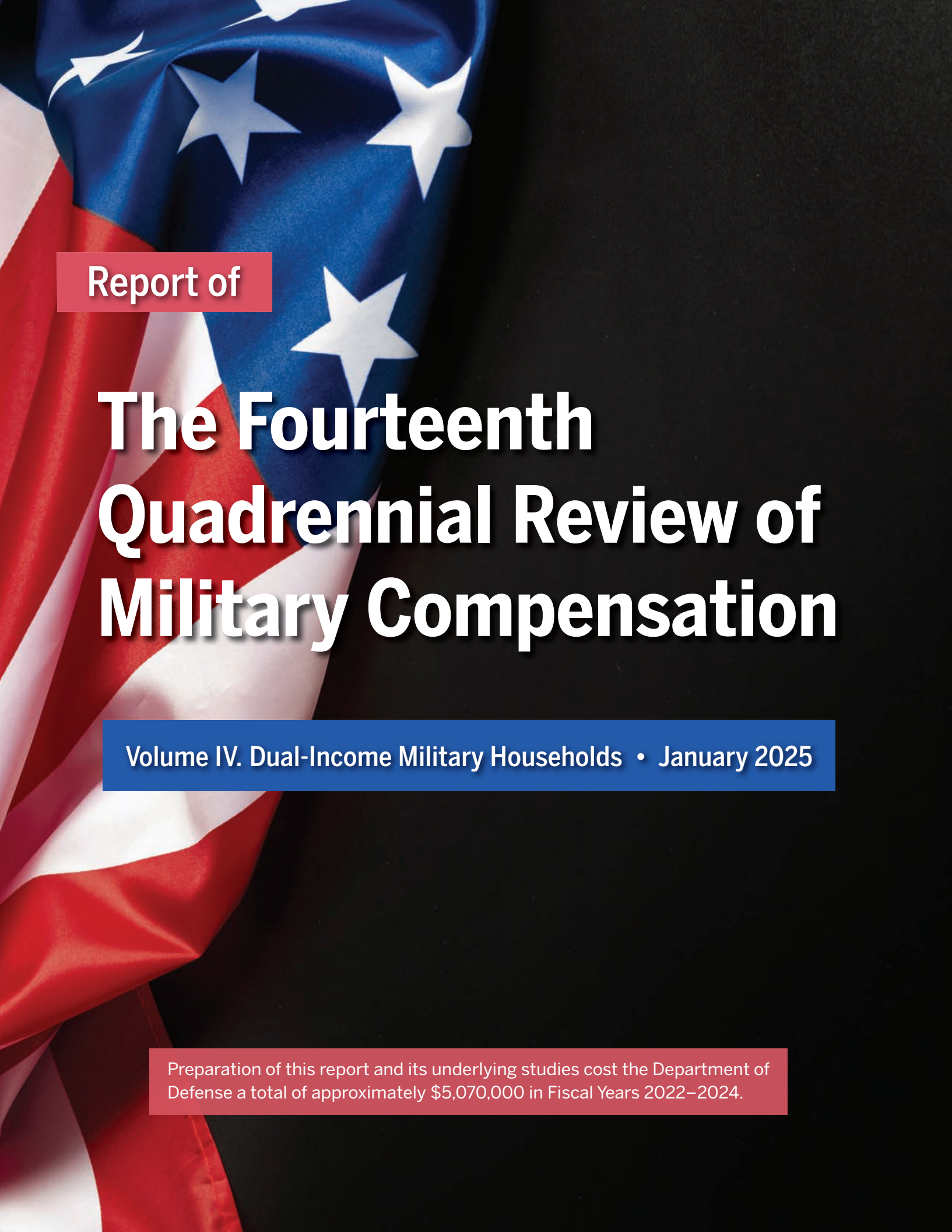

Report of

The Fourteenth Quadrennial Review of Military Compensation

Volume IV. Dual-Income Military Households • January 2025

Preparation of this report and its underlying studies cost the Department of Defense a total of approximately $5,070,000 in Fiscal Years 2022–2024.

Report of

The Fourteenth Quadrennial Review of Military Compensation

Volume IV. Dual-Income Military Households

January 2025

Preface

Every four years, the President directs "a complete review of the principles and concepts of the compensation system for members of the uniformed services."[1] When this review is completed, the President must submit a detailed report to Congress summarizing the results of the review along with any recommendations the President may have for changes in the statutory salary system and other elements of the compensation structure for members of the uniformed services.[2]

In January 2023, President Joseph R. Biden instructed the Secretary of Defense to serve as his Executive Agent in conducting the Fourteenth Quadrennial Review of Military Compensation (14th QRMC). In his charge to the Secretary, the President stated:

> Our great Nation has the finest fighting force in the world and it remains our sacred obligation to take care of our men and women in uniform. We owe our service members our support and gratitude, and we recognize the sacrifices they make every day in support of our Nation. Further, our service members deserve a 21st century military compensation system that recognizes and rewards their contributions, reflects the values of our Nation, and incentivizes the next generation of men and women to serve.[3]

In furtherance of this objective, the President directed the 14th QRMC to review and assess five topics: the current military compensation benchmark; the structure of the basic pay table; the requirements and methodologies used to calculate the housing, subsistence, and cost-of-living allowances, including the Basic Needs Allowance; compensation for critical skills; and the implications for compensation of the growing number of dual-income military households.

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1 U.S. Code, Title 37, Section 1008(b), Presidential Recommendations Concerning Adjustments and Changes in Pay and Allowances.

2 U.S. Code, Title 37, Section 1008(b).

3 White House, "Fourteenth Quadrennial Review of Military Compensation," memorandum for the Secretary of Defense, January 15, 2023.

At the request of the Commander, United States Special Operations Command, and the Chairman, Joint Chiefs of Staff, the Secretary of Defense added a sixth study—a review of entitlements for deployed members.

This fourth volume of the 14th QRMC report contains research papers on dual-income military households prepared by a federally funded research and development center in support of the QRMC. They provide more detailed discussion of the topics addressed in the main report, including description of the data sets and methodology used in the various analyses. These reports are presented, with permission, in their entirety. The views expressed in these papers represent those of the authors and are not necessarily those of the Department of Defense.

This volume includes the following:

Retain the Family: What It Takes to Keep Dual-Income Military Households, Volume I

Jacklyn R. Kambic, Juliana Esposito, Emily A. Fedele, Jared M. Huff, Anusuya Sivaram, Mikhail Smirnov, IDA

Retain the Family: Redefining the Military Compensation Benchmark, Volume II

Jacklyn R. Kambic, Jared M. Huff, Mikhail Smirnov, Anusuya Sivaram, Erin Eifert, IDA

INSTITUTE FOR DEFENSE ANALYSES

Retain the Family: What It Takes to Keep Dual-Income Military Households

Volume I

Jacklyn R. Kambic
Juliana Esposito
Emily A. Fedele
Jared M. Huff
Anusuya Sivaram
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January 2024
Approved for public release; distribution unlimited.
IDA Product 3000516

INSTITUTE FOR DEFENSE ANALYSES
730 E.Glebe Rd
Alexandria, VA 22305

The Institute for Defense Analyses is a nonprofit corporation that operates three Federally Funded Research and Development Centers. Its mission is to answer the most challenging U.S. security and science policy questions with objective analysis, leveraging extraordinary scientific, technical, and analytic expertise.

About this Publication

This work was conducted by the Institute for Defense Analyses under contract HQ0034-19-D-0001, project BE-6-5264, "14th Quadrennial Review of Military Compensation (QRMC): Initial Review of Current Benchmarks for Military Compensation" for the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD(P&R)). The views, opinions, and findings should not be construed as representing the official position of either the Department of Defense or the sponsoring organization.

Acknowledgments

The authors wish to thank Dr. John W. Dennis III, Dr. Dina Eliezer, and Dr. Matthew S. Goldberg for their technical review.

For More Information:

Dr. Jacklyn R. Kambic, Project Leader
jkambic@ida.org, 703-845-6918

Ms. Jessica L. Stewart, Director, SFRD
jstewart@ida.org, 703-575-4530

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Retain the Family: What It Takes to Keep Dual-Income Military Households

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Executive Summary

Pay, bonuses, and other forms of cash compensation are key tools that the services use to meet retention and recruiting goals as they compete with the civilian labor market for talent. Since 2002, the benchmark for military compensation has been set at the 70th percentile of individual income for comparably educated civilians. However, married individuals typically make career decisions such as military retention jointly with their spouse. A majority of military spouses are in the labor force, but military-specific challenges such as deployments and frequent moves negatively affect their earnings potential. As such, a compensation benchmark that does not account for the full effect of military service on household income may not be adequate to retain military personnel. In this two-volume report, we reevaluate the military compensation benchmark in the context of joint career decisions faced by a growing number of dual-income military households.

The first volume of this report presents a qualitative analysis of how military-specific challenges affect the careers of service members' civilian spouses and how these challenges, in turn, influence service members' retention decisions. The second volume provides a quantitative analysis of the roles of military compensation and household income in retention decisions, along with a policy recommendation on whether a change in the military compensation benchmark is needed to support retention.

The analysis in this volume answers two questions:

- How does military service affect spouses' civilian careers?
- How do service members consider their spouses' careers when making retention decisions?

Compared to spouses of civilians, military spouses are less likely to be employed, less likely to have a job that matches their qualifications, and earn less when they do work. In some cases, a spouse's inability to work puts significant financial pressure on military families. Service members acknowledge the effect of military life on their spouses' careers and life satisfaction and on their household income. In general, service members may view the cost to their spouses' careers as one part of a larger sacrifice – a sacrifice that can keep them away from their families, disrupt their home life, and interfere with their life goals. When making retention decisions, service members weigh these costs against the compensation, benefits, and self-fulfillment that a military career provides.

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1. Introduction

Under an all-volunteer force construct, the military competes with the civilian labor market for talent. Compensation is one of the key tools that the services use to meet recruiting and retention goals, and civilian salaries have served as a benchmark for military compensation since the beginning of the all-volunteer force in 1973. However, since the 1970s, social and economic norms in the United States have shifted toward a paradigm of dual-income households.[1] Single-income households (i.e., households where one spouse works in the labor force while the other provides house work and child care) used to be the norm in the United States: 51 percent of married couples with children in 1972 fit this description. By 2022, only 29 percent did. The situation for military families is similar. In 2021, only 31 percent of military spouses were reported as being out of the labor force.[2] However, the increase in women's labor force participation does not fully capture the ongoing change in social and economic norms. While the share of dual-income households peaked in the 1990s, the share of households in which the husband accounts for at least 60 percent of the household's combined earnings continued to decrease, falling from 85 percent in 1972 to 55 percent in 2022.[3] Given that military service is known to have a negative effect on the career prospects of military spouses, there is concern that a military compensation benchmark based on individual income alone may not accurately represent the household income tradeoffs that service members consider when deciding whether to stay in or leave military service.

In 2002, the 9th Quadrennial Review of Military Compensation (QRMC) estimated that to meet recruiting and retention requirements, Regular Military Compensation (RMC) needs to be at least at the 70th percentile of individual income for comparably educated civilians. The 70th percentile of individual income has since been used as the benchmark for military compensation, and subsequent QRMC studies have shown that military compensation has remained well above this benchmark since the early 2000s. The 11th QRMC found that by 2009, RMC for enlisted service members had increased to

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1 Julie Sullivan, "Comparing Characteristics and Selected Expenditures of Dual- and Single-Income Households with Children," *Monthly Labor Review* (Washington, DC: U.S. Department of Labor Statistics, 2020), 1, https://doi.org/10.21916/mlr.2020.19.

2 Office of People Analytics, "2021 Survey of Active Duty Spouses: Tabulations of Responses," Report No. 2022-053 (Alexandria, VA: OPA, July 2022).

3 Richard Fry et al., "In a Growing Share of U.S. Marriages, Husbands and Wives Earn About the Same," Pew Research Center, April 2023, https://www.pewresearch.org/social-trends/wp-content/uploads/sites/3/2023/04/Breadwinner-wives-full-report-FINAL.pdf.

approximately the 90th percentile of salaries for comparably educated civilians. The findings of the 13th QRMC were consistent with these trends, estimating RMC for enlisted personnel at the 85th percentile of the civilian wage distribution in 2017.

Despite RMC exceeding the 70th percentile benchmark, total end strength across the Department of Defense (DOD) active component has fallen short of the target set in the National Defense Authorization Act (NDAA) every year since 2010.[4,5] As illustrated in Figure 1, each service's active component has experienced a shortfall more than half of the time between 2002 and 2022. The services manage personnel end strength by setting targets for the numbers of new service members to recruit and existing service members to retain, and routinely use special and incentive (S&I) pays to further increase compensation in an effort to meet these requirements[6]. The existence of S&I pays, by itself, does not prove that the current benchmark is insufficient. Flexible S&I pays enable DOD to address personnel shortfalls in certain occupations or skills at specific points in time. However, persistent challenges in meeting end strength during a time when military pay has remained high relative to its benchmark suggests that the current benchmark for RMC may not reflect the level of compensation needed to recruit and retain the required military force.

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4 End strength targets were obtained from Section 401 of each year's NDAA, which authorizes the maximum number of active duty personnel in each of the services as of the end of the fiscal year.

5 Defense Manpower Data Center, "Military Personnel: Active Duty Military Strength by Service (Updated Monthly), accessed November 16, 2023, https://dwp.dmdc.osd.mil/dwp/app/dod-data-reports/workforce-reports.

6 It is beyond the scope of this analysis to attribute these gaps to either recruiting or retention challenges, and indeed it is likely that both recruiting and retention shortfalls have contributed at different times to the observed end strength gaps of the last two decades.

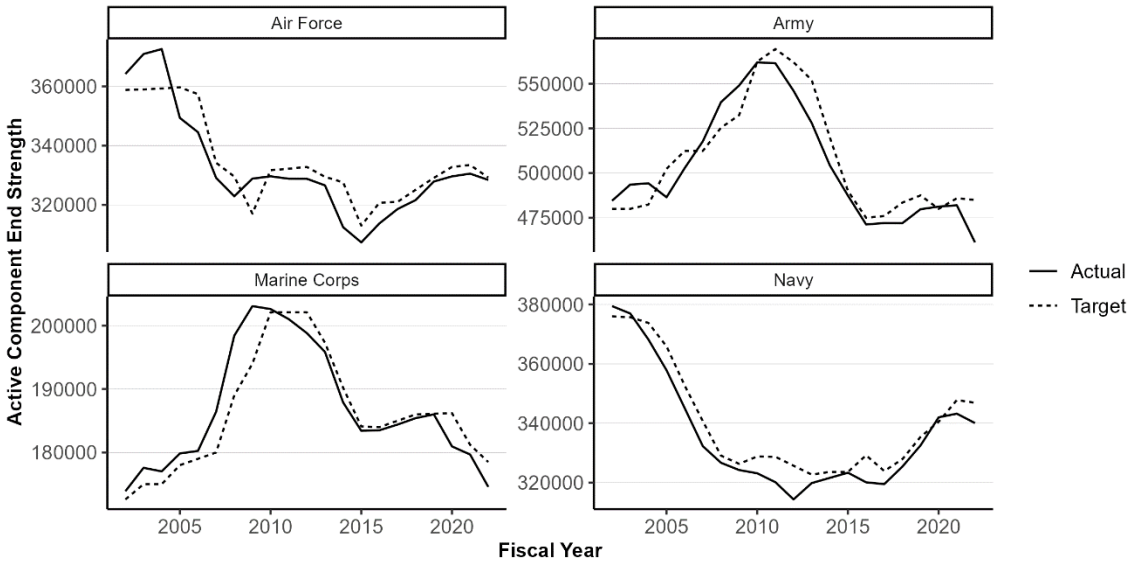

Figure 1. End Strength Targets vs. Actuals, 2002 to 2022

This report reevaluates the 70th percentile civilian pay benchmark for military compensation in the context of joint career decisions faced by a growing number of dual-income military households.[7] A complete view of the benefits and drawbacks of those remaining in the military includes the military-specific challenges affecting the incomes of military spouses, such as frequent permanent change of station (PCS) moves, periods of family separation and deployments, possible lack of access to child care services, and locations with limited employment opportunities. If military pay does not adequately compensate for the loss of household income resulting from these challenges, service members may be inclined to leave the service to enable their spouse to have a more stable and successful career.

This report uses a mixed-methods approach to analyze the effects that military-specific challenges have on the careers and incomes of military spouses and their joint household retention decisions. Our analysis uses a combination of qualitative and quantitative methods to characterize service members' retention decisions, accounting for the effect of military service on military spouses' careers and how this cost factors into service members' decision process. This volume of the report presents a qualitative analysis of the experiences of service members and their families in dealing with these military-specific challenges and how they affect military households' retention decisions.

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[7] We assume that most dual-income military households are married couples. We acknowledge that some unmarried service members may have a long-term romantic partner with whom they make household decisions. Some of the findings in this report are relevant to such circumstances, but we note that the effects of military-specific challenges on the employment and earnings of unmarried partners may be somewhat different from those of military spouses, particularly since unmarried partners are not eligible for many of the programs and benefits offered to married service members and their spouses.

The findings discussed here will be used to inform the development of a statistical model of these retention decisions that captures this dynamic. Volume 2 of this report covers this quantitative analysis and provides recommendations for compensation policies that would help the services to retain the qualified personnel they need.

The analysis in this volume answers two questions:

- How does military service affect spouses' careers?
- How do service members consider their spouses' careers when making retention decisions?

Evidence from previous literature, in combination with new results documented in this volume, clearly show that military service has a substantial negative effect on spouses' careers. Spouses of service members, compared to their civilian counterparts, are more likely to be unemployed, underemployed, or out of the labor force, to earn lower wages, and to work in jobs below their qualifications. Their careers are interrupted by frequent moves, and they are often relied on to be the primary child care provider in the family, limiting their ability to work. These effects add up over the years, so that military spouses are at a significant disadvantage compared to civilians in the labor market even after the service member leaves military service. Table 1 and Table 2 list our key findings on military spouses' labor market outcomes and military-specific challenges that affect spouses' careers, respectively.

Military spouses' employment outcomes are correlated with their support for the service member to remain on active duty, which, in turn, is predictive of the service member's retention behavior. Qualitative results from focus group discussions provide additional insights into the household decisions involved in this dynamic. These results make clear that the service member's military career takes priority over their spouse's civilian career. Military spouses are, in general, expected to shape their career decisions to meet the demands of their partner's military career. However, service members understand and consider the effect of military life on their spouse's career and life satisfaction. Accordingly, their retention decisions are driven by 1) household income, including benefits and 2) their own and their family's ability to manage the demands of military life. Table 3 summarizes our key findings regarding military household retention decisions.

Table 1. Findings on Military Spouses' Labor Market Outcomes

Findings	Estimates from Prior Research	Focus Groups
Military spouses are less likely to be in the labor force than comparable civilians.[8]	Military wives are 23 to 52 percent less likely to participate in the labor force.[9]	
Military spouses who are in the labor force are more likely to be unemployed than civilians.	16 to 24 percent unemployment rate (4 to 6 times higher than civilians)[10]	
Military spouses who are employed are often underemployed.	28 to 42 percent report being underemployed (either relative to their qualifications or working fewer hours than they would like)[11]	✓
Military spouses who are employed earn less on average than comparable civilians.	Earnings gap of 14 to 25 percent, depending on the time period and data used[12]	
Some military spouses have jobs, but most do not have their own careers.		✓

Note: ✓ in the "Focus Groups" column indicates that focus group data collected during this study supports the stated finding.

[8] To estimate the difference in labor force participation between military wives and comparable civilians, the authors control for demographics including age, education, race, Hispanic ethnicity, presence of children, presence of children under age 5, region, metropolitan status, and indicators for recent moves.

[9] Breann Whitby and Janice Compton, "The Labor Supply of Military Wives in the US," *Review of Economics of the Household* 16 (2018): 531–539, https://link.springer.com/article/10.1007/s11150-016-9352-y.

[10] Office of People Analytics, "Measuring Military Spouse Employment: Comparing Methods of the Bureau of Labor Statistics, the Census Bureau, and the Office of People Analytics," Report No. 2020-068 (Alexandria, VA: OPA, 2021).

[11] Office of People Analytics, "2021 Survey of Active Duty Spouses."

[12] James Hosek and Shelley MacDermid Wadsworth, "Economic Conditions of Military Families," *The Future of Children* 23, no. 2 (Fall 2013): 41–59, https://www.jstor.org/stable/23595619.

Table 2. Findings on Military-Specific Challenges Affecting Military Spouses' Careers

Findings	Estimates from Prior Research	MCFS	Focus Groups
Military spouses with children are less likely to be in the labor force than those without.	Labor force participation rates of 63 percent for those with children and 81 percent for those without[11]	✓	✓
Female military spouses are less likely to be in the labor force than male military spouses.	Labor force participation rates of 66 percent for women and 89 percent for men[11]	✓	
PCS moves reduce military spouses' earnings and the effect persists for multiple years.	14 percent reduction in earnings in the year of a PCS move, with up to 3 years of reduced earnings[13]		✓
Military spouses are less likely to be employed in the year of a PCS move than those who did not move.	4 to 5 percent reduction in employment in the year of a PCS move[13]	✓	✓
Many military spouses require a new license or credential to return to work after a PCS move.	32 percent of military spouses needed new credential after their most recent PCS move[11]		✓
Deployments and periods of family separation decrease military spouses' ability to work.	3 percentage point reduction in employment for women, no effect for men[14]		✓
The cost of child care outweighs potential earnings for many military spouses.	26 percent cite this as barrier[11]	✓	✓
Child care is a challenge that is exacerbated by the demands of military life.	42 percent report managing child care alone was a problem during a deployment[11] 47 percent report that child care availability was a problem following a PCS move[11]		✓
Challenges to military spouse employment vary by duty location.			✓

Note: ✓ in the "MCFS" column indicates that summary data from the Millennium Cohort Family Study (MCFS) supports the stated finding. ✓ in the "Focus groups" column indicates that focus group data collected during this study supports the stated finding.

[13] Jeremy Burke and Amalia R. Miller, "The Effects of Military Change of Station Moves on Spousal Earnings," RB-9920-OSD (Santa Monica, CA: RAND Corporation, 2016), https://www.rand.org/pubs/research_briefs/RB9920.html.

[14] Joshua D. Angrist and John H. Johnson IV, "Effects of Work-Related Absences on Families: Evidence from the Gulf War," *Industrial and Labor Relations Review* 54, no. 1 (October 2000): 41–58, https://economics.mit.edu/sites/default/files/publications/001979390005400103.pdf.

Table 3. Findings on Military Household Retention Decisions

Findings	Estimates From Prior Research	Focus Groups
Military spouses' employment outcomes are correlated with their support for remaining in service.	Unemployed spouses report lower support for staying in the military, by 1 point on a 5-point scale[15]	
Spouses' support for remaining in service is a factor in service members' retention decisions.	On a 5-point scale, each 1-point increase in spousal support increased the member's odds of remaining on active duty by 1.95[16]	✓
Retention decisions primarily depend on 1) household income and 2) family satisfaction with military life.		✓

Note: ✓ in the "Focus groups" column indicates that focus group data collected during this study supports the stated finding.

In this volume of the report, we document and summarize what is already known in the literature and from multiple surveys of military families and spouses. Next, we analyze data from the Millennium Cohort Family Study about the career outcomes of military spouses. Finally, we present the results of focus group discussions held with service members and their spouses to discuss the service members' retention decisions and their spouses' careers. The findings documented in this volume provide important context for the subsequent statistical modeling analysis and policy evaluation that are presented in Volume 2.

[15] Office of People Analytics, "Predictors of Spousal Support for a Member to Stay on Active Duty," Note No. 2019-039 (Alexandria, VA: OPA, 2019), https://download.militaryonesource.mil/12038/MOS/Surveys/Predictors-Spousal-Support.pdf.

[16] Office of People Analytics, "Spousal Support to Stay as a Predictor of Actual Retention Behavior: A Logistic Regression Analysis," Note No. 2017-009 (Alexandria, VA: Defense Research, Surveys, and Statistics Center (RSSC), 2017), https://download.militaryonesource.mil/12038/MOS/Surveys/Military-Spouse-Survey-Note.pdf.

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2. Literature Review

In this chapter, we discuss key takeaways from prior research that are relevant to the retention decisions of dual-income military households. We review the academic literature studying labor market outcomes of military spouses and the way dual-income households make career decisions. We also highlight relevant findings from recent survey data collected by DOD and other organizations, including the Status of Forces Survey of Active Duty Members (SOFS-A) and the Active Duty Spouse Survey (ADSS) conducted by the Office of People Analytics (OPA), the Millennium Cohort Study (MCS) and the Millennium Cohort Family Study (MCFS) conducted by the Naval Health Research Center (NHRC), the Military Family Lifestyle Survey conducted by Blue Star Families, and the Military Spouse Employment Flash Survey conducted by Hiring Our Heroes. We first focus on the effect that military service has on military spouses' labor market outcomes and the two military-specific challenges that appear to have the greatest effect: PCS moves and access to child care. We then summarize the evidence—from studies of military personnel and civilians—about how couples make joint household decisions when it comes to career options.

A military career affects not just service members, but also the personal lives and careers of their spouses and family members. Military service imposes recurring relocations, with service members and their spouses often having little input on when or to where they move. Military spouses' ability to work after relocating may depend on local civilian labor market conditions or availability of child care. Service members who are ordered to move may have a service obligation, making their relocation largely unavoidable regardless of the consequences to their spouses' careers. In addition to permanent moves, service members may deploy to locations where their family members cannot accompany them, leaving their spouses solely responsible for household management and child care. These challenges reduce military households' autonomy over their location and household management decisions. The degree to which the military claims an uncommonly high amount of its member's time, loyalty, and so forth has been the focus of its own branch of literature.[17]

The services have long recognized that service members' retention is influenced by their families. A recent OPA report linking DOD survey and administrative data found a strong relationship between service members' retention and their perceptions of their spouses' support for remaining on active duty.[16] Military spouses who are unemployed are more likely to favor their partner leaving the military, suggesting that the spouse's career

[17] Mady Wechsler Segal, "The Military And the Family As Greedy Institutions," *Armed Forces & Society* 13, no. 1 (Fall 1986): 9–38, https://www.jstor.org/stable/45305754.

outcomes can play a role in retention decisions.[15] We explore this household decision-making dynamic further through focus group discussions with service members and their spouses and present the results in Chapter B.

The degree to which military service negatively affects the careers of military spouses has been a research topic of interest since the start of the All-Volunteer Force.[18] Past research has focused on two questions in particular regarding how military spouses' careers compare to those of similar civilians:

- Are military spouses who work likely to earn less as a result of being married to a service member?
- Are military spouses more likely to be out of the labor force, unemployed, or underemployed as a result of being married to a service member?

The consensus of the literature, across a variety of time periods, data sources, and methodologies, is that the answer to both of these questions is emphatically "yes." Evidence from the academic literature and from survey data indicates that military life comes with unique challenges that negatively affect military spouses' labor market outcomes. Much of the reduction in employment and earnings can be attributed to PCS moves, child care requirements, or a combination of both. This chapter discusses key takeaways from the literature, with an emphasis on findings that inform the development of the quantitative model of retention used in Volume 2 of this report.

A. Careers of Military Spouses

That military spouses make less than civilian spouses is well documented in the academic literature across time. Studies have shown employment or wage gaps using data

[18] Louis Jacobson, *Research to Quantify the Effect of Permanent Change of Station Moves on Wives' Wages and Labor Supply*. Professional Paper 373 (Alexandria, VA: Center for Naval Analyses, January 1983), https://apps.dtic.mil/sti/citations/tr/ADA128300.

from the 1970s, 1980s, 1990s, 2000s, and early 2010s.[18,19,20,21,22,23,24,25,26,27] Each of these studies has shown some combination of lower wages, lower labor force participation, and higher unemployment for military spouses than for their civilian counterparts. While earlier studies focused on wives of service members due to sample size limitations, recent studies have also found similar results for husbands of service members. There is consensus that military husbands face wage gaps, although there is disagreement on whether the gaps are equivalent to or smaller than those faced by military wives.[24,25,19] While the existence of large persistent wage and employment gaps for military spouses is widely agreed-upon, there is no consensus on the exact size of those gaps. Estimated wage gaps range from 14 to 50 percent, which can serve as upper and lower bounds in our further analysis.[24,19]

Despite efforts by DOD to address wage and employment gaps for military spouses, progress has been mixed.[28,29] A number of resources exist to help military spouses navigate

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19 James Hosek et al., *Married to the Military: The Employment and Earnings of Military Wives Compared with Those of Civilian Wives*, MR-1565-OSD (Santa Monica CA: RAND Corporation, 2002), https://www.rand.org/pubs/monograph_reports/MR1565.html.

20 Margaret C. Harrell et al., "Working Around the Military: Challenges to Military Spouse Employment and Education," RB-9056-OSD (Santa Monica, CA: RAND Corporation, 2005), https://doi.org/10.7249/RB9056.

21 Deborah M. Payne, John T. Warner, and Roger D. Little, "Tied Migration and Returns to Human Capital: The Case of Military Wives," *Social Science Quarterly* 73, no. 2 (June 1992): 324–339, http://www.jstor.org/stable/42863036.

22 Jeremy Burke and Amalia R. Miller, "The Effects of Job Relocation on Spousal Careers: Evidence from Military Change of Station Moves," *Economic Inquiry* 56, no. 2 (April 2018): 1261–1277, https://doi.org/10.1111/ecin.12529.

23 Sarah O. Meadows et al., "Employment Gaps Between Military Spouses and Matched Civilians," *Armed Forces & Society* 42, no. 3 (2016): 542–561, https://doi.org/10.1177/0095327X15607810.

24 Roger D. Little and John J. Hisnanick, "The Earnings of Tied-Migrant Military Husbands," *Armed Forces & Society* 33, no. 4 (July 2007): 547–570, https://www.jstor.org/stable/48608600.

25 John J. Hisnanick and Roger D. Little, "Honey I Love You, but … Investigating the Causes of the Earnings Penalty of Being a Tied-migrant Military Spouse," *Armed Forces & Society* 41, no. 3 (2014): 413–439, https://doi.org/10.1177/0095327X13512620.

26 Nelson Lim, Daniela Golinelli, Michelle Cho, "'Working Around the Military' Revisited: Spouse Employment in the 2000 Census Data," MG-566-OSD (Santa Monica, CA RAND Corporation, 2007), https://www.rand.org/pubs/monographs/MG566.html.

27 Thomas J. Cooke and Karen Speirs, "Migration and Employment Among the Civilian Spouses of Military Personnel," *Social Science Quarterly* 86, no. 2 (June 2005): 343–355, https://www.jstor.org/stable/42956067.

28 U.S. Government Accountability Office, *Military Spouse Employment: DOD Should Continue Assessing State Licensing Practices and Increase Awareness of Resources*, GAO-21-193 (Washington, DC: GAO, 2021), https://www.gao.gov/assets/gao-21-193.pdf.

29 Marek N. Posard et al., *Evaluation of the Military Spouse Employment Partnership Program: Report on the Second Stage of* Analysis, RR-A531-1 (Santa Monica, CA: RAND Corporation, 2021), https://doi.org/10.7249/RR-A531-1.

employment opportunities.[30] For example, the military offers tuition assistance up to $4,000 to eligible spouses pursuing training in select portable career fields. Military spouses are also given preference in some civilian DOD job openings. Recent legislation has made it easier for spouses with select professional licenses to transfer these licenses between states.[31] However, while labor force participation rates for working-age women increased between 1990 and 2010, labor force participation among military wives actually decreased slightly during this time period, and military wives were estimated to be between 23 and 52 percent less likely to participate in the labor force than comparable civilians.[9] Recent data from the ADSS between 2015 and 2021 indicate that active duty spouses who are in the civilian labor force continue to experience higher rates of unemployment than comparable civilians. Those who are employed also face difficulties: nearly 40 percent of spouses who are employed full time report being underemployed relative to their education and nearly a third of those who work part time report wanting to work more hours.

1. PCS Moves

PCS moves require active duty service members to relocate frequently, disrupting military spouses' careers and reducing their earnings. These reductions in earnings are difficult to recover from and can persist for up to three years after the PCS move.[22] As a consequence, a policy with PCS moves taking place every three years is estimated to reduce military wives' earnings by 40 percent in comparison to a six-year rotation policy.[21] More recent analyses show large wage losses for military spouses in the year of relocation, with persistent wage losses for spouses who move more often. These wage losses differ by demographics, with older spouses and spouses with young children affected to a greater degree. Spouses with young children also experienced nearly twice the decrease in average annual earnings following a PCS move compared to those without.[19]

Frequent moves discourage some military spouses from seeking new employment after a career interruption. According to the most recent ADSS, 41 percent of spouses reported that they did not seek employment after their last PCS move.[32] This effect differs significantly across demographics. Around 50 percent of male spouses typically find employment within a month after a PCS move, whereas only 22 percent of female spouses

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30 Kristy N. Kamarck, Barbara L. Schwemle, and Sofia Plagakis, *Military Spouse Employment,* CRS Report R46498 (Washington, DC: Congressional Research Service, August 27, 2020), https://crsreports.congress.gov/product/pdf/R/R46498.

31 "Portability of Professional Licenses of Service Members and Their Spouses," 50 USC 4025a (2023), https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title50-section4025a&num=0&edition=prelim#sourcecredit.

32 Office of People Analytics, *2021 Active Duty Spouse Survey: Results from the 2021 Active Duty Spouse Survey*, Report # 2023-045 (Alexandria, VA: OPA, 2023), https://download.militaryonesource.mil/12038/MOS/Presentations/2021-active-duty-spouse-overview-briefing.pdf.

do. Spouses in occupations requiring professional credentials or licenses face additional difficulties finding employment in a new location. Licenses are typically administered by a state-level authority, and barriers to reciprocity may vary by state. Over thirty percent of employed military spouses report that they needed to acquire a new professional credential to work after moving to a new duty station. In some fields, transferring credentials can cost a significant amount of time and money. This burden on military spouses has been an area of concern in recent years, and in 2023 a federal law was passed directing states to provide license reciprocity to military spouses.

2. Child Care Cost and Availability

The long hours often worked by military personnel and the absences due to temporary duties or deployments can result in military spouses taking a disproportionate share of child care responsibilities. We have already noted that spouses with young children experience larger earnings losses following a move. Other work has shown that service members' wives work fewer hours when the service members are deployed.[14] These quantitative results are supported by prior qualitative work showing that military spouses often report that they bear the bulk of responsibility for either finding or directly providing care for a couple's children.[33]

According to recent survey data, nearly half of military spouses cite child care as the top reason for not working after a PCS move.[11] Despite the fact that DOD provides care through Child Development Centers (CDCs), School Age Care programs, Military Child Care in Your Neighborhood, and Family Child Care homes for an estimated 210,000 children, only 13 percent of military families reported that they use DOD-provided child care. Twenty-four percent of military families use civilian child care; about half of these families reported that they do not use military child care due to a lack of availability.[32,34] In 2014, the reported wait list times for military child care ranged from three to nine months.[34] This situation may be attributed in part to policy: single military parents and dual-military families are given priority above military members with a civilian spouse. Other military spouses cited inconvenient locations, affordability, quality, and operating hours as barriers to using DOD-provided child care.

When child care is available, some families may find the expenses associated with child care to be prohibitive. Child care costs at CDCs are subsidized, and the DOD offers fee assistance to military families who purchase child care off-base from eligible in-home

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[33] Thomas E. Trail et al., "Today's Army Spouse Panel Survey Results: Impact of COVID-19, August 2020 to May 2021," RR-A1850-2 (Santa Monica, CA: RAND Corporation, 2023), https://doi.org/10.7249/RRA1850-2.

[34] Kristy N. Kamarck, *Military Child Development Program Background and Issues*, CRS Report R45288 (Washington, DC: Congressional Research Service, Updated March 19, 2020), https://apps.dtic.mil/sti/citations/AD1169687.

or community-based providers.[35] Even at subsidized rates, child care can still amount to a sizable portion of a family's income.[34] In a 2022 survey conducted by the Blue Star Families organization, 25 percent of active duty spouses who worked full time reported spending at least half of their personal income on child care.[36] Some military households may decide that given the poor civilian labor market options available to military spouses, it makes more sense for the spouse to stay home and be the primary caretaker for the children.

B. Household Career Decisions

Research into the labor market and migration decisions of civilian couples has found that one partner is typically the primary beneficiary of the move, while the other partner is a "tied mover." Among civilians, there is an assumption is that a couple will move if and when it is in their best interest to do so. Unlike civilians, however, service members do not generally have the option to adapt the timing or location of their moves to suit their spouse's civilian careers. Instead, the military demands to be the primary job of most military households, offering families with little choice but to attempt to shape the military spouses' career around the demands of military life.

Given that the military is disproportionally male, the prioritization of military needs over a military spouse's civilian career may not have been dissimilar to the historical prioritization within civilian households. There is evidence that among couples where at least one spouse had a college degree, the educational attainment of the husband—not the wife—has historically been the driving factor behind the couple's migration decisions.[37,38] Research using more recent data suggests that the emphasis on the husband's educational attainment may be lower than previously estimated. If these results are attributable to a change in societal norms around household dynamics, the prioritization of a military career

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[35] A DOD report to the Congressional Armed Services Committees using data collected in January 2021 found that 45 percent of Navy, Marine Corps, and Air Force families who participated in the fee assistance program still reported child care expenses that were higher than their estimated cost of military child care. As a result, the Department increased the cap on fee assistance, estimating that the more generous subsidy would bring community-based child care expenses down to match the cost of on-base child care for 90 percent of participating families.

[36] Jessica D. Strong et al., *Military Family Life Survey: 2022 Comprehensive* Report (Encinitas, CA: Blue Star Families, 2023), https://bluestarfam.org/wp-content/uploads/2023/03/BSF_MFLS_Spring23_Full_Report_Digital.pdf.

[37] Janice Compton and Robert A. Pollak, "Why Are Power Couples Increasingly Concentrated in Large Metropolitan Areas?," *Journal of Labor Economics* 25, no. 3 (July 2007): 475–512, https://doi.org/10.1086/512706.

[38] Dora L. Costa and Matthew E. Kahn, "Power Couples: Changes in the Locational Choice of the College Educated, 1940–1990," *The Quarterly Journal of Economics* 115, no. 4 (November 2000): 1287–1315, https://www.jstor.org/stable/2586925.

may have become more at odds with typical household dynamics than in previous decades.[39]

Since military families have little choice when it comes to PCS moves, deployment schedules, and other aspects of military life that negatively affect military spouses' careers, those who would prefer to prioritize the spouse's civilian career may instead choose to leave the service. A recent study found that for married service members, military retention is likely to be a household decision rather than a decision made by the service member alone.[40] Evidence from survey data shows that the degree to which military spouses support their service member remaining in the military is correlated with the spouses' employment outcomes. Spouses who are unemployed are more likely to favor leaving.[15] Service members' perceptions of family member and spousal support is central to their satisfaction with military life and is strongly associated with the probability that the member will remain in the service.[16]

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[39] Curtis J. Simon, "Migration and Career Attainment of Power Couples: The Roles of City Size and Human Capital Composition," *Journal of Economic Geography* 19, no. 2 (March 2019): 505–534, https://doi.org/10.1093/jeg/lby009.

[40] Kelly A. Woodall et al., "Influence of Family Factors on Service Members' Decisions to Leave the Military," *Family Relations* 72, no. 3 (July 2023): 1138–1157, https://doi.org/10.1111/fare.12757.

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3. Military Spouse Employment by Demographics

The Millennium Cohort Program, conducted by DOD through the NHRC, administers two surveys that focus on the health and well-being of service members, veterans, and their families.[41] Every three to five years, a new sample of service members is selected to participate in the MCS. Study participants—whether they are still in service or not—are contacted for periodic follow-up surveys. The MCFS surveys spouses and former spouses of service members and veterans who were selected for participation in the MCS. The NHRC does not publicly release individual-level survey responses but agreed to provide the Institute for Defense Analyses (IDA) summary data in support of this study. IDA received summary data from the MCFS panels 1 and 2, which took place between 2019 and 2021. We requested summary data of military spouses' labor force participation status by demographic group, as well as military spouses' perceived barriers to employment. The data covered spouses of service members in the Active Components of the Army, Navy, Air Force, or Marine Corps. The MCFS data include more detail than the tabulated responses available from surveys such as the SOFS-A or ADSS, but the sample is relatively small and may not be representative of the entire population of active duty military spouses. As such, the results in this chapter are intended to support and provide context for the key takeaways discussed in the literature review. Additional results from the MCS and MCFS data are used to inform the statistical analysis in Volume 2 of this report and are discussed there.

Regardless of their education level, spouses of female service members (i.e., mostly men) are much more likely to work full time, while spouses of male service members (i.e., mostly women) are more likely to work part time or to be out of the labor force entirely.[42] Spouses of male service members are notably more likely to work full time if they have a Bachelor's degree or higher. Figure 2 shows the relationship between military spouses' education level and the probability of full-time employment, for spouses of male vs. female service members. These results are consistent with the findings from the literature and other survey data showing that military-specific challenges like PCS moves affect the career outcomes of military wives to a greater extent than those of military husbands.

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41 S. F. Castañeda et al., *Millennium Cohort Study: 20 Years of Research* (San Diego, CA: Naval Health Research Center, 2021), https://www.millenniumcohort.org/files/milco/2021/millenniumcohort_20_year_report.pdf.

42 Summary data were provided based on the gender of the service member, not the gender of the spouse.

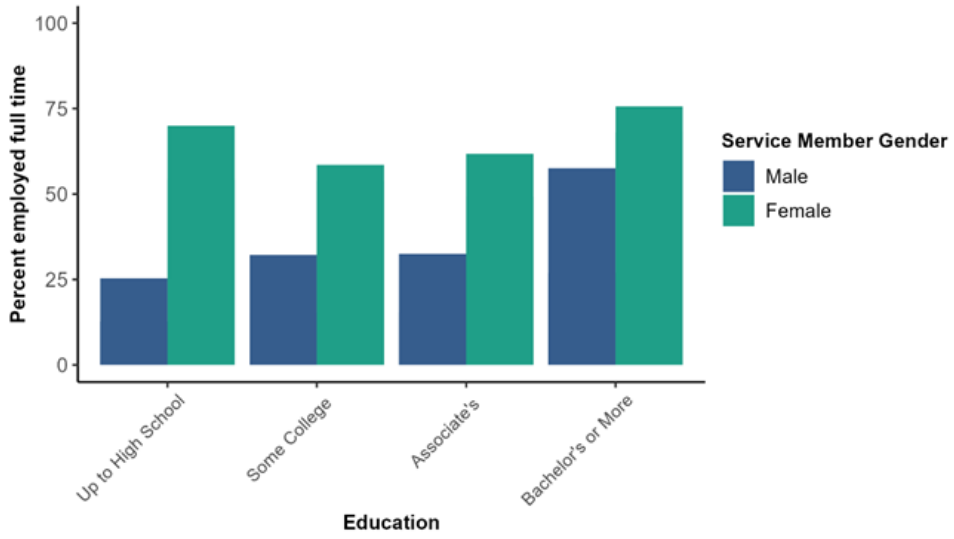

Figure 2. Full-Time Employment Rate of Military Spouses, by Education Level and Gender of Service Member

Similarly, Figure 3 and Figure 4 show the probability of full-time employment for military spouses with and without children. Military spouses with children are less likely to be employed full time than those without children. However, spouses of female service members are generally likely to work full time regardless of education level or whether they have children. On the other hand, spouses of male service members with children are about half as likely to be employed full time than those with no children. This finding suggests that child care responsibilities negatively affect military spouses' ability to work, and that the effect of challenges such as child care may vary significantly based on gender.

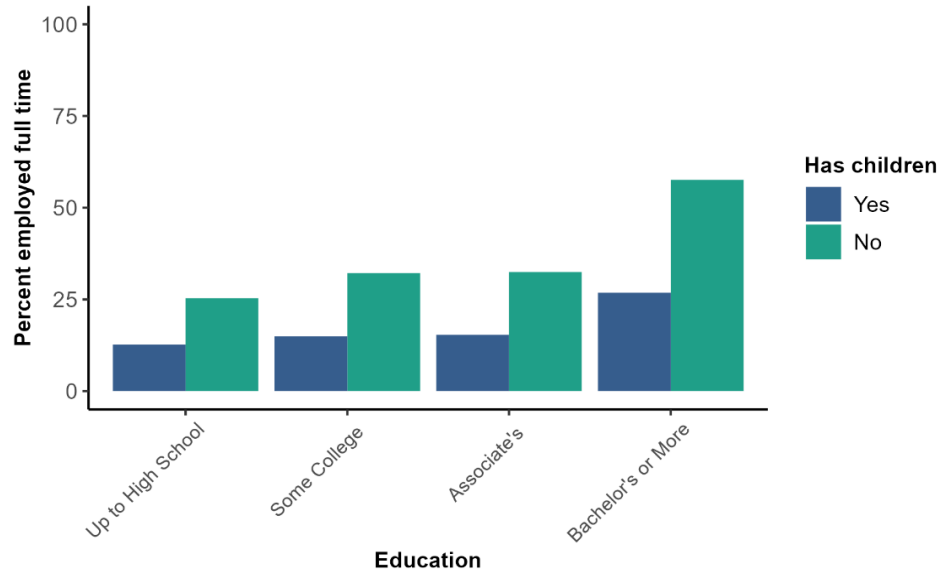

Figure 3. Spouses of Male Service Members: Full-Time Employment Rate, by Education Level and Parenthood

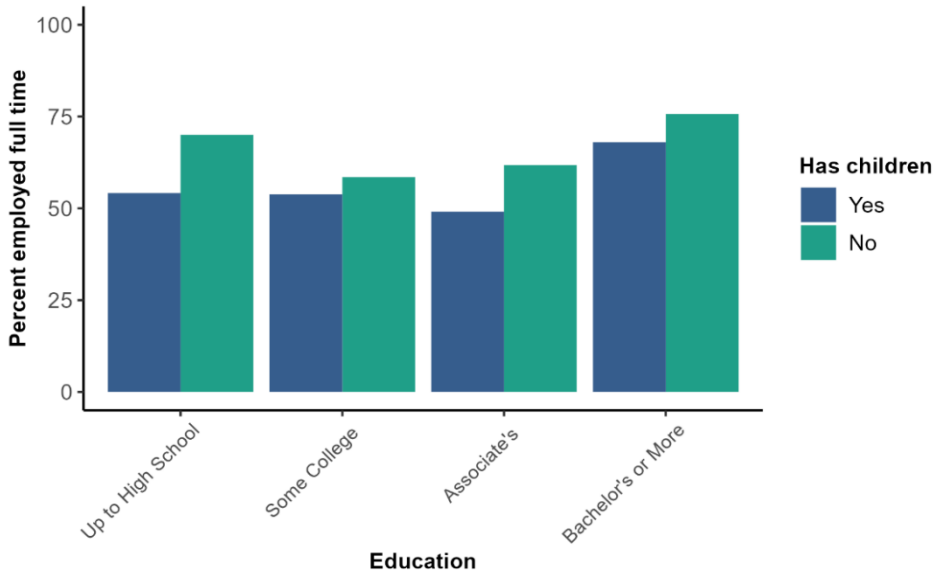

Figure 4. Spouses of Female Service Members: Full-Time Employment Rate, by Education Level and Parenthood

The survey asked military spouses who did not work full time to identify the barriers to their employment. Respondents were offered a list of potential barriers and instructed to indicate any and all reasons why they are not currently employed full time. Figure 5 shows the fraction of survey respondents with children who indicated that barriers related to child care, labor market frictions (including a perceived lack of jobs in a career field at the current location, inability to find work matching skills, and a license or credential that is not current or valid locally), and PCS moves were among the reasons why they do not work full time.[43] Among this group, the most commonly cited barriers were related to child care. The most frequently selected response across all education levels was "I want to be able to stay home to care for my child(ren)." Participants could and did select this response in combination with other child-care-related reasons. Over half of those who cited wanting to stay home also selected "Child care would cost more than what I expect to earn." While some respondents cited that "Care is not available to me," the relative frequencies of these responses suggest that the effect of child care availability on spouses' employment decisions is small relative to the effect of child care cost. The role of child care cost is notably lower among military spouses with a Bachelor's degree or higher. This group likely earns higher wages when employed, thus reducing the likelihood that child care costs outweigh spouses' potential earnings. Among those with a Bachelor's degree or higher, labor market frictions are more pertinent compared to those with lower education levels.

[43] Reasons grouped under "Other" include the following: attending school or training, not practical to work while the service member is deployed, not physically able to work, do not want to work, service member does not want the spouse to work, household responsibilities, and volunteer activities.

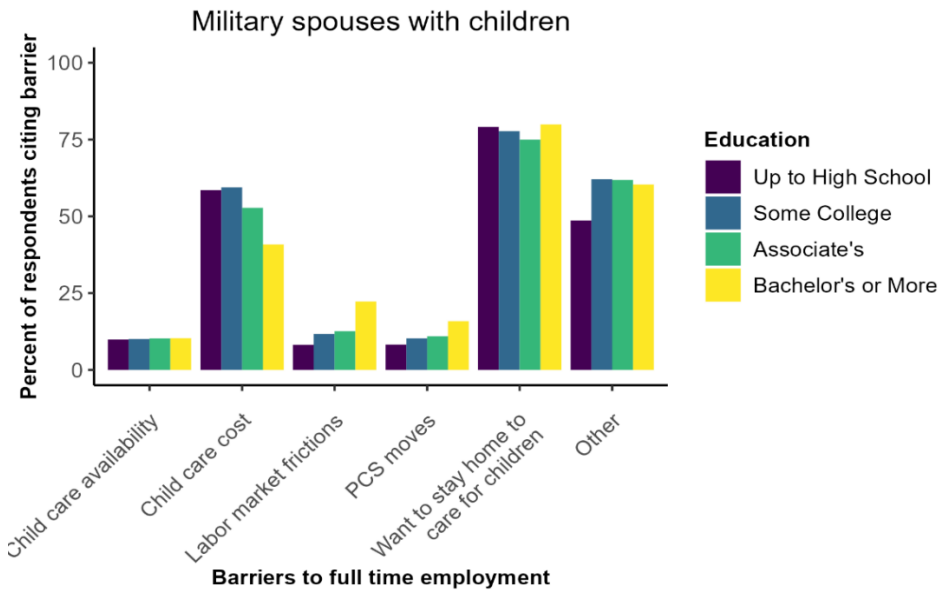

Figure 5. Barriers to Working Full Time, Among Military Spouses with Children

The labor market experiences of military spouses without children are significantly different from those with children. Figure 6 shows their responses. As expected, those without children rarely cite child-care-related reasons as a barrier to working full time. Respondents in this group were more likely to cite labor market frictions or PCS moves compared to their peers with children. In addition, respondents with some college education or an Associate's degree most commonly cited attending school or training as a reason to not work full time. Labor market frictions were the most commonly cited barriers among those with a Bachelor's degree or higher, while those with a high school education were most likely to report that they did not want to work and/or that their spouse did not want them to work.

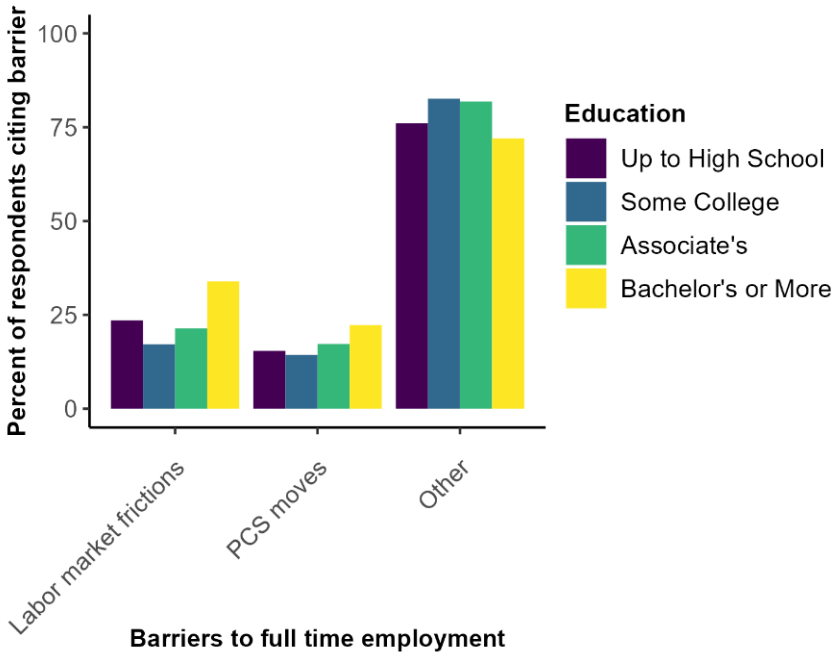

Figure 6. Barriers to Working Full Time, Among Military Spouses without Children

The civilian literature and existing DOD surveys note the potential role of child care in limiting spouses' employment options. However, available research reports do not discuss the interactions between gender, education level, and family structure that are relevant to many military spouses' employment decisions and outcomes. These differences in which military-specific challenges affect military spouses' careers and to what extent household incomes are affected can provide useful variation for estimating a retention model. The MCFS data paint a clear picture that labor market outcomes of military spouses differ by gender and education and that households with and without children face different barriers to spousal employment. Spouses of male service members are much less likely to work than spouses of female service members. Military spouses are more likely to work if they have a higher education, especially if they are spouses of male service members. Spouses are also much more likely to work if they do not have children. Accordingly, spouses with children are more likely to be out of the labor force. In line with findings from the literature and other survey data, the primary barrier to employment for spouses with children is access to child care, while, for spouses without children, it is the effect of PCS moves and resulting labor market frictions. Overall, these findings corroborate and provide additional insight into the key takeaways discussed from the academic literature and DOD survey data.

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4. Qualitative Analysis

Focus group discussions described in this chapter provide context about the military-specific challenges that military households face and the career decisions that they make. This information is incorporated into our modeling decisions for a statistical analysis of retention that is the focus of Volume 2 of this report. The insights from the focus groups make it possible to craft a behavioral model that captures key aspects of the retention decisions and provides robust conclusions that are grounded in the lived experiences of service members and their families.

The topics of the focus group discussions were informed by our review of the literature on household decision making and existing surveys of service members, veterans, and their partners discussed earlier in this volume. First, we aim to understand whether service members and their families today are experiencing the same kinds of challenges outlined in the literature review and to gather more detailed explanations and context surrounding these challenges. Analyses using existing survey data are bounded by the questions asked, but open-ended focus group discussions provide an opportunity to understand other potential factors. Second, existing literature does not provide answers to whether the military career is always the "leading" career for a dual-income couple today or how service members consider their spouses' career outcomes when making retention decisions. The focus group discussions served as an opportunity to have an in-depth conversation with service members and their spouses about these topics.

Analysis of service members' retention decisions must account for military spouses' careers in a way that is consistent with what service members think about them. Elucidating service members' thought process concerning their spouses' current and future careers when deciding whether to stay in service or to leave is the most important objective of our focus group discussions. While the literature finds a correlation between military spouses' careers and service members' retention decisions, previous research has not investigated the process through which military households make retention decisions. Understanding this dynamic is imperative to the analysis of how military compensation, the service member's potential civilian earnings, and their spouse's career affect the retention decisions that military households make.

In addition, the quantitative analysis of military retention as a household decision should accurately account for the costs and constraints that military service imposes on the careers of military spouses. This finding is important to the quantitative analysis for estimating the role of military spouse earnings in the retention decision and for evaluating potential policy options designed to mitigate the effect of military life on spouses' career outcomes. The existing literature finds strong evidence that military spouses' careers are affected by certain aspects of military life, and our focus group discussions serve to

corroborate and provide context for how service members and their families are currently experiencing and navigating these issues.

Focus group participants made clear that the military career takes priority over the spouses' career. In none of our conversations did we hear *any* examples of a service member attempting to have a military career while prioritizing their spouse's civilian career. Military spouses set aside their career goals to support their service members, at least until the service member leaves the military, at which point the spouse's career may become more of a priority. In general, the military-specific challenges that harm spouses' careers are viewed by service members and their families as part of a larger sacrifice that also keeps service members away from their families, disrupts their home life, and interferes with their life goals. Table 4 lists our key findings from focus group discussions on the topic of retention as a household decision, along with selected quotations from focus group discussions associated with each finding.

In line with previous findings, service member and spouse participants agreed that military service has a large and detrimental effect on spouses' careers. This effect is exacerbated for military families that have children, because the inflexibility of a military career leaves the spouse to be the primary caregiver for children. PCS moves further degrade spouses' civilian careers with every move, both due to interruptions in their jobs, and because some employers are unwilling to hire military spouses, expecting that they will have to leave the new job in short order. Some duty locations, particularly those overseas, are also disruptive to the spouses' ability to work. According to focus group participants, even those spouses who manage to have jobs rarely have careers that include professional growth and development. Table 5 presents findings from focus group discussions related to military spouses' careers.

Table 4. Findings from Focus Group Discussions: Military Retention as a Household Decision

Findings	Illustrative Responses
The service member's military career is the priority for the family.	*She has a serious professional career, and I'm a Marine. When push comes to shove, the Marines will take priority. – Marine Corps officer*
The effect of the military on a service member's family life is a primary consideration in the retention decision.	*It's like plan for me to be gone for dinner for half a year. Missing birthdays and holidays. So that's one of the bigger cons – you're choosing to continue to do that by staying in. – Marine Corps officer*
Household income and financial security are driving factors in many service members' retention decisions.	*My fear is if I get out and don't get the job I want and the compensation I need…. Or just stay in and suck it up, I don't have any other choice. – Army NCO*

The decision to stay in the military or leave may be made relatively close to their departure or reenlistment date.	*If I'm not happy, I'm out. If my daughters are not happy, I'm out. We have the conversation every time I have to re-up my orders. – Navy NCO*
Most service members had considered potential civilian career options and many had specific future career plans.	*[Many of us] can come back the next day as a contractor – [don't] even clean out your desk. – Army officer*
Dual-military service members typically prioritize one spouse's military career over the other.	*I really dreamed of being in the military and I can see myself going far, but I'm going to pick my relationship. I'm not going to risk it, because of how the military makes life. If he wants to stay in, I'm going to get out. – Navy first-term enlisted*

Table 5. Findings from Focus Group Discussions: Careers of Military Spouses

Findings	Illustrative Responses
Service members recognize the costs that their military career imposes on their spouse's civilian career.	*My wife has not been able to work for the majority of my career, mostly because I work unpredictable hours. – Navy NCO*
Most military spouses do not have their own careers.	*My wife has a Bachelor's in Accounting and has worked as an assistant manager at Panda Express for two years. – Army NCO*
PCS moves	
PCS moves are perceived to hinder spouses' careers.	*When we first moved here, I gave up my teaching career because there was no reciprocity. I had to start from scratch and figure out what to do for work, and decide whether it's even worth it to start looking for a new job when you're going to be somewhere 18–24 months. There's no way to progress and grow in any kind of career. – Female military spouse, works remotely*
Child Care Cost and Availability	
Availability and affordability of child care are central to military spouses' career outcomes.	*She has to stay home now. [After a PCS move] we were on our own with daycare for the little one. So, she stays home to do childcare and work her job, which is not ideal. – Army NCO*
Child care requirements are often perceived as preventing military spouses from working altogether.	*She's wanted to work, but, in times where we've weighed her working and not working, the balance of scales decided no—just be a full-time mom. – Marine Corps officer*
Other Military-Specific Challenges	
Some (primarily OCONUS) duty locations are particularly detrimental to spouses' careers.	*You have to be bilingual to walk in the door, or you're in a low-wage type of job. – Navy NCO*

A. Focus Group Methodology

The IDA team selected five military installations at which to hold in-person focus groups and conducted twenty-three focus groups with approximately three to six participants per group. At each installation, the IDA team scheduled focus groups with service members in the selected communities as well as their spouses and partners and worked with service liaisons to recruit focus group participants on a voluntary basis. Service liaisons had limited success in recruiting spouses and partners, and participation in these groups was relatively low. However, among the participants with whom we spoke, service members and spouses presented similar perspectives on the challenges of military life and the effect of these challenges on spouses' civilian careers. Our findings about military spouses' careers are drawn primarily from discussions with service members, bringing in perspectives from spouses where possible.

Focus groups were naturally stratified by service, since no joint bases were selected. Focus groups were also divided by seniority, and some groups were further restricted on the basis of gender or marital status to ensure that the participant population included sufficient women and service members in dual-military couples. However, the population of focus group participants is not representative of the entire active duty population. See Appendix A for a list of the focus groups conducted at each installation. During focus groups, the IDA team consisted of one interviewer and one or two notetakers.

When interpreting the focus group results presented here, it is important to remember that some service members may have chosen to leave the service to avoid the costs that military life imposes on military spouses' careers. Since we spoke only with those who are still in service, our focus group discussions capture the perspectives of a selected sample that may not represent the views of those who have left. To mitigate this selection issue, the team held some focus groups specifically to speak with junior service members who have not yet completed their initial active duty service obligation. These service members have not made their first retention decisions or had an opportunity to select out of service on the basis of their spouses' careers. However, many junior service members are unmarried and may not yet have considered these issues.

The focus group discussion questions covered two primary topics outlined earlier: the military-specific challenges to spouses' careers and the manner in which spouses' careers affect service members' retention decisions. For the focus group discussions, we broadened the scope to include not only military spouses, but also other types of partners such as long-term girlfriends/boyfriends and fiancées. All focus group discussions covered the same topics, but the language of the questions was modified for groups with service members in dual-military couples and groups with military spouses. Questions were also adjusted over the course of the study to improve clarity and to focus the discussion on the key topics of interest.

Discussions with service members began by asking participants to briefly talk about their partner's current employment situation. The first set of questions asked participants to discuss how their military service has affected their partners' careers.[44] The second set of questions asked participants to discuss how they make retention decisions. For those who had experience making a retention decision with a spouse or partner, we asked participants to discuss the role of their partner's career in those decisions. The final set of questions asked participants to describe what their own career and that of their spouse would look like if they were to leave the military.

Following the focus groups, the research team analyzed the collected data to extract high-level themes relevant to our research questions. First, the team developed codes primarily through deductive methods to align takeaways with specific topics that are important to the retention analysis. During an initial review of the focus group transcripts, researchers also used inductive reasoning to alter, merge, and separate codes of interest. The final list of codes focused on topics related to the effect of military service on military spouses' employment and income and how these effects, in turn, influence service members' retention decisions. After reviewing the coded results, the research team met to discuss key takeaways by topic to ensure the findings were consistent with our understanding of the discussions and to examine areas of overlap. The team summarized key findings and identified pertinent quotes for each topic. For consistency, a single researcher reviewed the takeaways identified by the team to ensure that the findings related to the larger research questions. Using an approach informed by thematic analysis, the team extracted high-level themes that were salient across multiple topics. Where pertinent, IDA examined differences in findings across demographic groups, such as career fields, rank (including officer vs. enlisted), service branches, and gender.

B. Military Retention as a Household Decision

In each of the focus groups, we asked participants to discuss how their partner's career affects their decisions about whether to stay in service. Nearly all of the responses indicated that **the service member's military career is the priority for the family** and that retention decisions do not directly depend on the spouse's civilian career.

> *I want to achieve my goals, but it's a sour taste for her. She has to move every two to three years, and she can't do the job she studied for. She's going for her master's degree, but she's trapped in my career. – Army NCO*

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[44] Most participants were currently or previously married or in a long-term relationship. For those who were not, questions were generalized to ask about how they think military-specific challenges would affect their future partners' careers.

While the sample of focus group participants may suffer from selection as discussed previously, we were able to speak with a number of participants who said they were planning to leave the service. When asked about their reasons for leaving, these participants cited financial issues, lucrative civilian employment opportunities, time spent away from family, dissatisfaction with various aspects of the military career, and many other factors. Participants did not specifically cite their spouses' careers as a key reason for leaving the military.

Service members seemed to prioritize their military careers over their spouses' careers for one of two reasons. Many service members indicated that the military career takes precedence because of the financial security it provides their family. Others expressed that they put the military first because of a sense of duty and desire to serve their country and that ultimately their spouses are supportive of that goal.[45]

> *It's not [just] a job. My parents were Marines. I'm measuring up to the promises I made to my dad. My son is now a Marine, and my youngest hopes he'll join the Air Force. – Air Force officer*

Regardless of the reason that the military career is prioritized, service members acknowledged and expressed dissatisfaction about the effect of their military service on their partner's careers.

> *You give the best years of your life to the Army, […] and so does the spouse. – Army NCO*

Household income and financial security are driving factors in many service members' retention decisions. Many service members, particularly those with families and those who do not see a clear path to a higher paying civilian career, view leaving the military as a risk that they are unwilling to take. For these service members and their families, the military provides a stable job with valuable benefits. In some cases, service members felt that their spouse's reduced earnings potential left them with little choice but to stay in the military.

> *Why would I risk the little bit of stability I got for something that might be there. – Army NCO*

Other service members instead cited compensation as a reason to leave the military. For some, military compensation is viewed as being insufficient to support the standard of living that they want for their family. Several focus group participants stationed near high

[45] These service members are unlikely to be as affected by monetary incentives as other service members, a fact that we incorporate into the quantitative analysis in Volume 2.

cost of living areas felt that they were struggling financially because their military pay did not adequately compensate for the increased cost of living.

> *[The biggest factor in retention is] the financial. I didn't come into the military to be in a worse situation, I came to better my situation. And now I'm in the same situation—just in the government. – Navy first-term enlisted*

The **effect of the military on a service member's family life is a primary consideration in the retention decision**. Specific factors such as the family's need to put down roots and the service member's desire spend more time with family were brought up in almost every focus group. A military career makes it difficult for service members to spend time with their families and kids.

> *It boils down to the time away from family. They're putting Wi-Fi on ships so you can facetime with your family. It's not that, it's actually being there, at your child's first birthday. – Navy SWO*

Closely related to this is the fact that a military career can be unpredictable, and the unpredictability is difficult for families.

> *I think we'll be happier [if I get out]. [In the military] random things come up, last minute. We plan weekend things, but then Friday or Saturday they tell you to cover a shift. – Army first-term enlisted*

Many service members expressed a desire for more stability in the form of fewer and less frequent PCS moves and said that it is a top consideration for them when considering whether to remain in service. When discussing these considerations, service members often bundled together the many personal sacrifices that military service demands from the service member and their family, without distinguishing which specific ones get top consideration for them.

When discussing how service members think about their retention decision, they made it clear that they consider their entire future career, **but the actual decision to stay or leave is made relatively close to their departure or reenlistment**. Despite thinking about upcoming decisions well in advance of the actual transition date, service members often reevaluate their plans and sometimes change what they intended to do in response to changing circumstances. Regardless of service, service members overwhelmingly indicated that around ten to twelve years of service is when the decision is made to try to stay until retirement eligibility. Among younger service members, this consensus seems to be changing, with service members more open to leaving later in their career because of the Blended Retirement System (BRS).

Most service members had considered potential civilian career options, and many had specific future career plans even if they were not currently planning to separate from the military. Some service members indicated that they would be able to work in their current field as a civilian. Focus group participants in occupations with transferrable skills (e.g., medical, logistics, cyber) were optimistic about their ability to find a civilian role. Many indicated that they could become defense contractors and make more money while performing the same tasks they do now and working fewer hours.

> *[Many of us] can come back the next day as a contractor – [don't] even clean out your desk. – Army junior officer, Cyber*

Other focus group participants would switch career fields entirely upon separation. Some of these participants are using education benefits such as tuition assistance to prepare for this career change, while others expect that their experience in the service will be sufficient to start a new career.

> *I might work in project management and get a certification before getting out. – Air Force junior officer, Logistics Readiness*

Apart from expecting higher income in the civilian sector, service members highly value the flexibility that a civilian life can offer. Several focus group participants cited the possibility of remote work, while others indicated that they would start their own businesses. Importantly for our research topic, many participants believed that leaving active duty service would allow them to better support their spouse's career since they would be able to take on more household responsibilities.

The interaction between each other's careers and retention decisions are almost entirely different for dual-military spouses, with whom we talked separately. **Dual-military service members typically prioritize one spouse's military career over the other.** They noted that being with a partner who is also in the military negatively affected each other's careers.

> *Being the person on shore duty means you are the one focused on family. Being that person may make you miss deadlines and take away from work. – Navy NCO, dual-military*

Whenever one spouse was deployed or sent on a temporary duty assignment, the other spouse essentially became a single parent while also having to continue with their military responsibilities. This situation is something that, in most cases, all service members agree is simply not possible to do successfully. In addition, while participants talked about colocation policies favorably, some noted that locations frequently do not have career-enhancing assignments for both spouses. As a result, dual-military couples have to prioritize one career over the other to be able to move to the same (or a nearby) location.

In most cases, the career of the more senior spouse is prioritized, at least until that spouse reaches twenty years of service.

> *Right now, we're leaning toward one of us getting out, probably me. […] She's further in her career than me, has more qualifications and bling on her uniform. – Navy SWO, dual-military*

In some cases, participants had a plan for the more senior spouse to leave the military as soon as they were eligible for retirement so the more junior spouse could focus on their military career. Among more junior service members who are further away from retirement eligibility, there was an understanding and expectation that one of the service members would likely leave the military at the next opportunity.

C. Careers of Military Spouses

Overwhelmingly, **service members recognize the costs that their military career imposes on their spouse's civilian career**. Specifically, the inflexibility and stress that come with a military career require the military spouse to be the flexible one. This need for flexibility is especially acute if a couple has small children because the service members' spouse ends up being the primary (or even sole) caretaker. This responsibility is often incompatible with a demanding job. Service members, particularly those in the Navy and Marine Corps, acknowledge that their spouses spend a significant amount of time as a "single parent" while the service member is away from home. Deployments, temporary duty assignments (TDY), long work hours, and unpredictable schedules reduce service members' ability to contribute to household responsibilities. Ultimately, focus group discussions corroborate the findings from previous literature that many spouses of service members are not in the labor force, particularly if they have children. For some, this decision is made with a lot of consideration for the costs and benefits of working, but many others feel that staying home is the only option available.

> *While I'm gone on deployment, it's just her, a single parent household. – Navy first-term enlisted*

> *My husband has always wanted to serve, and we felt like we didn't have a choice but for me to prioritize the kids. – Female military spouse, stay-at-home parent*

In part, due to the demands of military life, **most military spouses do not have their own careers**. Many have jobs, but, in most cases, these jobs do not lead to consistent progression in a career field. Military spouses are often unable to find long-term, stable employment and career advancement, regardless of ability, field of work, or qualifications. Commonly, spouses of service members—including those with college degrees—work in the service sector in jobs without potential for long-term growth.

There are jobs, and there are careers. [It's] much tougher [for a military spouse] to find a career. – Army NCO

Only a small number of spouses who participated in our focus groups were able to find employment in fields that required professional licensing, such as nursing, social work, and teaching. Those couples who are able to sustain a military and a civilian career, especially with children, do so through extensive planning, help from extended family, willingness of civilian employers to be accommodating, and often long periods of living apart.

Compared to service members' plans for their own future civilian careers, service members and their spouses were more uncertain about the spouses' future career options if the service member were to leave the military. Some service members have specific plans to prioritize their spouses' careers after leaving military service in the future. In most cases, these service members plan to remain in service until they are eligible for military retirement before leaving to "allow" their spouse to pursue a career.

She's tailoring her work and her job around me. It'll get flipped once I put on the suit instead of cammies. – Marine Corps officer

Many service members acknowledge that their military career has resulted in permanent damage to their spouse's ability to work. Focus group discussions indicated that most military spouses plan to work after the service member leaves the military. However, they expressed concerns around military spouses' lack of work histories making them unattractive to employers, noting that frequent moves while shouldering the majority of child care responsibilities preclude most civilian spouses from building a résumé and advancing in their career field.

1. PCS Moves

Service members and their spouses agreed that **PCS moves hinder spouses' careers**. They consistently explained that, for in-person employment, PCS moves inhibit spouses' ability to find a job due to a history of short-term employment. Several participants noted that employers avoided hiring military spouses due to fears that the spouses would leave after a short time.

A lot of our spouses have degrees or advanced education, but they're less employable the more and more they move around. – Navy NCO

Focus group participants also expressed that PCS moves inhibit long-term career development. When spouses do find employment after a move, it is often outside of their career field of choice. In some cases, the expectation of a long job search followed by a relatively short tenure in a position outside of their preferred field led spouses to opt out of looking for work entirely.

2. Child Care Cost and Availability

Availability and affordability of child care are central to military spouses' career outcomes, and, while these challenges are not unique to the military, they appear to be exacerbated by other aspects of military life. Focus group participants expressed that unpredictable schedules and long work hours often prevent service members from assisting with household responsibilities, including child care. Instead, the responsibility to care for children falls to the spouse, regardless of whether the spouse also works.

> *With childcare needs it made more sense for me to stay home. […] Now, even though I'm back to work, it's my responsibility to be the one who handles kid things when needed. – Male military spouse, works remotely*

As a result, military spouses often have to work in jobs that provide them with sufficient flexibility to handle child care demands. This choice is not without a cost, since decreases in weekly hours worked and increases in time spend out of the labor force are associated with decreases in hourly pay.[46]

In many cases, **child care is perceived as preventing military spouses from working** altogether, either due to the high cost or lack of availability. Military families have a clear understanding of the financial tradeoffs involved in purchasing child care. When comparing the spouse's potential earnings to the cost of child care, many military families decide that the best option is for the spouse to stay home with children. Similarly, child care demands also prevent spouses from pursing a degree or professional certification. Several focus group participants discussed an inability to simultaneously afford child care and an education that would lead to higher earning jobs. Focus group participants also discussed challenges around finding and effectively using child care. Those who were able to afford child care often faced long wait lists that limited their access to on-base child care. Even when child care on-base is available, the CDC hours are often incompatible with military work hours and lengthy commutes to and from the CDC.

> *[We] have to be at PT at 4 a.m., child care is not an option at that point. Some just bring their children with them and let them sleep on a cot. – Army officer, dual-military*

In many locations, off-base child care is just as unavailable, expensive, and inconvenient as on-base child care, leaving military families with few options other than to have the spouse stay home to take care of their children.

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[46] Claudia Goldin, "How to Achieve Gender Equality," *Milken Institute Review* Q3 (July 2015): 24–33, https://scholar.harvard.edu/goldin/publications/how-achieve-gender-equality

Some focus group participants discussed the additional challenges that the COVID-19 pandemic created for on-base child care availability. In many locations, the CDCs closed, while service members were expected to continue working. The outcome of closures varied by command, with some being notably more understanding and flexible than others. Off-base child care centers often remained open, but service members could not get their children into those centers due to lack of available space. Many families, especially dual-military ones, had to scramble to find any acceptable child care, sometimes having to send their children away to stay with extended family members. While the COVID-19 pandemic is a unique event, the disruptions that it caused illustrate how difficult it can be for military families to adjust to an emergency situation, which is not at all atypical in the course of a military career.

3. Other Military-Specific Challenges

Focus group participants noted that **some duty locations are particularly detrimental to spouses' careers**. Being stationed overseas is difficult for spouses. Language barriers, wage differences, and local regulations surrounding the employability of military spouses lead to substantial barriers to being able to find any employment, much less employment in support of a specific career field. Language barriers were also discussed. Jobs in certain locations may have a de facto bilingual requirement for civilian employment, presenting significant employment challenges for spouses who do not speak that language. For spouses who are pursuing a government career, the availability (or lack of) government jobs is particularly important and can vary significantly from location to location.

Opinions about the **effectiveness of programs intended to support military spouse employment** (especially those available after a move) were mixed. Spousal preference in government hiring and license/certification reciprocity were mentioned as being helpful. In contrast, several participants noted that the benefits of obtaining new licenses/certifications in areas without reciprocity agreements were not worth the monetary and time costs required. Remote work and government jobs were viewed as providing viable career options for some military spouses. Increased access to remote work could mitigate the effect of military service on spouses' careers to some degree, although some military spouses expressed concerns about their potential for career progression while working remotely.

D. Other Takeaways

Focus group participants' **perspectives on military compensation seemed to vary for enlisted members vs. officers, as well as for service members with and without families**. Enlisted perspectives on pay tended to be particularly negative, especially in high cost of living areas and even among some senior enlisted personnel.

It's paycheck to paycheck living in this area, and I'm an E-7. – Marine Corps NCO

Some enlisted service members worked second jobs as delivery drivers or security staff to supplement their military pay. In contrast, officers tended to view their pay much more favorably. Service members with children frequently expressed an appreciation for the financial value of military healthcare benefits, and several cited these benefits as having a considerable influence on their retention decisions. In addition to these general comments, participants across multiple focus groups brought up two specific issues related to pay: PCS costs often exceed the allowances provided by the services, and basic pay and the basic allowance for housing (BAH) are failing to keep up with inflation.

In our discussions, civilian spouses and service members recounted how **military service has disrupted and delayed their major personal milestones**. Participants discussed being unable to settle down, primarily due to frequent PCS moves and the unpredictability of future assignments. In many conversations, especially when speaking to members in dual-military couples, having a family was viewed as being in conflict with a successful military career.

It got to a point where I almost separated and divorced because of trying to do what I needed to military-wise, and my wife still says it sometimes, where the military takes priority over my family. – Navy NCO

Many participants delayed starting a family because of PCS moves, deployments, and career milestones associated with military service or until they could get out of the military. Women, in particular, expressed a sense of having to make a choice between having a family and having a military career. For those trying to do both, participants agreed that certain periods and assignments are better suited to it, although these periods and assignments differ across services. Many women expressed concerns and relayed specific experiences where their unit leadership reacted negatively to pregnancies outside of these "convenient" times, leading to negative career outcomes and decisions to leave the military.

Focus group participants also discussed how **being in the military affects the decision to get married**. PCS moves and deployments are perceived as disrupting the natural progress of relationships. While this issue was salient for men and women, the latter expressed the challenge of dating civilian men, as men are less likely to be willing to follow their partner at the expense of their career.[47] On the other hand, benefits such as pay, health

[47] As discussed in the literature review, an arrangement where a wife's career is prioritized over her husband's career is atypical and may exacerbate the effect of spouses' earnings losses in retention decisions for female service members.

insurance, colocation, and support with PCS moves contributed to some participants choosing to marry earlier than they otherwise might have since the benefits are conditional on marriage. In a few cases this rush to get married may have contributed to difficult interpersonal relationships for dual-military couples.

Navy and Marine Corps focus **group participants mentioned numerous challenges with access to health care**. While many service members valued the health insurance and the care that their children received, many talked about how inefficient and hard to access health care can be. In particular, for mental health care, participants conveyed having to wait months before receiving an appointment or a follow up, being stigmatized by their commanders and peers for using mental health services, and being forced to prioritize work over getting mental health care. In these situations, the lack of adequate access to mental health care and support from the command during difficult life situations contributed to the service members' decisions to separate from the military.

A consistent theme across most focus groups was that **being in the service is unnecessarily hard**. This feeling is primarily attributed to restricted freedom, toxic culture, inflexibility when family events occur, being forced to PCS even when a new assignment is available at the current location, not being allowed to telework for jobs that are suitable for remote work, last-minute PCS and overnight duty notices, late notice assignment changes, long hours, and high workload.

> *I missed three deaths in my family, two of my grandmother's funerals I had to watch on Facebook. […] I've had friends die, and, besides a phone call, I can't be there. […] And I wish we could be there to see people and that we did not have to go through eight people to request leave and it get denied. – Navy first-term enlisted*

> *We are both going to be at sea at the same time, so we have to figure out which of our families can take the baby for nine months. Both of our commands have had a miscommunication about this, which makes it harder. […] I have talked to people that could help us, and they tried their best. […] It gives us some time to see each other, but we'll go on deployment around the same time. – Navy first-term enlisted*

This reality causes many service members to consider leaving the military, even in cases where the pay and benefits that the military provides are far greater than their expected earnings in the civilian job market.

5. Conclusion

Military service places a lot of demands on the service member and their family, and comes with unique challenges that affect military spouses' ability to work and have a career. The literature, survey data, and results from focus groups all agree: a military career has a large and persistent negative effect on the career of a military spouse. Table 2 provides a list of these findings from previous research and indicates whether each finding is supported by evidence from the MCFS or from focus groups. Compared to civilians, military spouses are less likely to be employed, less likely to have a job that matches their qualifications, and earn less when they do work. Given the ongoing shift in societal norms toward dual-income households, this is a significant financial cost that a military career imposes on military families.

PCS moves are one of the two primary challenges that affect the careers of military spouses. Service members and their spouses move frequently, disrupting the careers of working military spouses. The literature shows that military spouses earn less following a PCS move and that this loss of income persists for several years. Military spouses who suffer income losses also have a reduced ability to save for future goals, including retirement. In addition to lost income, military spouses are typically unable to gain the necessary experience to progress in their company or career field. As one focus group participant put it, "There are jobs and there are careers. [It is] much harder for a military spouse to have a career." Even the prospect of PCS moves presents a challenge. Some military spouses are unable to find work because employers do not want to hire someone who is likely to leave in a couple of years. This loss of work experience accumulates over time. After years of intermittent work or being out of the labor force, military spouses do not have the same job opportunities as otherwise similar civilians. As a result, the damage to a military spouse's career may be difficult to reverse even after the service member leaves the military.

It is apparent from existing data and our focus group results that the availability and affordability of child care also presents a significant challenge to military spouses' careers. This issue is not a problem that is unique only to military families, but a military career exacerbates an already difficult situation. Military jobs often have very little flexibility, leaving the military spouse as the primary caregiver responsible for school drop off and pick up, doctor's appointments, extracurricular activities, and a myriad of other child care duties. Even if the spouse is able to work, they must find a job that will allow them to fulfill their caregiver responsibilities. Furthermore, when service members are deployed or on assignment away from their primary duty station, the spouse effectively acts as a single parent. These difficulties are compounded by long wait lists and high costs associated with

purchasing child care both on base and off base. It is therefore unsurprising that many military spouses feel that they must choose between having a career and having a family.

When service members make the decision to stay in or leave the military, the priority goes to the military career rather than the spouse's civilian career. Military families that would prefer to prioritize the spouse's civilian career may have little choice but to leave the service. Military spouses generally follow the service member from duty station to duty station, taking as given the service member's military career and constraints when making their own career decisions. A version of this scenario seems to hold for dual-military couples as well. In many cases, one member plans to leave early to enable the other to reach retirement, and, even when both members plan to remain in service, the couple prioritizes one career over the other.

When making a retention decision, service members weigh the costs associated with a military career against the pay and benefits that the military provides. The career of a spouse is one of these costs, but it is only part of the consideration. Service members must also contend with a stressful and inflexible work environment, time away from their families, missing major life milestones, and the unpredictability of military assignments. Although military pay and benefits exceed the current civilian compensation benchmark, many service members believe that they would be able to earn a similar income in a civilian job and have a better work-life balance. Some service members stay in the military out of a sense of duty and loyalty, but, in most cases, the retention decision centers around the costs and benefits of the military career and associated compensation.

The conclusions presented in this volume attempt to characterize the typical range of experiences of service members and their families. Every military family navigates these challenges differently, and none of the findings here are universally true across all service members or military spouses. However, the available evidence from previous studies, existing surveys, and our focus groups makes clear that these challenges are significant, widespread, and common across a large range of military families.

The results from this volume provide important information and context for the quantitative analysis of military compensation and retention that is the focus of Volume 2 of this report. In the next volume, we will develop a behavioral model of household retention decisions that captures the tradeoffs that military families face. The model will be informed by the findings in this volume about the effect that military careers have on the labor market outcomes of military spouses. Furthermore, we will explicitly incorporate the two most consistently identified challenges to spouse's careers: PCS moves and the accessibility and affordability of child care. The resulting behavioral model will capture the lived experiences of service members and their families to estimate the role of military compensation in the complex decisions that military families make about their careers. This will enable us to evaluate how effective changes to the military compensation benchmark would be at influencing military families' retention decisions.

Appendix A. Focus Group Details

Focus Group Populations

Focus groups were naturally stratified by service since no joint bases were selected. In addition, all focus groups were divided by seniority. The Institute for Defense Analyses (IDA) team worked with service liaisons to define seniority in a way that would facilitate recruiting participants, either on the basis of rank groups, years of service, or enlistment. Some focus groups were further restricted to on the basis of gender or marital status to ensure that the participant population included a sufficient number of women and service members in dual-military couples. To link the qualitative results as closely as possible to the eventual quantitative model, we met primarily with service members in fourteen occupations selected for detailed quantitative analysis.[1] In some of the women-only focus groups, we broadened the population beyond the selected occupation groups to ensure that enough participants could be recruited.

Overall, the IDA team conducted twenty-three focus groups, with approximately three to six participants in each group. See Table A-1, Table A-2, Table A-3, and Table A-4 for a list of the focus groups conducted at each installation. In addition, the team attempted to conduct virtual focus groups with civilian spouses and partners of service members. With the help of contacts at Military OneSource, we recruited participants through social media and offered small gift cards for participation. However, comments made during the first set of these focus groups cast significant doubt on the participants' truthfulness about their status as spouses or partners of service members. As a result, further virtual focus groups were cancelled and all data collected from the virtual focus groups was disregarded. During focus groups, the IDA team consisted of one interviewer and one or two notetakers.

[1] Details on the methodology and selected occupation groups to be provided in Volume 2.

Table A-1. Focus Groups with Navy Service Members and Spouses

Group	Population	Rating or Designator	Other restrictions
1	Enlisted, E-3 to E-6	FC, FCA, BM	
2	Enlisted, E-3 to E-6		Dual-military spouse
3	Officers, O-2 to O-3	SWO	
4	Officers, O-2 to O-5	Any URL/RL	Women
5			Spouses

Note: All Navy focus groups took place at Naval Base San Diego in San Diego, CA on July 6, 2023.

Table A-2. Focus Groups with Marine Corps Service Members and Spouses

Group	Population	MOS	Other restrictions
1	Enlisted, 1st term		Women
2	Enlisted, 2nd & 3rd term	Intelligence (02xx)	
3	Officers, O-2 to O-3	Air Traffic Control (72xx)	
4	Officers, O-4 to O-5	Air Traffic Control (72xx)	Dual-military spouse
5			Spouses

Note: All Marine Corps focus groups took place at Camp Pendleton in Oceanside, CA on July 7, 2023.

Table A-3. Focus Groups with Air Force Service Members and Spouses

Group	Population	AFSC	Other restrictions
1	Enlisted, E-3 to E-6	Medical Service (4N0X1)	Women
2	Enlisted, E-3 to E-6	Maintenance (2A)	
3	Officers, O-2 to O-5	Logistics (21X)	
4	Officers, O-2 to O-5	Logistics (21X)	Dual-military spouse
5			Spouses

Note: All Air Force focus groups took place at Eglin Air Force Base in Valparaiso, FL on July 21, 2023.

Table A-4. Focus Groups with Army Service Members

Group	Population	Branch	Other restrictions
1	Enlisted, 1 to 4 YOS	Air Defense Artillery	Not married
2	Enlisted, 1 to 4 YOS	Air Defense Artillery	Married
3	Enlisted, 1 to 4 YOS	Air Defense Artillery	
4	Warrant Officers	Air Defense Artillery	
5	Enlisted, 1 to 4 YOS	Cyber	
6	Enlisted, 5 to 12 YOS	Cyber	
7	Officers, O-2 to O-3	Cyber	
8	Officers, O-2 to O-5	Cyber	Women

Note: Groups 1 through 4 took place at Fort Bliss in El Paso, TX on August 31, 2023. Groups 5 through 8 took place at Fort Gordon in Augusta, GA on August 29, 2023. At both installations, attempts were made to recruit military spouses but no volunteers were found.

Focus Group Discussion Questions

The focus group discussion questions covered two primary topics: the military-specific challenges to spouses' careers and the extent to which spouses' careers affect service members' retention decisions. For the focus group discussions, we broadened the scope to include not only military spouses, but also other types of partners such as long-term girlfriends/boyfriends and fiancées. Each discussion began by asking participants to briefly talk about their partner's current employment situation.

Effect of Military Service on Spouses' and Partners' Careers

1. How has your military career affected your partner's career?
    a. How do the following aspects of military service affect your partner's career?
        i. PCS moves
        ii. Deployments or periods of family separation
        iii. Child care access
    b. Are there certain duty locations (including outside the continental United States (OCONUS)) that are better or worse for your partner and their career?
2. Are there any Service, Department of Defense (DOD), government, or employer programs that have helped to make it easier for your partner to have a career while you have been in the military?
    a. Any programs you or your partner have tried to use and not found helpful?
3. How does your military career affect your other major life decisions?

Extent To Which Partners' Careers Affect Retention Decisions

1. How likely are you to still be in the military five years from now?
2. To what extent does your partner and their career influence your decision about whether to stay in the service or to leave?
3. What other factors do you consider when making that decision?
    a. Do you consider …
        i. Child care needs?
        ii. Upcoming PCS moves?
        iii. Future deployments?
        iv. Potential duty locations?

b. How important is compensation in that decision process?

c. How much do you consider your future military career trajectory?

4. When you are deciding whether to stay in the service or to leave, how far in advance is that decision made?

Expectations About Civilian Careers

1. If you were to leave the military, would you start a civilian career? What would your civilian career look like?
2. How would your partner's career change if you were to leave the military?
    a. Would they …
        i. Go back to work?
        ii. Switch from part-time to full-time employment?
        iii. Look for higher paying jobs?
        iv. Change careers?

Appendix B. Illustrations

Figures

Tables

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Appendix C. References

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Appendix D. Abbreviations

ADSS	Active Duty Spouse Survey
BAH	basic allowance for housing
BRS	blended retirement system
CDC	Child Development Center
CONUS	continental United States
CRS	Congressional Research Service
DOD	Department of Defense
GAO	Government Accountability Office
IDA	Institute for Defense Analyses
MCFS	Millennium Cohort Family Study
MCS	Millennium Cohort Study
NCO	non-commissioned officer
NDAA	National Defense Authorization Act
NHRC	Naval Health Research Center
OCONUS	outside the continental United States
OPA	Office of People Analytics
PCS	permanent change of station
PT	physical training
QRMC	Quadrennial Review of Military Compensation
RMC	Regular Military Compensation
RSSC	Defense Research, Surveys, and Statistics Center
S&I	special and incentive
SOFS-A	Status of Forces Survey of Active Duty Members
SWO	Surface Warfare Officer
TDY	temporary duty assignments
USC	United States Code

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REPORT DOCUMENTATION PAGE	Form Approved OMB No. 0704-0188

1. REPORT DATE (DD-MM-YY)	2. REPORT TYPE	3. DATES COVERED (From – To)
xx-01-2024	Final	

4. TITLE AND SUBTITLE

Retain the Family: What It Takes to Keep Dual-Income Military Households Volume I

5a. CONTRACT NO. HQ0034-19-D-0001

5b. GRANT NO.

5c. PROGRAM ELEMENT NO(S).

6. AUTHOR(S)
Jacklyn R. Kambic
Juliana Esposito
Emily A. Fedele
Jared M. Huff
Anusuya Sivaram
Mikhail Smirnov

5d. PROJECT NO.

5e. TASK NO. BE-6-5264

5f. WORK UNIT NO.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Institute for Defense Analyses
730 E.Glebe Rd
Alexandria, VA 22305

8. PERFORMING ORGANIZATION REPORT NO. IDA Product 3000516

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Office of the Under Secretary of Defense
(OUSD) for Personnel & Readiness (P&R)
1500 Defense Pentagon, Rm. 2D573
Washington, DC 20301-1500

10. SPONSOR'S / MONITOR'S ACRONYM(S) OUSD (P&R)

11. SPONSOR'S / MONITOR'S REPORT NO(S).

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This paper documents the results of three lines of fact-finding analyses on the topic of military retention as a household decision. First, we outline a planned analytic methodology to estimate the effect of military spouses' employment outcomes on service members' retention decisions. Next, we provide an overview of existing literature on military spouses' careers and the household context of military retention decisions. We discuss the design and results of a small qualitative analysis conducted to supplement the knowledge available in the existing literature, and a preliminary data analysis of compensation and retention in selected occupations. We conclude with a brief overview of how these preliminary analyses together will guide the remainder of the analysis.

15. SUBJECT TERMS

Compensation; household income; retention; military spouses; QRMC

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NO. OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Thomas Emswiler
U	U	U	U	62	19b. TELEPHONE NUMBER (Include Area Code) 703-697-9832

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INSTITUTE FOR DEFENSE ANALYSES

Retain the Family: Redefining the Military Compensation Benchmark

Volume II

Jacklyn R. Kambic
Jared M. Huff
Mikhail Smirnov
Anusuya Sivaram
Erin Eifert

December 2024

IDA Product 3001177

INSTITUTE FOR DEFENSE ANALYSES
730 East Glebe Road
Alexandria, Virginia 22305

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About This Publication

This work was conducted by the IDA Systems and Analyses Center under contract HQ0034-19-D-0001, Project BE-6-5321, "14th Quadrennial Review of Military Compensation (QRMC): Initial Review of Current Benchmarks for Military Compensation," for the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD(P&R)). The views, opinions, and findings should not be construed as representing the official position of either the Department of Defense or the sponsoring organization.

Acknowledgments

The authors wish to thank Dr. John W. Dennis III, Dr. Matthew S. Goldberg, and Mr. Peter K. Levine of the Institute for Defense Analyses for their careful review of this product. The authors also wish to thank Mr. Lernes J. Hebert and Dr. Dina Eliezer for the useful comments they provided throughout this study.

For More Information

Jacklyn R. Kambic, Project Leader
jkambic@ida.org, (703) 845-6918

Jessica L. Stewart, Director, Strategy, Forces, and Resources Division
jstewart@ida.org, (703) 575-4530

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Executive Summary

The military compensation benchmark is a metric used by the Department of Defense (DoD) to assess whether military compensation is adequate to recruit and retain the talent the services need. The benchmark currently compares regular military compensation (RMC) to the 70th percentile of individual income for civilians with comparable levels of education. However, military retention decisions depend on household finances, and for dual-income families the service member's military pay is only part of this equation. Service members' spouses face military-specific challenges in the labor market that reduce their ability to contribute to household income, but this effect is not accounted for in the standard military-civilian income comparison. The objective of this study is to re-evaluate the 70th percentile civilian income benchmark in the context of the dual-career decisions faced by a growing number of military households, and provide recommendations for redefining the military compensation benchmark to ensure that military compensation remains adequate to meet retention needs.

Volume I of this report provides a qualitative analysis of how military households make retention decisions, focusing on how military spouses' careers and the unique labor-market challenges military spouses face influence household decisions about whether a service member will remain in the military. This volume uses the results of the qualitative analysis to extend IDA's Military Career Analysis Toolkit (MCAT) modeling framework for retention decisions to account for the role of military spouses' earnings, then applies this toolkit to evaluate how potential changes to military compensation and personnel policies affect retention. We assemble a dataset of historical retention decisions from administrative data on military personnel and use administrative and public data as well as estimates from prior research to compile the most comprehensive available estimates of household income and expenses for service members' families both in and out of the military. The MCAT model of retention decisions uses these data to estimate the trade-offs military families make about monetary and non-monetary factors affecting their households both in the moment and in the future.

We use MCAT to examine whether the current benchmark is still an effective metric for evaluating the adequacy of military compensation; it is not. Military compensation has remained well above the 70th percentile of comparable civilian income for many years. We expect—and find—that lowering military compensation to the level implied by the current benchmark would have severe consequences for retention and the sustainment of the all-volunteer force: Retention rates would fall by at least 24 percent and as much as 47

percent in the communities we study. The benchmark should be redefined to enable DoD to evaluate whether compensation is adequate to meet retention needs.

Next, we consider whether the benchmark should account for the impacts of military-specific challenges on military spouses' careers. We model military spouses' labor market outcomes to directly account for the effects of permanent change of station (PCS) moves and the child care demands that military spouses face. Quantifying the loss in income with military spouses' reduced labor force participation, employment, and earnings, we find that spouses of enlisted members are estimated to earn on average $9,500 less per year than they would if the member were to leave the service; spouses of officers earn on average $27,000 less. Using MCAT, we show that this loss in household income has a significant effect on retention. In the communities we study, between 5 percent and 12 percent of voluntary losses among enlisted service members and between 4 and 18 percent of officer losses can be attributed to these income gaps. Offsetting military spouses' lost earnings potential is an important role of military compensation, and the benchmark should account for the fact that military pay may need to be high relative to comparable civilian income in order to achieve this.

Comparing military households' discretionary income to what it would be if the member were to leave the service, we find that current military pay is, in general, already sufficient to offset the loss in military spouses' earnings potential. Our conversations with stakeholders and subject matter experts (SMEs) indicated that, overall, retention has been strong in recent years, implying that current levels of military pay are also adequate to meet retention needs. There are exceptions; in some specific military occupations, such as air traffic control, military compensation compares less favorably to civilian earnings potential and retention continues to be challenging. In these cases, targeted pays such as retention bonuses could be used. We do not recommend broad increases in military pay to further compensate military households for military spouses' reduced earnings. Instead, we recommend that the benchmark be increased to a level that is commensurate with contemporary military compensation.

Before providing a new value for the benchmark, we recommend changes to the income calculations used for the military-civilian pay comparison that would make the benchmark a more effective metric for DoD to evaluate military pay. A key objective of the benchmark is to enable DoD to evaluate whether pay is adequate to meet retention goals. The pay comparison should therefore approximate the financial considerations of service members who are making retention decisions. First, the pay comparison should be based on total pre-tax military compensation, including special and incentive pays and bonuses, to provide a more accurate comparison to civilian income estimates. Second, because of the large variation in civilian earnings potential on the basis of occupation, the estimate of comparable civilian income should account for a service member's military occupation. After implementing these changes to the definitions of military and civilian

pay used to perform the income comparison, we find that, in most communities and across most of the course of a military career, military pay falls between the 80th and 90th percentiles of comparable civilian income. We recommend that the military compensation benchmark be set to this range going forward.

In addition to determining whether the military compensation benchmark should account for the effects of military-unique challenges on household income, we were asked to consider whether the benchmark should be based on civilian household (rather than individual) income and whether the estimate of comparable civilian income should depend on the service member's marital status. We do not recommend either of these changes. A benchmark based on household income would be no more effective as a point of comparison for military compensation than a benchmark based on individual income. Setting military compensation based on the service member's marital status would increase the discrepancy in compensation between married and unmarried service members, raising concerns about fairness and exacerbating the role of financial incentives in service members' decisions about whether and when to marry.

In summary, we have the following recommendations regarding the benchmark: the military compensation benchmark should (1) be calculated using total pre-tax cash compensation, (2) account for service members' military occupation, (3) be set to a range between the 80th and 90th percentiles of individual incomes of civilians with comparable education and occupation, and (4) not depend on marital status. This report provides the methodological details needed to implement this definition of the benchmark. It is important to recognize that our recommendations about the definition and level of the benchmark are predicated on the conditions facing military families today. Therefore, we recommend that DoD re-evaluate these definitions periodically to ensure that the compensation benchmark continues to be set appropriately.

In addition to updating the benchmark for military compensation, we recommend that DoD continue to explore ways to mitigate the effects of military life on military spouses' careers, in particular by increasing access to child care and/or reducing the frequency of PCS moves. Analysis using MCAT shows that these policies have the potential to significantly improve military retention and quality of life without the need for broad increases in military compensation.

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Contents

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1. Introduction

In order to recruit and retain the talent that the services need, the military pay and benefits package must suitably compensate service members for their time, their skills, and the challenges of military life. Some of these challenges, such as dangerous assignments and sea duty, are associated with existing special and incentive (S&I) pays intended to directly compensate the service members who experience them. Military life also creates unique challenges for military spouses' careers, reducing their ability to contribute to household income, for which the military does not directly compensate.[1] Service members and their families weigh the monetary and nonmonetary benefits and challenges of remaining in service when making their retention decisions. This study provides recommendations for redefining the military compensation benchmark to ensure that military compensation remains adequate to meet active component retention needs.

The military compensation benchmark is used to assess whether military compensation is adequate to recruit and retain the talent that the services need. The benchmark currently compares regular military compensation (RMC) to the 70th percentile of individual income of comparable civilians.[2] First, this is not a comprehensive comparison: RMC is not total military compensation, the civilian earnings estimates do not account for variation based on service members' skills and occupation, and the comparison to individual earnings omits the impact of military-specific challenges on spouses' income. Second, RMC has been well above this benchmark for many years, making it no longer appropriate as a metric for compensation adequacy.[3] Even if the benchmark is intended as a "floor" for military compensation, it is not set at the appropriate level; the services would experience great difficulty recruiting and retaining necessary talent even at compensation levels well above the current benchmark. A more useful benchmark would enable DOD to accurately assess whether military compensation is keeping up with the relevant pays in the civilian labor market.

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[1] We use the term "military spouse" to refer to a spouse of a service member, who is not themselves a service member.

[2] Department of Defense, *The 9th Quadrennial Review of Military Compensation* (Department of Defense, March 2002), http://militarypay.defense.gov/Portals/3/Documents/Reports/9th_QRMC_Report_Volumes_I_-_V.pdf

[3] Troy Smith et al., *An Updated Look at Military and Civilian Pay Levels and Recruit Quality* (RAND Corporation, 2020), https://www.rand.org/pubs/research_reports/RR3254.html.

This study re-evaluates the 70th percentile civilian pay benchmark for military compensation in the context of dual-career decisions that a growing number of military households are facing. This evaluation requires a comprehensive examination of the role that household income plays in service members' retention decisions. Military-specific challenges affect military households' finances by negatively impacting spouses' careers.[4] In turn, these challenges influence service members' retention decisions by affecting household income. This study uses a combination of qualitative and quantitative methods to characterize this household retention decision and examine the role that military-specific challenges play in this decision for service members in selected military communities.[5]

The first volume of this report provides a qualitative analysis of how military households make retention decisions, focusing on the role of military spouses' careers and the challenges that military spouses face in the labor market.[6] In that volume, we reviewed administrative data and existing surveys of service members, veterans, and their partners to establish context and identify existing trends in the retention decisions. We used those findings to develop questions for focus groups with current service members and their partners about the specific challenges they face in the military and their decision-making process surrounding retention. Two key insights from the first volume guide the quantitative analysis in this volume: First, when thinking about retention decisions, military households have a comprehensive view of their household finances, and second, they consider the decision's impact on both of their careers. These insights are very much related; in most cases, military service negatively impacts a service member's spouse's career, but the service member often makes more than they could in a civilian job, and the military provides generous benefits in the form of health care, child care, and (potentially) retirement pay. Two aspects of military life in particular negatively impact spouses' employment: permanent change of station (PCS) moves, which disrupt spouses' careers, and child care obligations, which service members are often constrained in their ability to help with. For dual-income households, a choice for the service member to remain in the military is necessarily a choice to sacrifice some of their spouse's current and future income potential. These decisions have implications over the course of both partners' entire careers, and military families take them very seriously.

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[4] As in Volume I, we assume that unmarried Service members are not in dual-income households. While some unmarried Service members may have a partner with whom they make household decisions, we cannot observe their circumstances in the available data, and little is known about how their earnings compare to those of military spouses.

[5] Here, we use "community" to refer to an Army branch, Navy rating or officer community, Marine Corps occupational field, or Air Force career field. In addition, "military occupation" refers to a specific military occupational specialty (MOS) or Air Force Specialty Code (AFSC) within a community or a Navy rating or officer community.

[6] Jacklyn Kambic et al., *Retain the Family: What It Takes to Keep Dual-Income Military Households, Volume I*, IDA Product 3000516 (Institute for Defense Analyses, January 2024).

This volume of the report analyzes the role of military compensation in the retention decisions of military households and provides recommendations for the military compensation benchmark. This analysis has two parts. First is a comprehensive evaluation of household income and basic expenses for military families that are making retention decisions, comparing whether the families are better off financially having the service member remain in the military or transition to a civilian career. This comparison is informed by results from focus groups with service members who were in the middle of making retention decisions. The second part of the analysis is a quantitative evaluation of the retention decisions of military households that incorporates the detailed financial considerations and nonmonetary factors that military households consider. We conducted this analysis for ten enlisted and four officer communities in order to draw generalizable results for the military force overall.

A comprehensive evaluation of the role of household income in military retention decisions must do three things: Account for total military compensation, use detailed estimates of civilian labor market outcomes, and consider the effect of the retention decision on the spouse and family. This analysis does all three. Instead of using RMC as a proxy for military compensation, we identify total compensation paid to service members, including any bonuses and S&I pays, which vary significantly across communities and across individuals' military careers. To construct comparable civilian pay, we have created a crosswalk between military communities and civilian occupations and then use an econometric model to predict potential wages for every service member, based on their military occupation, education, experience, and demographics. This analysis confirms that these expected wages vary significantly between communities and across individuals' careers. Finally, we combine all available estimates of the impact of military career on military spouses' earnings, including the effects of PCS moves and child care requirements, and construct estimates of spouses' wages both in and out of the military. For the communities in this study, spouses of enlisted service members and officers earn an average of approximately $9,500 and $27,000 less per year, respectively, than spouses of similar veterans.[7]

To systematically analyze the role of household income and the relevant nonmonetary factors affecting the household retention decision, we have developed an econometric model of military career decisions. In addition to the detailed financial considerations described above, the model incorporates key aspects of the retention decisions that our qualitative analysis identified. First, the model explicitly includes both monetary and nonmonetary factors, capturing the trade-offs between higher income and the challenges

[7] We use "veteran" to refer to a service member's status after leaving the military, regardless of when in their career they leave (i.e., whether they retire from service) or whether they are eligible for disability compensation through the Department of Veterans Affairs.

associated with military life that military households face. Second, we use a dynamic model that captures the intertemporal nature of career decisions (i.e., the trade-offs between current challenges and future gains). This is especially important for modeling the impact of military service on spouses' careers, since a service member's decision to remain in the military has repercussions for their spouse's earnings potential for the remainder of the spouse's career. This econometric model of career decisions is specifically designed to evaluate the impact that alternative compensation and other policies would have on the military families' retention decisions. By estimating the value that households place on current and future monetary and nonmonetary factors, we can use the model to predict how changes in compensation and personnel policies would likely influence retention outcomes.

A. Summary of Recommendations

The military compensation benchmark should be a tool that DOD can use to determine whether military compensation is adequate to recruit and retain a quality force. Our analysis finds that the current benchmark is not an effective metric for evaluating the adequacy of military compensation. First, military compensation has been well above the benchmark for years, and if it were lowered to the current 70th percentile benchmark, military compensation would not be adequate to retain the force the services need. Second, because it excludes large parts of military compensation, such as S&I pays and bonuses, the benchmark does not reflect the full compensation that service members receive while in the military, creating a misleading comparison to what comparable civilians earn. Finally, the benchmark does not reflect the earnings service members can expect if they leave the service. It does not account for the service members' specialized technical and leadership skills, making it a poor gauge of the financial considerations that drive retention. We recommend that the benchmark be updated to address these shortcomings.

In light of the dual-career decisions that a growing number military households face, this report's primary recommendation is that DOD update the benchmark for military compensation to account for the negative impact of military life on spouses' careers and earnings potential. The following recommendations describe how this should be accomplished. First, we recommend changes to the definition of the benchmark to make it more representative of the financial considerations that service members are facing and thereby a more useful tool for measuring the adequacy of military compensation. Next, we recommend a level at which to set the benchmark, after making the appropriate updates to the benchmark calculation methodology.

1. Increase the benchmark to a level commensurate with contemporary military compensation.
2. Expand the calculation of military compensation to include all pre-tax current-year cash compensation and allowances.

3. Calculate the military-civilian pay comparison for each community, such that military compensation is compared to earnings of civilians with similar education levels and occupations.
4. Set the benchmark for military compensation to a range between the 80th and 90th percentile of individual income for civilians with comparable education levels and occupations.

Next, we consider other ways that the benchmark could be redefined to account for the impact of military life on spouses' careers. Specifically, we evaluate two potential changes to the definition of the benchmark that were posed in the 14th QRMC charter; we do not recommend adopting either.

5. Continue to base the benchmark on an individual, rather than household, civilian income distribution.
6. Keep the benchmark independent of marital status.

We also recommend that DOD continue to explore ways to directly mitigate the effects of military life on military spouses' careers. These policies have the potential to improve military retention and quality of life without the need for broad changes in compensation. Finally, we acknowledge that our recommendations about the definition and level of the benchmark are predicated on the conditions faced by military families today, and we recommend that DOD re-evaluate these definitions periodically to ensure that the compensation benchmark continues to be set appropriately.

7. Continue to pursue policies that improve military spouses' ability to have a career and contribute to household finances, including increasing access to child care, lowering military families' child care costs, and reducing the frequency of PCS moves.
8. Continue to regularly perform comparisons of military and civilian pay across the force. In addition, periodically re-evaluate the military compensation benchmark.

B. Updating the Military Compensation Benchmark

Recommendation 1: Increase the benchmark to a level commensurate with contemporary military compensation. The current 70th percentile benchmark was introduced by the 9th QRMC in 2002 to address recruiting and retention challenges facing the services in the late 1990s. The 9th QRMC recommended significant increases to RMC, specifically through basic pay, in order to bring military compensation back to this level. In the decades since, RMC has remained well above the 70th percentile.[8] This study

[8] RMC includes basic pay, the basic allowances for housing and subsistence, and the tax advantage that service members have because these allowances are not subject to federal income tax.

evaluates whether pay at the 70th percentile of comparably educated civilians is still adequate to enable the military to retain the quantity and quality of personnel needed. We find that it is not; if military pay were reduced to this level, retention would fall by at least 24 percent and as much as 47 percent in the communities we analyze. Comparing military compensation to the 70th percentile of individual earnings for comparably educated civilians no longer provides DOD with an accurate assessment of the adequacy of military pay.

The loss of military spouses' civilian earnings potential resulting from military-specific challenges provides one important reason for the benchmark to be set at a higher level of comparable civilian pay. We find that military life has a significant, negative, and lasting impact on military spouses' earnings. Despite this negative impact, current levels of military compensation and benefits are high enough that most military households are financially better off staying in the military, and the services have generally met retention goals (though not all recruiting goals) in recent years. There is no evidence that force-wide increases in military pay are needed at this time. In practice, military compensation and benefits have already increased over time to offset the reduction in spouses' earnings and other costs and challenges that the households face as a result of military life. The military compensation benchmark should reflect this change.

Our analysis shows that if military compensation were lowered so that it no longer offset spouses' lost earnings, retention would fall by between 6 percent and 26 percent across communities, significantly reducing the Services' ability to meet retention needs. This implicit compensation for spouses' lost earnings potential is an important function of military pay. Acknowledging this function explicitly would make it easier to appropriately benchmark and set adequate levels of military compensation. We recommend that the military compensation benchmark be increased to a level commensurate with current military pay, acknowledging that, in addition to compensating service members for the value of their skills and the challenges of a military career, compensating military households for military spouses' lost earnings potential is another important role for military pay.

Recommendation 2: Expand the calculation of military compensation to include all pretax current-year cash compensation and allowances. In particular, the calculation of military compensation should include special and incentive (S&I) pays and bonuses. While RMC at a given year of service (YOS) varies slightly across communities (due to differences in the share of service members who are married or in promotion/advancement rates), S&I pays and bonuses can vary significantly; many, particularly retention bonuses, are used to incentivize service members to stay in the military and to provide the services the flexibility to offer targeted pays where needed to compensate service members for specific skills or job duties or to manage retention. Focus group discussions indicated that service members do not typically differentiate between different types of compensation

when considering whether their military pay is sufficient for them to remain in the service. Excluding these types of pay from the calculation of military compensation makes the compensation benchmark a less informative representation of the monetary considerations that service members face when making retention decisions.

Excluding S&I pays and bonuses from the benchmark calculation may lead to the conclusion that RMC is too low when that is not the case. The services have used S&I pays and bonuses extensively in recent years, in part to meet retention needs; RMC alone would not have been sufficient to enable the services to meet their retention goals. If S&I pays and bonuses were excluded from consideration, RMC would appear to be inadequate for retention, suggesting a need for higher military compensation. In practice, however, S&I pays and bonuses are used to manage compensation and retention across communities, and total military compensation is currently adequate; force-wide increases in RMC are not necessary at this time. It may seem sensible to exclude pays that are not guaranteed or are variable across communities from the benchmark calculation, but this approach does not lead to a clear interpretation of the compensation benchmark. Instead, the compensation benchmark should adapt to provide DOD a more accurate assessment of how well service members are compensated relative to similar civilians.

Our third recommendation, discussed below, is that comparable civilian earnings should account for service members' skills and occupation; the calculation of military pay should also be updated to reflect this change and incorporate community-specific compensation, such as S&I pays and bonuses. Comparing only RMC to civilian earnings by community will highlight areas where S&I pays and retention bonuses may be needed, but doing so will not provide any information on the extent to which these pays are already in place. Redefining both sides of the military pay benchmark would give DOD a more informative comparison of military and civilian pay.

Recommendation 3: Calculate the military-civilian pay comparison for each community, such that military compensation is compared to earnings of civilians with similar education levels and occupations. The 9th QRMC noted, "As military requirements for technical skills increase, the Services must make the correct pay comparisons for the job skills they require."[9] In the decades since, the military has further increased recruiting standards to bring in more high-quality recruits who can be trained to perform skilled technical jobs.[10,11] As the number of service members with technical

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[9] Department of Defense, *The 9th Quadrennial Review of Military Compensation* (Department of Defense, March 2002), 47.

[10] Troy Smith et al., *An Updated Look at Military and Civilian Pay Levels and Recruit Quality* (RAND Corporation, 2020), https://www.rand.org/pubs/research_reports/RR3254.html.

[11] In recent years, recruiting challenges have affected the composition of enlisted accession cohorts, increasing the share of recruits with waivers and changing the distribution across test score categories.

skillsets has risen, particularly among the enlisted force, the civilian earnings distribution used for the current benchmark has become less representative of service members' civilian earnings potential. Even in communities without high technical requirements, service members still gain leadership and management skills that can directly increase their civilian earnings potential. The compensation benchmark aims to compare military compensation to the earnings of "comparable civilians"; failing to adjust for the distribution of occupations and skills dilutes this comparison and makes it difficult to assess whether military pay is keeping up with relevant civilian earnings.

To evaluate whether military pay is keeping up with the earnings that service members could expect if they left the service, we recommend that the military–civilian pay comparison be done at the community level.[12] Service members' civilian earnings potential varies widely according to military occupation.[13] Some military jobs, such as those in Cyber and Air Traffic Control, have direct and high-paying counterparts in the civilian labor market; service members with experience in these communities can typically transition into similar civilian jobs if they choose. In other communities, such as air defense artillery, service members do not have the option to continue in the same career field upon leaving the service, but their military experience is still correlated with their civilian job opportunities; service members with technical skills or training are expected to earn more in a civilian job. This report provides a generalizable methodology using an occupation crosswalk and publicly available data on civilian earnings to compare military compensation to occupation-specific civilian earnings potential. Our results show significant variation in pay comparability across military communities. Performing this comparison across communities can help DOD identify areas where military compensation compares particularly unfavorably to civilian earnings potential, possibly indicating a need for additional compensation in order to meet retention goals. Implementing a community-level benchmark calculation would not require extensive additional work in comparison to the current force-wide benchmark. Extending the methodology outlined in this report would require defining military occupation groups or communities and using military pay data and civilian earnings data to estimate earnings profiles; it would not require estimating military spouses' earnings potential, fully characterizing household discretionary income, or developing a model of retention behavior.

It is unclear how these differences in accession cohorts will translate into differences in the distribution of education levels or technical skillsets in the future.

[12] Comparing military compensation to civilian earnings potential at the military occupation level may be impractical and unnecessary for those that are particularly detailed, such as Air Force Specialty Codes (AFSCs), which can have up to six digits. Aggregating these into communities can reduce the effort needed to perform these comparisons with little loss of information.

[13] Charles Goldman et al., *Navigating a Big Transition: Military Service Members' Earnings and Employment After Active-Duty Service* (RAND Corporation, 2021), https://www.rand.org/pubs/research_reports/RRA361-1.html.

If a single pay benchmark for the entire force is essential, it can be constructed from occupation-specific ones; the comparable civilian earnings distributions could be re-weighted with the occupation crosswalk to match the distribution of military occupations. This would provide more relevant civilian comparison groups for both enlisted and officers than the current methodology does. Given the military's requirements for high-quality personnel with technical skills, accounting for the earnings potential these skills generate is an essential consideration for the benchmark to be a useful metric of the adequacy of military pay.

Recommendation 4: Set the benchmark for military compensation to a range between the 80th and 90th percentile of individual income for civilians with comparable education levels and occupations. Even if both sides of the pay comparison are redefined following the above recommendations, there will be variation in how military and civilian pay compare across communities. It is unrealistic to expect that a single percentile of the civilian earnings distribution will work for service members at different points in their military careers or that a single percentile can represent adequate military compensation across all communities. Currently, the benchmark is intended to serve as a lower bound to ensure that military compensation does not fall behind civilian earnings. We recommend introducing an upper bound to redefine the benchmark as a range, rather than a single percentile. Introducing an upper bound on what is considered typical can identify points in careers or communities where military pay may be outperforming comparable civilian earnings by more than is required to support retention needs. Having an upper bound also reflects that there are valid reasons not fully captured by variation in civilian earnings potential, such as danger associated with military job duties, time spent at sea, more frequent PCS moves, and assignments in undesirable locations, to explain why members in some communities earn more than others. If the military–civilian pay comparison is updated to include S&I pays and bonuses, acknowledging that a certain amount of variation in how military compensation compares to civilian earnings is to be expected will be important.

Across the communities selected for this study, pretax military cash compensation typically fell between the 80th and 90th percentiles of relevant civilian earnings between 2014 and 2022. Discussions with subject matter experts (SMEs) indicated that the communities in which compensation falls below this range, such as Army Cyber, are frequent areas of concern for retention. An upper bound for the benchmark could allow for some of the expected variation across communities and shed light on areas where military compensation is particularly high relative to civilian pay. However, finding that compensation in a particular community is above this range does not necessarily mean that military pay is too high; it may instead indicate communities with particularly difficult assignments that require additional compensation. Communities where military

compensation falls outside the typical range should be evaluated on a case-by-case basis to determine the advisability of changes in compensation level.

Recommendation 5: Continue to base the benchmark on an individual, rather than household, civilian income distribution. There is no clear right way to construct a more effective military compensation benchmark by using a household income distribution. The level and slope of current military compensation do not match any single percentile of the U.S. civilian household income distribution, either for all households or for married households. Since civilian household income increases more rapidly with age compared to military compensation, setting compensation to a percentile of the household income distribution would necessarily skew military pay lower for junior service members and higher for senior service members. Changing the structure of military compensation in this way is not supported by our findings. Volume I shows that reports of financial difficulties are concentrated among junior enlisted service members. In this volume, we show that junior service members' retention decisions are more responsive to changes in military pay than those of more senior service members. Decreasing pay among junior service members would reduce early-career retention rates, while increasing pay among mid-career and senior service members would have relatively small effects, given the already strong retention in those groups.

Recommendation 6: Keep the benchmark independent of marital status. Benchmarking to household income would introduce the questions of whether military pay should be compared to married or single household earnings and of whether the relevant household income distribution should vary based on the service member's marital status. Paying service members differently based on marital status can influence their decisions about whether and when to get married. Increasing the pay differential between single and married service members by explicitly setting pay to a percentile of the respective household income distribution would only exacerbate this issue. To avoid this unintended consequence, compensation for single service members could also be benchmarked to married household income. This would obscure the comparison between military compensation and earnings of similar civilians, making the compensation benchmark less informative. Because there are no clear advantages to a benchmark based on household income and there are clear problems, we do not recommend implementing a benchmark that depends on marital status.

C. Nonmonetary Policies

Recommendation 7: Continue to pursue policies that improve military spouses' ability to have a career and contribute to household finances, including by increasing access to child care, decreasing military families' child care costs, and reducing the frequency of PCS moves. Nonmonetary policies that support military spouses' careers can increase their earnings potential and therefore improve military families' finances and

increase retention. Compared to broad increases in military compensation, nonmonetary policies can provide a targeted benefit to military families whose household incomes are currently most impacted by military-specific challenges. Although these policies do have costs, improving military spouses' labor market outcomes is a way to increase military households' discretionary incomes and retention without resorting to increases in military compensation.

Qualitative analysis of military household retention decisions identified PCS moves and child care challenges as the primary military-specific challenges that reduce spouses' earnings potential. This study evaluates the retention impact of two nonmonetary policies to understand the potential gains from addressing these challenges. First, we find that ensuring all military families have access to free child care would increase retention by 5 percent to 14 percent across enlisted service members in the communities we study. Second, we find that decreasing PCS frequency such that PCS moves are at least 6 years apart would increase retention by 4 percent to 8 percent through the increase in spouse income alone. In comparison, introducing additional compensation to offset the difference in earnings between military spouses and similar civilians would cost an average of about $9,500 per year for enlisted members and $27,000 for officers and would increase retention by 7 percent to 12 percent. These potential gains in retention from supporting military spouses' ability to work are significant. It is beyond the scope of this study to evaluate these policies' cost-effectiveness, but programs that are designed to provide specific benefits to families affected by military-specific challenges have the potential to be more cost-effective than overall increases in the level of military compensation. We recommend that DOD continue to investigate these kinds of nonmonetary policies targeted toward military spouse employment.

Recommendation 8: Continue to regularly perform comparisons of military and civilian pay across the force and periodically re-evaluate the military compensation benchmark. The percentile of civilian income at which the benchmark is set is based on retention outcomes and compensation levels that reflect the characteristics and impact of military life over a given period of time. While social change and large changes in military life do not happen overnight, the socioeconomic environment in which service members and their families make retention decisions is continually evolving. Some of the assumptions and estimates underlying our analysis are likely to change in the future as the nature of the civilian labor market, family dynamics, and military careers change. Updating the compensation benchmark or redefining the military and civilian compensation calculations to account for these changes can help ensure that the regular military–civilian pay comparisons continue to provide DOD with useful information about the adequacy of military pay.

D. Military Communities Selected for Analysis

To analyze the effect of military-specific challenges that service members and their families face, we selected fourteen communities to examine in detail. These challenges, their impact on spouses' earnings, and the effect on retention decisions vary significantly from community to community. In some cases, frequent PCS moves disrupt a military spouse's civilian career. In other cases, PCS moves are less frequent, but long deployments keep service members away from home for extended periods of time, leaving their spouses responsible for handling child care and other family or household duties. Focusing on a selected group of communities enabled us to model key aspects of household retention decisions, including the frequency and effect of PCS moves and child care responsibilities, that vary across different types of military careers. Examining communities where service members and their families face different circumstances and challenges is necessary to understand how a different compensation benchmark would affect service members across the force.

The communities studied here were chosen to include a wide range of careers and reflect a variety of challenges that service members and their spouses experience in the military. The list of selected communities is provided in Table 1. Our objective was to capture variation across communities in key dimensions, including female representation, combat focus, dispersion of assignments across duty stations, desirability of common duty stations, transferability of skills to a civilian career, and earnings potential in a civilian career. As a first step, we requested input from SMEs from the Army, Navy, Air Force, and Marine Corps to understand which communities they viewed as challenging to retain and what they believed to be the reason for this difficulty. Next, we used the Active Duty Master File (ADM) maintained by the Defense Manpower Data Center (DMDC) to identify communities with sufficiently large populations that captured variation in at least one of the features listed, with the objective of selecting at least two enlisted communities and one commissioned officer community from each service (and including warrant officer communities where applicable). Space Force was omitted because when this study was conducted there were not yet enough years of data available to estimate a model of retention decisions made by Space Force members.

Table 1. Military Communities Selected for Modeling

Service and pay grade group	Community	Short name
Army		
Enlisted & Warrant	Infantry (11x)	Infantry
	Air Defense Artillery (14x)	Air Defense
	Cyber (17x)	Cyber
	Special Forces (18x)	SOF
Officer	Cyber (17x)	Cyber

Service and pay grade group	Community	Short name
Navy		
Enlisted	Boatswain's Mate (BM)	BM
	Fire Controlman (FC, FCA)	FC/A
Officer	Surface Warfare Officer (SWO)	SWO
Air Force		
Enlisted	Aerospace Medical (4N0xx)	Medical
	Aerospace Maintenance (2Axxx)	Maintenance
Officer	Logistics (21x)	Logistics
Marine Corps		
Enlisted	Intelligence (02xx)	Intelligence
	Air Control/Air Support/Anti-air Warfare/Air Traffic Control (72xx)	Air Control
Officer	Air Control/Air Support/Anti-air Warfare/Air Traffic Control (72xx)	Air Control

Note: The short name column lists the acronym or shortened version of the community name that we use to reference each community in discussions and visualizations of quantitative results.

Modeling a subset of communities introduces some limitations to the generalizability of the results. The communities selected for the study represent many, but not all, of the possible facets of military careers. It is important to note that the objective of this study is not to recommend a specific change to military compensation but rather to evaluate whether the military compensation benchmark is set appropriately. In selecting a subset of communities to study, our claim is that, if a benchmark works well for all of these groups, it will also work for most other typical communities. If there is no single benchmark that works for these fourteen communities, then it is unlikely that there is a benchmark that works for the rest of the force. No set of compensation policies will work for every service member in every situation at every point in time. It is important for DOD to maintain flexibility to address retention shortfalls in specific communities or skills at specific points in time. The results of this study provide a general answer to whether the current pay benchmark is adequate *overall* in light of military-specific challenges to dual-income households and how the benchmark could be redefined to provide DOD with a more informative metric for the adequacy of military compensation.

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2. Comparison of Military Compensation and Civilian Earnings

To understand how service members and their families make retention decisions, we examine their financial circumstances, both while in the military and in the alternative scenario where they choose to leave the military. Income is not the only factor that matters for household finances; expenses play an important role as well. A decision to leave the military has implications for almost all aspects of a household's finances: The service member's income will change as they transition to a civilian job, their spouse's income will likely change as a result of a more stable career, household expenses will change with a loss of subsidized health care and possibly child care, and taxes will change, since a portion of their earnings is no longer tax-free. What matters to service members and their families is the bottom line: After all of these elements are taken into account, is the household better off in or out of the military?

We have two goals in conducting this in-depth analysis of whether service members' households are better off financially in or out of the military: We consider which parts of this comparison should be incorporated into the compensation benchmark, and we construct the data inputs required by the econometric model of career decisions that we use to evaluate the impact of military compensation on retention. These goals are distinct; we would not recommend that the benchmark attempt to incorporate all aspects of the discretionary income comparison we are conducting here. Since service members identified discretionary income as the key financial factor in their retention decisions, we carefully construct an estimate of discretionary income and incorporate it into our econometric model. This process highlights some important limitations of the current military–civilian pay comparison that is used for the compensation benchmark, and we identify ways to redefine this comparison and improve the benchmark's effectiveness as a tool for DOD to measure the adequacy of military pay.

To better represent the financial considerations that are part of service members' retention decisions**, the military–civilian pay comparison should use total pretax current year military compensation (including allowances, S&I pays, and bonuses) and community-specific civilian income distributions.** This creates a direct comparison of what a service member with specific skills in a given community could earn in the military versus what they could expect to earn if they entered the civilian labor market. The military tax advantage should be included in this calculation to make pretax incomes comparable, and the Basic Allowance for Housing (BAH) should be included, since a large

share of members receive this benefit directly in cash.[14] The pay comparison used for the benchmark does not need to include a comprehensive comparison of household discretionary income; while this in-depth analysis can provide additional insights, it is not essential for assessing the adequacy of military pay. Instead, the pay comparison should use direct, robust, simple measures of military and civilian pay that enable DOD to make informed decisions about military compensation policy.

RMC is often used as an approximation of military pay for comparisons of military and civilian earnings, but it underestimates total military pay and omits variability in pay related to service members' skills and experience. RMC includes the components of military pay that are common to all service members—basic pay, allowances for housing and subsistence, and the tax advantage—but it does not capture the variability in military pay that results from special and incentive pays, such as retention bonuses and hazardous duty pay. These excluded components are particularly relevant for comparisons of military and civilian compensation; special pays are related to service members' skills, experience, or duty assignments, many of which are the same factors that determine service members' potential civilian earnings. In other words, highly compensated service members are also likely to have high-paying job opportunities when they leave the military.

The standard military–civilian pay comparison also fails to account for variation in service members' civilian earnings potential. It uses a percentile of the individual earnings distribution for comparably educated civilians to represent the potential civilian earnings. Many service members gain specialized skills and additional education while in the military that can increase their expected civilian earnings potential. For example, there is no reason to believe that the appropriate civilian earnings comparison for a trained military cyber specialist is the distribution of earnings of civilian high school graduates just because the cyber specialist has only a high school degree. In addition to technical skills, veterans' military experience, leadership and management skills, and security clearances may also provide access to different and better job opportunities in the civilian labor market than the general population has.

While the military compensation benchmark is based on service members' individual income, retention decisions are household decisions that also depend on the spouse's income and household expenses. In addition to estimating the levels of total military and civilian earnings and accounting for systematic variation in earnings on the basis of education, occupation, and demographics, the household income calculation used in the model of retention decisions adjusts for differences in spouses' earnings and the cost of basic expenses. Compared to what they are expected to earn outside of the military, service

[14] The "tax advantage" is an accounting adjustment to military compensation to represent the fact that housing and subsistence allowances are not taxable. It is not actual cash compensation but is used to make military compensation comparable to pretax civilian compensation.

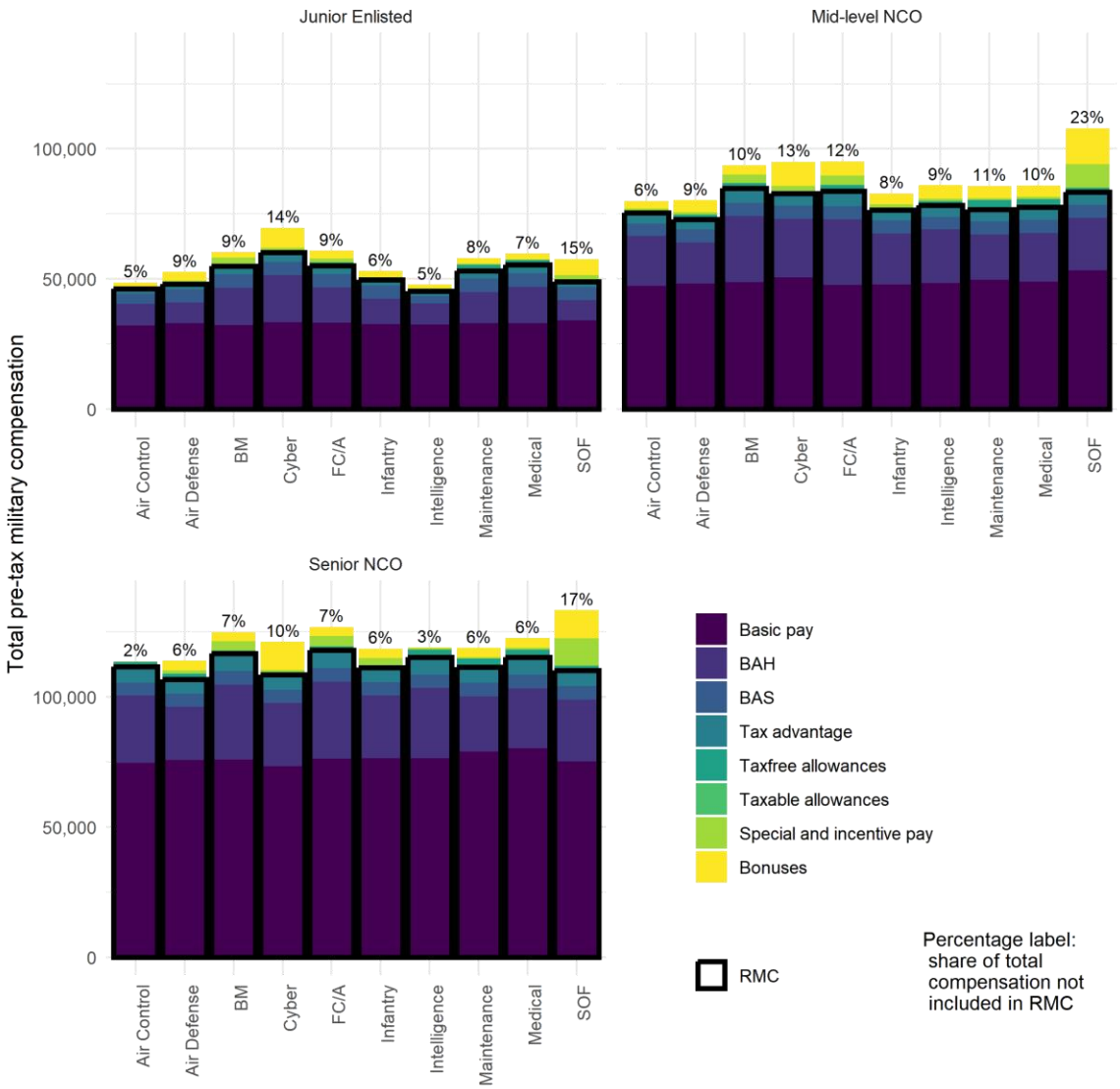
members typically earn more while their spouses earn less. Basic household expenses, which include the costs of food, transportation, health care, child care, and housing, are also different in and out of service. To determine whether households are financially better off staying in the military, and by how much, we account for these financial considerations in our calculation of household discretionary income.

A. Total Pretax Military Compensation

Total military compensation is more than just RMC. In the communities we study, RMC accounts for between 77% and 98% of cash compensation to service members. In addition to cash, service members receive several forms of noncash current compensation (including, most notably, health care) as well as cash and noncash deferred compensation (including retirement pay and health care). This deferred compensation is an important factor in service members' retention decisions and is incorporated in the econometric model. In 2023, noncash compensation was estimated to be approximately 23 percent of current compensation for a median enlisted service member and 14 percent of current compensation for a median officer, while deferred compensation was estimated to account for 21 percent and 23 percent of total compensation costs for median enlisted personnel and officers, respectively.[15]

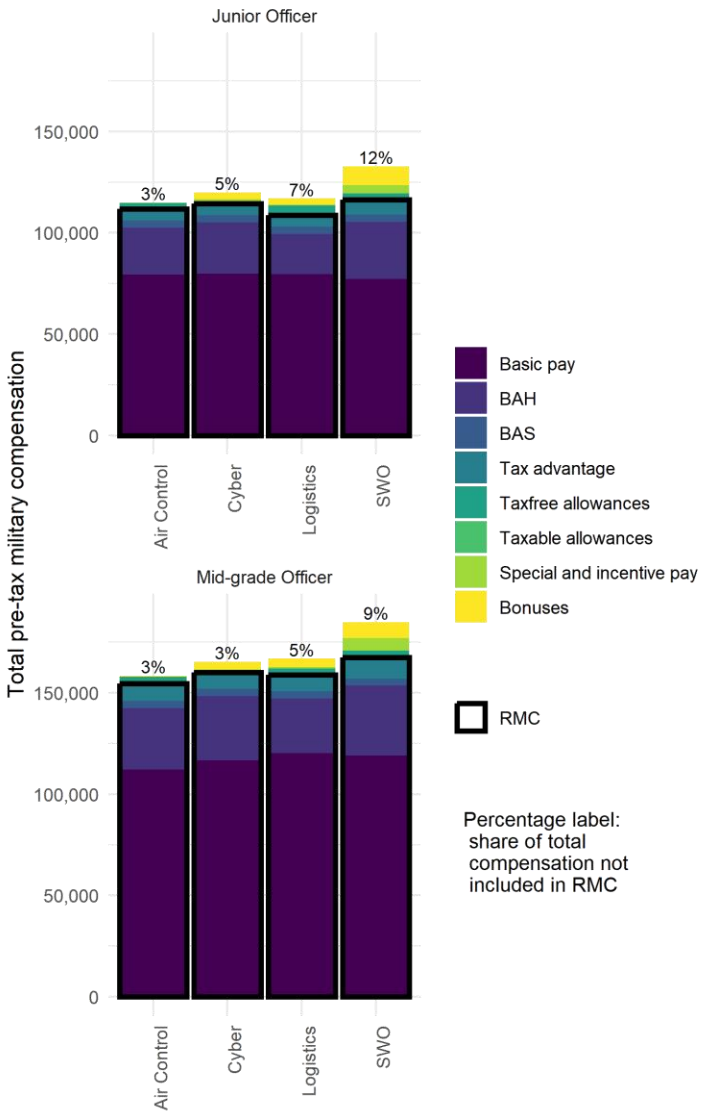
For the purposes of this study, we compare earnings on the basis of current cash compensation. RMC accounts for a large share of current cash compensation for junior service members, but the share of compensation that is attributable to RMC changes throughout a military career. In addition to basic pay, allowances for housing and food, and the tax advantage, cash compensation includes other allowances, bonuses, and S&I pays. In particular, retention bonuses are explicitly designed to incentivize service members to remain in the military and can account for a large share of cash compensation for service members in some communities. As a result, there is substantial variation in military compensation across communities, as shown in Figure 1 and Figure 2. RMC is represented by the black box in each column. Members in some communities receive as much as 23 percent of their pay in S&I pays, bonuses, and other allowances that are excluded from RMC.

[15] Congressional Budget Office (CBO), "Atlas of Military Compensation" (CBO, December 2023), https://www.cbo.gov/system/files/2023-12/59475-Military-Compensation-Infographic.pdf.



Note: Junior Enlisted includes grades E-2 through E-4, Mid-level NCO includes grades E-5 through E-7, and Senior NCO includes grades E-8 and E-9. E-1 is excluded because few service members are observed to make voluntary retention decisions at this pay grade.

Figure 1. Military Compensation for Enlisted Members in Selected Communities



Note: Junior Officers include grades O-2 and O-3, while Mid-grade Officers include grades O-4 through O-6. O-1 is excluded because few members are observed to make voluntary retention decisions at this pay grade.

Figure 2. Military Compensation for Officers in Selected Communities

In addition to current compensation, the model of military retention decisions needs to take into account the total military compensation that a service member would expect to earn if they choose to stay in the military for an additional commitment. Military compensation is observable only for those service members who chose to stay; for those who have left the service, we need to construct the expectation of what they would have earned had they decided to stay. Constructing some components of military compensation, such as basic pay, is straightforward using tables from policy documents (although this approach still requires us to construct expectations of promotions). Reconstructing other

components, such as retention bonuses and S&I pays, is not a trivial problem. Historical policy documents are not always available, eligibility criteria and pay amounts change often, and the available data do not always allow us to definitively determine service members' (hypothetical) eligibility for specific pays.

Instead of attempting to reconstruct all available bonuses and pays and service members' eligibility for them, we use econometric models to estimate service members' expected pays, based on the pays received by similar service members who stayed in the military. We develop models using monthly data from DMDC—specifically, the ADM and the Active Duty Pay File (ADP)—to estimate taxable and tax-free cash compensation for service members, conditional on characteristics such as pay grade, military occupation, and duty station. Both our retention and compensation models use data from 2014 to 2022, and we normalize all dollar values to real 2022 dollars. Total cash compensation is modeled in four components: basic pay, housing allowances, other allowances and tax-free pays, and retention bonuses and other taxable pays.[16] We use these four models to predict annual compensation for every year for service members who leave the military, as part of our effort to construct the expectations of what they could have earned had they decided to stay in. Finally, we apply an approximate federal income tax rule, accounting for eligibility for the Combat Zone Tax Exclusion (CZTE), to calculate after-tax earnings for the purpose of calculating discretionary income.

B. Comparable Veteran Earnings

When making retention decisions, service members consider how much they could earn if they left the military and entered the civilian labor market as a veteran. Service members' civilian earnings potential varies based on their occupation, years of experience, education level, and other characteristics. The current military pay benchmark captures variation in expected civilian earnings on the basis of years of experience (using age) and education level and adjusts to reflect the gender mix in the military. It does not vary based on community, adjust for occupation mix, or account for the fact that military veterans may have better job opportunities than similar civilians due to their military experience. This variation in earnings on the basis of military occupation and demographics is also a key feature in the retention model; capturing the level and variation in civilian earnings potential is needed to accurately estimate the role of military compensation in retention decisions. We expected (and find) that when military pay compares less favorably to their expected pay as veterans in the civilian labor market, service members are more likely to decide to separate from the military.

[16] Some of these components correspond to specific columns (or groups of columns) in the ADP data, but others must be imputed; see Appendix C for details on how each of these components of pay is calculated and estimated.

Military occupations are strongly correlated with service members' earnings potential in the civilian labor market, thanks to both the fact that some occupations have high accession requirements and the experience and skills that service members gain on the job. Skill requirements at accession vary by community; in particular, many enlisted communities require a minimum score on the Armed Services Vocational Aptitude Battery (ASVAB) in order to qualify for entry. Performance on the Armed Forces Qualification Test (AFQT), a composite score derived from ASVAB subtests, has been shown to be positively associated with labor market outcomes over the lifetime.[17] In addition, service members gain job experience and skills while in the military that can translate, directly or indirectly, to the civilian labor market. Although not all veterans will work in civilian occupations that are similar to their military occupation, the skills and experience they gain can lead to high-paying civilian job opportunities.

To capture how military skills translate to the civilian labor market, we develop a link between military and civilian occupations. There are no publicly available, nationally representative data that provide information on veterans' prior military occupations as well as their current civilian earnings and employment. We rely on the Occupational Information Network (O*NET) crosswalk, which was developed in part to help service members transition into civilian careers with similar skill requirements. We have designed a two-step weighting methodology that constructs community-specific weights for each civilian occupation, accounting for the size of the community, the size of the civilian occupation, and the demographic composition of veterans in that occupation.[18] For every military occupation, the weighted crosswalk provides a list of relevant civilian occupations and the probability that a veteran from that military occupation will work in the matched civilian occupations.

Data on veterans' earnings in specific civilian occupations come from the American Community Survey (ACS). The ACS is an ongoing survey conducted by the U.S. Census Bureau that provides data on employment, earnings, housing, demographics, and other socioeconomic and demographic topics. We use ACS data from 2017 through 2021, the most recent ACS 5-year sample available at the time this work was completed. Individual earnings are modeled as a function of occupation, age (as a proxy for experience), education level, gender, marital status, number of children, and race, using weighted least squares regression where the weights are constructed by multiplying the ACS person weight by the community-occupation weight derived from the O*NET crosswalk. Using these models, we predict expected veteran earnings for every service member in our data. The average of predicted earnings by community and YOS are shown in Figure 3.

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[17] Dajun Lin, Randall Lutter, and Christopher J. Ruhm, "Cognitive Performance and Labour Market Outcomes," *Labour Economics* 51 (2018): 121–35, https://doi.org/10.1016/j.labeco.2017.12.008.

[18] Appendix D provides an example and more detailed discussion of the crosswalk and weighting scheme.

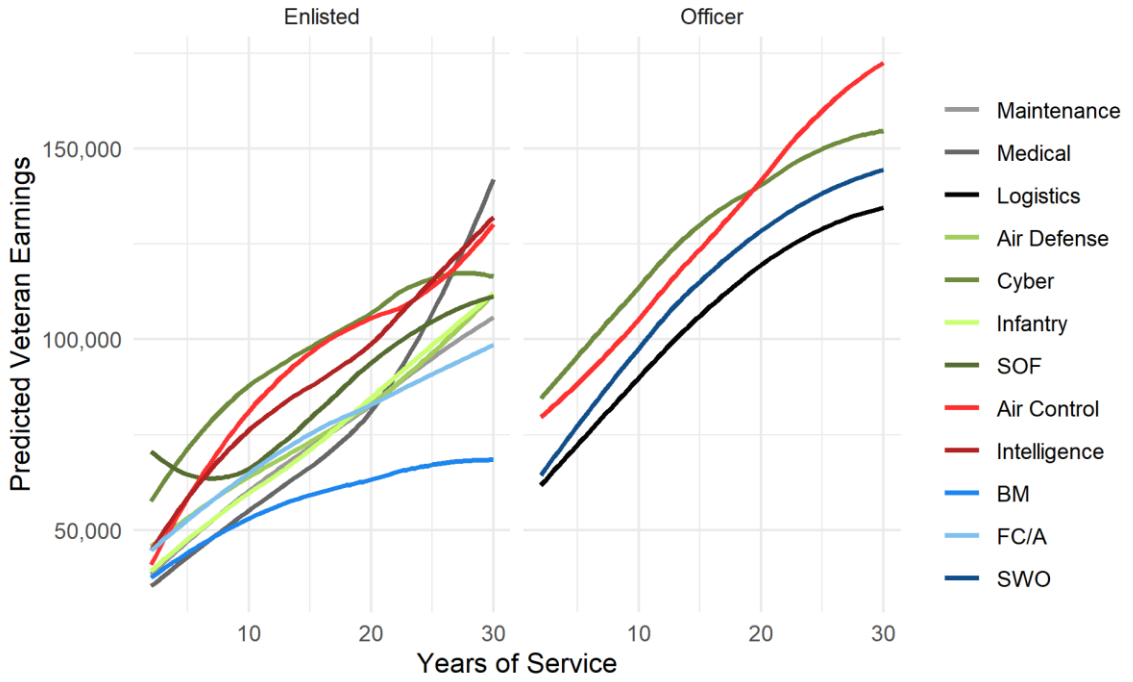

Figure 3. Estimated Veteran Earnings by Community

To provide a concrete example as we discuss the details of the civilian earnings predictions, the next two figures show results for enlisted soldiers in the Army Air Defense Artillery (ADA) branch.[19] Figure 4 shows a comparison of observed pre-tax military compensation and predicted veteran earnings across the career. At every YOS, average military compensation is higher than the average expected veteran earnings. However, comparing averages hides heterogeneity within the community; not every service member earns more in the military than they expect to earn as a veteran. The numeric labels above each point represent the fraction of service members for whom observed military pay exceeds expected veteran earnings; this ranges from 73 percent to 90 percent across the military career. Figure 5 plots the distribution of military compensation against that of predicted veteran earnings for soldiers in ADA who are at 4 YOS, with dashed lines representing the mean of each distribution. The distribution of military pay is bimodal; the two peaks correspond to soldiers who have and have not yet been promoted to E-4. The veteran earnings distribution has a long right tail corresponding to those service members who have had additional education, including some who have college degrees. On average, soldiers at 4 YOS earned $9,542 more in the military than their expected earnings as a veteran, and military compensation exceeds predicted veteran earnings for 76 percent of individuals in this group. However, 24 percent of soldiers, primarily those who had not yet

[19] Figures and results for other communities are available in Appendix F.

been promoted to E-4, earned less in the military than they were predicted to earn in the civilian labor market.

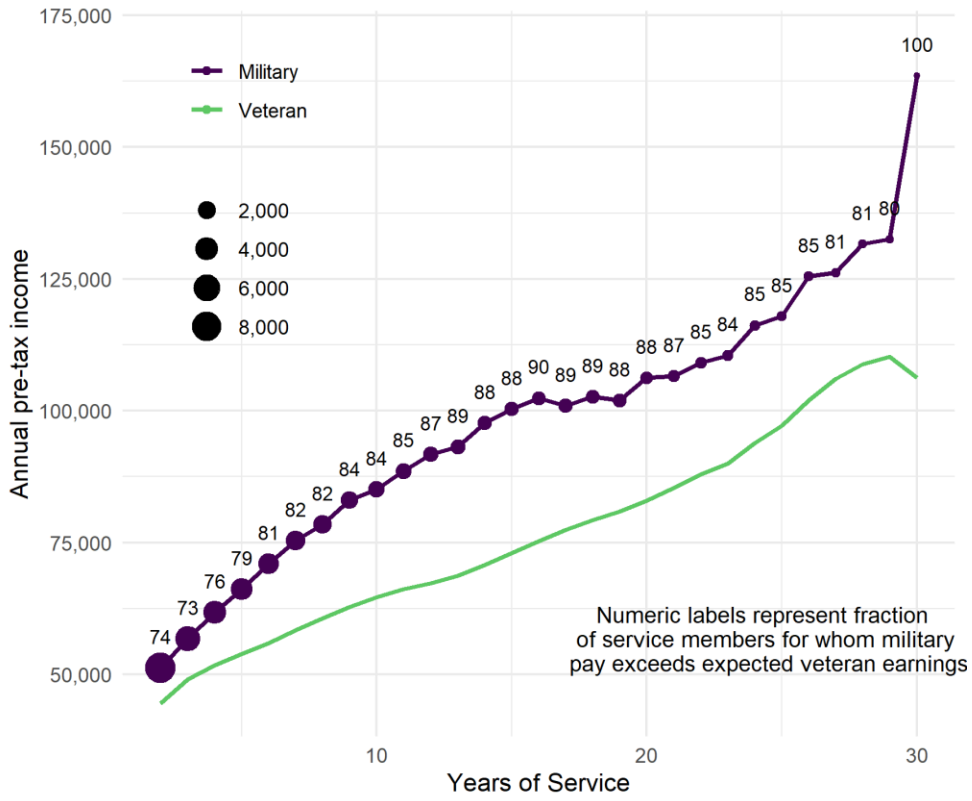

Figure 4. Comparing Military to Predicted Veteran Earnings Within ADA

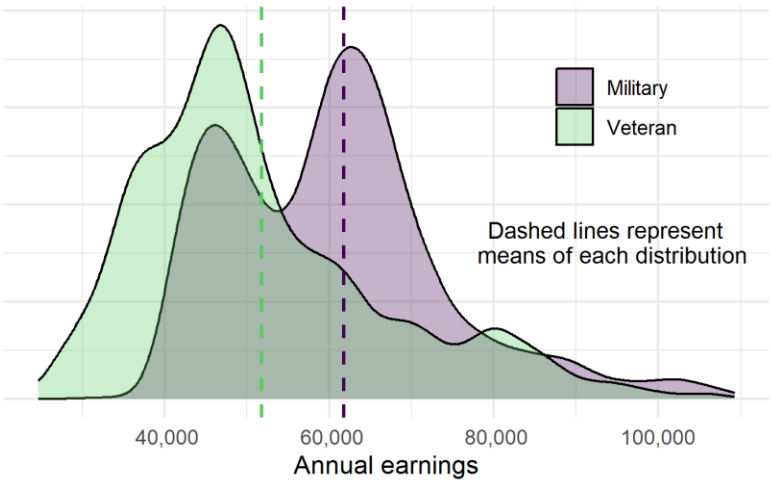

Figure 5. Distribution of Military and Predicted Veteran Earnings at 4 YOS Within ADA

Eligibility for military retirement benefits is a major consideration in service members' decision to stay in the military until at least 20 YOS. For members who are not

yet at the point of retirement eligibility, retirement benefits are an important incentive to remain in the service longer. For those who have reached retirement eligibility, these benefits increase service members' expected income if they leave the service. The Blended Retirement System (BRS) introduced several changes to the military retirement system that affect retention decisions of early- and mid-career service members. Our data include decisions that were made both before and after the introduction of the BRS. To accurately model the effect of military retirement benefits for these decisions, we account for the share of service members who are enrolled in BRS and model expected retirement benefits under both the legacy retirement system and the BRS.[20]

C. Military Spouses' Labor Market Outcomes

Research, reviewed in Volume I of this report, shows that military spouses are less likely to be employed, less likely to have a job that matches their qualifications, and earn less when they do work than spouses of civilians are. Volume I also documents results from focus groups that examined the effects of military-specific challenges on military spouses' labor market outcomes, and identifies heightened child care responsibilities and PCS moves are the two main challenges that have a negative and lasting impact on military spouses' careers and earnings potential. In this section, we quantify these effects of military life on spouses' earnings in order to account for them in our analysis of the financial aspects of the retention decisions.

Data on military spouses' employment and earnings are limited. Standard large-scale surveys used for research on civilian labor market outcomes, such as the ACS and the Current Population Survey, typically do not include a sufficient sample of active duty service members and exclude individuals living outside of the United States. Surveys that focus on military spouses, such as the Active Duty Spouse Survey (ADSS), do not provide sufficient detail on earnings and employment. Prior research discussed in Volume I of this report provides evidence comparing labor market outcomes of military spouses to spouses of similar civilians. Our approach is to estimate outcomes for civilians who are similar to military spouses, then using findings from the existing literature to adjust for differences in labor force participation, unemployment, and earnings.

We use ACS data collected between 2017 and 2021 to estimate earnings of civilians who are similar to military spouses, similar to the approach we took to estimating veteran earnings. First, the data are filtered to married civilians (excluding veterans) between the ages of 18 and 62 who work full time and whose spouse is also in the labor force. For each individual in this dataset, we use the ACS household relationship information to identify their spouse and the spouse's annual earnings. We estimate spousal earnings as a function of the individual's gender, age, education level, number of children, and race, since these

[20] See Appendix D for details on how expected retirement benefits are calculated.

are the variables that are available in both the ACS and our DMDC data on service members. This approach enables us to use the service member's observable characteristics to predict spousal earnings (conditional on being in the labor force) for all service members married to civilians.

Military spouses' labor force participation is lower than that of similar civilians.[21] Tabulations based on ADSS data provide average labor force participation rates for military spouses by gender. Labor force participation also varies by duty station location and other features not available in ADSS data, and our findings in Volume I confirm that location can play an important role in spouses' ability to find employment. To capture all of these sources of variation, we first estimate labor force participation rates for spouses of full-time employed civilians as a function of location (defined using metropolitan statistical areas), age, gender, education level, and number of children. We then adjust these estimates down to match the average labor force participation rate by gender to the estimates from the ADSS (63 percent and 79 percent for spouses of male and female service members, respectively).

Findings in Volume I make it clear that PCS moves and difficulties obtaining and paying for child care are the two primary ways in which military life affects military spouses' earnings potential. We specifically account for both of these factors. PCS moves affect earnings for military spouses who are in the labor force, while child care responsibilities affect both the spouse's probability of participating in the labor force and the household's expenses. During a year in which the household experiences a PCS move, military spouses are estimated to earn 14 percent less than they otherwise would; earnings take multiple years to recover and are estimated to be 8 percent and 3 percent lower in the first and second years after the move, respectively.[22] We use members' assigned duty station location identify PCS moves in the ADM data and apply penalties to military spouses' predicted earnings based on the time since the last PCS move.[23]

The effect of military service on spousal earnings may persist even after service members leave the military, and service members consider this long-run effect when

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[21] Evidence from the Millennium Cohort Family Study, discussed in Volume I, suggests that some military spouses prefer to stay at home instead of participating in the labor force. However, there is not enough data to compare these responses against the preferences of similar civilians. As a result, our analysis of policies that improve military spouses' ability to participate in the labor force assumes that, conditional on observable factors, labor force participation rates would not differ between military spouses and civilians on the basis of this preference.

[22] Jeremy Burke and Amalia R. Miller, *The Effects of Military Change of Station Moves on Spousal Earnings*, RB-9920-OSD (RAND Corporation, 2016), https://www.rand.org/pubs/research_briefs/RB9920.html.

[23] We assume that PCS moves occur when the member's duty station location changes states, countries, or regions (in the case of military ZIP codes). This is likely an underestimate of the number of PCS moves that members experience.

making retention decisions. Many military spouses experience multiple periods of unemployment and underemployment throughout the member's military career, often related to PCS moves. Based on the available estimates, we conclude that, in cases where PCS moves occur less than 3 years apart, the spouse's earnings do not have time to fully recover between moves and part of the loss in earnings potential becomes permanent. As a result, the growth in military spouses' earnings potential over time can be lower than that of similar civilians. In these cases, even if a spouse works full time after the member leaves the service, the cumulative effect of multiple frequent PCS moves permanently reduces their earnings potential. This loss of lifetime earnings potential increases over the course of a military career and is an important consideration for retention decisions. To capture this trade-off that service members and their families face, we use available estimates from the literature to construct a long-run impact of PCS moves on military spouses' earnings, taking into account how long the service member has been married and the typical frequency of PCS moves in their community.

Service members and their spouses frequently cite child care costs as a reason why the spouse does not work full time.[24] To account for the role of child care costs in labor force participation decisions, we make a final adjustment to military spouses' predicted labor force participation such that those whose predicted earnings do not exceed predicted child care costs by at least 20 percent are instead assumed to be out of the labor force (and therefore do not pay for child care).[25] The effect of other child care responsibilities is captured by allowing labor force participation and earnings to vary based on the number of children a family has; those with more children are less likely to be in the labor force and are estimated to earn less (often because of a reduction in work hours) when they do work.

When making a retention decision, service members and their families have expectations about what the military spouse would earn if the service member were to leave the service, and these expectations are incorporated into the retention model. We again use ACS data, this time estimating earnings for spouses of full-time employed veterans ("veteran spouses"). These estimates do not fully capture the variation in earnings of veteran spouses that comes from accumulated PCS moves. To account for this variation, we adjust predicted earnings for veteran spouses, using a long-run PCS penalty based on the expected number and frequency of PCS moves that they have experienced. As a result, veteran spouses in communities with infrequent PCS moves or those who are recently married are expected to have higher-than-average earnings, while those who have been married for longer or have moved frequently are expected to have lower-than-average earnings.

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[24] Office of People Analytics (OPA), *2021 Survey of Active Duty Spouses: Tabulations of Responses*, Report No. 2022-053 (OPA, July 2022).

[25] Calculation of predicted child care costs is discussed in Appendix F.

Predicted earnings potential (that is, earnings conditional on being in the labor force) for spouses of enlisted members and officers is shown in Figure 6 alongside earnings potential for veteran and civilian spouses. Civilian spouse earnings represent estimates from ACS data before any adjustments are made; the difference between civilian and military spouses' earnings potential shows the full effect of military-specific challenges on earnings for spouses who are in the labor force. This effect is larger for female service members whose spouses are likely to be male and who therefore earn more and are more severely impacted by career disruptions. The effect is also larger for officers, who (in the communities we study) make PCS moves more frequently and whose spouses typically have higher education levels.

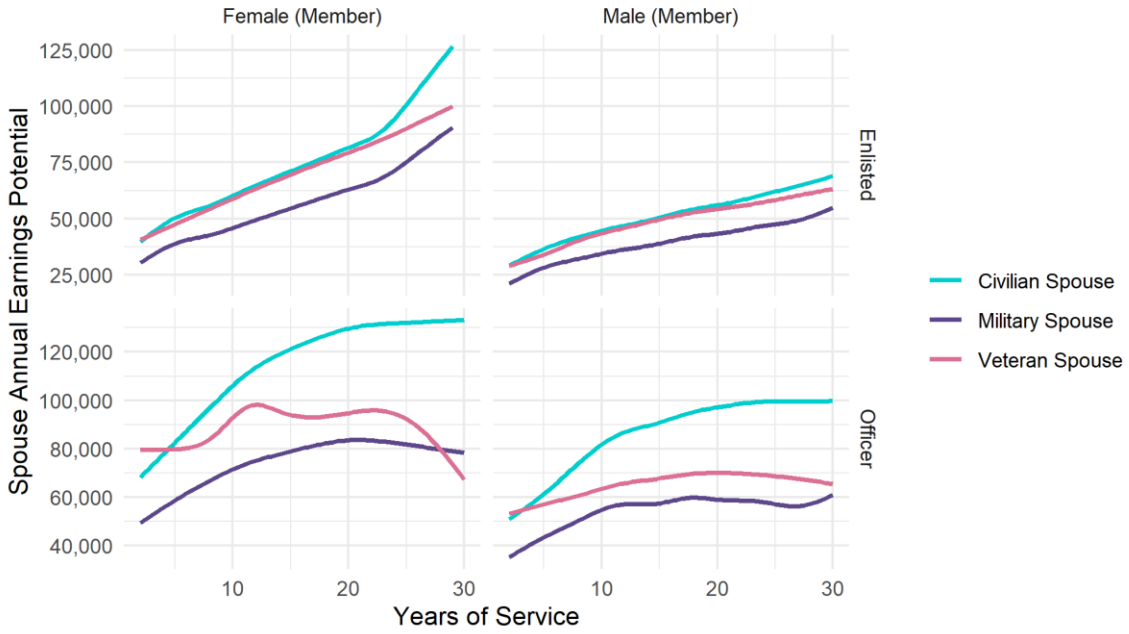

Figure 6. Estimated Earnings Potential for Spouses of Service Members, Veterans, and Civilians

Figure 7 compares earnings potential for spouses of soldiers in ADA to their expected earnings if the member were to leave the service at 4 YOS and at 20 YOS. The difference between these estimates reflects the factors discussed above: higher unemployment, greater underemployment, and slower earnings growth over time as a result of PCS moves. For a service member at 4 YOS who is considering whether to leave or stay in the military, the shaded blue area represents the loss in their spouse's cumulative earnings potential. The shaded green area represents the loss in the spouses' earnings potential if a service member remained in the military from 20 to 30 YOS. Note that the green line never reaches the blue line; even after the member leaves, military spouses' earnings never reach the level that they would have been at had the service member left earlier; the damage to the earnings

potential is permanent. In addition to the loss of earnings potential shown in Figure 7, military spouses have lower labor force participation, as discussed above. After accounting for these differences in labor force participation, spouses of soldiers in ADA are expected to earn on average $16,202 less per year than comparable veteran spouses.

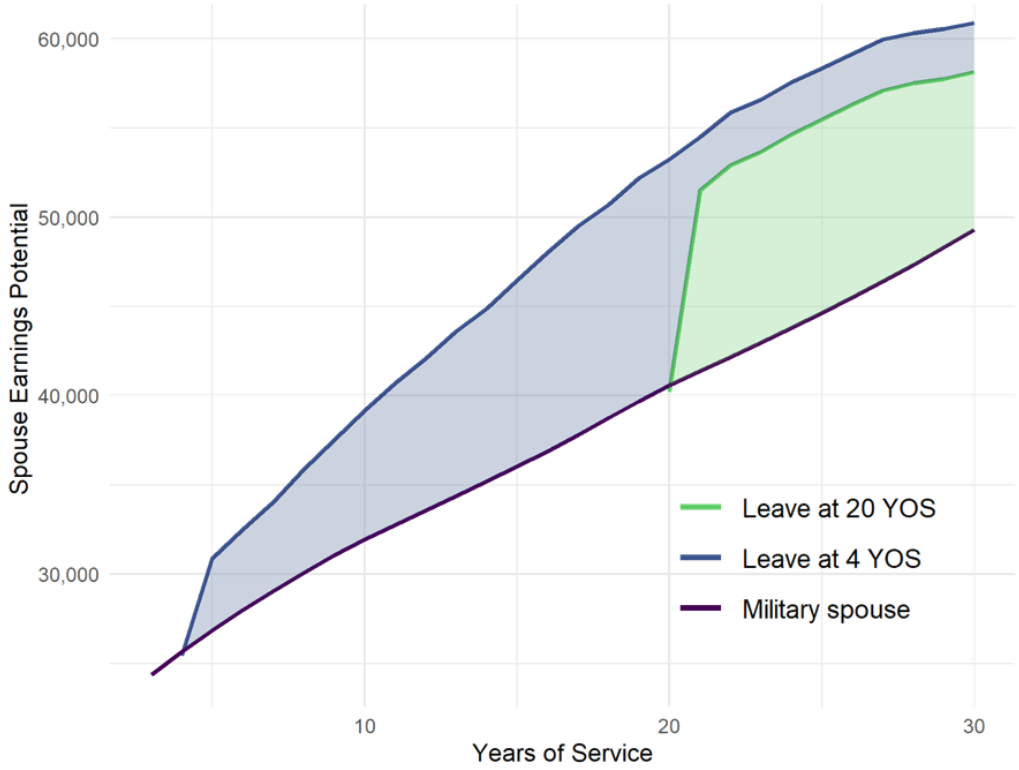

Figure 7. Comparison of Predicted Earnings of Military Spouses with Those of Veteran Spouses, Conditional on Being in the Labor Force, for enlisted Soldiers in ADA

D. Discretionary Household Income

Findings from qualitative analysis in Volume I of this report make it clear that the household's discretionary income is a key determinant for retention decisions. In particular, the value of in-kind benefits like health care and costs of necessary expenses like housing are critical components of households' financial well-being and are important considerations for military households deciding whether to leave or stay in the service. In calculating discretionary income, we include expenses that either vary significantly in versus out of the military, directly correspond to components of military compensation, or featured prominently in our focus group discussions. The resulting list includes six types of expenses: housing, food, transportation, child care, health care, and taxes.[26] To

[26] Calculation of necessary household expenses is discussed in Appendix F.

comprehensively characterize service members' financial considerations and incorporate them in our econometric model of retention decisions, we use these expense categories and household income to construct household discretionary income.

Household discretionary income is equal to the service member's (or veteran's) pretax earnings plus the spouse's pretax earnings (if applicable) minus necessary expenses and taxes. Figure 8 shows an example of the discretionary household income calculation and how discretionary income compares for similar households in the military versus if they were to leave the service. This example shows an E-4 in ADA with one child and a spouse who is employed in a civilian job. The two columns on the left break down household income and expenses for the household while the E-4 is in the military; the black box in the military household income column represents RMC for this household. RMC excludes S&I pays and bonuses, but includes a tax advantage to account for the fact that some income in the military is tax-free.

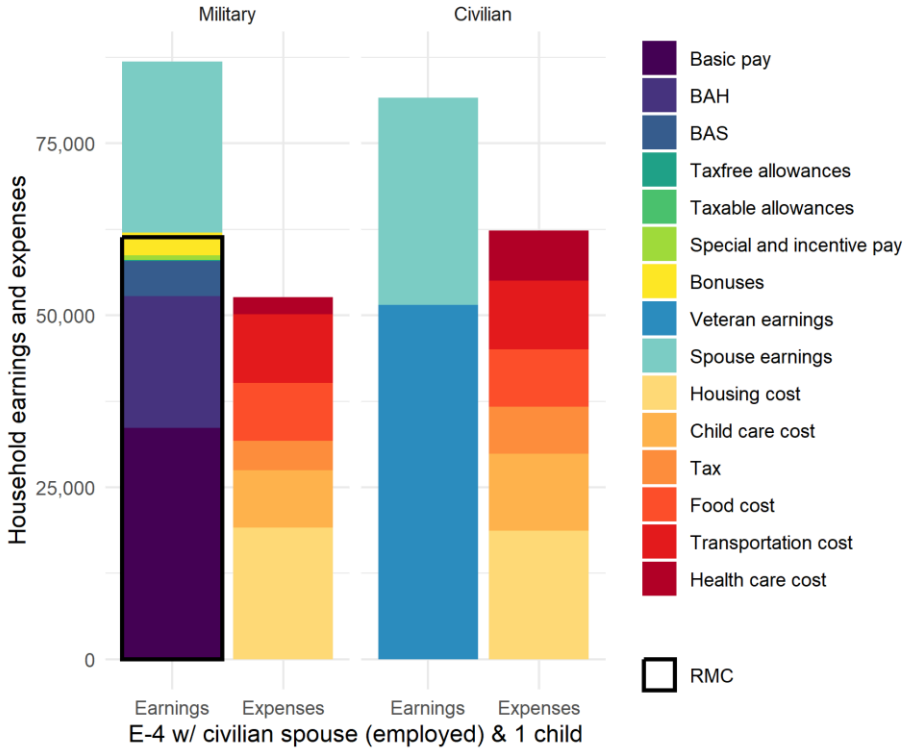

Figure 8. Discretionary Income Calculation for an E-4 in ADA with One Child and a Spouse Who Is Employed

In this example, RMC is almost exactly equal to the service member's total pretax cash compensation. Service members in this community receive S&I pays and retention bonuses, which happen to be approximately equal in size to the tax advantage that RMC includes, but this is not necessarily always the case. Discretionary income, the difference

between the earnings column and the expenses column, is notably higher in the military than it would be if the member left the service. This is primarily due to lower earnings for the member and higher household expenses. While the spouse is predicted to earn more if the service member were to leave the military, this increase in earnings would not fully offset the lower pay the service member would expect as a veteran. Additionally, the costs of child care and health care are lower for the household while the E-4 is in the military, due to military benefits. Transportation costs are unchanged, since both adults work in both scenarios, and predicted housing costs are similar in both cases, since most soldiers in ADA are not stationed in areas with particularly high costs of living. Thanks to tax-free allowances, the household's tax burden is slightly lower in the military even though pretax household income is higher. In this example, the discretionary household income is approximately $35,000 in the military and $18,000 if the E-4 decides to leave.

This comparison is available in Appendix F for E-4s, E-6s, and E-8s in each of the enlisted communities selected for study and for O-3s and O-5s in each of the Officer communities. While there is variation both across communities and over the course of the military career, in most cases, military households' discretionary income exceeds that of similar veteran households. Mid-career Marines in air traffic control are the notable exception: Their predicted veteran earnings are high enough that discretionary income in the military falls short of what the household could earn in the civilian market. Marine Corps SMEs highlighted air traffic controllers as an occupation group facing retention challenges. The discretionary income comparison changes after 20 years of service; retirement-eligible members typically expect to earn more if they leave the military, once retirement benefits are added to the calculation of veteran household earnings.

3. Analysis of Military Households' Retention Decisions

To evaluate retention under different military compensation policies, we need a framework that can systematically account for military pay, potential civilian earnings, the effect of service on military spouses' careers, and nonmonetary factors. IDA's military career analysis toolkit (MCAT) was developed specifically to account for both monetary and nonmonetary factors in military career decisions and to provide credible evaluations of the impact of compensation policy changes on retention outcomes.[27] For this study, we extend MCAT to incorporate the effect of military service on military spouses' careers.[28] We model the retention decision as a household-level decision, taking into account the outcomes for both the service member and their spouse (or potential future spouse, if the service member is single). This formulation of the decision problem is informed by our qualitative findings and is a major departure from previous quantitative work on retention. While other approaches are able to capture the relationship between military compensation and retention, the extended framework in MCAT makes it possible for us to analyze the impact of compensation and personnel policy changes affecting military compensation, spouse income, and household expenses.

MCAT is a combination of an individual-level economic decision model and a military career simulation framework. Individual-level models account for the varying circumstances that different individuals face, which is important for analyzing the impact of policies that affect service members differently based on factors such as marital status. The economic model we use is an instance of an individual-level dynamic discrete choice (DDC) model. Dynamic models offer a framework for connecting current decisions with future outcomes. Importantly for this application, dynamic models capture the fact that current decisions have consequences for future decisions; a service member who decides to stay in the military at 12 years of service is very likely to continue to stay all the way until 20, as focus group participants made clear. Previous studies of retention behavior have used this methodology to link compensation policies and retention behavior.[29] However,

[27] Jacklyn Kambic et al., *Implementing Dynamic Discrete Choice Models of Military Retention*, IDA Paper P-33602 (Institute for Defense Analyses, September 2023).

[28] This section provides a non-technical overview of the model. For the technical details, see Appendix G.

[29] Michael G. Mattock and Beth J. Asch, *The Dynamic Retention Model: Theory, Estimates, Innovations, and Extensions* (RAND Corporation, 2023), https://www.rand.org/pubs/research_reports/RRA2581-1.html.

none of the previous studies accounted for total military compensation, linked service members to their potential civilian careers based on occupation and demographics, and incorporated the effect of military life on current and future earnings of military spouses.

MCAT links individual service members' observed decisions to monetary and nonmonetary variables that are relevant to these decisions. In addition to affecting the household's discretionary income in many ways, a military career creates other challenges for military families, as we documented in focus groups. Some military assignments are very difficult and require service members to spend extended time away from their families, adjusting to living abroad can be challenging for families, and frequent PCS moves can be disruptive. We incorporate these nonmonetary factors into the MCAT model to ensure that it accurately reflects the trade-off that service members face; some service members may prefer to leave the military because of these nonmonetary challenges even if doing so negatively impacts their household finances. The model also incorporates two unobserved factors: an idiosyncratic shock that captures temporary, decision-specific circumstances beyond those observed in the data and a permanent "taste" parameter for each service member to capture the fact that a military career is a better fit for some service members than for others.

The simulation framework provides a representation of service members' expectations about their future careers if they decide to remain in the military. Our approach to simulations uses observed career histories of service members who remained in the military to generate hypothetical career trajectories for service members who left.[30] Using observed career histories enables the simulation framework to capture career features that are specific to each community, such as frequency of PCS moves, promotion or advancement rates, and assignment characteristics, such as sea duty or being stationed abroad. In addition to simulating features of the career, we simulate family outcomes, including changes in marital status and number of children. These expectations about family outcomes capture the fact that service members who are currently single or have no children still consider the possibility that in the future they will marry and may have children and that their military career will have an impact on their future family.

MCAT's combination of an individual-level decision model and simulation framework makes is specifically designed to evaluate what service members would have done if they faced a counterfactual compensation policy. Using MCAT, we can evaluate the impact of any change in military compensation, such as an increase or decrease in total pay or the timing and size of retention bonuses. The simulation framework creates future career expectations, including military compensation and military spouses' incomes, under different assumptions about future policies. The DDC model connects these changes to the

[30] For the military career simulations, we match on pay grade, current assignment location, and time on station. For family outcomes, we match on age, gender, current marital status, and number of children.

retention decisions that service members make. Comparing model-predicted decisions under alternative policy scenarios to observed decisions provides an estimate of the impact of the counterfactual policies on retention.

A. Model of Household Career Decisions

An economic model of decisions links observed variables to observed outcomes and formulates a series of rules for how the decisions are made. The model uses a mathematical representation of the value that individuals place on monetary and nonmonetary factors affecting their decisions. Individuals are more likely to make choices that correspond to higher-valued outcomes. Unobserved factors are built into the model to account for variables that are known to the household but not to the researcher; some are transitory, such as a particularly good job offer that a service member gets, while others are persistent, such as a family tradition of military service. Of course, no model can perfectly describe human behavior; the purpose of this model is to accurately capture the relationship between discretionary income and retention decisions.

The MCAT decision model conceptualizes individuals making retention decisions by comparing their expected lifetime utility of staying in the military versus leaving, then choosing the best available option. If a service member stays in the military, they get the monetary and nonmonetary benefits and costs associated with the military career, including its impact on their spouse, for the duration of their commitment. After the end of the commitment, they get to make another decision, and so on, until the end of a military career at 30 years of service. If a service member decides to leave the military, they get the benefits and costs of a civilian career for them and their spouse until the end of their careers, with no opportunity to return to the military at any time.[31] Service members look to the future and consider the lifetime utility of their career when making their current decision; a large part of the value of staying in the military early on comes from the opportunity to make another decision a few years later, which is not available to service members who leave right away.

In the model, a decision point occurs when a service member has the opportunity to leave the military. We define and identify these points in the data. Using the ADM, we find dates associated with the end of a service contract for enlisted service members or the end of the service obligation for officers who are under an obligation.[32] In cases where a service member extends their commitment at a point before their current commitment expires, we

[31] We do not model reserve component participation or retention in this analysis.

[32] Many service members make a new commitment in the form of a new contract or obligation at some point before their current commitment expires. We attach the additional obligation to the decision point at the end of the original contract. This allows us to be consistent in how we treat retention decisions across services, since some services in some situations forgive existing obligations when a new contract is signed and others do not.

define the decision point as the end of the original commitment and use the length of the extension as the new obligation. For officers who are not under contractual obligation and for Army soldiers who are on indefinite contracts, we define decisions at the end of tours or assignments and assume that a decision to stay in the military is associated with an additional 3-year assignment the service member intends to complete. Using these definitions, a decision point in the model is always an opportunity for a service member to leave the military and is associated with an additional service commitment of a specific length if they decide to stay.[33]

In the short run, the value of leaving the military is the expected present discounted sum of utility from the discretionary income that the household is projected to have in the civilian labor market. The short run is defined as being the same length as the term for which the service member is considering staying in the military. In other words, the service member is comparing a military commitment of a particular length to the value they would receive over the same period if they instead worked in a civilian career. This formulation allows us to directly tie the utility of discretionary income over the next few years to the retention decision that service members are making.

In the long run, the value of leaving the military is the total value associated with the remaining civilian careers of the household members. There are a multitude of decisions and possible scenarios involved: Individuals may change careers, get additional education, or start a business. It would be infeasible to account for all of these possibilities, and it is unnecessary; our estimation method only requires that the value associated with leaving the military be defined and known. We summarize the long-run value, using the quantile of the civilian household income distribution that matches household income at the end of the short run, as a representation of the household's socioeconomic position.[34] We allow this approximation to enter the model flexibly rather than attempting to convert it to a dollar value. We expect (and find) that households strongly prefer decisions that lead them to being at a higher quantile of income in the long run.

Unlike the value of leaving, the value of staying in the military has both monetary and nonmonetary components. In the short run, the monetary value of staying at a decision point is the expected present discounted sum of utility from the discretionary income that the household is projected to have if the service member remains in the military. In

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[33] There is one exception to this. Some first-term Navy contracts have a "hard" and "soft" end of obligated service. For example, a "hard" end may be at 4 YOS and a "soft" end at 6 YOS. A sailor would have an opportunity to re-enlist at the "hard" end of obligation even though they do not have an opportunity to leave the Navy at that point.

[34] In order to use one characterization for both married and single households, we use the married household income for this calculation. If a service member is single, then at the end of the short run we compute the household income *as if they were married* to a civilian and use the quantile that this income corresponds to.

addition, the value accounts for observed nonmonetary factors, such as family outcomes, to capture the fact that the military career imposes challenges on the family that a civilian career does not. This value also incorporates the unobserved heterogeneity ("taste") parameter for military service to represent individuals' persistent preferences for a military versus civilian career. Finally, this value includes an idiosyncratic unobserved parameter to represent unique circumstances that a particular service member's family may be facing at a specific point in time.

The long-run value of staying in the military is the value associated with being able to make another retention decision in the future. At the end of the commitment associated with the short run the service member can again decide to stay in the military or leave. If they leave, they receive the value associated with leaving at that future decision point. If they stay, they receive the short run value associated with the next commitment and then get to make yet another retention decision. This dynamic process continues until the member either chooses to leave or reaches thirty years of service.[35] Because service members consider their next decision when making the current one, expected changes in monetary or nonmonetary factors in the future will affect current behavior. In particular, this means that service members consider the impact of their decisions on the future earnings of their spouses. Table 2 summarizes the elements included in the short-run value and the long-run value for leave and stay decisions.

Table 2. MCAT Model Elements

Decision	Short-run value	Long-run value
Leave	Household discretionary income	Household income quantile
Stay	Household discretionary income Family outcomes • Marital status and length of marriage • Number and ages of children Military career outcomes • Pay grade • Time on station and PCS moves • Assignment abroad • Sea duty (Navy only) Unobserved heterogeneity • Permanent "taste for military service" • Transitory idiosyncratic factors	Value of the next decision point

[35] Although some members can serve longer than 30 YOS, very few do. In addition, retention decisions of members beyond 30 YOS are unlikely to be made in the same way as those of members who are much earlier in their military careers.

Nonmonetary aspects of military careers are an important factor in the calculus about retention decisions. Focus group participants emphasized that military careers can make it difficult to balance work and family life. Long and unpredictable hours can put a strain on service members' relationships and require their spouses to be the primary (sometimes sole) care takers for any children. The model includes marital status, number of children, and presence of young children in the family to capture this dynamic. In addition, the model includes some nonmonetary aspects of a military career, such as assignment abroad, sea duty (for the Navy), and an indicator for pay grade group to capture the nature of the work that a service member is likely performing.

Some nonmonetary characteristics are incorporated into the model through an effect on the persistent unobserved heterogeneity (sometimes called a "taste for military service") parameter. In particular, the service member's gender, race, ethnicity, and community are incorporated in this manner. We use a discrete distribution with three levels to model taste for military service, with the proportion of service members at each level depending on gender, race, ethnicity, and community. This formulation allows the model to appropriately capture the selection process that happens over multiple retention decisions. Some service members dislike the military and will leave no matter what; some can be persuaded to remain, depending on the circumstances; and some strongly prefer to make the military a career. Those who dislike the military leave early on in their careers; by the middle of a career, the force is composed mostly of people who have a relatively high taste for service. As a result, changes in military compensation and other policies are most effective early on, when there are still marginal service members who can be influenced. Additionally, if higher pay early on in their careers persuades these marginal service members to stay, they will likely also require more compensation later on.

We rely on standard econometric techniques and assumptions to estimate the model. We follow Arcidiacono and Miller's conditional choice probability estimation method, which greatly simplifies the computational complexity of the estimation algorithm.[36] Service members are assumed to discount the future at an annual rate of 12 percent for enlisted service members and 6 percent for officers.[37] To ensure that the model is representative of behavior across many different communities and not dominated by a few large communities, we reduce the influence of particularly large communities (e.g., infantry) by sampling from the available population. Our estimation sample is constructed by randomly selecting service members from the larger communities so that no community has more than five times as many observations as the smallest one (Army Cyber for both

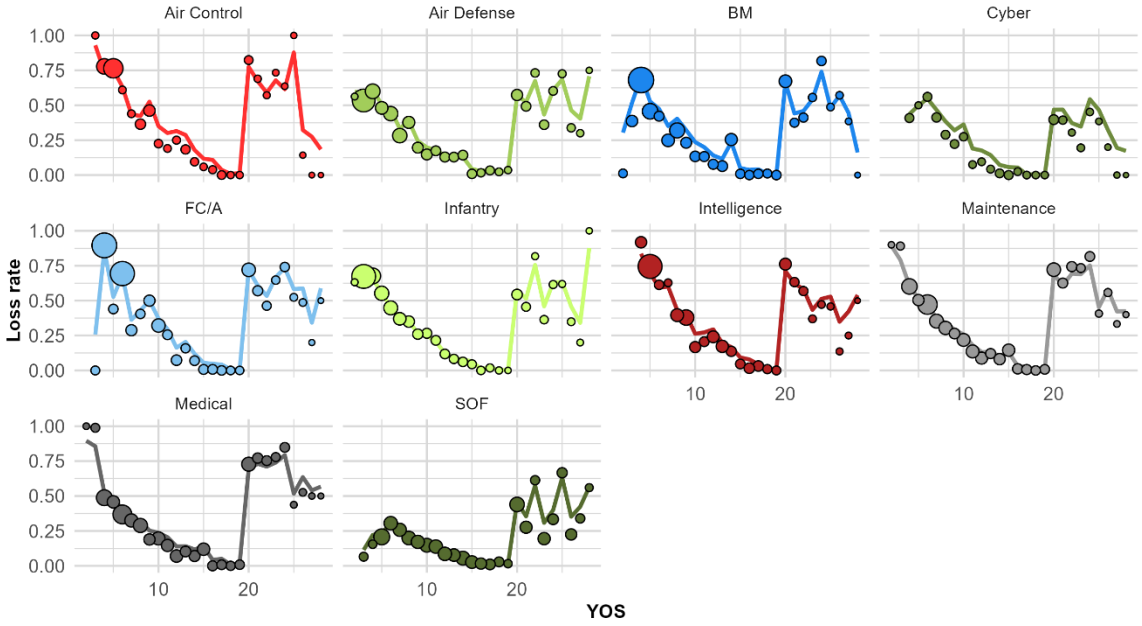
[36] Peter Arcidiacono and Robert A. Miller, "Conditional Choice Probability Estimation of Dynamic Discrete Choice Models With Unobserved Heterogeneity," *Econometrica* 79, no. 6 (2011): 1823–67, https://doi.org/10.3982/ECTA7743.

[37] See Kambic et al. (2023) and Mattock and Asch (2023) for a discussion of the assumptions around discount rates and potential alternatives.

enlisted and officers). We estimate the models using 63,913 observed decisions from 43,653 unique enlisted service members and 10,716 decisions from 6,327 unique officers (between 6,000 and 7,000 decisions per year for enlisted service members and approximately 1,000 decisions per year for officers).

B. Model Fit and Parameter Estimates

The model captures the essential pattern of service members' stay and leave decisions. Figure 9 plots the actual loss rate by enlisted community across YOS against the model predictions.[38] Although the overall pattern of losses is similar across communities, the levels vary significantly; early career loss rates in Air Control and FC/A are around 75 percent but only about 35 percent in SOF. Post-retirement loss rates also vary significantly, with medical and maintenance around 75 percent but Cyber below 50 percent. Appendix H includes figures that show model fit specifically for married service members and female service members.



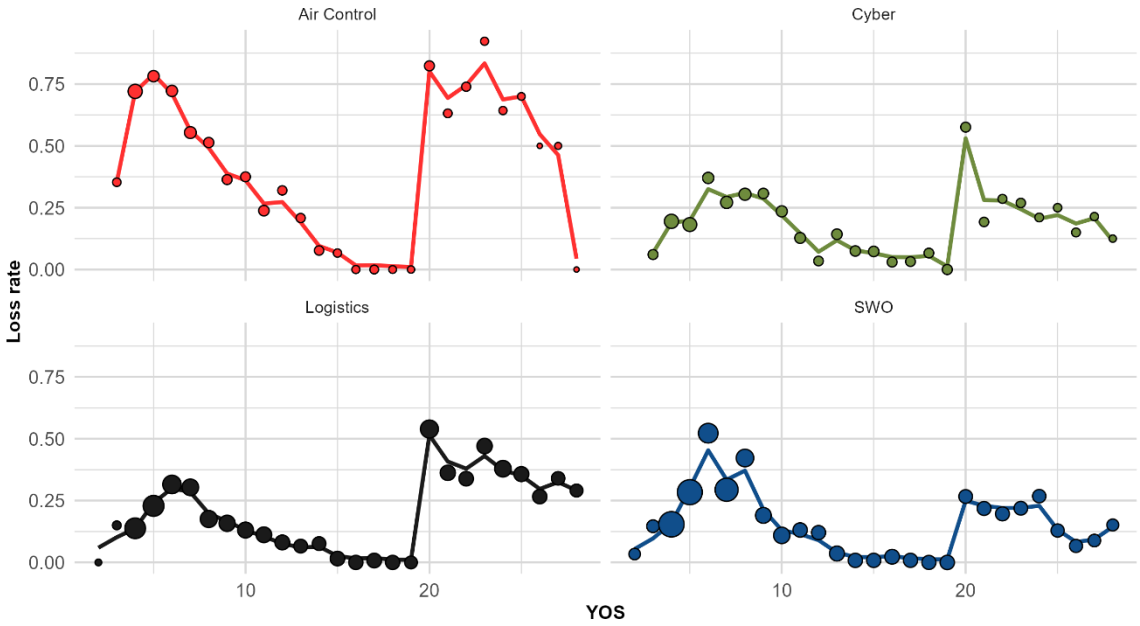
Note: Points represent average loss rates by YOS for observed decisions in the data; the size of the points corresponds to the number of observed decisions. Lines are predictions from the model.

Figure 9. Enlisted Model Fit

The officer model, which is estimated separately from the enlisted model, captures the retention of officers across four different communities well. Figure 10 shows the fit of

[38] For communities other than Cyber, Air Control, and Intelligence, the figure shows out-of-sample fit predicted on a holdout sample. These three communities are very small, so it was not possible to hold out sufficient observations.

the officer model.[39] In general, officer retention is significantly higher than enlisted retention, except in Air Control. The Air Control officer stay-versus-leave decisions look more like decisions in enlisted communities than decisions in other officer communities. Despite this, the officer model is able to match the retention pattern across YOS in Air Control as well as in the three other officer communities we selected for study: Cyber, Logistics, and SWO. As with the enlisted model, Appendix H includes figures that show model fit for officers who are married and for female officers.



Note: Points represent average loss rates by YOS for observed decisions in the data; the size of the points corresponds to the number of observed decisions. Lines are predictions from the model.

Figure 10. Officer Model Fit

Model parameter estimates for the MCAT decision model provide an insight into how monetary and nonmonetary factors affect retention behavior. Table 3 shows estimates for our preferred enlisted model. The values shown are the parameters of the utility function that translates observed annual variables into a numeric representation of the relative value to the service member of staying versus leaving the military. Large positive parameters mean that the variable is strongly associated with the service members making a choice to stay, suggesting that they place a high value on that variable, and vice versa. For example, a $10,000 increase in disposable income for a year generates 0.112 units of utility, while being stationed abroad for a year decreases utility by 0.262. These estimates imply that

[39] For logistics and SWO, the figure shows out-of-sample fit. For Cyber and Air Control, the number of observations was too small to create a holdout sample.

service members' dislike of assignments abroad is, on average, similar to a $23,400 reduction in discretionary income.

Household discretionary income has a strong positive effect on retention, as does the future household income quantile. The estimates of the two parameters imply that households value an increase of 10 percentiles in the long-run household income distribution (which, between the 60th and 70th percentiles, corresponds to almost exactly $27,000 per year) the same as $321,000 today.[40] This confirms that military households place relatively high weight on their future financial state. The decisions that see the largest changes in future household income quantiles are those near retirement eligibility, implying that service members place a large value on the military retirement benefits (possibly even over and above their nominal monetary value).

Table 3. Enlisted Model Parameter Estimates

Parameter Definition	Estimate
$10,000 of discretionary income	0.112
Household income quantile	35.941
Married (spouse is a civilian)	-0.081
Married (spouse also a service member)	0.045
Number of children	-0.158
Presence of young children	-0.235
Junior enlisted pay grade	-0.671
Senior NCO pay grade	0.377
Warrant officer pay grade	0.379
Sea duty (Navy only)	-0.438
Stationed abroad	-0.262
First value of taste for military service	-0.620
Second value of taste for military service	-1.897
Third value of taste for military service	-4.214

Note: All parameter estimates are significant at the $p \leq 0.05$ level in the second stage of the estimation procedure. However, computational limits make it impractical to bootstrap standard errors for the estimation overall.

Model estimates are consistent with quantitative findings that a military career is associated with additional challenges for military families. The parameter estimates for variables that capture having a spouse, children, and in particular young children are all negative and relatively large. For example, the disutility associated with having young

[40] A 0.1 increase in the quantile of long-run household income distribution generates 3.6 units of utility (0.1 * 35.941). Generating the same increase in utility using today's discretionary income requires $321,000 (32.1 * 0.112).

children in the military is equivalent to a loss of approximately $20,000 in discretionary income. Each additional child (up to three) also has a significant negative impact on the value of staying in the military.[41] This negative impact is partially offset by the reduced cost of child care that military families with access to child development center (CDC) care face relative to civilian families.

Estimates for the parameters that capture aspects of the military career are also consistent with findings from focus groups. Junior assignments are not as well-liked as more senior ones, and being stationed abroad or on sea duty is also associated with lower retention probabilities. For example, sea duty for the Navy has a similar effect on retention as a decrease of $40,000 in discretionary income. Of course, the Navy provides sea duty incentive pays and often uses other bonuses and incentives to compensate sailors for going to sea, something the model suggests is necessary. All other things being equal, senior NCOs and warrant officers value their assignments significantly more than junior enlisted and junior NCOs do, requiring relatively less generous compensation to retain them.

Parameter estimates for our preferred officer model also agree with both the findings from the enlisted model and the results of the qualitative analysis. Table 4 shows the parameter estimates. Most of the estimates in the officer model are less extreme, reflecting the lower discount rate and the higher overall retention rates relative to the enlisted population. Officers appear to place somewhat less value on an equivalent amount of discretionary income, although overall discretionary income continues to be a key driver of retention, since officers' incomes are significantly higher than those of enlisted service members. Unobserved heterogeneity is estimated to contribute more to officers' retention decisions than to enlisted members'—that is, officers tend to have higher retention probabilities for reasons that are not captured in the observable data.

Table 4. Officer Model Parameter Estimates

Parameter Definition	Estimate
$10,000 of discretionary income	0.074
Household income quantile	31.453
Married (spouse is a civilian)	-0.022
Married (spouse also a service member)	-0.009
Number of children	-0.082
Presence of young children	-0.103
Junior officer pay grade	-0.791
Sea duty (Navy only)	-0.413
Stationed abroad	-0.021

[41] There are not enough data to estimate the impact of any additional children beyond the third.

Parameter Definition	Estimate
First value of taste for military service	0.132
Second value of taste for military service	-0.934
Third value of taste for military service	-3.360

Note: All parameter estimates are significant at the $p \leq 0.05$ level in the second stage of the estimation procedure. However, computational limits make it impractical to bootstrap standard errors for the estimation overall.

C. Impact of Military Spouses' Reduced Earnings Potential on Retention Decisions

Before turning to policy evaluations, we use the model to evaluate the role that military spouses' reduced earnings play in service members' retention decisions. Recall that military spouses are more likely to be out of the labor force, more likely to be unemployed, earn less than their civilian counterparts, and have their careers interrupted by PCS moves, leading to lasting damage to their earnings potential. We remove all of these effects in the simulations for this evaluation. For spouses of enlisted members this corresponds to, on average, $9,454 in discretionary income per year ($26,852 for spouses of officers). The increases are larger late in the career, when the spouses' earnings potential is highest. This is not a policy evaluation; there is no policy that could achieve this outcome. Instead, removing these effects provides a way to measure the total impact on retention resulting from military spouses' lost earnings potential.

MCAT outputs a probability of staying in the military versus leaving for each service member in the dataset, given the monetary and nonmonetary variables that go into the model. Model parameters that are estimated from the data govern the relationship between the variables and the predicted probabilities; they determine how the probability of staying versus leaving would change if household discretionary income or other features of the military career were to change. This method of analyzing retention behavior under conditions that were not observed in historical data is the kind of counterfactual analysis that this framework is designed for. For a particular counterfactual analysis, we make adjustments in the simulated data to military compensation, spouses' incomes, expenses, or other aspects of the military career. In some cases, these changes include second-order effects; for example, increased earnings for military spouses cause more spouses to join the labor force. Next, we use the estimated model parameters to predict the retention decisions that service members in our dataset would have made under the counterfactual scenario. The impact of the change is measured by the difference in retention decisions between the observed data and the counterfactual scenario.

This approach to policy analysis does not impose additional assumptions about future cohorts of military recruits, but it limits the model's ability to predict what the impact of a policy change would be in the future because of possible changes in the military population

over time. In addition, it does not account for the possibility that major changes to compensation policies or military careers would also impact decisions to join the military. For example, fewer PCS moves or free child care may attract more service members whose spouses have demanding careers. These potential new military families may not make the same retention decisions as those who joined under a different policy environment. Finally, care should always be taken when extrapolating model predictions well outside of the range of available data. When evaluating the impacts of extremely large changes to military compensation of the kind that we have not seen historically, the model will necessarily be less accurate than when evaluating the changes of a similar size to what has been observed in the past.

Figure 11 shows the impact on retention of removing the effects of military-specific challenges on military spouses' careers, or, equivalently, the effect of increasing military spouses' earnings to match those of similar civilians. Results of counterfactual policy evaluations in the next section will be shown in the same format. The *y*-axis is retention relative to the baseline (shown above in Figure 9). We show the impact overall and then break it down for the service members early on in their career (YOS 2–6), those who have already made at least one retention decision (YOS 7–12), married members whose spouse is a civilian, and women. The overall loss of retention due to the challenges that military life imposes on spouses' careers ranges between 5 percent and 12 percent, depending on community. The effect is particularly high in communities such as FC/A, Cyber, and Air Control where a lot of service members are married and have higher levels of education and technical skills, since their spouses also tend to have higher earnings potential. The impact is lower in communities such as SOF, where service members receive large bonuses and already have very high retention, and BM, where service members have relatively low levels of education and lower potential civilian earnings.

Figure 11. Retention Impact of Increasing Military Spouses' Earnings to Match Those of Similar Civilians, for Enlisted Communities

The impact of military spouses' earnings loss among officer communities is more variable, as shown in Figure 12. Three of the officer communities we selected for analysis—Cyber, SWO, and Logistics–have relatively high retention rates at baseline. Retention in these communities is relatively less affected, although the impact is still almost 11 percent for married officers in Logistics whose spouses are civilians. The impact is generally lower than for enlisted because the sensitivity of officers' retention decisions to changes in discretionary incomes is lower. The fourth community—Air Control—has relatively low retention rates and a retention profile across the career that looks more similar to that of the enlisted communities. Marine Corps SMEs indicated at the beginning of the study that the service is struggling to retain the needed number of both enlisted service members and officers in Air Control. The retention impact on this community is very large; for mid-grade officers and those married to civilians, retention is 15 percent to 20 percent lower than it could be if their spouses' earnings were not affected by the military career. Officers' spouses tend to have high earnings potential, and their careers are seriously disrupted by PCS moves and other challenges of military life. This suggests that the military is losing a significant number of service members in this community in particular due to the challenges that military life poses for their spouses' careers.

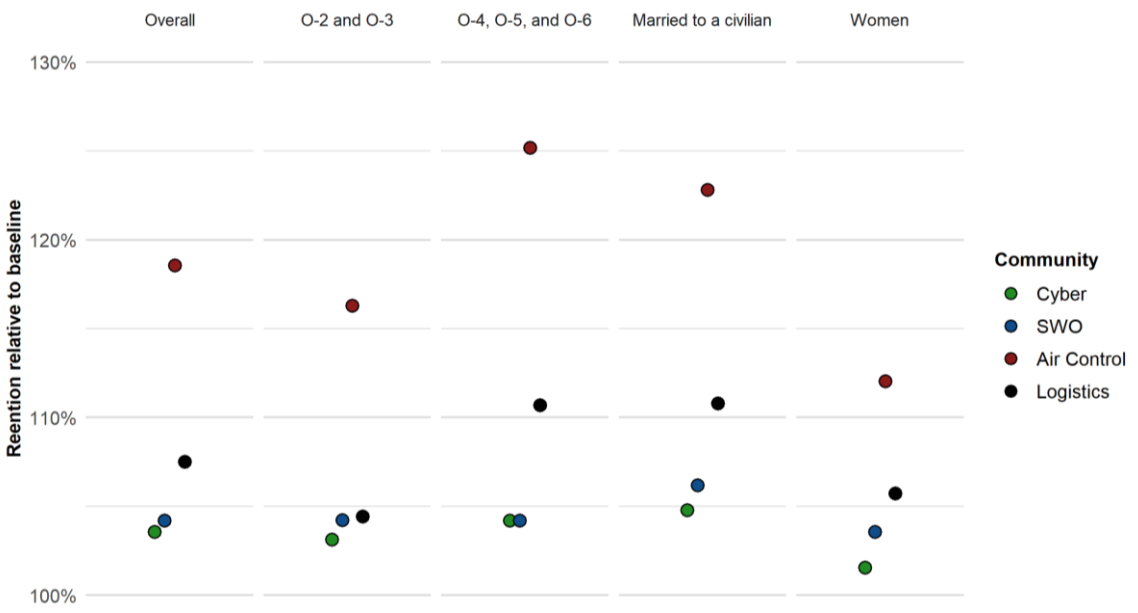


Figure 12. Retention Impact of Increasing Military Spouses' Earnings to Match Those of Similar Civilians, for Officer Communities

Restoring military spouses' earnings to match those of similar civilians has a meaningful impact on the retention of both enlisted service members and officers. This is unsurprising; we showed earlier in this report that military life imposes significant challenges for military spouses' careers that diminish their ability to contribute to household finances. One way the military already compensates for this loss of income is through higher pay and more generous benefits than many comparable civilian jobs. In some communities, such as enlisted FC/A, Cyber, and Air Control, the effect of lost spousal income is particularly large. Policies that mitigate this impact, such as reducing the frequency of PCS moves and increasing access to child care, are likely to be particularly effective at improving retention for these service members.

4. Policy Evaluation and Recommendations

The objective of this study is to determine whether the 70th percentile of comparable civilians' individual income is still the right benchmark for military compensation. In particular, the study focused on whether military-specific challenges that reduce military spouses' earnings necessitate an increase in the benchmark to ensure that the services can meet their retention needs. To evaluate whether a change in the benchmark is needed, we first use MCAT to predict the effect on retention of lowering military compensation to the current benchmark. We then evaluate whether using an alternative definition of the benchmark based on household income would be more effective. In addition to the analysis of the benchmark, we assess the potential for nonmonetary policies that mitigate the effect of military-specific challenges on military spouses' earnings potential to improve retention.

Retention rates from 2014 to 2022 serve as the baseline against which we evaluate potential changes in compensation and in nonmonetary policies. SMEs in each service and stakeholders in DOD indicated that retention overall has been adequate over this time period (although some specific communities are experiencing retention challenges). Our analysis and recommendations regarding changes to the military compensation benchmark focus on ensuring that compensation remains adequate to maintain retention and providing DOD with better tools and information to gauge the adequacy of military pay.

The first part of our analysis addresses a series of policy questions about the military compensation benchmark:

1. Is the 70th percentile of individual income for civilians with comparable education levels still the right benchmark for military compensation?
2. Should the benchmark be based on household rather than individual income?
3. Should the benchmark account for the effects of military-specific challenges on spouses' careers?

We find that the current 70th percentile military compensation benchmark is not adequate to ensure that the services meet their retention goals. The current level of military pay is well above this benchmark and compensates service members adequately for the challenges of military life, including the loss in military spouses' earnings. If military pay were set to a lower level that excluded the implicit compensation for spouses' lost earnings, retention would be significantly lower. In order for it to be a useful tool for measuring the adequacy of military compensation, we recommend that the benchmark be updated to reflect contemporary military compensation levels, in part to account for the effects of

military-specific challenges on spouses' careers. We do not recommend defining the compensation benchmark based on household income to accomplish this; instead, we recommend redefining the military and civilian income calculations so that the benchmark more accurately captures the comparison that service members actually make.

Evaluation of the military compensation benchmark is predicated on the current context and circumstances of military service, including the effects of military-specific challenges on spouses' earnings potential. If military life did not impact military spouses' earnings, military pay would not need to be as high to meet retention needs. The second part of our analysis considers the retention impact of policies that support military spouses' careers. If they are effective, these policies can increase spouses' earnings potential, leading to higher household discretionary incomes for service members' families while in service, as well as higher retention. Child care challenges and PCS moves were identified as the key military-specific challenges impacting military spouses' careers. To quantify the potential gains from addressing these challenges, we use MCAT to predict the retention impact of offering free child care to all military families and of reducing the frequency of PCS moves. It is beyond the scope of this study to evaluate the cost-effectiveness of these policies; as a point of comparison, we estimate the amount of military compensation that would be needed to achieve the same increase in retention as these policies.

A. Military Compensation Benchmark

The 70th percentile of individual income for comparable civilians is no longer an appropriate benchmark for military compensation. Military compensation is currently well above this benchmark—and has been for years. Finding that military pay is above the current benchmark no longer provides sufficient information to determine whether pay is adequate to achieve the necessary levels of retention, reducing the benchmark's utility as a tool for the DOD. The effect of lowering military compensation to the 70th percentile on enlisted military households' discretionary income is shown in Figure 13. The dashed line shows discretionary household income under current military pay, averaged across selected enlisted communities. The solid lines represent discretionary income if military compensation were set to the 70th percentile of the U.S. civilian individual or household income distribution, adjusted for the age and education levels of the military population. Setting compensation to the 70th percentile of the individual income distribution would reduce discretionary income of enlisted households by more than $25,000 per year on average across an individual's career.

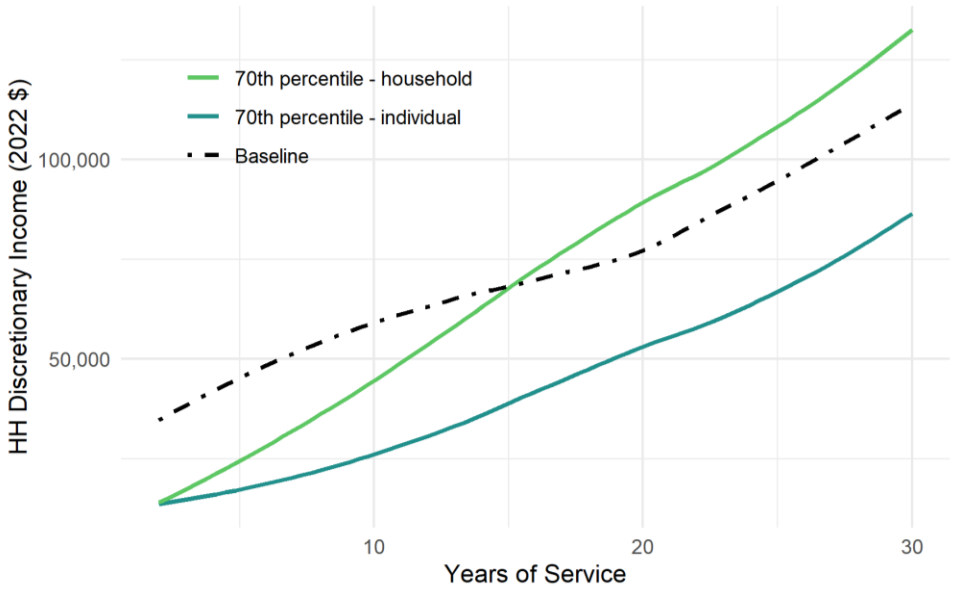


Figure 13. Discretionary Income Under Contemporary Military Compensation Structure Compared to Discretionary Income if Military Compensation Were Set to the 70th Percentile of the U.S. Civilian Individual or Household Income Distribution (Adjusted for Age and Education Level)

Reducing military compensation to the 70th percentile benchmark would be a large pay cut for the entire force, and we would expect it to significantly reduce retention. We evaluate this impact using MCAT by comparing actual retention outcomes with predicted outcomes with compensation set to the benchmark. Figure 14 plots the predicted retention effect for the enlisted communities. If military compensation were set to the 70th percentile of civilian earnings, retention of enlisted service members would have been 24 percent to 47 percent lower across the selected communities. In some communities, retention of early and mid-career enlisted service members would have been less than half of the baseline level. Service members late in their careers would be less impacted by this change, but both junior and mid-career enlisted service members would drastically change their retention behavior. The level of compensation implied by the current benchmark would not sustain the force. Comparing military pay to this benchmark does not provide an informative measure of the adequacy of military compensation relative to civilian pay.

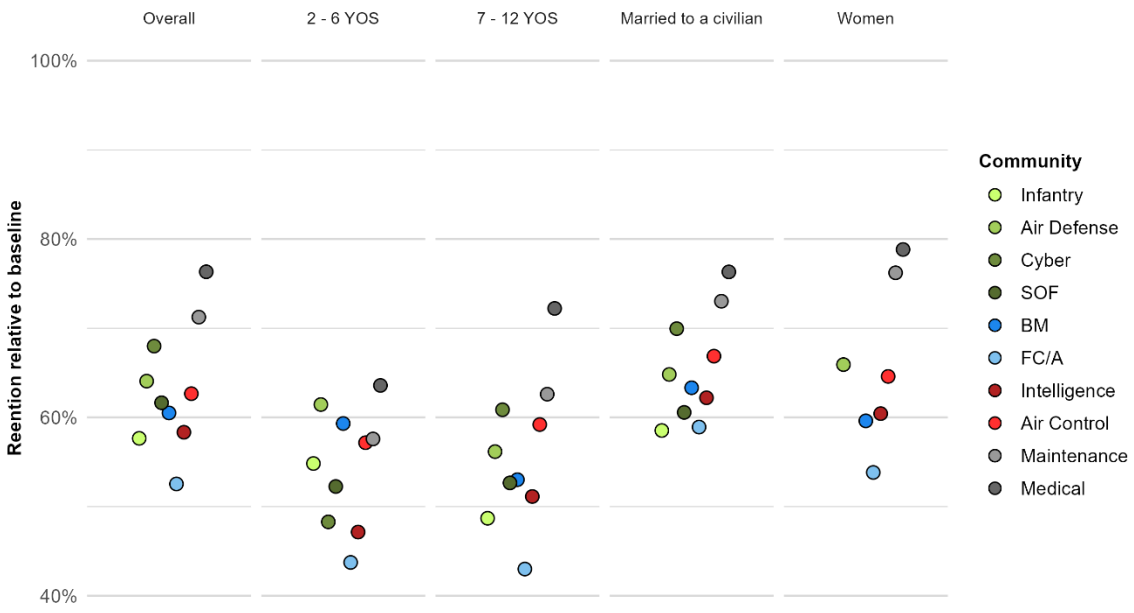


Figure 14. Retention Impact of Setting Military Compensation to the 70th Percentile of Individual Income

Given that the current 70th percentile benchmark is inadequate, we consider other possible measures of individual and household income that could define the benchmark. Figure 15 plots military compensation at each YOS, averaged across the selected enlisted and officer communities, against percentiles of the U.S. civilian individual and household income distributions. Civilian income distributions are based on ACS data on earnings of full-time employed civilians, adjusted at each YOS to match the distribution of age and education of the selected military population. Consistent with the findings of previous studies evaluating how military compensation compares to civilian earnings, pretax current-year cash compensation for enlisted members falls above the 90th percentile of the distribution of individual income for comparable civilians during about the first half of the career, then is between the 80th and 90th percentile during the second half of the military career.

The military compensation benchmark should be based on individual rather than household income. The comparison in Figure 15 demonstrates that household income distribution is no more effective than individual income distribution at matching the level and slope of the current military compensation structure. Both married household income and household income not conditional on marital status are steeper across the career than individual income. Matching a percentile of either of these household income distributions would require a significant restructuring of military compensation across the career. For example, setting military pay to the 70th percentile of household income would result in significantly lower discretionary income for members with less than 15 years of

service and higher discretionary income for members with more than 15 years of service. Our qualitative analysis indicated that financial concerns are concentrated among more junior service members, and quantitative analysis using MCAT shows that junior service members are more responsive to changes in compensation. Neither qualitative nor quantitative evidence supports this change in the structure of military compensation.

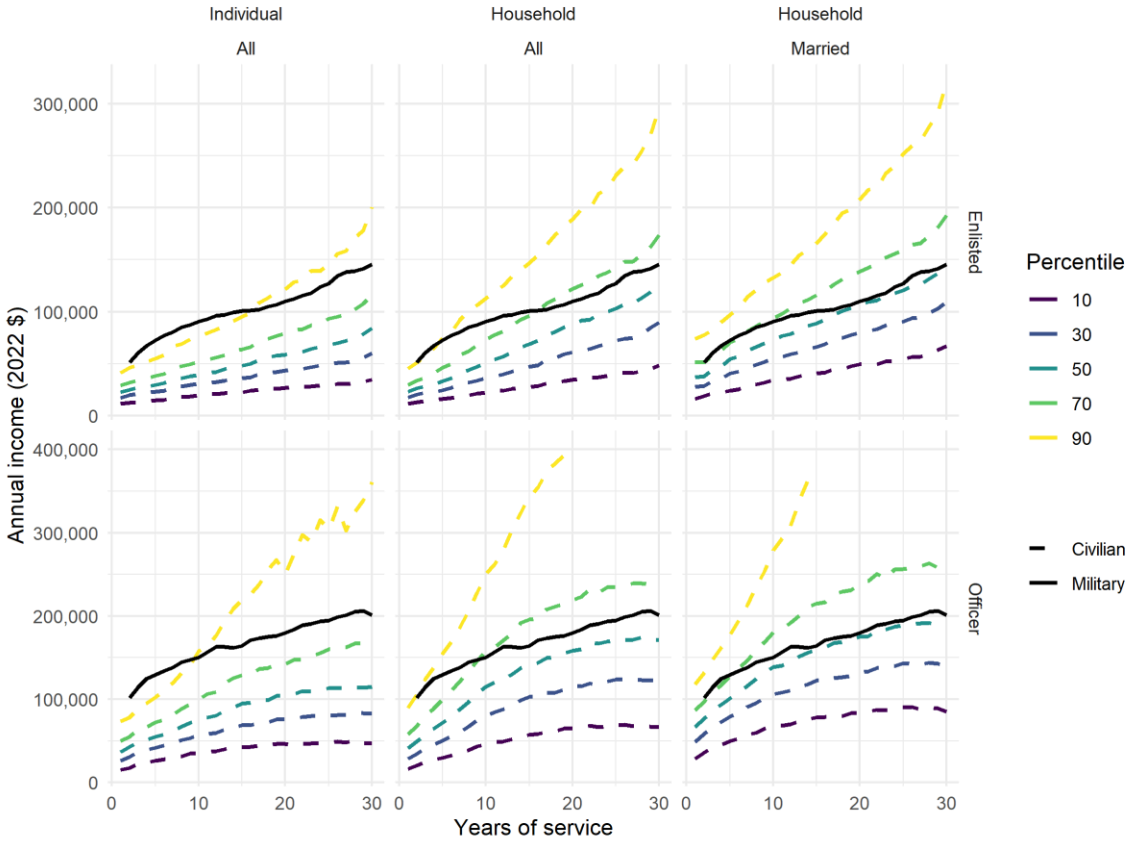
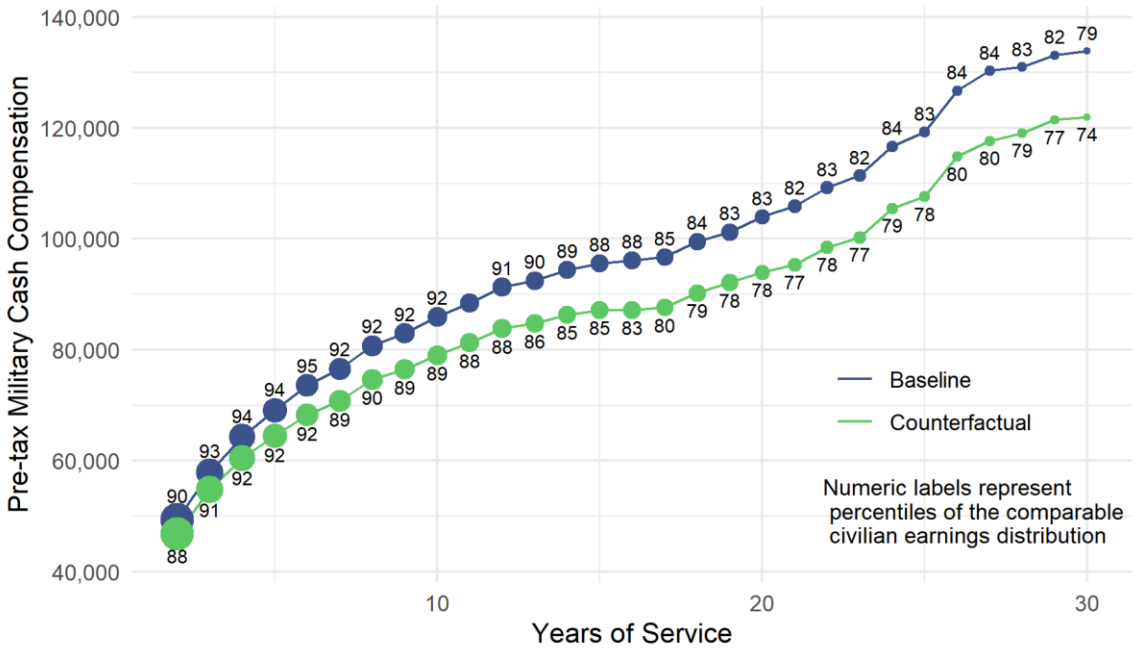


Figure 15. Average Military Compensation by YOS, Compared to Quantiles of Individual and Household Income

The military compensation benchmark should be set to a level commensurate with recent military pay. SMEs and stakeholders indicated that recent retention has been adequate, suggesting that current pay is appropriate to meet retention needs. At the current level of military pay, household discretionary income is in general higher for military households than for comparable veteran households, indicating that military pay has already adjusted to offset the loss in spouses' earnings potential and other challenges of military life. A benchmark that represents this level of compensation would provide the DOD with a way to gauge whether military compensation going forward continues to be as adequate as current compensation is.

Even if military spouses' earnings were not affected by challenges of military life, military compensation would need to be well above the 70th percentile of individual income in order to keep retention at current levels. Figure 16 plots baseline military compensation across our selected enlisted communities against the level of military compensation that would be required to maintain retention if military spouses' earnings matched those of similar civilians. Numeric labels above or below each point represent the percentile of the civilian individual earnings distribution (adjusted for age and education levels) matching military pay in each case. Compensating for the loss of spouses' earnings is one reason why the military compensation has to compare favorably to civilian compensation, but it is not the only one: Service members have important technical skills and experiences, are asked to perform dangerous jobs, are sometimes sent to undesirable locations, and otherwise sacrifice flexibility in their professional and personal lives. The current high level of military compensation reflects the fact that in order to retain a sufficient number of service members, the military must compensate them at a much higher level than what they could expect to earn in a civilian job.



Note: The size of each point represents the number of service members in our sample at that YOS.

Figure 16. Military Compensation Needed to Maintain Current Retention Across Selected Enlisted Communities, if Military Spouses Earned as Much as Similar Civilians

Current military pay implicitly compensates service members for the loss of their spouses' incomes. What if it did not? The difference between the two lines in Figure 16 represents the amount of military pay that is needed to make up for the loss of spouses' earnings, taking into account the share of members at each YOS who are married to

civilians.[42] We consider a counterfactual policy scenario in which military compensation is set to this level without a corresponding increase in military spouse earnings, and use MCAT to predict retention under this scenario. Figure 17 shows the effect on retention across the selected enlisted communities. Setting military pay to this counterfactual benchmark would result in a 6 percent to 16 percent decrease in retention. This is not as large a reduction as setting military pay to the current benchmark, but it would still present challenges for the services in meeting their retention goals. In order for the DOD to measure the adequacy of military pay for meeting retention goals, the benchmark should be set at a level that adequately compensates military households for the negative impacts of military life has on military spouses' careers.

Figure 17. Retention Impact of Setting Military Pay to a Level That Excludes the Implicit Compensation for Military Spouses' Lost Earnings

The benchmark for military compensation should be set to a range between the 80th and 90th percentile of individual income for civilians with comparable education level and occupation. Section 2 argues that the military–civilian pay comparison underlying the compensation benchmark should account for service members' total pretax compensation (including bonuses and S&I pays) as well as variation in their civilian earnings potential on the basis of occupation. Figure 18 shows how total pretax military

[42] For example, if 50 percent of members at a given YOS are married to civilians and if spouses of members at that YOS are estimated to earn $10,000 less than comparable civilians, then the average earnings gap for households at that YOS is $5,000.

compensation currently compares the occupation-specific civilian income distribution in each of the selected enlisted communities. Military pay in most communities falls between the 80th and 90th percentile for most of the military career. One notable exception is the Army Cyber branch, where high civilian earnings potential in mid- and late career has been a cause of low retention. Another exception is SOF, where high military compensation as a result of arduous and/or dangerous duties compares particularly favorably to the relevant civilian earnings.

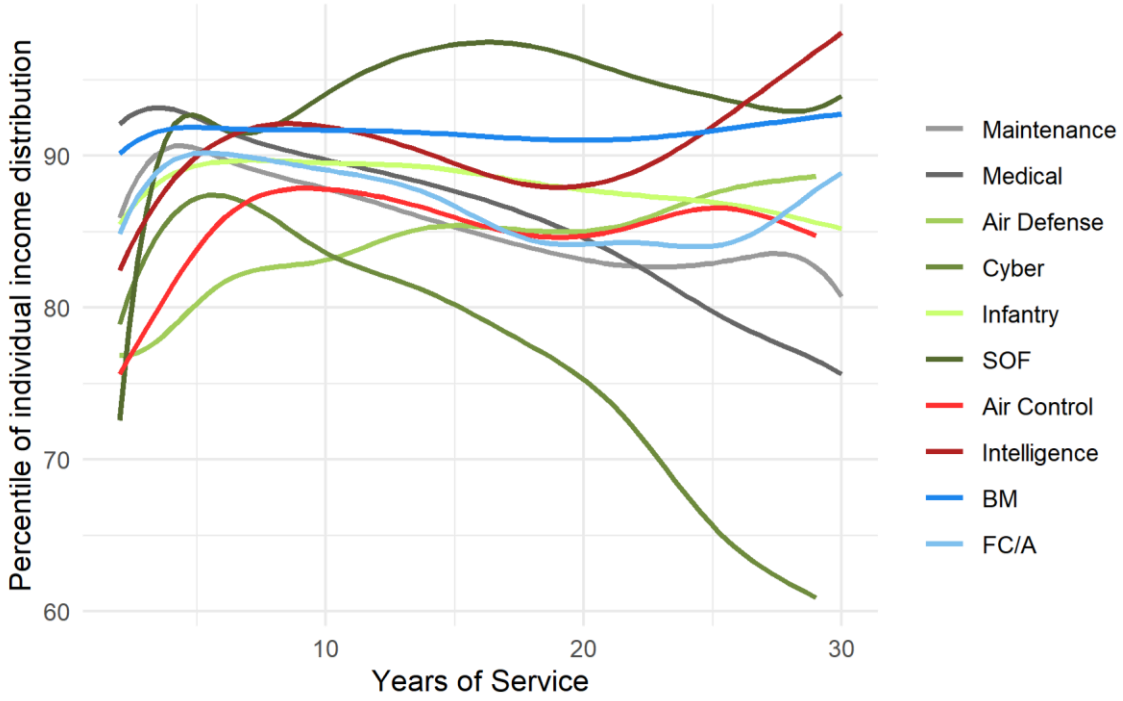


Figure 18. Percentile of the Civilian Individual Income Distribution, Adjusted for Education Level and Occupation, Matching Pretax Military Compensation in Selected Military Communities

A community-specific comparison of total pretax military compensation to the education- and occupation-adjusted civilian earnings distribution would provide DOD with better information about how military pay measures up against what service members could expect to earn in a civilian job. This is the comparison that is important for service members' retention decisions and therefore for judging the adequacy of military pay to meet retention goals. A single percentile is insufficient to capture the variation in military pay either across a military career or between communities. In general, military pay declines relative to relevant civilian pay as service members approach 20 YOS. At that point in a military career, eligibility for military retirement benefits is a major part of the military compensation package that is not captured by an annual earnings comparison. Some communities may need higher compensation than others even relative to their

respective civilian earnings potential, due to dangerous assignments, time spent at sea, more frequent PCS moves, or duty stations in undesirable locations. Using a range rather than a single percentile as the benchmark for military compensation would recognize this variability in relative pay across both careers and communities, and it would help DOD easily identify unusual patterns where compensation may need to be further evaluated and adjusted.

B. Mitigating the Impact of Military-Specific Challenges on Military Spouses' Earnings

DOD should continue to pursue policies that improve military spouses' ability to have a career and contribute to household finances, including increasing access to child care, lowering military families' child care costs, and reducing the frequency of PCS moves where feasible. Nonmonetary policies that are effective in supporting military spouses' ability to have a civilian career can mitigate the negative impact of military-specific challenges on spouse earnings. Frequent PCS moves and exacerbated child care demands were identified as the primary military-specific challenges that reduce military spouses' earnings. In this section, we evaluate the potential for nonmonetary policies to mitigate this earnings loss. While nonmonetary policies may also be costly, they can increase retention by increasing income for military households currently facing challenges with spousal employment. Targeting assistance in this way could enable DOD to increase retention at a lower per-person cost than a comparable increase in military compensation for all service members.

First, we consider the retention effect of ensuring that all military families have access to free child care. This policy would increase military families' household income both directly by removing child care costs from household expenses and indirectly by increasing military spouses' labor force participation rates and earnings. Since we do not know how many military spouses would choose not to work even if they had access to free child care, we set their labor force participation and earnings equal to those of military spouses of the same age without children. Second, we examine the effect of decreasing PCS frequency to at least 6 years apart. This would increase military spouses' earnings in the short run by reducing unemployment and underemployment in the years immediately following the move. In addition, it would mitigate the long-run earnings gap by allowing military spouses more time to recover their career and earnings after each move. Focus groups with service members suggest that requiring fewer PCS moves could also increase retention by reducing disruption in military families' lives and increasing satisfaction with military life, but our estimates do not capture these effects.

If military spouses earned the same as spouses of similar civilians (i.e., if there were no impact of military life on spouses' careers), retention would increase by 7 percent to 12 percent across the selected communities. This suggests that policies the help support

spouses' careers are likely to have an impact on retention. Having free child care available for all military families would increase retention by 5 percent to 14 percent. In some cases, this is larger than the effect of removing all impacts of military life, because this policy also removes the cost of child care from the families. Decreasing the frequency of PCS moves would increase retention by 4 percent to 8 percent. Because these policies improve spouses' career outcomes and earnings, they improve military households' financial situations and retention without the need to increase direct compensation to service members.

To put the potential gains from these policies into perspective, in Figure 19 we compare the per-person per-year increase in household discretionary income to the amount of money that we estimate military spouses currently lose due to military-specific challenges. Reducing the frequency of PCS moves almost entirely returns spousal earnings to the earnings level of similar civilians. Since civilians also face some challenges with child care access and cost, improving access to child care has the potential to further increase military spouses' earnings above those of comparable civilians. For service members between approximately 4 and 19 YOS, free child care has the largest annual impact on household discretionary income, since military families in this range are the most likely to have young children. At mid-career, the retention impact of reducing PCS moves is roughly equivalent to a direct increase of military compensation of $4,500 per year for every service member. The retention impact of free child care at mid-career is roughly equivalent to an average pay increase of $10,000 per year per service member.

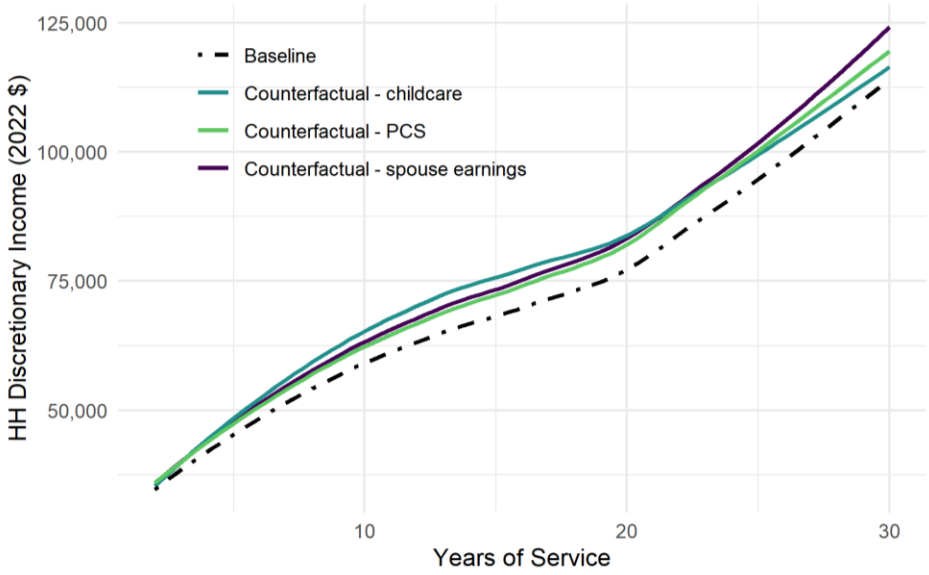


Figure 19. Household Discretionary Income Under Counterfactual Nonmonetary Policies, Averaged Over Enlisted Members in Selected Communities

Appendix A. Military Communities Selected for Modeling

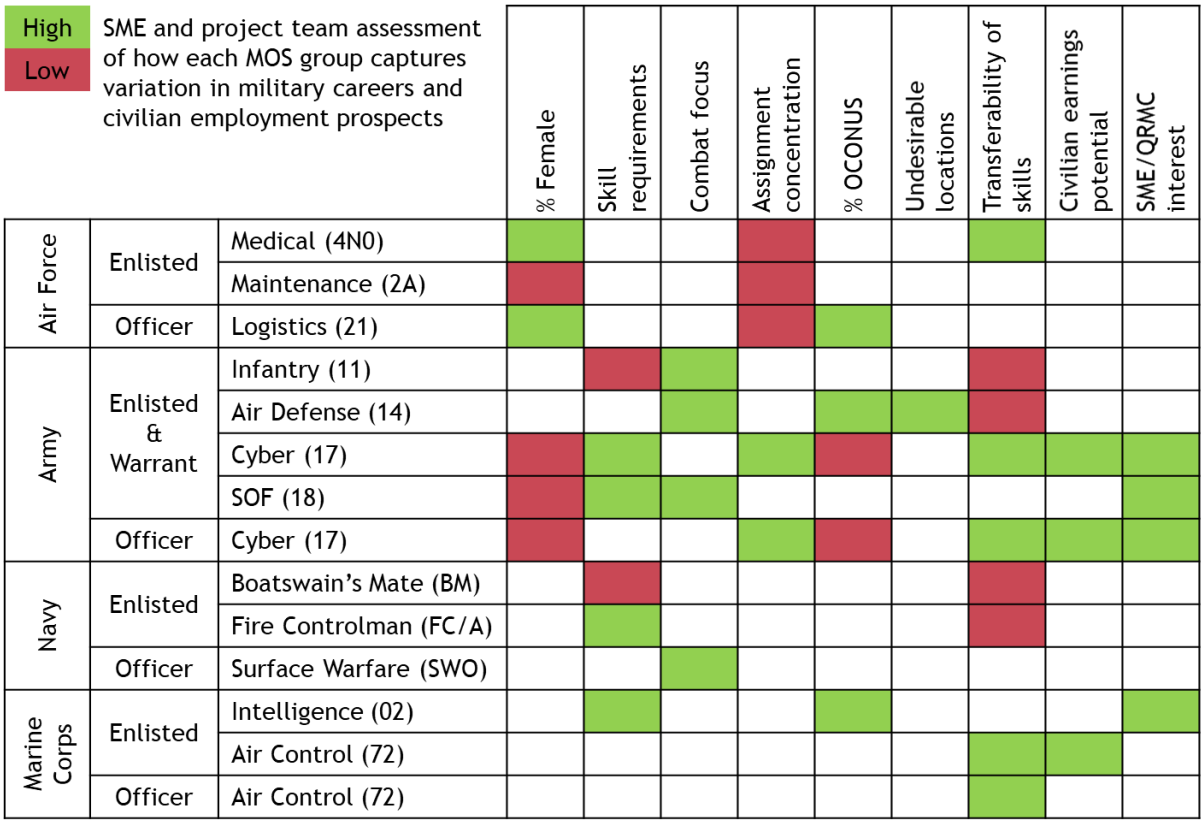


Figure A-1. How Communities Selected for Study Capture Variation Across Different Types of Military Careers

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Appendix B. Occupational Crosswalk Details

The Occupational Information Network (O*NET) Program maintains an occupation crosswalk that uses the knowledge, skills, and abilities of civilian and military occupations, various crosswalks developed by DMDC, information from the military services, and other sources. This crosswalk was developed primarily to help veterans transition to civilian jobs by offering suggestions for civilian occupations that are similar to their military occupation.[43] To obtain a point estimate of veteran earnings for a specific service member, we also need a weighting scheme to combine the earnings estimates from each of the matched civilian occupations.

The O*NET crosswalk is many-to-many; in general, military jobs with direct civilian counterparts (e.g., air traffic controllers) tend to have fewer and more specific civilian occupation matches, while those without direct civilian counterparts (e.g., those in air defense artillery) tend to have more civilian occupation matches with a wider variety of occupations represented. Table B-1 provides an example of the crosswalk for service members in AFSC 2A333M, Air Force Tactical Aircraft Maintenance Apprentice, F-16 (Enlisted).

Table B-1. Civilian Occupation (SOC) Matches for AFSC 2A333M

Major Group	Minor Group	Broad Group	Detailed Occupation	Occupation Name
11-0000	11-1000	11-1020	11-1021	General & Operations Managers
	11-3000	11-3010	11-3012	Administrative Services Managers
		11-3050	11-3051	Industrial Production Managers
17-0000	17-3000	17-3020	17-3021	Aerospace Engineering & Operations Technologists & Technicians
25-0000	25-1000	25-1190	25-1194	Career/Technical Education Teachers, Postsecondary
49-0000	49-1000	49-1010	49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers
	49-2000	49-2090	49-2091	Avionics Technicians

[43] Civilian occupations are denoted by Standard Occupational Classification (SOC) codes. SOC is an occupation coding system developed and maintained by the Bureau of Labor Statistics, and it is considered the federal statistical standard used by federal agencies to categorize civilian occupations.

Major Group	Minor Group	Broad Group	Detailed Occupation	Occupation Name
			49-2094	Electrical & Electronics Repairers, Commercial & Industrial Equipment
	49-3000	49-3010	49-3011	Aircraft Mechanics & Service Technicians
		49-3090	49-3093	Tire Repairers & Changers
	49-9000	49-9040	49-9041	Industrial Machinery Mechanics
			49-9043	Maintenance Workers, Machinery
		49-9070	49-9071	Maintenance & Repair Workers, General
		49-9090	49-9098	Helpers--Installation, Maintenance, & Repair Workers
51-0000	51-1000	51-1010	51-1011	First-Line Supervisors of Production & Operating Workers
	51-2000	51-2010	51-2011	Aircraft Structure, Surfaces, Rigging, & Systems Assemblers
		51-2020	51-2022	Electrical & Electronic Equipment Assemblers
			51-2023	Electromechanical Equipment Assemblers
		51-2030	51-2031	Engine & Other Machine Assemblers
	51-9000	51-9060	51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers
		51-9120	51-9124	Coating, Painting, & Spraying Machine Setters, Operators, & Tenders
53-0000	53-6000	53-6050	53-6051	Aviation Inspectors

We use a two-step weighting procedure, constructing community-specific weights for each civilian occupation. In the first step, we use person weights from the American Community Survey (ACS) data as a proxy for employment shares in each civilian occupation. Person weights enable us to simultaneously account for the availability of jobs in each civilian occupation and the likelihood that a service member would work in each of those occupations, conditional on their demographic characteristics. For example, a relatively large share of veterans are employed as police officers, but most of them are male. This step will place a high weight on police officer earnings within communities that match to them, and the weight on police officers will be higher for men than for women.

Next, for each civilian occupation in our crosswalk we estimate the share of veterans employed in that occupation that are drawn from each military community. We assume that, all else equal, the distribution of veterans in a civilian occupation is proportional to

the sizes of the military occupations that match to this occupation in the crosswalk. We use DMDC data from 2014 to 2022 to calculate the size of each MOS. For example, many military occupations, including large communities like Army infantry, match to the civilian occupation code that includes police officers. However, some smaller communities like those in Air Force aerospace medical service also match to police officers as well as medical occupations such as paramedics. Because of the relative size of each community, we expect that former infantry members make up a much larger share of police officers than do former aerospace medical service members. This step reduces the weight placed on police officers' earnings relative to paramedics' earnings when estimating potential earnings for aerospace medical service members. Table B-2 shows a simplified example of this for an example military that has only these two communities. In practice, this step is accomplished by estimating a weighted least squares regression for veterans' earnings, where the regression weights multiply the ACS person weights by the community weights created in this step.

Table B-2. Simplified Example of MOS-SOC Weight Calculation

Community	Number of Members	SOC	Total Number of Members Matching SOC	MOS-SOC Weight
Aerospace medical	6,000	Police officers	64,000	0.09
		Nurses	6,000	1.00
Infantry	58,000	Police officers	64,000	0.91
		Correctional officers	58,000	1.00

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Appendix C. Total Military Compensation

Basic Pay

Monthly basic pay depends on the service member's pay grade (PG) and years of service (YOS), and it is adjusted at the beginning of each calendar year. Basic pay is observed in ADP, so to predict this value we simply use the average of monthly basic pay conditional on PG and YOS. To impute basic pay for PG-YOS combinations not observed in the data, we fill backward and forward on YOS within each PG.

Basic Allowance for Housing

BAH is paid to service members stationed within the United States who do not live in barracks. It changes year to year based on updated information on the cost of housing in the Military Housing Area (MHA) around each duty station but depends primarily on the service member's pay grade, whether they have dependents (including children or a spouse who is not also a service member), and the location of the duty station. BAH is observed in ADP, but for many duty stations we do not observe enough service members to simply take the average BAH conditional on all relevant characteristics. Instead, we estimate a linear regression model to predict the value of BAH that a service member would receive. The model interacts a categorical variable for PG with an indicator for whether the member has dependents, and it includes a shifter for each duty station ZIP code.

$$BAH \sim PG * (dependents > 0) + ZIP\ code$$

Overseas Housing Allowance

OHA is paid to service members stationed outside of the United States. Unlike BAH, it is a direct reimbursement for housing costs. OHA is observed in ADP, but we cannot use a simple average to predict OHA without also predicting the country in which each service member will be stationed. Instead, we again estimate a linear regression model to predict the average OHA that a service member would receive conditional on their pay grade, dependents, and community. Including community in the regression accounts for differences in duty station locations across services and communities, without requiring us to predict OHA for each potential duty location or country (for which the data are likely insufficient).

$$BAH \sim PG * (dependents > 0) + community$$

Other Tax-Free Pays

Service members receive other kinds of tax-free allowances, including basic allowance for subsistence (BAS), family separation allowance (FSA), and basic needs allowance (BNA). Excluding housing allowances, the total value of tax-free allowances is relatively small compared to service members' taxable income. Rather than predicting each of these allowances separately, we use a linear regression to predict the average value of tax-free allowances that each service member would receive. In the regression below, $Abroad$ is an indicator for whether the service member is stationed abroad and Sea is an indicator for whether they are on sea duty.

$$Other\ taxfree \sim PG * (dependents > 0) * Abroad * Sea + community$$

Retention bonuses

Unlike the previous pay categories, retention bonuses are not reliably observed in the ADP data and must be imputed before we can construct a model to predict them. ADP includes several columns to capture retention bonuses, so we begin with these. However, we checked the value of retention bonuses calculated this way against information available from policy documents describing retention bonuses offered in recent years and observed that a large share of service members who we expect would have received a retention bonus did not have earnings recorded in the appropriate columns of ADP. Many of these service members experienced large and otherwise unexplained increases in year-to-date taxable income during the year in which we expect they would have received a retention bonus, and case-by-case inspections revealed that these increases align with the value of the expected retention bonus. This phenomenon was sufficiently prevalent to suggest that retention bonuses were in fact being paid out but not recorded in the appropriate columns.

To impute retention bonuses, we first create a column for year-to-date (YTD) taxable pay by combining two columns in ADP that each appear to contain YTD taxable pay at different times. Total entitlements paid YTD seems to be the best available data on this, as it provides the total pay before adjusting for CZTE. However, it is not available for the Air Force, Army, or Navy before FY 2018. We use total federal taxable wages YTD to fill in these earlier years, dropping observations for service members who are receiving CZTE. Next, we compute monthly taxable pay using month-to-month changes in total YTD taxable pay. Then we subtract all taxable pays that can be directly accounted for using ADP columns (e.g. basic pay, any observed special pays and bonuses, and taxable allowances) from the monthly taxable pay. In addition, the Air Force, Army, and Navy appear to include tax-free allowances (e.g. BAH, BAS) in total entitlements, so we also subtract these allowances from the monthly taxable pay. The remainder is assumed to be actual earnings that are not otherwise recorded in individual ADP columns; for the purpose of this section, we refer to these earnings as "extra pay."

We disaggregate extra pay into monthly and annual components as follows. We identify the month in each fiscal year during which a service member's monthly extra pay is highest. If the extra pay that month is both strictly greater than all other months of that member's extra pay received during the fiscal year and strictly greater than one month of that member's basic pay, then we label it "annual" extra pay. All other extra pay is considered to be "monthly" extra pay. Case-by-case examinations suggest that this generally captures retention bonuses, but unfortunately we cannot be certain. We add annual extra pay to the annual total of observed retention bonuses and refer to this as the imputed retention bonus. Since we cannot credibly say whether this value represents just retention bonuses, we combine it with other taxable pays for the discussion of total military compensation in the body of this report.

We model the imputed retention bonus using linear regression models tailored to each service or community's retention bonus structure. All estimated bonuses depend on the year in which the decision is made and the number of years of additional obligation or service associated with the decision to stay. In addition, the models for each service and rank group include the following variables to capture the service member's likely eligibility for retention or reenlistment bonuses.

- Navy enlisted: rating, reenlistment zone
- Navy officer: designator (SWO or SWO-N), pay grade
- Marine Corps enlisted: occupational field, pay grade, reenlistment zone
- Marine Corps officers: occupational field, pay grade
- Air force enlisted: career field, pay grade, reenlistment zone
- Air force officers: career field, pay grade
- Army enlisted: branch, pay grade
- Army officers: branch, pay grade

Other Taxable Pay

Other taxable pay is primarily made up of special and incentive pays, but it also includes the cost of living allowance received by service members stationed in the continental United States (CONUS COLA) and monthly extra pay imputed as described in the previous subsection. In general, the total value of other taxable pays is relatively small and highly variable, so these pays are modeled together rather than individually. We use a linear regression to predict the value of other taxable pay that a service member would receive. For the purpose of discussion in the body of this report, other taxable pays and retention bonuses are combined.

$$Other\ taxable \sim PG * Abroad * Sea + community + YOS$$

BRS Continuation Pay

To date, a relatively small share of service members each year receive Blended Retirement System (BRS) Continuation Pay (CP). However, as more service members who opted in or were automatically enrolled in BRS reach eligibility for CP, this will become a slightly larger component of total military cash compensation. Eligibility for CP is currently at 12 YOS for all Active Component services except for the Army, where the eligibility window changed from 12 YOS to 8 YOS starting in FY 23. Since retention decisions in our dataset took place between 2014 and 2022, we model BRS eligibility at 12 YOS across all of the services. To account for the effect of CP on retention decisions at 12 YOS, our model assumes that any member enrolled in BRS who chooses to stay in the service past 12 YOS receives CP.

Appendix D. Comparable Veteran Earnings

When making retention decisions, service members consider how much they could earn if they left the military and entered the civilian labor market as a veteran. Service members' civilian earnings potential varies based on their occupation, years of experience, education level, and other characteristics. We assume that service members expect to be in the labor force and employed when they are considering their future civilian career. To the extent that they expect a period of unemployment before finding a job, this is captured by the idiosyncratic shock term in the value function.

Data on veterans' earnings in specific civilian occupations come from the ACS. We filter the data to the relevant veteran population, including individuals between the ages of 18 and 62 who indicate that they have previously served on active duty in the military, work full time (usually worked at least 30 hours per week during the previous 12 months), and who have either wage income representing a wage of at least $5/hour or non-zero business income. We use ACS data from 2017 through 2021, the most recent ACS 5-year sample available at the time this work was completed. Individual earnings are modeled as a function of occupation, age (as a proxy for experience), education level, gender, marital status (married or single), number of children (top-coded at 2), and race, using weighted least squares regression where the weights are constructed by multiplying the ACS person weight by the community-occupation weight derived from the O*NET crosswalk. Age enters as an integer, while all other variables (including the number of children), enter as dummy variables. For each community, we estimate the following regression using the set of ACS observations in civilian occupations matching to any military occupation in the community.

$$income \sim gender * education * age + gender * education * age^2 +$$
$$gender * married + gender * children + married * children +$$
$$gender * race + gender * occupation$$

Military Retirement Pay

Service members make retention decisions in part based on their expected future earnings, including military retirement pay. The introduction of the Blended Retirement System (BRS) changed how much service members expect to receive in several ways. BRS enrollment took place in 2018; new service members were automatically enrolled, but existing members with less than 12 years of service were given the option to enroll in BRS or remain on the legacy retirement system. For this study, we estimate a retention model using data on retention decisions between 2014 and 2022; at this time, no service members

who were eligible to enroll in BRS had reached retirement eligibility. However, BRS enrollment may impact retention decisions of mid-career service members through the change in the structure of financial incentives. BRS lowers the defined-benefit payment to retirees, reducing the incentive for mid-career service members to stay in service through 20 YOS. Instead, it incentivizes retention at mid-career through Continuation Pay (CP), which is offered to service members with between 8 and 12 YOS in exchange for an additional service commitment. It also introduces a matching contribution to service members' Thrift Savings Plan (TSP) accounts.

We model expected retirement benefits under both the High-36 retirement system and the BRS. This enables the model to capture the change in retention as a result of BRS. Our data do not include individual-level information on BRS enrollment, but the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD P&R) provided BRS opt-in and auto-enrollment counts by service, component, and pay grade as of January 2019. We use these counts to simulate BRS enrollment for individuals in our data, which allows us to match the share of service members who make decisions under BRS.

To calculate the defined-benefit payment under either BRS or the High-36 retirement system, we need to know the average of the highest 36 months of basic pay. This is observable for a subset of members in our data; using data on members for whom we observe at least 36 months of pay, we calculate the average retired pay base value conditional on YOS, pay grade, and community. Finally, we apply the defined-benefit formula from either the BRS or the High-36 retirement plan to predict the benefit that a member would expect to receive if they chose to retire at a given point.

Service members enrolled in BRS are assumed to contribute 5 percent of their basic pay to their TSP accounts, in order to receive the maximum (6%) matching contribution from DOD. The accumulated TSP value is calculated as a function of the member's current pay grade, YOS, and the number of years since BRS enrollment. To approximate the value of TSP as a savings vehicle, we assume that service members begin to withdraw from their TSP upon leaving the service. Using a 5 percent annual rate of return, service members may expect to withdraw 5 percent of the value of their TSP each year; this amount is added to the member's expected annual income as a veteran.

Appendix E. Military Spouses' Labor Market Outcomes

Data on military spouses' employment and earnings are limited. The ACS, which we use for estimating civilians' and veterans' earnings, only collects data on family members who have been living at the sampled housing unit for more than two months. Spouses of service members who are or have recently been deployed or on TDY cannot be identified as military spouses, since the service member is excluded from the ACS population. In addition, the ACS only samples housing units in the United States, so military families stationed abroad are not included in the ACS population. The ADSS collects information on household income in bins and reports only aggregate data, which is not sufficient to estimate earnings as a function of individual characteristics.

Military spouses who are civilians

Our approach uses ACS data from 2017 to 2021 to estimate earnings of civilians who are similar to military spouses, then adjusts predictions to account for the effects of military life. The objective is to predict a military spouse's earnings (conditional on being in the labor force) as a function of the service member's observable characteristics. The data are filtered to married civilians (excluding veterans) between the ages of 18 and 62 who work full-time and whose spouse is also in the labor force. For each individual in this dataset, we use the ACS household relationship information to identify their spouse and the spouse's annual earnings. We estimate spouse earnings as a function of the individual's gender, age, education level, number of children, and race, since these are the variables that are available in both the ACS and our DMDC data on service members. All of the variables on the right-hand side of the equation below refer to the service member's characteristics.

$$income \sim gender * education * age + gender * education * age^2 +$$
$$gender * children + gender * (any\ children\ under\ age\ 5) + race$$

Similarly, military spouses' labor force participation rates are based on estimates of civilian labor force participation from ACS data. In addition to some of the same variables used to estimate earnings, labor force participation is estimated as a function of the state and (if applicable) metropolitan statistical area (MSA) where a household lives. Labor force participation is coded as a binary indicator for whether the spouse is in the labor force and is estimated as a logistic regression.

$$lfp \sim age + gender + children + education + state + MSA$$

Spouses of veterans

For service members who are married, the value of leaving military service depends on what their spouse is expected to earn once they are no longer in the military. We again use ACS data, this time estimating earnings for spouses of full-time employed veterans, conditional on the spouse being in the labor force.

$$income \sim gender * education * age + gender * education * age^2 +$$

$$gender * children + gender * (any\ children\ under\ age\ 5) + race$$

These estimates capture the average long-run impact of PCS moves on earnings of veterans' spouses. To account for variation by community and across individuals, we adjust predicted earnings for veteran spouses, using a long-run PCS penalty based on the expected number and frequency of PCS moves that they have experienced.

Spouses of members in dual-military couples

Although they were not the focus of our study, we also need estimates of spousal earnings for members in dual-military couples. To accomplish this, we use DEERS data to identify spouses of service members in each of our selected communities (the "primary service member") who are themselves service members. We locate the spouses in ADP data and estimate their taxable and tax-free earnings as a function of the primary service member's gender, rank group (enlisted or officer), and YOS.

$$earnings \sim gender * rank\ group * YOS + gender * rank\ group * YOS^2$$

Appendix F. Discretionary Household Income

We define discretionary household income as pre-tax household earnings minus necessary expenses and federal taxes. We approximate the household's federal tax burden (after accounting for the probability of eligibility for the Combat Zone Tax Exclusion) using total household pre-tax income and marital status. Necessary expenses considered for this calculation include housing, food, transportation, child care, and health care. This section discusses the calculation of each of these expenses.

Housing

We use observed basic allowance for housing (BAH) or overseas housing allowance (OHA) payments in ADP as a proxy for military households' expenditures on housing. As with other components of military compensation, BAH and OHA are only observed for members who stay in service. For those who have left, we need to predict housing expenses as if they had stayed in the service, so we construct a table of average BAH and OHA payments conditional on the member's pay grade, marital status, and dependents. In addition, we need to approximate how much these households expect to spend on housing when they leave the service. We use data from the ACS on reported rent and mortgage costs to estimate national-level median housing costs for similar families, conditional on the individual's marital status, number of children, and education level.

Food

To calculate basic food expenses for the household, we use values from the Department of Agriculture's Thrifty Food Plan. These values correspond to the maximum monthly benefit values of the Supplemental Nutrition Assistance Program (SNAP) and represent a "nutritious, practical, cost-effective diet."[44]

Transportation

We approximate annual transportation costs by assuming that each working adult in the household needs a vehicle. The Department of Transportation's Bureau of Transportation Statistics releases transportation economic trends annually. These statistics

[44] Department of Agriculture, "Official USDA Thrifty Food Plan: U.S. Average, June 2024," last updated July 2024, https://fns-prod.azureedge.us/sites/default/files/resource-files/Cost_Of_Food_Thrifty_Food_Plan_June_2024.pdf.

provide information on average transportation spending and the number of vehicles per household, by household income quintile. In the first, second, and third quintiles (the bottom 60% of the household income distribution), the average cost per vehicle owned is just over $5,000 per year (in 2022 dollars). Therefore, we assume that each required vehicle costs a household $5,000 per year.[45]

Child care

Our qualitative analysis highlights that affordability of child care is often a source of concern for military households and that child care costs are sometimes viewed as a barrier to military spousal employment. Some military families have access to reduced-cost care through Child Development Centers (CDCs). Findings from qualitative analysis indicated that most unmarried service members and dual-military couples with children have access to CDC care. However, CDC capacity is a binding constraint on availability for members with a civilian spouse; of those who purchase child care, only 45 percent report using CDC care. For members with a civilian spouse, predicted child care costs in the model are a weighted average of the cost of civilian child care and the cost of CDC care.

Monthly costs for CDC care are based on the FY 23 Child Care Fee Assistance DOD Parent Fees for installations not designated as high-cost.[46] We use service members' military compensation and spouses' predicted earnings conditional on working to calculate total household income, and assume that young children require full-time care while school-age children require part-time care. The cost of purchasing child care in the civilian market is based on the Department of Labor's National Database of Childcare Prices. These data provide county-level average weekly costs for toddlers and for school-age children. Location-specific prices are used in the cost calculation for military households, while for veteran households we instead use a single national-level price. We assume that those who purchase child care require a full year of care for each child, and we use the number and ages of children in the household (from Defense Enrollment Eligibility Reporting System [DEERS] data) combined with the monthly or weekly costs for each age group to calculate the annual cost of purchasing child care. Military households are assumed to have no child care costs if there is a civilian spouse who does not work, which happens when the spouse would not earn at least 20 percent more than the predicted cost of child care, the service member is stationed abroad, or the spouse is simulated as being out of the labor force (using the predicted labor force participation rate).

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[45] Department of Transportation, Bureau of Transportation Statistics, "Transportation Economic Trends," accessed July 10, 2024, https://data.bts.gov/stories/s/ida7-k95k.

[46] "FY 23 Child Care Fee Assistance Total Family Income Categories, DoD Parent Fees, High Cost Installations, and Provider Caps," accessed July 10, 2024, https://www.childcareaware.org/wp-content/uploads/2022/09/FY23-NAFMC-Fee-Categories-and-Parent-Fees.pdf.

Health care

Service members, particularly those with families, highlighted the value of TRICARE benefits when discussing the financial considerations in their retention decisions. We estimate health care costs for military and veteran households in two steps. First, all households incur some out-of-pocket expenses. The Medical Expenditure Panel Survey, conducted by the Department of Health and Human Services Agency for Healthcare Research and Quality, provides individual-level data on out-of-pocket (OOP) expenses. We estimate average OOP expenses conditional on the age of the household head, marital status, and number of children in the household.

$$OOP \sim age * children + age^2 * children + age * married +$$
$$age^2 * married + children * married$$

Second, we assume that service members who leave the military prior to retirement eligibility will purchase health insurance in the civilian market. The National Health Interview Survey, conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics, provides data on health insurance premium costs for families with private health insurance. We estimate health insurance costs as a function of the age of the household head, marital status, number of children in the household, and household's income group (pre-tax earnings of less than $50,000; $50,000 to $100,000; or more than $100,000).

$$premium \sim age * children + age^2 * children + age * married +$$
$$married * children + children * income\ group + married * income\ group$$

Adjustments

Finally, we adjust these predicted costs to reflect the fact that some low-income households may not be able to afford even these basic expenses. To the extent possible, we base these adjustments on eligibility for various federal assistance programs:

1. Housing costs for veteran households are capped at 30 percent of pre-tax income, reflecting the fact that the Department of Housing and Urban Development's Section 8 Housing Choice Voucher Program requires a family to pay 30 percent of their adjusted gross income for rent and utilities
2. Food costs for military and veteran households are capped at 30 percent of pre-tax income, approximating the SNAP benefit calculation.
3. Health insurance costs for low-income veteran households are reduced using an approximation of Medicaid eligibility rules.

4. Child care costs for single veterans are capped at 30 percent of pre-tax income. For married veterans whose child care costs would exceed this threshold, we instead assume that the spouse leaves the labor force to provide child care.

Results

Figure F-1 through Figure F-13 show the discretionary household income calculation and how discretionary income compares for similar households in the military versus if they were to leave the service, for each of the communities in our analysis. The two columns on the left break down household income and expenses for the household while they are in the military, while the two on the right provide the civilian comparison. The black box in the military household income column represents RMC for the household.

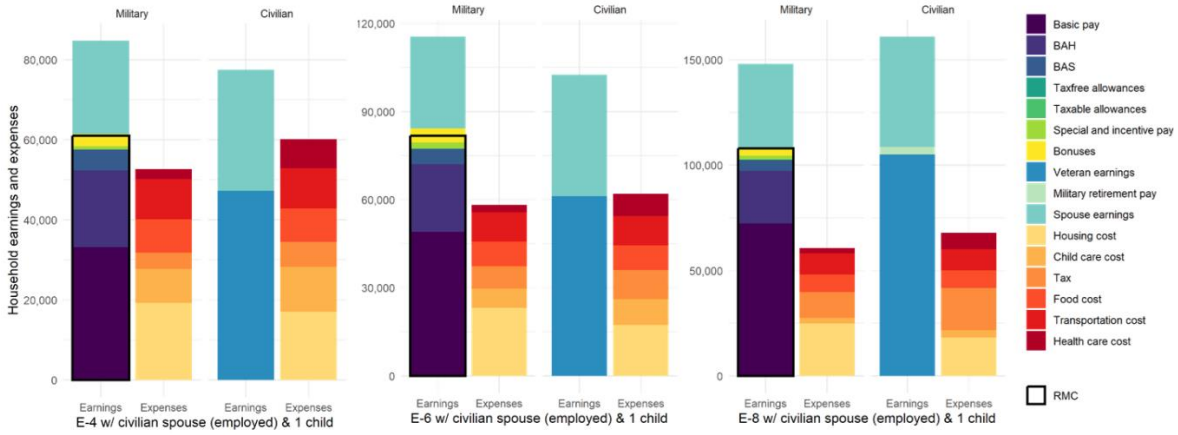

Figure F-1. Discretionary Income, Army Infantry Enlisted

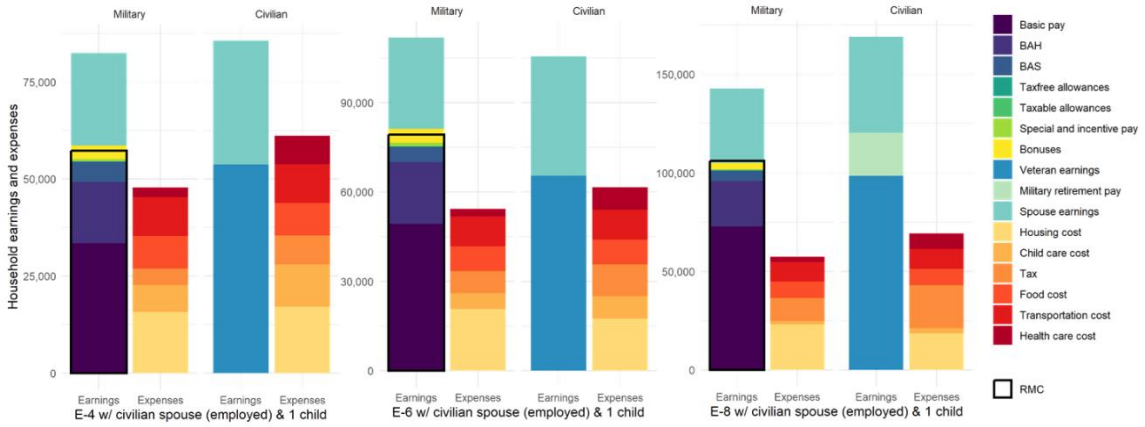

Figure F-2. Discretionary Income, Army Air Defense Artillery Enlisted

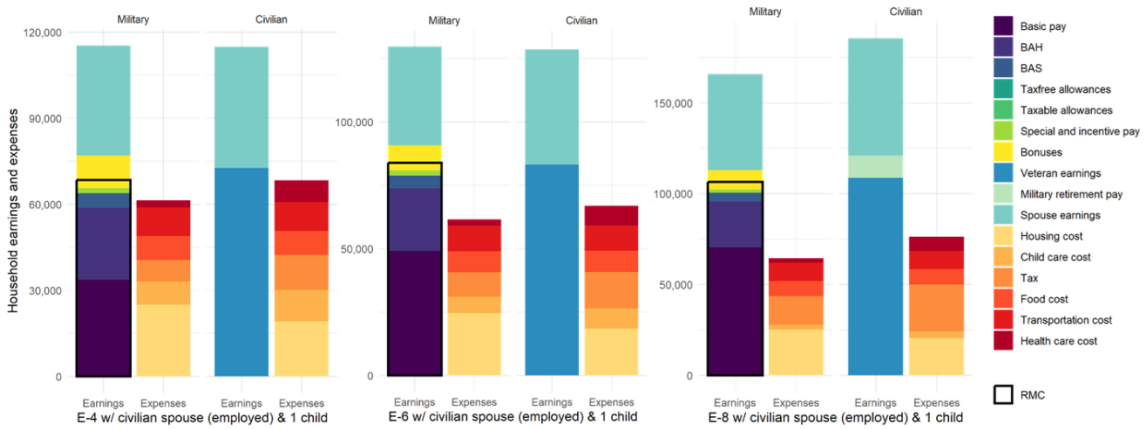

Figure F-3. Discretionary Income, Army Cyber Enlisted

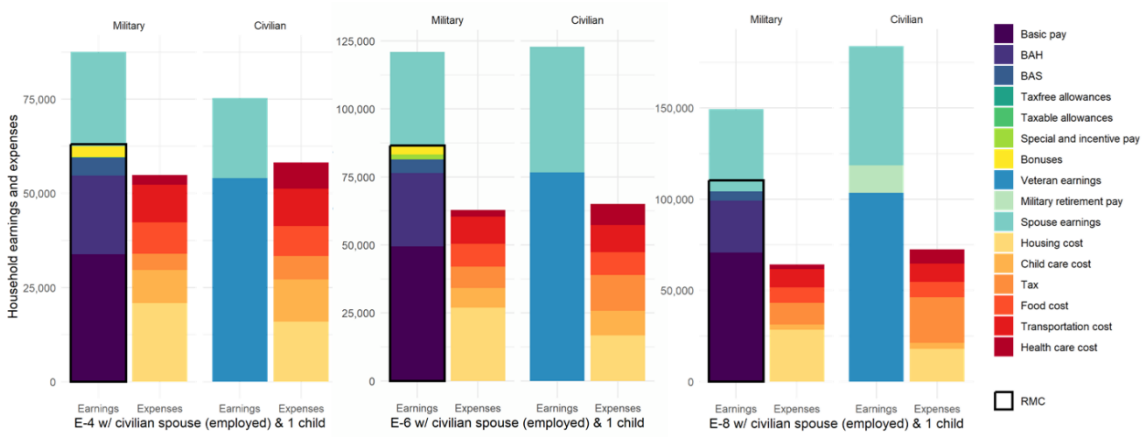

Figure F-4. Discretionary Income, Marine Corps Air Control/Air Support/Antiair Warfare/Air Traffic Control Enlisted

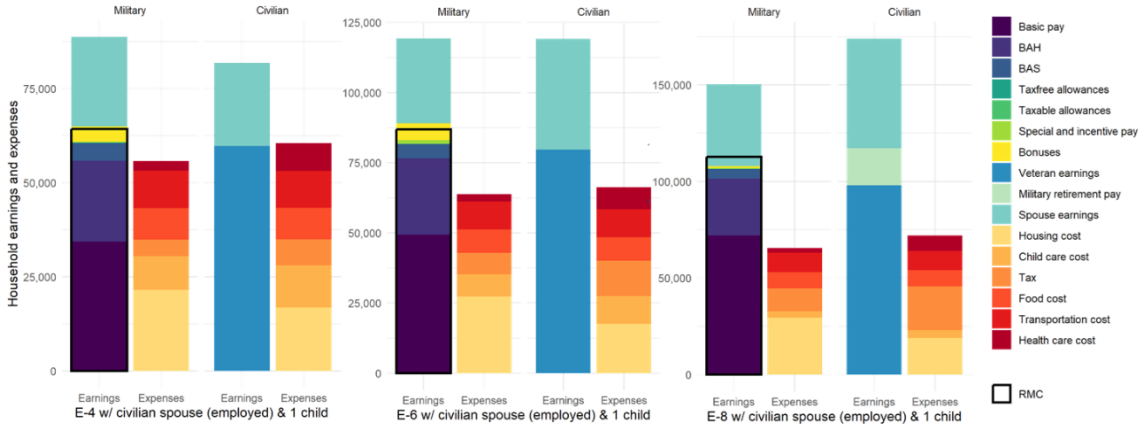

Figure F-5. Discretionary Income, Marine Corps Intelligence Enlisted

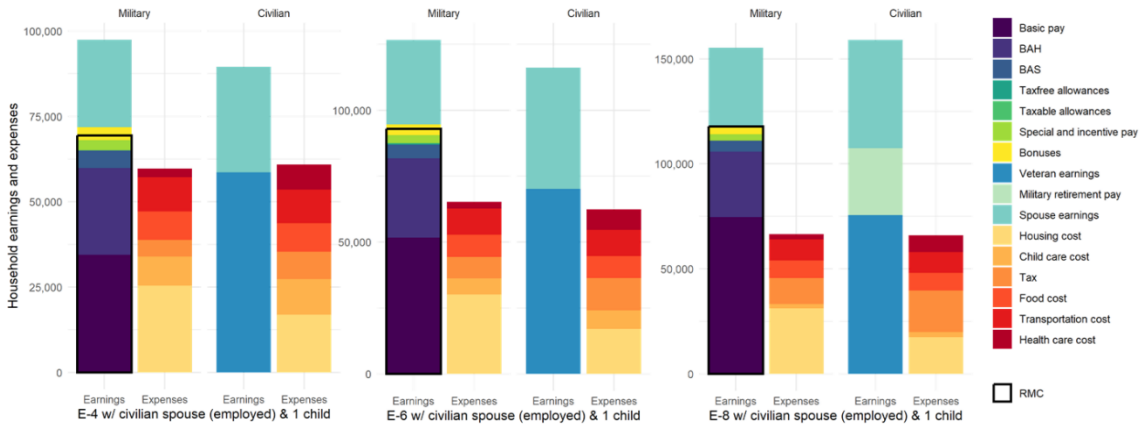

Figure F-6. Discretionary Income, Navy BM Enlisted

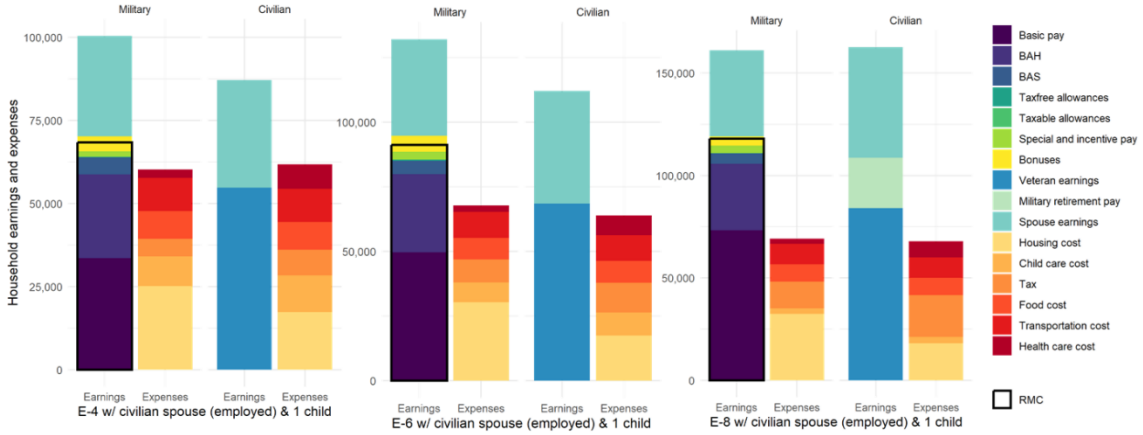

Figure F-7. Discretionary Income, Navy FC/FCA Enlisted

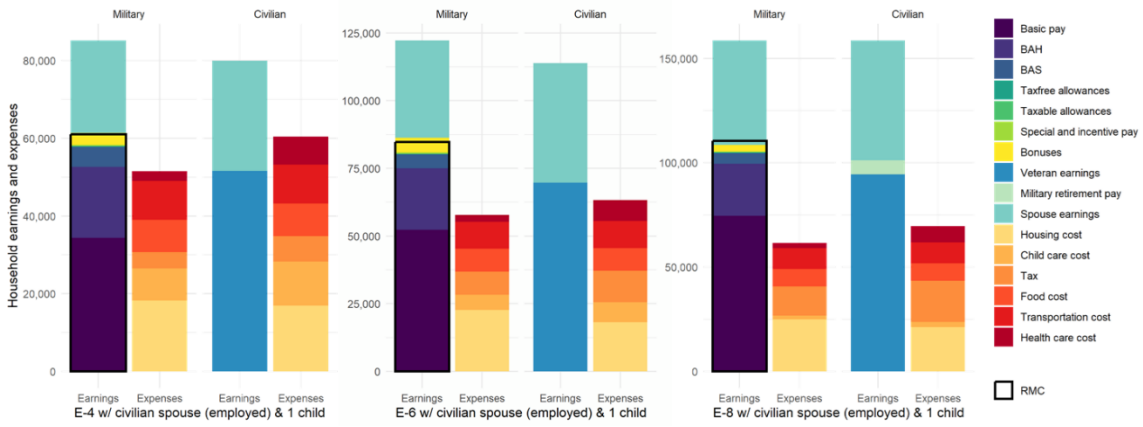

Figure F-8. Discretionary Income, Air Force Aerospace Maintenance Enlisted

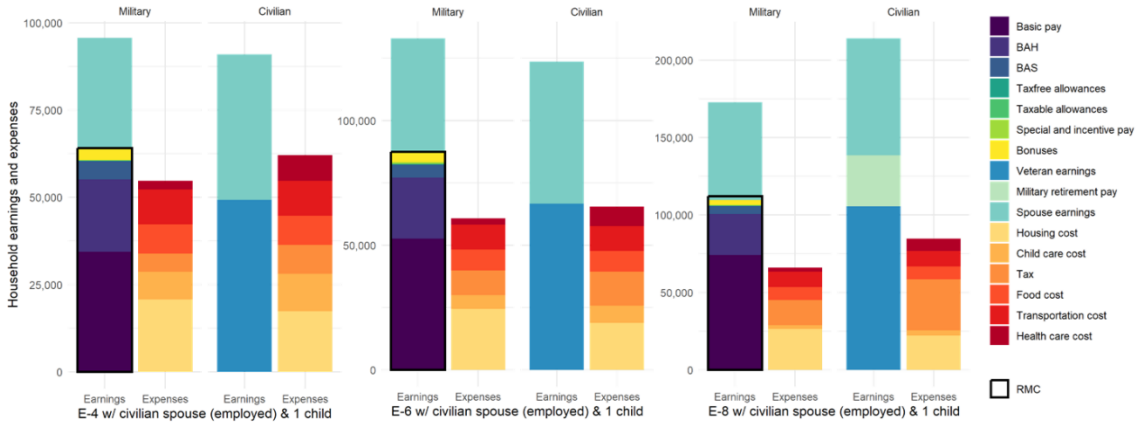

Figure F-9. Discretionary Income, Air Force Aerospace Medical Enlisted

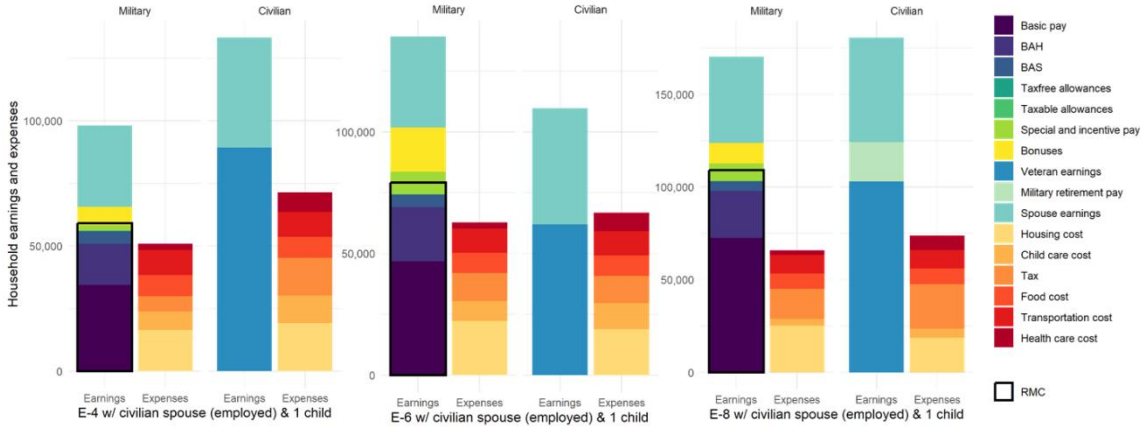

Figure F-10. Discretionary Income, Army Special Forces Enlisted

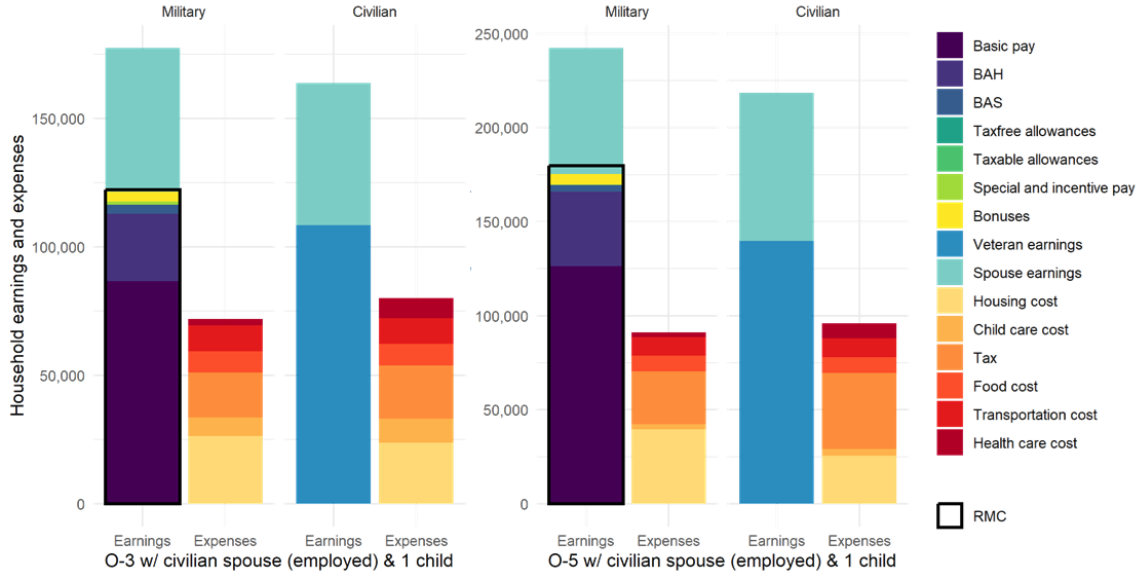

Figure F-11. Discretionary Income, Army Cyber Officers

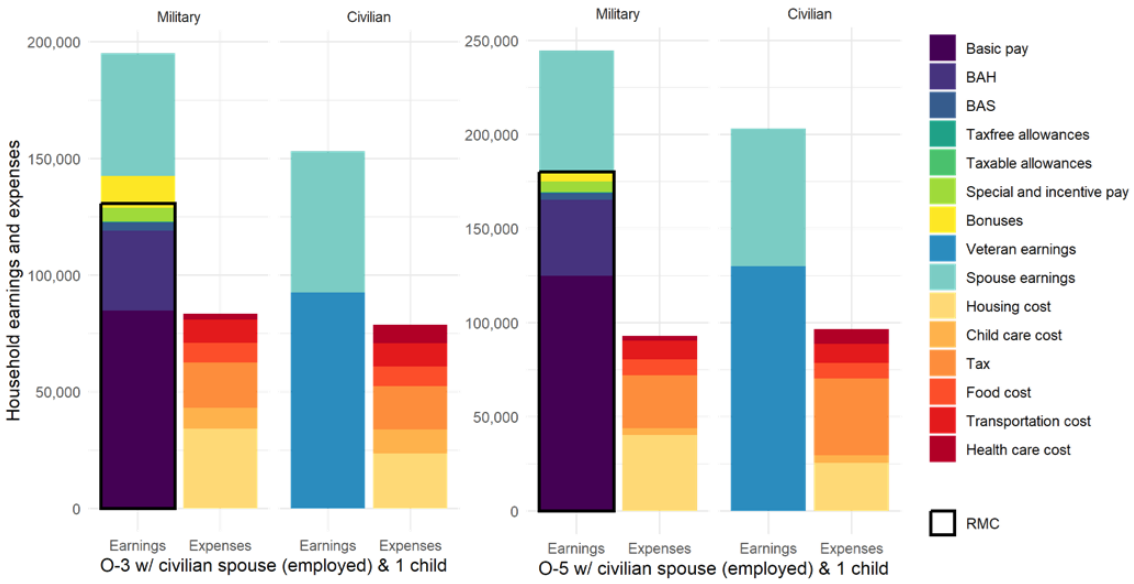

Figure F-12. Discretionary Income, Navy Surface Warfare Officers

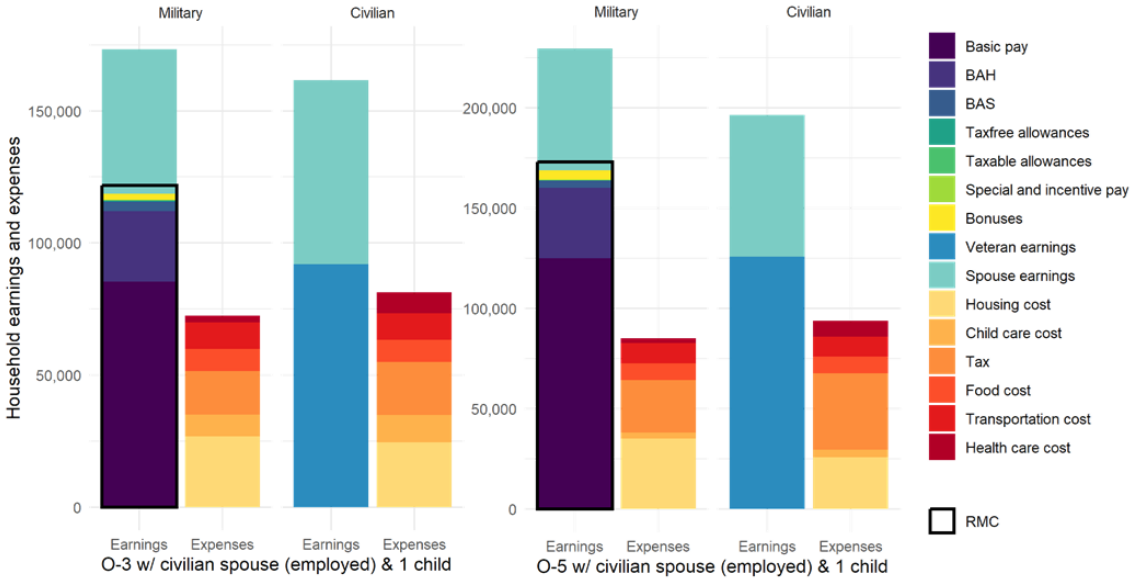

Figure F-13. Discretionary Income, Air Force Logistics Officers

Appendix G. MCAT Methodology Details

The retention model we use for the analysis of military compensation is based on our prior work.[47] For this Appendix, we assume familiarity with this model and discuss only the innovations and implementation details that are not covered in the previous technical paper. The retention model is a dynamic discrete choice (DDC) econometric model of stay/leave decisions that we extend to incorporate the effect of this decision on service members' spouses' careers. We estimate the model using the conditional choice probability (CCP) method for DDC models with unobserved heterogeneity.[48] There are three particular innovation of note that we will discuss. First, we use a matching technique to create simulations of military careers that form the expectation terms in the model. Second, we use a similar matching technique to deal with the initial conditions problem, allowing us to use a relatively short panel of data. Third, we summarize the value of the future civilian career using a quantile of the income distribution, significantly simplifying that component of the model.

Model Basics

Following the notation in our previous paper, let i represent service members and d represent decisions. We use a vector $z_{i,d} = (x_{i,d}, s_i)$ to represent both the observed and unobserved components of heterogeneity, the latter of which is time-invariant. We use a utility function $U(stay, \dots)$ to represent the value of staying until the next decision point, and $U(leave, \dots)$ to represent the value of leaving and having a civilian career. The parameter β is an annual discount rate and t_d is the number of years that a service member

[47] Jacklyn Kambic et al., *Implementing Dynamic Discrete Choice Models of Military Retention*, IDA Paper P-33602 (Institute for Defense Analyses, September 2023).

[48] Arcidiacono and Miller, "Conditional Choice Probability Estimation of Dynamic Discrete Choice Models With Unobserved Heterogeneity."

is committing to stay for at decision d. Under the assumption that the error terms in U are type I extreme value distributed, we can get a closed-form representation of the model:[49,50]

$$p(stay|z) = \frac{\exp(v(z,stay))}{\exp(v(z,stay))+\exp(v(z,leave))} \quad (1)$$

$$v(stay, z) = U(z, stay; \theta) + \beta^{t_d}\mathbb{E}[U(z_{d+1}, leave; \theta) - \ln\big(p(leave|z_{d+1})\big) + \gamma] \quad (2)$$

$$v(z, leave) = U(z, leave; \theta) \quad (3)$$

The model is estimated using maximum likelihood (ML) by integrating out the unobserved heterogeneity in z. We use the well-known expectation-maximization (EM) algorithm, which converges to the ML estimates. The unobserved component of heterogeneity, s_i is drawn from a discrete distribution with a fixed number of types. We discuss some additional decisions we make about the estimation procedure in Appendix H.

The utility function $U(stay, \dots)$ is linear in the observed variables and parameters. Recall that it represents the value until the next decision. For example, suppose a service member is considering staying for 2 years and is (or expects to be) married for both years, and that β is 0.92. Then the part of the utility function associated with this variable for this decision would be $\theta_{married} * (1 + 0.92)$. For household discretionary income, the utility function works the same way: We add together the expected discounted values and use a parameter θ_{money} to translate it into utility. We discuss $U(leave, \dots)$ later in this Appendix.

Definition of Decisions

A decision in the model is an opportunity for a service member to either leave the service or to commit to staying in the military for a fixed period of time. This is an abstraction from reality; some officers and enlisted service members do not have fixed-term contracts, and contracts are often modified at a time when a service member could not have left. Since our focus is not the *timing* of decisions, we attempt to standardize most decisions in a way that makes the variables associated with them directly comparable.

For most decisions we use a basic principle: A decision occurs when a service member could leave service; if they did not leave service at that time, they must have extended their obligation, which is the length of their new commitment. Consider a handful of examples. First, an enlisted service member at the end of their 4-year contract who re-enlists for 4 more years: We mark the decision on the date their first contract ends and use the length

[49] V. Joseph Hotz and Robert A. Miller, "Conditional Choice Probabilities and the Estimation of Dynamic Models." *Review of Economic Studies* 60, no. 3 (1993): 497–529.

[50] In our equations, we suppress the i and d subscripts for readability where we think it will not cause confusion.

of the new contract as the commitment period. Second, the same service member who re-enlists a year prior to the expiration of their contract: We still mark the decision on the date their first contract would have ended and use the difference in end dates of the contracts to figure out the commitment. Third, an officer or enlisted service member not under obligation: We identify decisions using PCS moves or changes in assignment that are at least 2 years apart, and use the length of the assignment as the commitment.

There is one exception to our principle: The Navy's initial enlisted contracts that have a hard end of obligated service (HEAOS) that is different from the soft end of obligated service (SEAOS). In these cases, we include a decision at HEAOS despite the fact that the service member cannot leave at this point. Their options are to re-enlist for at least 2 years beyond their current obligation or to stay until the end of their SEAOS and make another decision. Since the Navy forgives the difference between SEAOS and HEAOS for those sailors who reenlist early, the majority of sailors who plan to stay in the Navy do so at HEAOS. Choosing not to reenlist at this point is a very strong indication that the sailor plans to separate from the Navy at SEAOS, and it is important for us to capture this first decision in the model.

Our model includes only voluntary decisions. A service member who attrites from the military during or at the end of their contract is not making a voluntary decision. Unfortunately, based on our conversations with service members and SMEs it seems likely that some voluntary losses are marked as attritions due to disability in the data. These service members potentially could have stayed in the military if they had wanted to. We do not attempt to differentiate and make any judgements about these situations. If the transaction data indicate an involuntary loss, we treat it as an involuntary loss and exclude it from the model. This likely serves to improve the overall baseline retention rates that we observe and fit the model on. We do not have any reason to believe that service members who are marked as attritions due to disability would have a different sensitivity to military compensation than other service members, so we do not expect this quirk of the data to have bearing on our analysis of the effectiveness of military compensation.

We make some adjustments to the decisions in cases where the data appear unreliable. Sometimes there are multiple reenlistments or extensions in a row, in which case we combine the obligations and attach the full amount of time to the first decision point. We enforce that the decisions must had at least 2 and no more than 6 years of obligation. In cases where there are long gaps between decisions (usually for officers who are at a single location for a long time), we impute decisions in the middle of a tour. Finally, we assume that if the data indicate that a service member left voluntarily at the end of their contract, they must have been able to do so, even if the data also say that the service member was still under obligation: We adjust the length of the previous decision to match the loss date.

To operationalize equation (2) and be consistent with what we heard in focus groups, we redefine the commitment length for some mid-career decisions. Note the

$-\ln(p(leave, \ldots))$ term in the equation. If the probability of leaving at that decision point is extremely low, then the term will tend to negative infinity and even small changes in the probability will induce massive changes in the value of the decision. For most of our communities, the probability of leaving after 12 YOS and before 20 YOS is extremely small. We therefore assume that a commitment that takes a service member past 12 YOS is essentially a commitment to stay to 20 YOS. This modeling decision is in line with focus group results; in fact, we specifically included a question in the focus groups about when a retention decision essentially becomes a decision to stay until retirement, and almost unanimously service members indicated the 10- to 12-YOS range. Here is an example of how we make the change for the model: If a service member has two decisions, one at 8 YOS to stay for 6 more years, and another at 14 YOS to stay for 6 more years, we replace the length of the first decision with 12 and keep the second decision as is. This creates some inconsistency, in that the length of the first decision and the timing of the second decision are not aligned, but it appropriately characterizes both decisions and allows us to keep information from both of them in the model.

Finally, we remove some decisions and individuals from the data if the data about them or their decisions appear unreliable or if they have particularly unusual careers. For every community, we exclude decisions that are outliners based on pay grade and YOS combinations in that community. We exclude decisions that suggest data inconsistencies, such as retirements before apparent eligibility or voluntary losses after 20 YOS that are not counted as retirements. Finally, we exclude individuals if the data about them are missing and we cannot reliably impute those data, which typically involve contract dates or accession dates that are missing or are wildly implausible.

Simulations

To form the expectation term in equation (2), we need a simulation of the military career of service members at least until their next retention decision. For service members who stay in service and for whom we observe the entire period until the next decision, we can use observed outcomes. For all others, we must somehow simulate the vector x_i for every year. We choose to do this using a matching procedure, and we do this for the full military career rather than just until the next decision point.

The idea behind our matching process is simple: We find another service member who looks the same as the service member we need expectations for and use that person's observed outcomes. In practice, there are some challenges. Even in large communities we do not have enough observations to simultaneously match service members on their family status and their careers with enough precision. We decide to separate these two parts of the simulation and do them separately. This reduces our ability to pick up any potential cross-correlations between family status and career progression; for example, we would not

identify a relationship between the age of youngest child and PCS frequency, if one existed. Here is a simplified summary of the steps in our simulations:

1. Match service member (SM) on community, gender, age (within 2 years), and marital status; draw new marital status for next year.
2. Match SM on community, gender, age (within 2 years), marital status, and the number of children; draw any change in the number of children.
3. Adjust length of marriage and age of youngest child, if necessary.
4. Match SM on community, pay grade, and YOS (years of commissioned service [YOCS] for officers) (within 1 year); draw new pay grade.
5. Match SM on community, pay grade, and education level; draw new education level.
6. Match SM on community, pay grade, years on station, and (for the Navy only) sea/shore duty and time at sea/shore; draw new assignment, including location and (for the Navy only) sea/shore status.
7. Figure out information related to PCS move, if any.

We repeat this process for every service member until we have a full military career and family history for them, to 30 YOS. Every service member has only one simulation in our implementation of the model; using more than one could improve the efficiency of the estimates, but given our large sample sizes we do not believe this to be a particular concern.

Although we do not use backwards induction when solving our model, we use all of the simulations when computing the expectation and the $-\ln(p(leave, \ldots))$ term in equation (2). Instead of aggregating decisions of other service members to estimate $p(leave, \ldots)$ at the next decision point, we use the model to predict this probability for every specific service member for every decision for their entire career. In the language of Arcidiacono and Miller, we get the CCPs "from the model" rather than "from the data."[51]

Initial Conditions Problem

As with most DDC models, we are faced with the well-known "initial conditions problem." We do not observe all of the service members in our data from the beginning of their careers, nor would we want to. Estimating the model only on service members for whom we observe the entire career would require us to use data that are three decades old and which may no longer be particularly relevant to the retention decisions current service members are making today. We therefore have to somehow adjust the unobserved

[51] Arcidiacono and Miller, "Conditional Choice Probability Estimation of Dynamic Discrete Choice Models With Unobserved Heterogeneity."

heterogeneity distribution of these service members to take into account decisions that we do not observe in the data, but which they must have made in the past.

We could use a backwards simulation technique to construct hypothetical careers and decisions for service members who enter our data in the middle or towards the end of their careers. We would then incorporate these decisions in the E step of the EM algorithm when updating our estimate of the unobserved heterogeneity. In fact, this is the procedure we describe in our previous paper. Instead of this approach, we use the simulations of full military careers that we already constructed and separate the E step into two parts.

First, we use the current set of model parameters to update our estimate of unobserved heterogeneity only for the service members for whom we observe their first retention decision (i.e., a retention decision at or before 6 YOS). The full career simulations for these service members all the way until 30 YOS give us an estimate of the distribution of unobserved heterogeneity for all of these service members, conditional on staying until different points in their career. We estimate a regression for the probability of each type in each community conditional on YOS (modeled with a spline), gender, and race (the variables we include in our model for unobserved heterogeneity). This regression gives us the probability distribution of the unobserved heterogeneity in every community at every point in the career conditional on gender and race.

Second, we use our regression model for unobserved heterogeneity to predict an "initial" distribution of types for every service member whose first decision we do not observe. This is our adjustment to the initial distribution of types. After this adjustment, we update the distribution of unobserved types as usual in the E step, taking model parameters as given and calculating the probability of each type conditional on observed decisions using Bayes rule.

We find this approach to be more robust than attempting to backwards simulate military careers. First, we do not have to fully characterize past decisions that we have no data on, so fewer assumptions are necessary. Second, the regression model necessarily smooths out simulations that could be outliers, so we do not have to make decisions about what to do with "unusual" simulations or outcomes. Third, this approach creates a direct link between the E step of the algorithm and the way we construct the future terms in the model, which we find desirable; there is no possibility that the expectations of future career that we build into the model diverge in any way from the type distribution and selection process that we estimate.

Value of the Civilian Career

The final piece of the model is the value of the civilian career given by $U(leave, \dots)$ in equation (3). This represents the expected present discounted value of the entirety of the civilian careers that a service member and their spouse may have. At this point in the model,

they no longer make any future decisions, but when making the final decision to leave they do consider the full future horizon and what is likely to happen to them. We need to estimate or summarize the value of this option without introducing unnecessary modeling or computational complexity.

We do not know what happens to service members after they leave the military; we do not have panel data that links to active duty service records and tracks veteran's employment. It would be extremely ambitious to attempt to construct a simulation for every service member of what their entire civilian career might look like, together with earnings, any potential future education, and changes to their career. Instead, we separate the value of the civilian career into a short-term and a long-term component, and summarize the long-term component with a single statistic.[52]

For this statistic we represent the long-term component with the quantile of the civilian income distribution where the household falls. This captures both the absolute and relative socioeconomic standing of the household. Since the income distribution is nonlinear, this introduces diminishing marginal returns to the long-term value of the career: It is more impactful for a household to have an additional $20,000 in annual income if they are at the median than if they are already at the 0.90 quantile. Separating the short-run and long-run portions also allows the model to decouple the value service members place on short-term discretionary income from the value of long-term economic income and stability. This formulation is consistent with the findings from focus groups; service members talked about their immediate financial future in very concrete terms focused on having enough income to make ends meet and about their long-term financial future in broader terms, such as whether their family will be "well-off" if they leave the military or if they reach retirement eligibility.

Specifically, for the long-term component of the value of the civilian career, we compute the quantile that the service member's income falls at in the household income distribution. We compute this quantile as if the household is married; if the service member is single, we impute spousal income without any veteran spouse penalties. This quantile enters the model linearly, just like all of the other variables. The difference in the long-term value is most pronounced when service members are considering staying until retirement or not—reaching military retirement eligibility can increase the quantile that their household income falls in by as much as 0.25. In most other decisions the differences in the long-term value are small relative to the differences in the short-term value of discretionary income.

[52] The short-term component is discussed in the main body of the paper.

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Appendix H. Model Estimates and Fit

We estimate one model for the enlisted service members in our communities and one model for officers. Because we want the model to be representative of the force more generally, and we want to evaluate how military compensation affects service members in different communities, we create a sample that underweights large communities. Specifically, we restrict the number of service members that we include from any community to be no more than five times the number of service members in the smallest community. In practice, the smallest community is Army Cyber, and it has 1,053 unique enlisted and 587 unique officers in our sample. We therefore take up to 5,265 enlisted and 2,935 officers from each community for our estimation sample.

Even with the CCP formulation and our simplification of the long-term value of the civilian career, model estimation is computationally-intensive. We estimate the models in sequence, using our initial estimates as starting values for future model runs. To determine the structure of unobserved heterogeneity, we first estimate models with different numbers of types. We then add observed variables and test different specifications. Our final model is always estimated with all parameters fully unrestricted, first using a gradient-based method for the M step, then again using a gradient-free method. Our preferred models are included in the main text of the paper; here we include estimates from a selection of other models to give an idea of how estimates differ depending on specification.

Model Estimates

Tables H-1 and H-2 present estimates from models with different parameters. Models 4 and 5 in Table H-1 were used to set the starting parameters for the preferred enlisted model, and models 3 and 4 in Table H-2 were used to set the starting parameters for the preferred officer model. In early models, upper and lower bounds were placed on parameter values in order to reach convergence in optimization.

Table H-1. Enlisted Models

Parameters	Model 1	Model 2	Model 3	Model 4	Model 5	Preferred
Income	0.075	0.095	0.053	0.074	0.164	0.112
Income quantile		41.820		39.822	30.237	35.941
Retirement eligible			-51.117			
Married (to civilian)				-0.080		-0.081
Married (to SM)				0.191		0.045

Parameters	Model 1	Model 2	Model 3	Model 4	Model 5	Preferred
Children				-0.123		-0.158
Young children				-0.078		-0.235
Junior enlisted					-1.602	-0.671
Senior NCO					0.930	0.377
Warrant					0.914	0.379
Sea duty					-0.352	-0.438
Stationed abroad					-0.255	-0.260
Number of types	5*	3*	3	3	3	3

* The values of the most extreme taste parameter are at the bound in this specification.

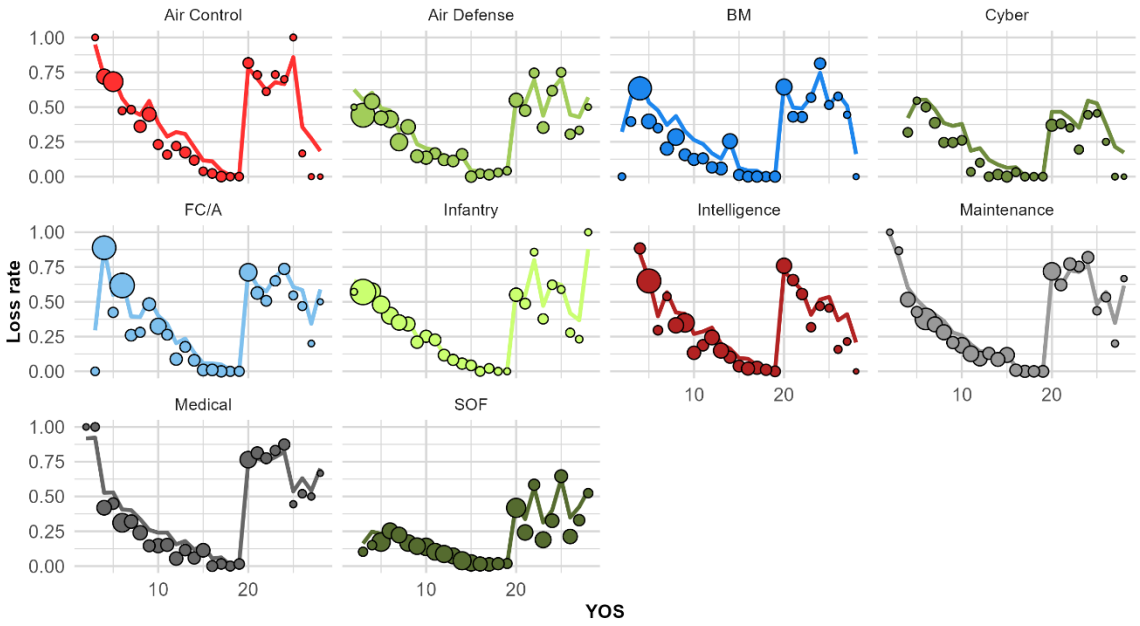
Table H-2. Officer Models

Parameters	Model 1	Model 2	Model 3	Model 4	Preferred
Income	0.051	0.084	0.122	0.058	0.074
Income quantile		27.901	30.515	29.585	31.453
Married (to civilian)			-0.041		-0.022
Married (to SM)			0.012		-0.009
Children			-0.066		-0.082
Young children			-0.053		-0.103
Junior officer				-1.130	-0.790
Sea duty				-0.624	-0.413
Stationed abroad				-0.056	-0.021
Number of types	5*	3	3	3	3

* The values of the most extreme taste parameter are at the bound in this specification.

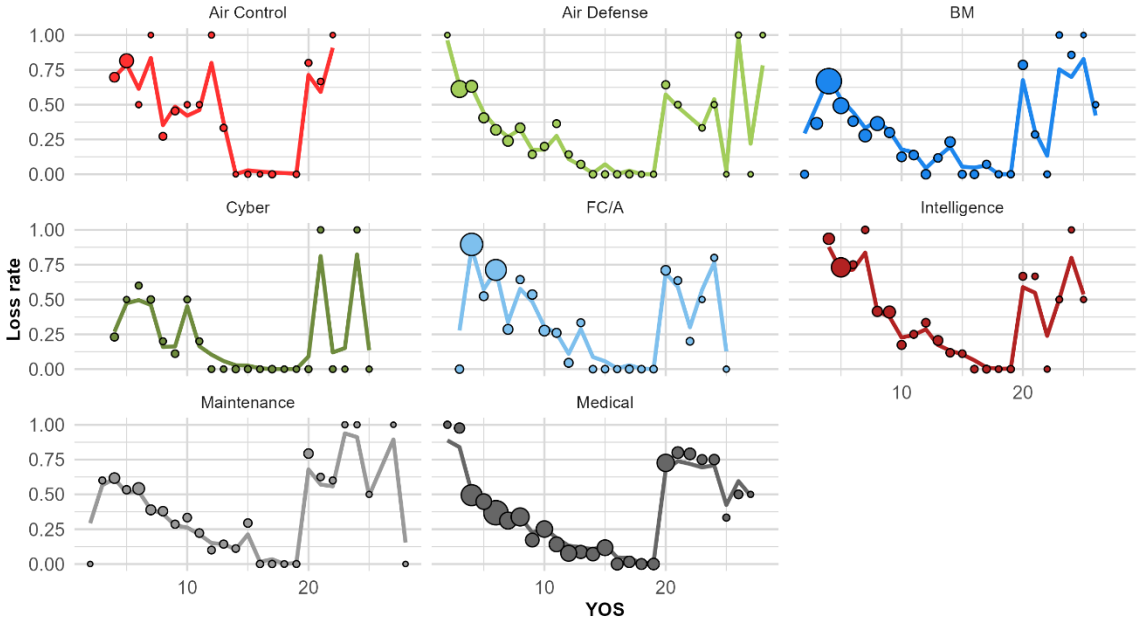
Model Fit

We include figures that show the model fit overall in the main body of the paper. Here, we include figures that show the model fit for service members with civilian spouses and service members who are women, since these are two populations of particular concern for this study. As before, the figures show in-sample fit for Cyber, Air Control, and Intelligence and out-of-sample fit for the other communities.



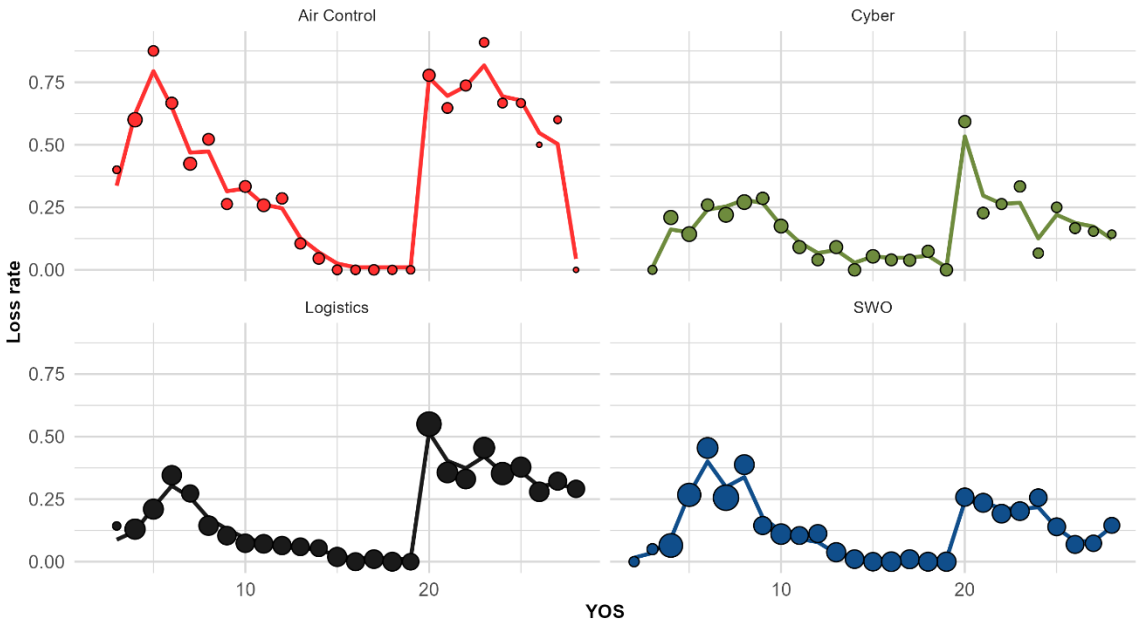
Note: Points represent average loss rates by YOS for observed decisions in the data; size of point corresponds to the number of observed decisions. Lines are predictions from the model.

Figure H-1. Enlisted Model Fit—Civilian Spouse



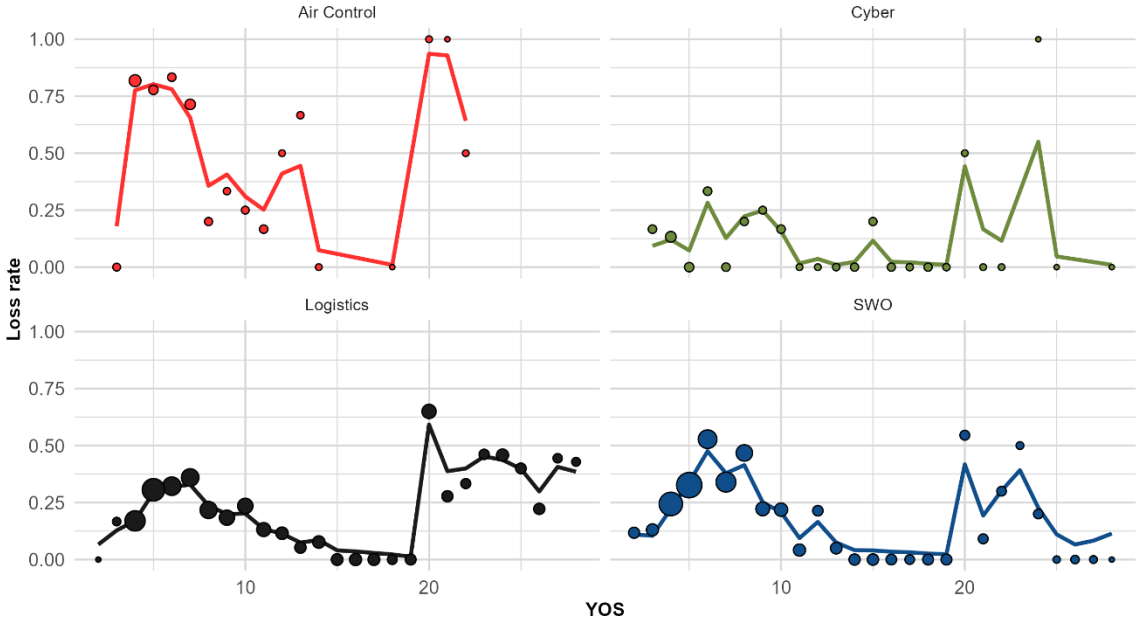
Note: Points represent average loss rates by YOS for observed decisions in the data; size of point corresponds to the number of observed decisions. Lines are predictions from the model.

Figure H-2. Enlisted Model Fit—Women



Note: Points represent average loss rates by YOCS for observed decisions in the data; the size of the points corresponds to the number of observed decisions. Lines are predictions from the model.

Figure H-3. Officer Model Fit—Civilian Spouse

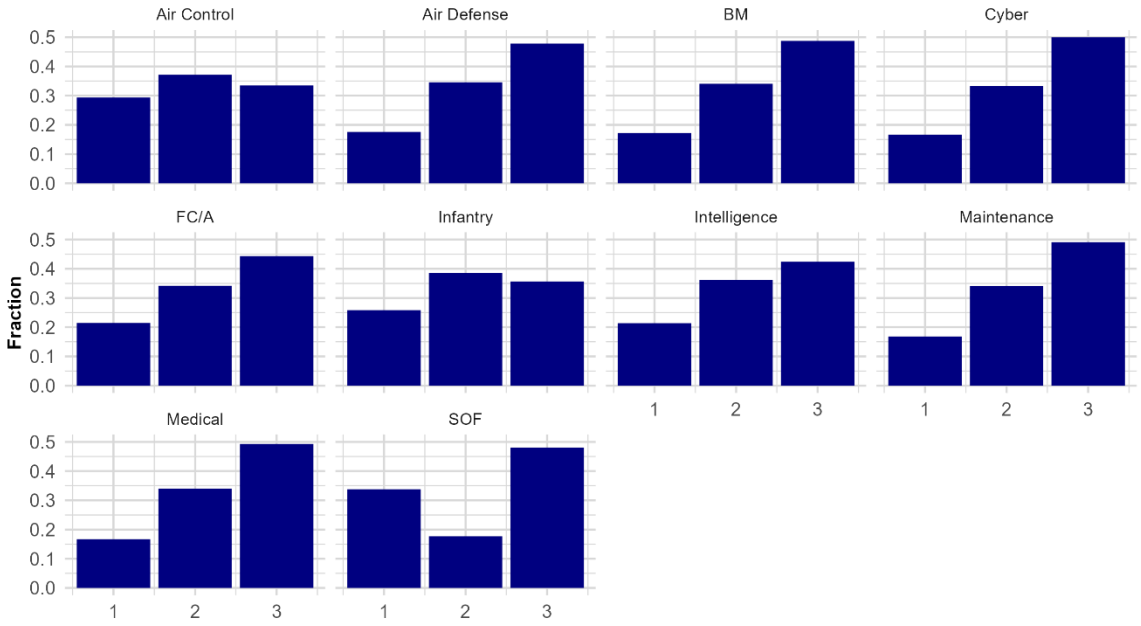


Note: Points represent average loss rates by YOCS for observed decisions in the data; the size of the points corresponds to the number of observed decisions. Lines are predictions from the model.

Figure H-4. Officer Model Fit—Women

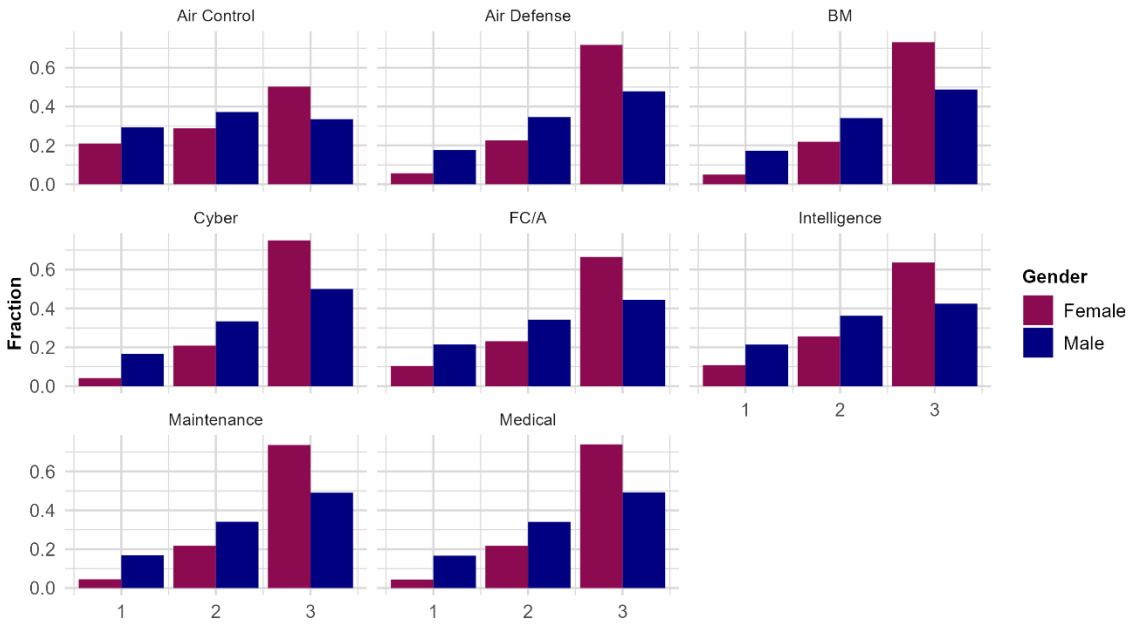
Distribution of Types

The distribution of unobserved types plays an important role in the model. This distribution is not, strictly speaking, a structural parameter of the model the way the utility parameters are—it represents an agglomeration of persistent features that the rest of the model does not capture. Without an investigation of what this heterogeneity represents, it is unclear how useful an examination of the distributions can be. Here we provide figures of the distribution of types for our preferred models by branch and gender (there appeared to be no differences by race). We caution against drawing any strong conclusions based on these distributions.



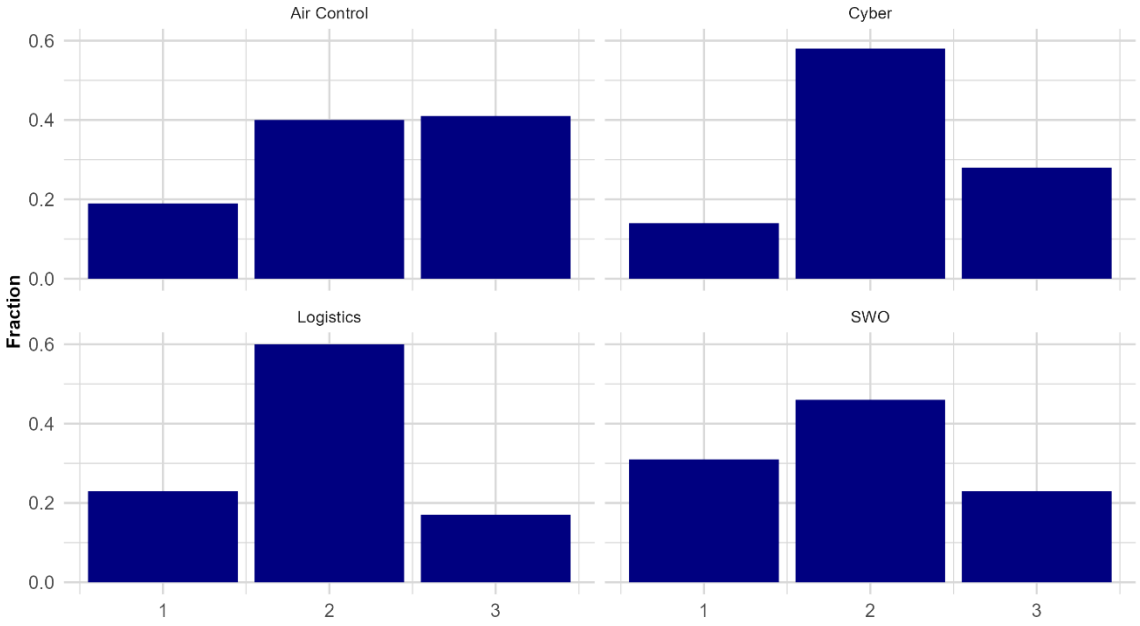
Note: Type 1 in this figure corresponds to the parameter with the highest preference for military service and type 3 with the highest preference for a civilian career.

Figure H-5. Distribution of Unobserved Heterogeneity by Branch in the Enlisted Model



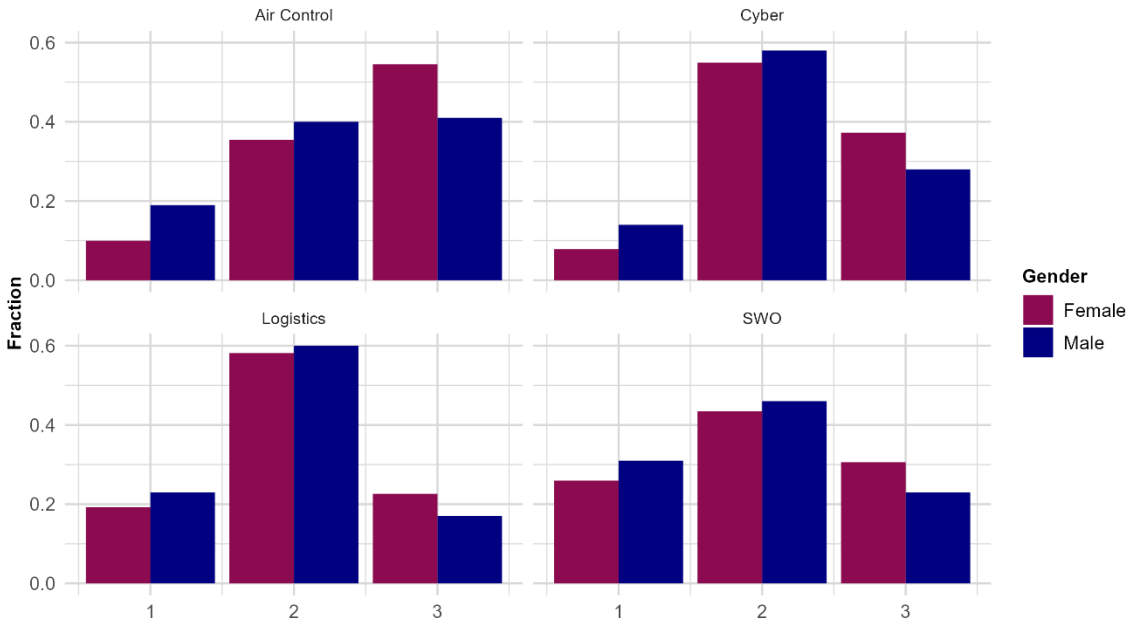
Note: Type 1 in this figure corresponds to the parameter with the highest preference for military service and type 3 with the highest preference for a civilian career.

Figure H-6. Distribution of Unobserved Heterogeneity by Branch and Gender in the Enlisted Model



Note: Type 1 in this figure corresponds to the parameter with the highest preference for military service and type 3 with the highest preference for a civilian career.

Figure H-7. Distribution of Unobserved Heterogeneity by Branch in the Officer Model



Note: Type 1 in this figure corresponds to the parameter with the highest preference for military service and type 3 with the highest preference for a civilian career.

Figure H-8. Distribution of Unobserved Heterogeneity by Branch and Gender in the Officer Model

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Appendix I. List of Illustrations

Figures

Tables

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Appendix J. References

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Appendix K. Abbreviations

ACS	American Community Survey
ADA	Air Defense Artillery
ADSS	Active Duty Spouse Survey
AFSC	Air Force Specialty Code
ADM	Active Duty Master File
AFQT	Armed Forces Qualification Test
ASVAB	Armed Services Vocational Aptitude Battery
BAH	Basic Allowance for Housing
BM	Boatswain's Mate
BNA	Basic Needs Allowance
BRS	Blended Retirement System
CCP	Conditional Choice Probability
CDC	Child Development Center
CONUS COLA	Continental United States Cost of Living Allowance
CP	Continuation Pay
CZTE	Combat Zone Tax Exclusion
DDC	Dynamic Discrete Choice
DEERS	Defense Enrollment Eligibility Reporting System
DMDC	Defense Manpower Data Center
DoD	Department of Defense
EM	Expectation-Maximization
FC/A	Fire Controlman
FSA	Family Separation Allowance
HEAOS	Hard End of Obligated Service
MCAT	Military Career Analysis Toolkit
MHA	Military Housing Area
ML	Maximum Likelihood
MOS	Military Occupational Specialty
O*NET	Occupational Information Network
OHA	Overseas Housing Allowance

OPA	Office of People Analytics
OUSD P&R	Office of the Under Secretary of Defense for Personnel and Readiness
PCS	Permanent Change of Station
PG	Pay Grade
QRMC	Quadrennial Review of Military Compensation
RMC	Regular Military Compensation
S&I	Special and Incentive
SEAOS	Soft End of Obligated Service
SM	Service Member
SME	Subject Matter Expert
SNAP	Supplemental Nutrition Assistance Program
SOC	Standard Occupational Classification
SOF	Special Forces
SWO	Surface Warfare Officer
TSP	Thrift Savings Plan
YOS	Years of Service
YOCS	Years of Commissioned Service
YTD	Year-to-Date

REPORT DOCUMENTATION PAGE

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1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED	
		START DATE	END DATE
December 2024	Final		

4. TITLE AND SUBTITLE

Retain the Family: Redefining the Military Compensation Benchmark, Volume II

5a. CONTRACT NUMBER	5b. GRANT NUMBER	5c. PROGRAM ELEMENT NUMBER
HQ0034-19-D-0001		
5d. PROJECT NUMBER	**5e. TASK NUMBER**	**5f. WORK UNIT NUMBER**
BE-6-5321		

6. AUTHOR(S)

Kambic, Jacklyn R.; Huff, Jared M.; Smirnov, Mikhail; Sivaram, Anusuya; Eifert, Erin

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
Institute for Defense Analyses / Systems and Analyses Center Research Division 730 East Glebe Road Alexandria, Virginia 22305	IDA Product 3001177

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)	11. SPONSOR/MONITOR'S REPORT NUMBER
Tony Licari Program Analyst, Military Personnel Policy Accession Policy, Pentagon Rm. 3D1066 Washington, DC 20301-1500	OUSD(P&R))	

12. DISTRIBUTION/AVAILABILITY STATEMENT

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The military compensation benchmark compares military compensation to civilian incomes to assess whether military compensation is adequate for recruitment and retention goals. However, military retention decisions depend on household finances. For dual-income families, the service member's pay is only part of this equation, and military spouses face unique challenges in the labor market that can limit their ability to contribute to household income. This report reevaluates the current benchmark in the context of the dual-career decisions facing a growing number of military households. We use a mixed-methods approach to analyze how military spouses' careers, the challenges of military life, and military compensation affect retention decisions. This volume provides recommendations for redefining the benchmark to ensure that military compensation remains adequate to meet retention needs: It should be calculated using total pre-tax cash compensation, account for military occupation, be set to a range between the 80th and 90th percentiles of individual incomes of civilians with comparable education and occupation, and not depend on marital status. We also recommend that DoD continue to explore ways to mitigate military life's effects on spouses' careers, such as increasing access to child care and/or reducing the frequency of permanent change of station moves.

15. SUBJECT TERMS

Military compensation, military retention, dual-income households, military families, veterans' earnings, military spouse employment

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES
a. REPORT	b. ABSTRACT	c. THIS PAGE		
U	U	U	UU	111

19a. NAME OF RESPONSIBLE PERSON	19b. PHONE NUMBER
Tony Licari	703-693-7490

U.S. Department of Defense
Office of the Under Secretary of Defense for
Personnel and Readiness
Washington, D.C.