have there been any signs of rats, mice, termites, roaches, spiders, ants, or other pests in your current housing? 58/

- (Check One)
- 1 Yes → Go to Question 40
  - 2 No → Go to Question 41

40. How serious a problem was this in the past six months? 59/

(Pick a number from 1 - 5 where 1 stands for a Very Serious Problem and 5 means Not a Serious Problem)

- (Check One)
- 1    2    3    4    5
- A Very Serious Problem ←————→ Not a Serious Problem

132 An Evaluation of Housing Options for Military Families

41. In general, how would you rate the condition of the following items in your current housing?

*(Check One on Each Line)*

	Poor	Fair	Good	Very Good	Excellent	Does Not Apply or Don't Know
a. Floors and floor coverings -- linoleum, carpets, etc. ....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 60/
b. Walls and ceilings .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 61/
c. Doors .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 62/
d. Windows .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 63/
e. Kitchen appliances .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 64/
f. Heating unit.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6 65/
g. Air conditioning .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6 66/
h. Roof .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 67/
i. Yards and grounds around your house or apartment .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6 68/
j. Overall condition of your housing .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 69/

42. In general, how satisfied are you with the following aspects of your current housing?

*(Check One on Each Line)*

	Very Dissatisfied	Dissatisfied	Neither Satisfied Nor Dissatisfied	Satisfied	Very Satisfied	Does Not Apply
a. Number of rooms.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 70/
b. Size of your rooms .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 71/
c. Yard .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6 72/
d. The services your landlord or housing manager provides.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6 73/
e. Overall quality of your housing....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 74/
f. Your ability to improve and decorate your housing .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 75/
g. The rules about how you live and keep your housing .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 76/
h. Your housing costs .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	-- 77/

CARD 04 89/  
171

43A. How would you rate the following aspects of your current neighborhood?

(Check One Answer on Each Line)

	Poor	Fair	Good	Very Good	Excellent	Don't Know	
a. Quality of schools .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	10/
b. Parks and recreational facilities.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	11/

43B. How much of a problem are the following things in your neighborhood?

(Check One Answer on Each Line)

	Major Problem	Somewhat of a Problem	Minor Problem	Not a Problem	
a. Traffic .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	12/
b. Noise .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	13/
c. Crime .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	14/
d. Racial or ethnic tension .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	15/

43C. Are your current neighbors:  
(Check One)

16/

- 1 Mostly civilian
- 2 Mostly military
- 3 Mix of military and civilian

43D. How much can you count on your neighbors to look out for your family when you are deployed?  
(Check One)

17/

- 1 Not at all
- 2 Somewhat
- 3 A lot

44. About how many minutes does it take you by car to get to the places where you go on a regular basis?

If you have children in 2 or more schools, record the distance to the school that is the farthest away from your home.

If you have children in more than one day care facility, record the distance to the place that is the farthest away from your home.

(Check One Answer on Each Line)

	10 Minutes or Less	11-20 Minutes	21-30 Minutes	31-45 Minutes	More than 45 Minutes	Not Applicable	
a. Where you work .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	--	18/
b. Grocery store.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	--	19/
c. Other shopping areas .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	--	20/
d. Child's school .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	21/
e. Child's day care .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	22/
f. Spouse's employment .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	23/

**Section 4  
YOUR CHOICE OF  
MILITARY FAMILY HOUSING  
VS  
CIVILIAN HOUSING**

The next questions are about factors that may have influenced your decision to live in military family housing or civilian housing in this area. Please answer the next question to determine the correct questions to answer based on your current housing situation.

45. Does your family currently live in:

*(Check One)*



<sub>1</sub> Military family housing



Go to Question 46, Next Page

<sub>2</sub> Civilian housing that you rent



Go to Question 59, Page 13

<sub>3</sub> Civilian housing that you own (or are buying)



Go to Question 69, Page 16

241

**THIS PAGE FOR PEOPLE WHO CURRENTLY LIVE IN  
MILITARY FAMILY HOUSING**

46. Is your military family housing unit located:
- (Check One)* 25/
- <sub>1</sub> On base
  - <sub>2</sub> Next to the base (for example, across the street from the base)
  - <sub>3</sub> Off base

47. Why did you decide to live in military family housing in this area?
- (Check All That Apply)*
- <sub>A</sub> Military housing was available when I needed it 26/
  - <sub>B</sub> Liked the military housing that was offered 27/
  - <sub>C</sub> Liked the security of living in military housing 28/
  - <sub>D</sub> Living in military housing was a better economic decision 29/
  - <sub>E</sub> Liked having military neighbors 30/
  - <sub>F</sub> Liked being close to work 31/
  - <sub>G</sub> Did not like the civilian housing that was available and affordable 32/
  - <sub>H</sub> Thought schools were better 33/
  - <sub>I</sub> Liked being close to base facilities, such as exchange and commissary 34/
  - <sub>J</sub> Other: Please Describe 35/
- 
- 36/

48. Which of the reasons listed in Question 47 were the most important reasons you decided to live in military family housing?
- Please write the letter in the boxes below.*
- Most Important Reason:  37/
- 2nd Most Important Reason:  38/

49. Did you do the following things to investigate civilian housing units before you accepted your military family housing unit?
- (Check All That Apply)*
- <sub>1</sub> Looked at local newspapers or real estate guides 39/
  - <sub>2</sub> Checked information about civilian housing at the military housing office at this base 40/
  - <sub>3</sub> Contacted a real estate agency or rental agency 41/
  - <sub>4</sub> Visited just a few units in civilian neighborhoods 42/
  - <sub>5</sub> Visited lots of different units in several civilian neighborhoods 43/
  - <sub>6</sub> Other: Please Describe 44/
- 
- 45/

50. When you were deciding where to live, did you consider buying a home in this area?
- (Check One)* 46/
- <sub>1</sub> Yes
  - <sub>2</sub> No

51. Why did you decide not to buy a place in this area?
- (Check All That Apply)*
- <sub>1</sub> Already owned housing elsewhere 47/
  - <sub>2</sub> Could not afford to buy 48/
  - <sub>3</sub> Not a good investment/too risky 49/
  - <sub>4</sub> Prefer to live in military housing 50/
  - <sub>5</sub> Only expected to be here a short time 51/
  - <sub>6</sub> Other: Please Describe 52/
- 
- 53/



CARD 05 8-9/  
1-71

THIS PAGE IS FOR PEOPLE WHO CURRENTLY LIVE IN  
CIVILIAN HOUSING THAT THEY RENT

59. Why did you decide to rent civilian housing in this area?  
(Check All That Apply)
- A Military family housing was not available when I needed it 10/
  - B Renting civilian housing was a better economic decision 11/
  - C Liked the security of living in civilian housing 12/
  - D Liked having civilian neighbors 13/
  - E Liked the privacy of living in a civilian community 14/
  - F Liked the freedom from military housing rules and regulations 15/
  - G Did not like the military family housing that was available 16/
  - H Thought schools were better in this area 17/
  - I My spouse is military, so it is not worth it to live in military housing 18/
  - J Other: Please Describe 19/
- \_\_\_\_\_ 20/

60. Which of the reasons listed in Question 59 were the most important reasons you decided to rent civilian housing at this location?  
Please write the letter in the boxes below.
- Most Important Reason:  21/
- 2nd Most Important Reason:  22/

61. When you were deciding where to live, did you consider buying a home at this location?  
(Check One) 23/
- 1 Yes
  - 2 No

62. Why did you decide not to buy a place in this area?  
(Check All That Apply)
- 1 Already owned housing elsewhere 24/
  - 2 Could not afford to buy 25/
  - 3 Not a good investment/too risky 26/
  - 4 Only expect to be here a short time 27/
  - 5 Other: Please Describe 28/
- \_\_\_\_\_ 29/

63. Think back to when you first arrived for your current tour at this base. Suppose the housing office at this base had guaranteed your waiting time to move into a typical military family housing unit at this base.
- Would you have moved into military family housing when it became available:  
(Check One Answer for Each Item)

- |  | Yes                        | No                         |     |
|--|----------------------------|----------------------------|-----|
| a. If you could move in right away ..... | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 30/ |
| b. If you had to wait 1 month .....      | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 31/ |
| c. If you had to wait 2 months .....     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 32/ |
| d. If you had to wait 6 months .....     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 33/ |
| e. If you had to wait 1 year.....        | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 34/ |

**THIS PAGE IS FOR PEOPLE WHO CURRENTLY LIVE IN CIVILIAN HOUSING THAT THEY RENT**

64. Suppose that military family housing became available at this base right away. Do you think you would move into military housing or remain in civilian housing under the following conditions:

*(Check One Answer for Each Item)*

- |  | Move into<br>Military<br>Family<br>Housing | Stay in<br>Civilian<br>Housing |
|--|--|--------------------------------|
| a. If your total housing allowance (BAQ&VHA) was the same as you get now | <input type="checkbox"/> 1                 | <input type="checkbox"/> 2 35/ |
| b. If your total housing allowance (BAQ&VHA) was \$50 more               | <input type="checkbox"/> 1                 | <input type="checkbox"/> 2 36/ |
| b. If your total housing allowance (BAQ&VHA) was \$100 more              | <input type="checkbox"/> 1                 | <input type="checkbox"/> 2 37/ |
| b. If your total housing allowance (BAQ&VHA) was \$150 more              | <input type="checkbox"/> 1                 | <input type="checkbox"/> 2 38/ |
| b. If your total housing allowance (BAQ&VHA) was \$200 more              | <input type="checkbox"/> 1                 | <input type="checkbox"/> 2 39/ |
| b. If your total housing allowance (BAQ&VHA) was \$250 more              | <input type="checkbox"/> 1                 | <input type="checkbox"/> 2 40/ |

65. How much do you pay for rent each month for the place where you live now?

*Include total amount you pay the owner including any charges you pay for furnishings, utilities, etc.*

\$     per month 41-44/

66. How much did you pay last month for the following?

*(Just your best estimate)*

- a. Water \$     or  0 Included<sup>45-47/</sup> in rent <sup>48/</sup>
- b. Gas \$     or  0 Included<sup>49-51/</sup> in rent or don't use <sup>52/</sup>
- c. Electricity \$     or  0 Included<sup>53-55/</sup> in rent <sup>56/</sup>
- d. Fuel oil or other fuel \$     or  0 Included<sup>57-59/</sup> in rent or don't use <sup>60/</sup>

67. When you began your current tour at this base, did you have to pay the following deposits at the time you moved into your current unit?

*(Check Yes or No for Each Line)*

- |                       | Yes                        | No                         |     |
|-----------------------|----------------------------|----------------------------|-----|
| a. First month's rent | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 61/ |
| b. Last month's rent  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 62/ |
| c. Other deposit      | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 63/ |

68. What was the total amount of all the deposits you paid at that time?

\$     64-67/



THIS PAGE IS FOR PEOPLE WHO CURRENTLY LIVE IN  
CIVILIAN HOUSING THAT THEY RENT

68A. How would you describe the overall quality of the work that the landlord does on the yards and grounds around your civilian housing unit?

(Check One) 68/

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very good
- 5 Excellent
- 6 Landlord does not do this

68B. How would you rate the timeliness of the work the landlord does to take care of the yards and grounds around your civilian housing unit?

(Check One) 69/

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very good
- 5 Excellent
- 6 Landlord does not do this

68C. How would you describe the overall quality of the work the landlord does to take care of general repairs and maintenance of your civilian housing unit?

(Check One) 70/

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very good
- 5 Excellent
- 6 Landlord does not do this

68D. How would you rate the timeliness of the work that the landlord does to take care of general repairs and maintenance of your civilian housing unit?

(Check One) 71/

- 1 Poor
- 2 Fair
- 3 Good
- 4 Very good
- 5 Excellent
- 6 Landlord does not do this

Go to Section 5, Page 18

THIS PAGE IS FOR PEOPLE WHO CURRENTLY LIVE IN  
CIVILIAN HOUSING THAT THEY OWN

69. Why did you decide to buy civilian housing in this area?  
(Check All That Apply)
- A Military family housing was not available when I needed it 10/
  - B Owning my home was a better economic decision 11/
  - C Liked the security of living in civilian housing 12/
  - D Liked having civilian neighbors 13/
  - E Liked the privacy of living in a civilian community 14/
  - F Liked the freedom from military housing rules and regulations 15/
  - G Did not like the military family housing that was available 16/
  - H Owning my own home provided a good investment and tax advantage 17/
  - I My spouse is military, so it is not worth it to live in military housing 18/
  - J Expect to live in this area when I leave the military 19/
  - K Thought schools were better in this area 20/
  - L Like the ability to change my house/condo the way I want it 21/
  - M Didn't want to deal with a landlord 22/
  - N Other: Please Describe 23/
- \_\_\_\_\_ 24/

70. Which of the reasons listed in Question 69 were the most important reasons in your decision to own?  
Please write the letter in the boxes below.
- Most Important Reason:  25/
- 2nd Most Important Reason:  26/

71. Think back to when you first arrived for your current tour at this base. Suppose the housing office at this base had guaranteed your waiting time to move into a military family housing unit at this base.

Would you have moved into military family housing when it became available:

(Check Yes or No for Each Item)

- |  | Yes                        | No                         |     |
|--|----------------------------|----------------------------|-----|
| a. If you could move in right away ..... | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 27/ |
| b. If you had to wait 1 month .....      | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 28/ |
| c. If you had to wait 2 months .....     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 29/ |
| d. If you had to wait 6 months .....     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 30/ |
| e. If you had to wait 1 year.....        | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | 31/ |

72. In what year did you buy the place where you live now?
- YEAR: 19   32-33/

73. What is your monthly mortgage?
- \$     OR 34-37/
- 0 Not applicable; we own the housing free and clear (Go to Question 75) 38/

CARD 07 8-9/  
1-71

THIS PAGE IS FOR PEOPLE WHO CURRENTLY LIVE IN  
CIVILIAN HOUSING THAT THEY OWN

74. Does your monthly mortgage payment include:
- (Check Yes or No for Each Line)*
- |                              | Yes                        | No                             |
|------------------------------|----------------------------|--------------------------------|
| a. Real estate taxes         | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 10/ |
| b. Property/hazard insurance | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 11/ |
| c. Condominium fees          | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 12/ |
| d. Other fees                | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 13/ |

75. How much did you pay last month for the following? *(If you don't use this item, put "0" in the boxes)*
- (Just your best guess)*
- |                          |    |   |            |        |
|--------------------------|----|---|------------|--------|
| a. Water                 | \$ | <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> | last month | 14-16/ |
| b. Gas                   | \$ | <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> | last month | 17-19/ |
| c. Electricity           | \$ | <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> | last month | 20-22/ |
| d. Fuel oil or other oil | \$ | <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/> | last month | 23-25/ |

76. If you were permanently reassigned to another base, what would you do with your current home?
- (Check One)* 26/
- 1 Sell
- 2 Rent
- 3 My family would continue to live here
- 4 Other: Please Describe: \_\_\_\_\_
- \_\_\_\_\_ 27/

77. If you put your home on the market today, do you think you would:
- (Check One)* 28/
- 1 Make a profit
- 2 Break even
- 3 Lose money

Next, we'd like some information about the kinds of loans and mortgages that are used by military members in your location. If you have more than one mortgage or loan, please answer Questions 78-83 about the first one you took out for the place where you live now.

78. Was this a VA loan? 29/
- (Check One)*
- 1 Yes
- 2 No

79. What was the length of the loan when you got it? 30-31/
- # YEARS:

80. What is the current annual interest rate? 32-36/
- PERCENT:  .  %

81. How much was your down payment? 37-41/
- \$  ,

82. How much were the closing costs and other fees associated with buying your current home? 42-46/
- (Just your best estimate)*
- \$  ,

83. What was the purchase price of your current home? 47-52/
- \$  ,

**Section 5**  
**YOUR HOUSING PREFERENCES AND OPINIONS**

In this section, we want to know more about what factors make military family housing more or less appealing. Questions 84 and 85 ask if you would want to live in different kinds of military family housing if they were available at your location under different circumstances.

These questions do not reflect any specific proposals for changing your housing benefit. Instead, they are designed to allow us to identify what aspects of military housing are most important to military personnel.

**Please Continue on  
Next Page**



84. Imagine you were offered the military housing unit pictured below when you arrived at this base for your current tour.



- built in 1954
- located on base
- living room with dining area
- kitchen (updated in 1975)
- bedrooms and baths
- If you have ONE OR NO CHILDREN, assume the house has two bedrooms and one bath.
- If you have TWO CHILDREN, assume the house has three bedrooms and two baths.
- If you have THREE OR MORE CHILDREN, answer assuming you had two children.
- small rooms
- limited storage
- off-street parking lot, no garage
- laundry room shared with other units
- no private yard
- pets allowed

84A. Do you think you would have decided to move into this military housing unit or civilian housing if it had been offered to you under each set of conditions?

(Check One Answer For Each Offer)

Your Total Housing Allowance For Civilian Housing is:	Guaranteed waiting time to move in to this Military Unit:	I would move into:	
Offer 1 Same as your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 53/
Offer 2 \$100 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 54/
Offer 3 \$150 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 55/
Offer 4 Same as your current BAQ & VHA	2 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 56/
Offer 5 Same as your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 57/

84B. Suppose the military housing pictured above were located off-base. Would you be less likely or more likely to live in this unit or would there be no difference?

(Check One)

58/

- 1 Less likely
- 2 More likely
- 3 No difference

85. Now please look at the military housing unit pictured below.



- built in 1996
- located on base
- living room with dining area
- kitchen
- bedrooms and baths
- If you have ONE OR NO CHILDREN, assume the house has two bedrooms and one bath.
- If you have TWO CHILDREN, assume the house has three bedrooms and two baths.
- If you have THREE OR MORE CHILDREN, answer assuming you had two children.
- good size rooms
- extra room for guests, den, etc.
- generous storage
- single garage
- large laundry/utility room with hookups for washer/dryer
- small private yard
- pets allowed

85A. Do you think you would have decided to move into this military housing unit or civilian housing if it had been offered to you under each set of conditions?

(Check One Answer For Each Offer)

Your Total Housing Allowance For Civilian Housing is:	Guaranteed waiting time to move in to this Military Unit:	I would move into:
Offer 1 \$100 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing <i>59/</i>
Offer 2 \$150 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing <i>60/</i>
Offer 3 \$200 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing <i>61/</i>
Offer 4 Same as your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing <i>62/</i>
Offer 5 \$100 more than your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing <i>63/</i>
Offer 6 Same as your current BAQ & VHA	1 year wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing <i>64/</i>

85B. Suppose the military housing pictured above were located off-base. Would you be less likely or more likely to live in this unit or would there be no difference?

(Check One)

65/

- 1 Less likely
- 2 More likely
- 3 No difference

CARD 08 8-9/  
1-71

Next, we'd like your opinions about the most important benefits of having military family housing available where you live.

86. How important are the following reasons for having military family housing available where you live?

*(Check One Answer on Each Line)*

REASONS FOR HAVING MILITARY HOUSING	<u>Not</u> <u>Important</u>	<u>Somewhat</u> <u>Important</u>	<u>Very</u> <u>Important</u>	
A. Maintaining military values	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	10/
B. Supporting families of deployed military personnel	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	11/
C. Making it financially easier for military families to make ends meet	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	12/
D. Helping junior enlisted personnel fit into the military	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	13/
E. Making military members and their families feel a part of the military	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	14/
F. Supporting families so members can focus on their jobs	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	15/
G. Other: Please Describe _____	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	16/ 17/

87. Which of the reasons listed in Question 86 above are the MOST IMPORTANT reasons for having military family housing in the area where you live? (Enter the letter from Question 86 in the boxes below)

Most Important Reason	2nd Most Important Reason	
<input style="width: 30px; height: 20px;" type="text"/>	<input style="width: 30px; height: 20px;" type="text"/>	18/
		19/

88. Do you have comment about changes you would like to see to any aspect of military family housing programs or policies?

- Military Family Housing includes:
- Housing Allowances (VHA & BAQ)
  - Family Housing Units
  - Housing Office
  - Waiting List Procedures
  - Anything else you associate with military family housing

1 Yes       2 No 20/

Please Describe \_\_\_\_\_ 21/

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**Section 6  
INDIVIDUAL AND FAMILY  
BACKGROUND**

The next questions ask for background information about you and your family. This will allow us to understand how housing choices and preferences are the same or vary for different groups of Service members and their families.

**89. What is your pay grade?**

*(Check One)*

22-23/

- |                             |                             |                             |
|-----------------------------|-----------------------------|-----------------------------|
| <input type="checkbox"/> E1 | <input type="checkbox"/> W1 | <input type="checkbox"/> O1 |
| <input type="checkbox"/> E2 | <input type="checkbox"/> W2 | <input type="checkbox"/> O2 |
| <input type="checkbox"/> E3 | <input type="checkbox"/> W3 | <input type="checkbox"/> O3 |
| <input type="checkbox"/> E4 | <input type="checkbox"/> W4 | <input type="checkbox"/> O4 |
| <input type="checkbox"/> E5 | <input type="checkbox"/> W5 | <input type="checkbox"/> O5 |
| <input type="checkbox"/> E6 |                             | <input type="checkbox"/> O6 |
| <input type="checkbox"/> E7 |                             |                             |
| <input type="checkbox"/> E8 |                             |                             |
| <input type="checkbox"/> E9 |                             |                             |

**90. As of today, how long have you served at this post, base, or duty station during your current tour? Please include any extensions to your current tour.**

*(If less than 1 month, put "00" in the boxes below)*

# OF YEARS:   24-25/

# OF MONTHS:   26-27/

**91. How much longer do you expect to be stationed at this base until your next PCS move? (Just your best guess)**

# OF YEARS:   28-29/

# OF MONTHS:   30-31/

OR  
 D Don't know 32/

**92. What are your chances of being continuously deployed for 30 days or longer in the next 12 months?**

*(Check One)*

33/

- 0 No chance  
 1 Unlikely  
 2 Even chance (50/50)  
 3 Very likely  
 4 Certain

**93. During your current tour at this base, how many months have you been separated from your family because of your military duties?**

*(Check One)*

34/

- 1 None  
 2 Less than 1 month  
 3 1-6 months  
 4 7-12 months  
 5 13-18 months  
 6 19-24 months  
 7 25-30 months  
 8 31-36 months  
 9 Over 36 months

**94. Since you've been on active duty, how many years has your family lived in military family housing (either on base or off base)?**

*(If less than 1 year, put "00" in the boxes below)*

# OF YEARS:   35-36/

**95. As things now stand, how many total years do you expect to serve on active duty in the military?**

TOTAL YEARS OF SERVICE:   37-38/

OR  
 D I'm not sure how long I will serve 39/



96. When you finally leave the service (or retire) do you think you will remain in this area?

- (Check One) 40/
- 1 Definitely yes
  - 2 Probably yes
  - 3 Probably no
  - 4 Definitely no

97. What is your state of legal residence?  
(Please print the two-letter postal abbreviation - for example, "CA" for California)

STATE:   41-42/

98. Are you male or female?

- (Check One) 43/
- 1 Male
  - 2 Female

99. Are you of Spanish/Hispanic origin or descent?

- (Check One) 44/
- 1 No (not Spanish/Hispanic)
  - 2 Yes, Mexican, Mexican-American, Chicano
  - 3 Yes, Puerto Rican
  - 4 Yes, Cuban
  - 5 Yes, other Spanish/Hispanic

100. What race do you consider yourself to be?

- (Check One) 45/
- 1 White
  - 2 Black or African American
  - 3 Eskimo, Aleut
  - 4 Indian (American)
  - 5 Asian or Pacific Islander
  - 6 Other race: Please Describe

46/

101. How much education have you completed?

(Check the one answer that describes the highest grade or academic degree that you have completed) 47/

- 1 Less than 12 years of school (no diploma)
- 2 GED or other high school equivalency certificate
- 3 High school diploma
- 4 Less than 2 years of college credits, but no college degree
- 5 2-year college degree (AA/AS)
- 6 More than 2 years of college credits, but no 4-year college degree
- 7 4-year college degree
- 8 Some graduate school, but no graduate degree
- 9 Masters, doctoral, or professional school degree (MA, MS, PhD, MD, JD, DVM)

102. What is your date of birth?

48-49/  
50-51/

/   /    
MONTH DAY YEAR

52-53/

103. At anytime during 1996, did you work at a civilian job or at your own business during your off-duty hours?

(Check One) 54/

- 1 Yes
- 2 No

104. **Altogether in 1996, what was your TOTAL GROSS HOUSEHOLD income from all sources that you reported on your 1996 tax return? Please include the income that you, your spouse, and other household members earned in 1996, such as wages, salary, tips, interest, dividends, alimony, and annuities. (Give your best estimate.)**

FAMILY'S TOTAL 1996 GROSS TAXABLE HOUSEHOLD INCOME:

*(Check One)*

551

- <sub>1</sub> Less than \$10,000
- <sub>2</sub> \$10,000 to \$19,999
- <sub>3</sub> \$20,000 to \$29,999
- <sub>4</sub> \$30,000 to \$39,999
- <sub>5</sub> \$40,000 to \$49,999
- <sub>6</sub> \$50,000 to \$74,999
- <sub>7</sub> \$75,000 to \$99,999
- <sub>8</sub> \$100,000 and over

- **If you are currently married, go to Question 105.**
- **If you are not currently married, this is the end of the survey. Seal your questionnaire in the privacy envelope provided and return it to your Command survey representative. You may also mail the questionnaire directly to RAND in the enclosed envelope. No postage is needed.**

**YOUR SPOUSE**

The next questions ask for background information about your current spouse. This will allow us to better understand how spouses' background and experience affect their family's housing choices.

**105. Is your spouse currently:**

*(Check All That Apply)*

- <sub>1</sub> In the Armed Forces (Active duty or Reserve/Guard) 56/
- <sub>2</sub> Working at a Federal civilian job 57/
- <sub>3</sub> Working at some other civilian job 58/
- <sub>4</sub> Self-employed in his or her own business 59/
- <sub>5</sub> With a job, but not at work because of temporary illness, vacation, strike, etc. 60/
- <sub>6</sub> Unpaid worker (volunteer or in family business) 61/
- <sub>7</sub> Unemployed, laid off, or looking for work 62/
- <sub>8</sub> In school (full or part-time) 63/
- <sub>9</sub> Retired 64/
- <sub>10</sub> Disabled 65/
- <sub>11</sub> Homemaker/housewife/househusband 66/
- <sub>12</sub> Other: Please Describe \_\_\_\_\_ 67/

**106. Regarding your answer to Question 105, was this your spouse's usual work situation at your last military duty station?**

*(Check One)*

- <sub>1</sub> Yes, this was my spouse's usual work situation at my last duty station
- <sub>2</sub> No, this was not my spouse's usual work situation at my last duty station
- <sub>3</sub> Does not apply--I was not married at that time or this is my first tour

**107. Does your spouse currently work on-base or off-base?**

*(Check One)*

70/

- <sub>1</sub> On-base
- <sub>2</sub> Off-base
- <sub>3</sub> My spouse does not work outside the home or for money

**108. During 1996, approximately how many hours did your spouse usually work for pay per week?**

*(Check One)*

71/

- <sub>1</sub> None
- <sub>2</sub> 1-19 hours
- <sub>3</sub> 20-34 hours
- <sub>4</sub> 35 or more hours

**109. Altogether in 1996, what was the total amount, before taxes and other deductions, that YOUR SPOUSE earned from all jobs or his or her own business? (Give your best estimate)**

*(Check One)*

72/

- <sub>1</sub> None
- <sub>2</sub> Less than \$10,000
- <sub>3</sub> \$10,000 to \$19,999
- <sub>4</sub> \$20,000 to \$29,999
- <sub>5</sub> \$30,000 to \$39,999
- <sub>6</sub> \$40,000 to \$49,999
- <sub>7</sub> \$50,000 to \$74,999
- <sub>8</sub> \$75,000 to \$99,999
- <sub>9</sub> \$100,000 and over

**YOUR SPOUSE**

110. How much education has your spouse completed?

*(Check the one answer that describes the highest grade or academic degree that your spouse has completed)* 73/

- 1 Less than 12 years of school (no diploma)
- 2 GED or other high school equivalency certificate
- 3 High school diploma
- 4 Less than 2 years of college credits, but no college degree
- 5 2-year college degree (AA/AS)
- 6 More than 2 years of college credits, but no 4-year college degree
- 7 4-year college degree
- 8 Some graduate school, but no graduate degree
- 9 Masters, doctoral, or professional school degree (MA, MS, PhD, MD, JD, DVM)

111. How old was your spouse on his or her last birthday?

AGE:   74-75/

112. Is your spouse of Spanish/Hispanic origin or descent?

*(Check One)* 76/

- 1 No (not Spanish/Hispanic)
- 2 Yes, Mexican, Mexican-American, Chicano
- 3 Yes, Puerto Rican
- 4 Yes, Cuban
- 5 Yes, other Spanish/Hispanic

113. Which of the following best describes your spouse's race?

*(Check One)* 77/

- 1 White
- 2 Black or African American
- 3 Eskimo, Aleut
- 4 Indian (American)
- 5 Asian or Pacific Islander
- 6 Other race: Please Describe

Thank you for completing this survey. Please seal your completed survey in the privacy envelope provided and give it to the command representative who is coordinating the survey at your base.

Or, you can mail the survey directly to RAND in the privacy envelope provided. No postage is necessary.

**REPLACEMENT PAGES FOR SENIOR ENLISTED PERSONNEL**

84. Imagine you were offered the military housing unit pictured below when you arrived at this base for your current tour.



- built in 1954
- located on base
- living room with dining area
- kitchen (updated in 1975)
- bedrooms and baths
- If you have ONE OR NO CHILDREN, assume the house has two bedrooms and one bath.
- If you have TWO CHILDREN, assume the house has three bedrooms and two baths.
- If you have THREE OR MORE CHILDREN, answer assuming you had two children.
- small rooms
- limited storage
- carport
- laundry area in kitchen with hookups for washer/dryer
- small private yard
- pets allowed

84A. Do you think you would have decided to move into this military housing unit or civilian housing if it had been offered to you under each set of conditions?

*(Check One Answer For Each Offer)*

	Your Total Housing Allowance For Civilian Housing is:	Guaranteed waiting time to move in to this Military Unit:	I would move into:	
Offer 1	Same as your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 53/
Offer 2	\$150 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 54/
Offer 3	\$200 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 55/
Offer 4	Same as your current BAQ & VHA	2 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 56/
Offer 5	Same as your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing 57/

84B. Suppose the military housing pictured above were located off-base. Would you be less likely or more likely to live in this unit or would there be no difference?

*(Check One)*

58/

- 1 Less likely
- 2 More likely
- 3 No difference

85. Now please look at the military housing unit pictured below.



- built in 1996
- located on base
- living room with dining area
- kitchen
- bedrooms and baths
- If you have ONE OR NO CHILDREN, assume the house has two bedrooms and one bath.
- If you have TWO CHILDREN, assume the house has three bedrooms and two baths.
- If you have THREE OR MORE CHILDREN, answer assuming you had two children.
- good size rooms
- extra room for guests, den, etc.
- generous storage
- double garage
- large laundry/utility room with hookups for washer/dryer
- private yard
- pets allowed

85A. Do you think you would have decided to move into this military housing unit or civilian housing if it had been offered to you under each set of conditions?

*(Check One Answer For Each Offer)*

	Your Total Housing Allowance For Civilian Housing is:	Guaranteed waiting time to move in to this Military Unit:	I would move into:	
Offer 1	\$150 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>59/</i>
Offer 2	\$200 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>60/</i>
Offer 3	\$250 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>61/</i>
Offer 4	Same as your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>62/</i>
Offer 5	\$150 more than your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>63/</i>
Offer 6	Same as your current BAQ & VHA	1 year wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>64/</i>

85B. Suppose the military housing pictured above were located off base. Would you be less likely or more likely to live in this unit or would there be no difference?

*(Check One)*

- 1 Less likely
- 2 More likely
- 3 No difference

65/

**REPLACEMENT PAGES FOR OFFICERS**

84. Imagine you were offered the military housing unit pictured below when you arrived at this base for your current tour.



- built in 1954
- located on base
- living room with dining area
- kitchen (updated in 1975)
- bedrooms and baths
- If you have ONE OR NO CHILDREN, assume the house has two bedrooms and one bath.
- If you have TWO CHILDREN, assume the house has three bedrooms and two baths.
- If you have THREE OR MORE CHILDREN, answer assuming you had two children.
- small rooms
- limited storage
- carport
- laundry area in kitchen with hookups for washer/dryer
- small private yard
- pets allowed

84A. Do you think you would have decided to move into this military housing unit or civilian housing if it had been offered to you under each set of conditions?

*(Check One Answer For Each Offer)*

Your Total Housing Allowance For Civilian Housing is:	Guaranteed waiting time to move in to this Military Unit:	I would move into:
Offer 1 Same as your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing 53/
Offer 2 \$150 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing 54/
Offer 3 \$225 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing 55/
Offer 4 Same as your current BAQ & VHA	2 months wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing 56/
Offer 5 Same as your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit <input type="checkbox"/> 2 Civilian housing 57/

84B. Suppose the military housing pictured above were located off-base. Would you be less likely or more likely to live in this unit or would there be no difference?

*(Check One)*

58/

- 1 Less likely
- 2 More likely
- 3 No difference

CARD 07

85. Now please look at the military housing unit pictured below.



- built in 1996
- located on base
- living room with dining area
- kitchen
- bedrooms and baths
- If you have ONE OR NO CHILDREN, assume the house has two bedrooms and one bath.
- If you have TWO CHILDREN, assume the house has three bedrooms and two baths.
- If you have THREE OR MORE CHILDREN, answer assuming you had two children.
- good size rooms
- extra room for guests, den, etc.
- generous storage
- double garage
- large laundry/utility room with hookups for washer/dryer
- private yard
- pets allowed

85A. Do you think you would have decided to move into this military housing unit or civilian housing if it had been offered to you under each set of conditions?

(Check One Answer For Each Offer)

	Your Total Housing Allowance For Civilian Housing is:	Guaranteed waiting time to move in to this Military Unit:	I would move into:	
Offer 1	\$150 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>59/</i>
Offer 2	\$225 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>60/</i>
Offer 3	\$300 more than your current BAQ & VHA	No wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>61/</i>
Offer 4	Same as your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>62/</i>
Offer 5	\$150 more than your current BAQ & VHA	6 months wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>63/</i>
Offer 6	Same as your current BAQ & VHA	1 year wait	<input type="checkbox"/> 1 This military unit	<input type="checkbox"/> 2 Civilian housing <i>64/</i>

85B. Suppose the military housing pictured above were located off-base. Would you be less likely or more likely to live in this unit or would there be no difference?

(Check One)

- 1 Less likely
- 2 More likely
- 3 No difference

65/



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**SURVEY RESPONSE AND WEIGHTING ISSUES**

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**SURVEY RESPONSE**

The overall response rate was 51.7 percent. This figure includes individuals who were reassigned to other bases between being drawn for the sample and receiving their questionnaire; excluding such individuals would result in a 57.3 percent response rate. All subsequent response rates described are uncorrected for such reassignment.

Response rate varied by base: it was significantly above the group mean at the Air Force bases of McGuire, Minot, and Tyndall (73.7, 68.4, and 64.4 percent, respectively) and significantly below the mean at Fort Jackson (35.7 percent). All differences reported as significant are significant at  $\alpha=0.05$  after Bonferroni corrections for multiple comparisons.

There was also a small but significant pattern of higher response rates with increasing rank: 48.5, 53.0, and 55.5 percent for junior enlisted, senior enlisted, and officers, respectively. The response rate did not differ between on-base and off-base personnel (51.7 percent), with  $\alpha > 0.9$ . It also did not differ among those in combat/ship positions (50.3 percent) and those not (52.1 percent) with  $\alpha > 0.1$ .

**SAMPLE WEIGHTS**

Sample weights were created for each of the twelve bases as follows. First, for a given base, the number of eligibles and the number of responses were calculated within each of 24 cells. The cells were defined as all-factorial combinations of rank (E3–E5/E6–E9/O2–O5),

on-base or off-base residence, ethnicity (African American/non-African American), and combat/ship status (on or off ships for San Diego and Mayport, combat or noncombat occupation for other bases). An initial inverse weight was created for each cell by dividing the number of responses by the number of eligibles within each cell.

The inverse of this ratio could be used as a sampling weight, but it would have a large amount of variance because of the small cell sizes. In order to contain this variance with what we feel is a beneficial bias/variance tradeoff, we took two further steps. First, we modeled the response rates within each cell using log-linear models, including all main effects and first-order interactions in the model, but omitting all higher-order interactions. In doing so, we assumed that the former effects reflected true response rate patterns, while the latter only reflected sampling variance. This procedure reduced the variance of cell weights, but left weights that were still overly variable for some bases. To further reduce the variance of the weights to acceptable levels, we then applied the following shrinkage rule: If the ratio of the largest cell weight to the smallest cell weight within a given base exceeded 10, all cell weights for that base were shrunk toward the smallest cell weight for that base by a polynomial factor that resulted in the ratio of the largest to the smallest being exactly 10. This is equivalent to linear smoothing on a logarithmic scale.

For convenience, these weights were then arithmetically standardized to sum to the number of actual responses for the base. This base-level normalization reflected that our design was intended to represent the population at individual bases and not the set of individuals across the whole set of bases. When we selected the bases, we classified the bases into clusters and then picked bases in numbers proportionate to the number of bases of each type. In that sense, the units that we were trying to proportionately represent were bases, not individuals. This is why we did not weight according to the population of each base.

It should be noted that we also tried to represent services somewhat more evenly in numbers of bases chosen than would have been the case by being strictly proportionate to either the number of individuals or the number of bases existing per service. This is both a consequence of the constraints of being limited to a small number of bases and an intentional desire to have several bases for each service.

To the extent that the above methods induced a small amount of bias in sampling weights, it should be as follows: The modeling may result in the misweighting of cells that have substantial true high-level interactions in their response probabilities. The shrinkage may result in the underrepresentation of those cells with very low response rates. In return for the small amount of bias induced by these two steps, it is likely that the variability of the sample weights with respect to the true (inverse) probabilities on inclusion has been greatly reduced. This probably means that all resulting estimates will have substantially less mean squared error than would estimates that were simply derived as inverse sample proportions of response.



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**HEDONIC RENT EQUATION ADJUSTED FOR SELF-  
SELECTION OF RENTERS**

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As discussed in Chapter Three, our selection-adjusted model of hedonic rents is based on two equations. The first equation reflects the probability of a civilian rental relative to living in military housing:

$$\text{Prob}(\text{Rent}) = \mathbf{z}_j\boldsymbol{\gamma} + \varepsilon_{1j}$$

where  $\mathbf{z}_j$  is a vector of independent variables that affect the tenure choice for observation  $j$ ,  $\boldsymbol{\gamma}$  is a vector of estimated parameters, and  $\varepsilon_{1j}$  is a normally-distributed error term with zero mean and unit variance. The second hedonic price equation is

$$y_j = \mathbf{x}_j\boldsymbol{\beta} + \sigma\varepsilon_{2j}$$

where  $y$  is the log of gross rent,  $\mathbf{x}_j$  is a vector of housing attributes,  $\boldsymbol{\beta}$  is a vector of estimated hedonic prices, and  $\varepsilon_2$  is a normally-distributed error term with zero mean and unit variance that is potentially correlated with  $\varepsilon_1$  with correlation  $\rho$ .

The estimated coefficients and standard errors of the two equations are reported in Tables E.1 and E.2. The estimated correlation between the error terms in the two equations is  $-0.0804$ , with a standard error of  $0.0998$ . The sample size was  $2984$ , and the  $\chi^2$  for the maximum likelihood model was  $767.47$ .

**Table E.1**  
**Probit Estimates for Rent Relative to Military Housing**

Variable	Coefficient	Standard Error
Log family income	0.2807 <sup>a</sup>	0.0578
Single parent	0.5151 <sup>a</sup>	0.1040
Spouse full-time	0.1154	0.0686
Spouse part-time	-0.1415 <sup>a</sup>	0.0719
Spouse military	0.8150 <sup>a</sup>	0.1022
One child	-0.3508 <sup>a</sup>	0.0746
Two children	-0.6909 <sup>a</sup>	0.0761
Three or more children	-0.9849 <sup>a</sup>	0.0856
Expect to deploy	-0.0166	0.0579
Female	-0.2005 <sup>a</sup>	0.0856
Hispanic	-0.1212	0.0788
Black	-0.2258 <sup>a</sup>	0.0720
Other ethnicity/race	0.2014	0.1040
Carson	0.3236 <sup>a</sup>	0.1092
Hood	0.4117 <sup>a</sup>	0.1074
Jackson	-0.3905 <sup>a</sup>	0.1212
Lewis	0.0878	0.1047
Mayport	0.5103 <sup>a</sup>	0.1176
Patuxent River	-0.1703	0.1095
McGuire	-1.0055 <sup>a</sup>	0.1213
Minot	-1.4728 <sup>a</sup>	0.1311
Tyndall	-0.5232 <sup>a</sup>	0.1188
Pendleton	-0.0751	0.1072
Cherry Point	-0.7801 <sup>a</sup>	0.1256
Constant	-0.6126 <sup>a</sup>	0.2108

<sup>a</sup>Significant at the  $\alpha = 0.05$  confidence level.

**Table E.2**  
**Estimates from the Hedonic Rent Equation Adjusted for Selectivity**

Dependent Variable: Log Rent	Coefficient	Standard Error
Mobile home	-0.0748	0.0456
Attached house	-0.0485	0.0287
Apartment	-0.0655	0.0336
Year house was built	-0.0447	0.0652
Year built squared	0.0049 <sup>a</sup>	0.0017
Number of bedrooms	0.0911 <sup>a</sup>	0.0136
Number of full baths	0.0926 <sup>a</sup>	0.0181
Number of half baths	0.0445 <sup>a</sup>	0.0175
Number of other rooms	0.0293 <sup>a</sup>	0.0064
Square feet (in thousands)	0.0000	0.0000
Dummy variable indicating missing square feet	-0.0119	0.0237
Refrigerator included	-0.1004 <sup>a</sup>	0.0232
Dishwasher included	0.1247 <sup>a</sup>	0.0200
Garbage disposal included	0.0060	0.0182
Central air	0.0089	0.0203
Other air	-0.0334	0.0184
Cable	-0.0477	0.0246
Private yard	0.0136	0.0261
Pets allowed	-0.0034	0.0156
Laundry machine in unit	0.1396 <sup>a</sup>	0.0258
Laundry hook-up	0.1099 <sup>a</sup>	0.0223
Shared, free laundry facilities	0.0475	0.0330
Coin-operated laundry facilities	0.0222	0.0234
One-car garage	0.0365	0.0219
Two-car garage	0.1078 <sup>a</sup>	0.0279
Carport	0.0300	0.0231
Off-street parking lot	-0.0183	0.0183
Driveway	-0.0159	0.0188
Playground nearby	-0.0192	0.0155
Schools good quality	0.0373 <sup>a</sup>	0.0170
Commute within 10 minutes	0.0244	0.0183
Tenant less than 1 year	0.0130	0.0148
Good condition	-0.0198	0.0155
Carson	-0.1533 <sup>a</sup>	0.0276
Hood	-0.2091 <sup>a</sup>	0.0315
Jackson	-0.2249 <sup>a</sup>	0.0395
Lewis	-0.2496 <sup>a</sup>	0.0296
Mayport	-0.1772 <sup>a</sup>	0.0324
Patuxent River	-0.1082 <sup>a</sup>	0.0343
McGuire	0.1509 <sup>a</sup>	0.0432
Minot	-0.3343 <sup>a</sup>	0.0532
Tyndall	-0.2728 <sup>a</sup>	0.0392
Pendleton	-0.1006 <sup>a</sup>	0.0280
Cherry Point	-0.3804 <sup>a</sup>	0.0458
Constant	6.3301 <sup>a</sup>	0.0632

NOTES: Annotated coefficients (a) are significant at the  $\alpha = 05$  percent confidence level. The coefficients on "Year Built" and "Year Built Squared" are multiplied by 100.





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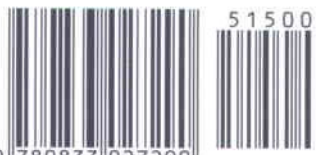
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