Volume III. Structural Changes to the Military Pay System

December 2020

Report of

The Thirteenth Quadrennial Review of Military Compensation

Preparation of this report and its underlying studies cost the Department of Defense a total of approximately $5,680,000 in Fiscal Years 2018–2020.

Report of the Thirteenth Quadrennial Review of Military Compensation

Volume III. Structural Changes to the Military Pay System

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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] In September 2017, President Donald J. Trump instructed the Secretary of Defense to conduct the Thirteenth Quadrennial Review of Military Compensation (13th QRMC). In his charge to the secretary, the President stated:

> In addition to our support and gratitude, we owe our men and women in uniform the tools, equipment, resources, and training they need to fight and win. Our military compensation system must recognize their sacrifices and adequately and fairly reward them for their efforts and contributions. It also must encourage the next generation of men and women to answer the call to serve their fellow citizens as members of our uniformed services. Although the world and the threats to our Nation have changed over time, the structure of our military compensation system, with the exception of recent changes to military retirement, has remained largely the same.[2]

Thus, the 13th QRMC examined several structural changes to the military compensation system—a single-salary system and a time-in-grade pay table—in addition to topics concerning the adequacy of military pay.

This third volume of the 13th QRMC report contains research papers on structural changes to the military pay system prepared by federally funded research and development centers in support of the QRMC. They include more detailed discussion of the topics addressed in the main report to include 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:

Analysis of a Salary-Based Pay System for the Quadrennial Review of Military Compensation

Nancy M. Huff, Joseph F. Adams, Amy A. Alrich, Claudio C. Biltoc, James M. Bishop, Jerome Bracken, Dave I. Cotting, Norman L. Cotton, Meredith J. Dozier, Dina Eliezer, David R. Graham, R. Abraham Holland, Stanley A. Horowitz, Nigel J. Mease, Neil V. Mithal, Christopher D. Oswald, Heidi C. Reuter, Jenns A. Robertson, Scott Schutzmeistr, Ashlie M. Williams, Institute for Defense Analyses

1. United States Code, Section 1008b, title 37.

2. The White House, "Thirteenth Quadrennial Review of Military Compensation," memorandum for the Secretary of Defense, September 15, 2017.

The Single-Salary System for Military Personnel: An Analysis of Second- and Third-Order Effects

Thomas M. Geraghty, Lauren Malone, Tom Woo, Christopher Gonzales, CNA

Estimating the Effect of a Single-Salary System on Marriage Rates and Retention

Thomas M. Geraghty, Gerald E. Cox, Jared M. Huff, Rachel Townsley, Lauren Malone, Jacklyn Kambic, CNA

How a Single-Salary Compensation System Could Affect Privatized Military Housing

Glenn H. Ackerman, S. Alexander Yellin, Robert W. Shuford, Susan Starcovic, Jessica T. Fears, CNA

The Single-Salary System for Military Personnel: A Review of Existing Practices and Literature

Thomas M. Geraghty, Kyle Neering, Patty Kannapel, Juliana Pearson, Lauren Malone, Justin Ladner, CNA

Analysis of a Time-in-Grade Pay Table for Military Personnel and Policy Alternatives

Beth J. Asch, Michael G. Mattock, Patricia K. Tong, RAND Corporation

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Executive Summary

The Thirteenth Quadrennial Review of Military Compensation (QRMC) was established by the President in a September 2017 memorandum to the Secretary of Defense. One of its three main provisions was "to determine whether the structure of the current military compensation system, as a system of basic pay, housing, and subsistence allowances, remains appropriate, or whether an alternate compensation structure, such as a salary system, would enhance readiness and better enable the Department of Defense [DoD] to recruit and retain tomorrow's military force."[1]

This direction echoes the 2017 National Defense Authorization Act (NDAA), which requires that the Secretary of Defense submit to the Armed Services Committees a report on a single-salary pay system.[2] The act states that the single-salary system should be adjusted by the same cost-of-living adjustment that DoD uses for civilian employees.[3] It also specifies that the new pay structure "will result in no or minimal additional costs to the Government."[4]

The Director of the Thirteenth QRMC, via the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD (P&R)), asked the Institute for Defense Analyses (IDA) to provide the fact-finding, analytic tools, and analysis necessary to assess how a single-salary system would affect Service members' earnings and behavior. Additionally, we assessed the readiness, cost, and tax revenue implications of such a system. Although past QRMC studies have examined portions of the salary system—removing the marriage premium, for example—this QRMC is the first to have been tasked with evaluating and quantifying the effects of a salary system as a whole. In doing so, our analysis reveals many complex interactions among compensation variables and the parallel policy changes necessary to establish a salary system without inducing radical swings in compensation or cost. We find that the implementation of the proposed single-salary system would introduce substantial additional complexity, reduce aggregate after-tax

1 "Thirteenth Quadrennial Review of Military Compensation," Memorandum for the Secretary of Defense, September 15, 2017.

2 The full text of the September 2017 Presidential memo and the relevant section of the 2017 NDAA are available in Appendix A.

3 The annual cost-of-living adjustment for civilian employees is well-specified but complex. It is codified in 5 U.S. Code § 5303, Annual adjustments to pay schedules; and described in, "Federal Employees: Pay and Pension Increases Since 1969," Congressional Research Service (CRS) report 94-971, January 20, 2010, https://fas.org/sgp/crs/misc/94-971.pdf.

4 National Defense Authorization Act for Fiscal Year 2017, Public Law 114–328, Section 604, December 23, 2016.

compensation (also known as "take-home" pay), and generate little, if any, benefit to readiness. Moreover, a salary system is likely to encounter substantial suspicion and resistance from Service members.

Our assessment of a salary system follows three lines of effort. First, the IDA Salary System Assessment Tool (SSAT) models the after-tax income effects of transitioning to a salary system by focusing on four major characteristics of Service members: rank, dependency status, receipt of the Basic Allowance for Housing (BAH) versus government-owned housing, and tax liabilities.[5] The model calculates how transferring current funding for allowances to the salary system pay pool affects the after-tax, take-home pay of each category of Service members. The SSAT analyses show how individual after-tax cash compensation change for specified pay policies. In this paper, we examine four cases:

1. **A baseline case**: Current allowances ($24.9 billion) are allocated proportionately to current basic pay. Basic pay is increased further to cover federal taxes on the higher basic pay.
2. **A tailored case**: The percentage increase in basic pay to offset reduction in allowances varies by pay grade to reduce cross-rank variation in proportional changes in after-tax income.
3. **A baseline case with rent**: Service members are required to pay market-equivalent rent for government-owned housing.
4. **A tailored case with rent**: The provisions for cases 2 and 3 are combined.

The output for each policy case shows the distribution of categories of Service members who "win" or "lose" after-tax income (also known as "take-home pay") relative to the current system. Major takeaways of the distributional analysis of the four alternative salary systems include the following:

- If government spending is not allowed to increase, the total take-home compensation of military personnel would decline under a salary system. This decline is due to increases in state taxes associated with higher basic pay. The two criteria specified by Congress, that compensation not fall and that cost to the government not rise, cannot be satisfied simultaneously.
- The cost to DoD is equal to the cost to the government plus federal taxes, including the employer's share of Social Security and Medicare taxes. In the current system, we estimate this cost to be $89 billion. This cost would rise to roughly $97 billion under the salary systems we examine.

[5] Some Service members live in government-owned housing and do not receive BAH. However, Service members who live on base in privatized housing are provided BAH. In the latter case, the BAH allowance is paid by allotment to the landlord.

- Currently, under our assumptions, junior personnel not receiving BAH have lower total compensation than other personnel because they do not receive as valuable a housing benefit.
- If members in government-owned housing are not charged rent, they would benefit from a salary system at the expense of Service members who pay for housing.
- The baseline systems, which multiply each member's basic pay by the same percentage, favor more senior personnel.
- The tailored systems reduce discrepancies among categories of BAH recipients, particularly married ones.
- Charging market rents for government-owned housing eliminates the unequal gains Service members in such housing receive under a salary system.
- A tailored salary system with market rents largely equalizes compensation within a pay grade regardless of marriage status and occupancy of government-owned housing. Under such a system, married BAH recipients would suffer an average loss in after-tax income of 5.5 percent while single BAH recipients' losses would average 2.5 percent.
- A tailored salary system with market rents would reduce the pay of married members relative to unmarried members, and reduce the pay of BAH recipients relative to residents of government-owned housing. These adverse impacts on elements of the force would likely have a negative impact on retention.
- The impact of moving to a salary system will differ by individual within a category. For example, personnel with high-earning spouses will lose more of their increases in basic pay to federal taxes.

The second line of effort entails an econometric analysis designed to estimate the likely responses of Service members to changes in after-tax income. This work complements and extends a long history of studies of military retention. We analyze annual data on all active duty Service members from December 2000 through December 2017, roughly 1.3 million Service member records each year.

A long history of prior econometric estimates finds that retention and recruiting are sensitive to changes in pre-tax compensation. Those estimates suggest that a salary system that would substantially increase the pay of junior personnel would improve recruiting. At the same time, pay cuts to career enlisted personnel receiving BAH could well lead to retention problems.

There are, however, opposing considerations. First, our econometric analysis found no significant effect on retention from a permanent change in annual *after-tax* income of

$1,000. Second, behavioral economic theory and evidence from our field fact-finding suggest (a) the responses to pay losses are stronger than the responses to pay gains, and (b) the uncertainty created in adopting a salary system could undermine how Service members' value their compensation. We caution that the unprecedented nature and magnitude of the changes inherent to adopting a salary system, and the diversity of Service member perspectives and perceptions, prevent us from confidently predicting how Service members might respond.

The third line of effort entails extensive fact-finding in the field with individual Service members and focus groups. We engaged with 740 Service members in every Service by visiting Active and Reserve Component installations in four states across the country. The field research indicates that Service members mainly

- Value pay and benefits, but also join the military for employment stability as well as the education and career development opportunities it offers. Service members are more concerned with the value of national service, childcare, healthcare, education benefits and loan forgiveness, and stability in compensation than the precise level of compensation.
- Strongly favor fairness in pay that reflects work demands, risks, and rank. Service members widely support greater differentials in pay for effort, assignment responsibility, hours, and onerous or risky duty.
- Express strong concerns about "correcting" childcare and housing allowances while hoping for improvements in other non-cash benefits. Service members see inadequate childcare as a particularly major issue that also relates to the fairness of family compensation.
- Express strong skepticism of major restructuring of military compensation systems. Service members view the current system as imperfect, but "fair enough." They see uncertainty in how a salary system would work, and its implications for themselves. Their major feedback focused on the needed improvements within the current system.

In addition, we included questions related to a salary system in the 2019 Status of Forces survey for active duty personnel (SOFA) conducted by the DoD Office of People Analytics (OPA). Overall, 78 percent of research participants in the focus groups and 75 percent of SOFA respondents indicated that they "strongly opposed" or "somewhat opposed" a change to a salary system. The participants also indicated that there would be impacts to the proposed changes both in terms of retention and to the potential recruitment of those not yet in the military. Economic research has shown that losers tend to feel more strongly about losing than winners feel about gaining an equivalent amount. We observe a very similar pattern from the focus groups and survey results. When queried about retention perceptions associated with earning levels as a result of a proposed change to a salary

system, research participants responded in an asymmetric way. The reported disapproval for a certain percentage drop in pay as a result of a salary system was much larger than the reported approval for an equivalent percentage increase in pay.

Other Paths to Efficient and Fair Compensation

In modeling the transition to a salary system, we identified many possible mechanisms—short of adopting a salary system—that might improve the efficiency or fairness of the current system, and thereby enhance readiness. Mechanisms that could be considered include the following:

- Shifting the basic allowance for subsistence and the "marriage premium" portion of BAH into targeted, flexible pays such as special and incentive pays
- More precisely targeting flexible pays, such as special and incentive pays, to resolve readiness issues
- Tailoring the basic pay table by occupation to target readiness issues
- Reforming BAH to reflect locational factors beyond the cost of housing
- Improving quality of and access to in-kind benefits such as housing and childcare

Each of the above improvements could be implemented without adopting a salary system. In addition, DoD's current cash compensation system already allows a high degree of flexibility, particularly through the many categories of special and incentive pays and enlistment and retention bonuses.

One important overall conclusion of our work is that the DoD would be well served to consider a broader range of alternatives for improving compensation beyond the wholesale elimination of allowances and the adoption of a salary system.

Contents

1. Introduction

The goal of a salary system is to "enhance readiness and better enable the Department of Defense to recruit and retain tomorrow's military force."[1]

Consideration of a salary system for compensating military personnel goes back at least to the post-Civil War era. Until 1870, in addition to basic pay officers received a cash allowance to cover their subsistence. The size of the allowance varied with rank. The Army and Navy Appropriation Acts for 1871 established a salary system for officers and abolished the allowances for subsistence or rations. This system remained in effect until 1922, when subsistence allowances again became a separate part of officers' compensation.[2]

In a more recent context, the virtues of a salary system have been debated since some time before the advent of the all-volunteer force. In 1967, the First Quadrennial Review of Military Compensation (QRMC) concluded that the same salary should be paid to all personnel of the same grade and years of service regardless whether they have dependents or live in government-owned housing. It also found that the system of pay and allowances was both inefficient and inequitable. The inefficiency was tied to the fact that military pay was "complex and confusing."[3] A survey determined that "potential reenlistees underestimate the true value of their pay by almost one-fourth. We do not get the maximum retention return from our compensation dollars."[4]

Regarding inequity, the study group observed that "only 58 percent of total pay depends on the work done by the member. The rest depends on family size, accidents of quarters availability, and whether the member serves to retirement. Potential reenlistees cannot be sure what their pay will be. Many, especially bachelors, dislike a system that does not pay equal pay for equal work."[5] Further, "allowances have not kept pace with

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1 "Thirteenth Quadrennial Review of Military Compensation," Presidential Memo to the Secretary of Defense, September 15, 2017.

2 "Military Compensation Background Papers, Eighth Edition," Under Secretary of Defense for Personnel and Readiness, July 2018, 159.

3 "Modernizing Military Pay," Report of the First Quadrennial Review of Military Compensation, Volume I, Active Duty Compensation, Washington, D.C., November 1, 1967, 35.

4 Ibid, 34.

5 Ibid, 36.

costs. Thus, members who draw cash allowances must often spend more than their allowances on food and housing. They are thereby penalized compared to those who are furnished these items in kind. Potential reenlistees see these results and are apprehensive. They cannot be reasonably sure what their living conditions will be, hence cannot predict what their pay will be if they do reenlist."

Since the First QRMC, the concept of a salary system has been revisited with some regularity. The Report of the President's Commission on an All-Volunteer Armed Force, usually called the Gates Commission after its chairman, played a central role in the end of conscription. It found that although conversion to a salary system was not essential for creating an all-volunteer force, it was ultimately necessary for reasons of equity and efficiency.[6] In addition to the reasons cited by the First QRMC, the Gates Commission Report notes that "providing compensation in cash has an inherent advantage… it allows each individual to decide how he or she will use whatever he earns. He can thus get the full value of whatever costs are incurred by the government in paying him. When he is compensated in non-cash form, however, the value of what he receives is often less to him than its cost to the government. Meanwhile, he is encouraged to consume more of particular goods or services than he otherwise would."[7] More recently, a paper by the Center for Naval Analyses (CNA) notes that the Third (1976) and Seventh (1992) QMRCs, as well as the Defense Manpower Commission Report (1976), discussed the potential advantages and disadvantages of transitioning to a salary system.[8]

The general interest in adopting a salary system is motivated by the belief that such a system can better use available budget dollars to create a ready force. The CNA report identifies from the literature the following arguments for a salary system:

- The current system is unduly complex, and members do not understand the true value of their compensation packages. While both basic pay and tax-free allowances are received in cash, the tax advantage associated with the allowances is not clearly quantified.
- The current system does not represent equal pay for equal work. The size of housing allowances is larger for personnel with dependents.[9]

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6 "Report of the President's Commission on an All-Volunteer Force," U.S. Government Publishing Office, September 1970, 56.

7 Ibid, 63.

8 Thomas M. Geraghty, Kyle Neering, Patty Kannapel, et al., "The Single-Salary System for Military Personnel: A Review of Existing Practices and Literature," Center for Naval Analyses (CNA), March 2019, 2.

9 Although housing allowances also vary by location, this variation does not violate the principle of equal pay for equal work. Location is a differentiating characteristic of work. Regardless of the similarity in tasks, work that requires living in a coastal metropolitan hub is not equal to work that requires living in

- The current system does not reflect normal market practice. Also, the value of the tax advantage hinges on dependency status and income bracket. Those with higher salaries enjoy a greater tax advantage.
- Because much of military compensation occurs through the tax system (in the form of reduced revenues to federal, state, and local governments rather than explicit budgetary outlays), the current system does not make transparent the true cost of military compensation.[10]

Although these studies present strong arguments for a salary system, the literature also advances the following arguments against a salary system:

- A salary system might be more difficult to administer, particularly if it charged rent for government-provided housing.
- More high-ranking officers would find their pay capped because of constraints related to the pay of Executive Level II and V government civilians. Some officers in pay grades O-8 (Major General or Rear Admiral upper half) and above are capped now.
- As noted above, the DoD budget would have to increase to compensate Service members for the additional taxes they would pay under a salary system. This increase could be politically difficult for many reasons, including jurisdictional disputes among the relevant Congressional committees.
- The increased tax burden might fall more heavily on junior personnel because tax-free allowances now make up a larger proportion of their income. Alternatively, high-ranking personnel might bear a greater tax burden because they are in higher tax brackets. Which of these two effects is stronger is an empirical question that we analyze in this paper.
- The implications of a salary system for the ultimate Social Security benefits that Service members will receive are unclear, depending on rank and ultimate years of service. The true value of the compensation system would still not be entirely transparent.

While past studies have presented reasonable arguments for and against moving to a salary system, none of these studies has evaluated these arguments empirically. For example, these studies have not examined how much compensation will increase or decrease for various categories of Service members. Understanding the impact of a salary system is central to evaluating the wisdom of adopting one.

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a heartland town. Section 7.A discusses principles and options for variation in pay by location under a salary system.

[10] Ibid, 3.

A. The Thirteenth Quadrennial Review of Military Compensation

The Thirteenth QRMC was established by the President in a September 2017 memorandum to the Secretary of Defense. One of its three main provisions was "to determine whether the structure of the current military compensation system, as a system of basic pay, housing, and subsistence allowances, remains appropriate, or whether an alternate compensation structure, such as a salary system, would enhance readiness and better enable the Department of Defense to recruit and retain tomorrow's military force."[11]

This direction echoes the 2017 National Defense Authorization Act, which requires that the Secretary of Defense submit to the Armed Services Committees a report on a single-salary pay system.[12] The act states that the single-salary system should be adjusted by the same cost-of-living adjustment that DoD uses for civilian employees.[13] It also specifies that the new pay structure "will result in no or minimal additional costs to the Government."[14]

The Director of the Thirteenth QRMC, via the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD (P&R)), asked the Institute for Defense Analyses (IDA) to provide the fact-finding, analytic tools, and analysis necessary to assess how a single-salary system would affect Service members' earnings and behavior and to assess the readiness, cost, and tax revenue implications of such a system.[15] Although past QRMC studies have examined portions of the salary system—removing the marriage premium, for example—this QRMC is the first to evaluate and quantify the effects of a salary system as a whole. Our analysis reveals many complex interactions among compensation variables and the parallel policy changes that are necessary to establish a salary system without inducing radical swings in compensation or cost. We find that the implementation of the proposed single-salary system would introduce substantial additional complexity, reduce aggregate take-home compensation, and generate little, if

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11 "Thirteenth Quadrennial Review of Military Compensation," Memorandum for the Secretary of Defense, September 15, 2017.

12 The full text of the September 2017 Presidential memo and the relevant section of the 2017 NDAA are available in Appendix A.

13 The annual cost-of-living adjustment for civilian employees is well-specified but complex. It is codified in 5 U.S. Code § 5303, "Annual Adjustments to Pay Schedules"; and described in "Federal Employees: Pay and Pension Increases Since 1969," Congressional Research Service (CRS), report 94-971, January 20, 2010, https://fas.org/sgp/crs/misc/94-971.pdf.

14 National Defense Authorization Act (NDAA) for Fiscal Year 2017, Public Law 114–328, Section 604, December 23, 2016.

15 Specifically, we were asked to investigate the implications of a salary system for uniformed personnel in the Department of Defense. Although not part of this study, personnel in three additional uniformed services—the United States Coast Guard, the United States Public Health Service Commissioned Corps, and the National Oceanic and Atmospheric Administration Commissioned Officer Corps—also receive basic pay, BAH, and BAS. These personnel would also be affected by the elimination of BAH and BAS under a salary system.

any, benefit to readiness. Moreover, a salary system is likely to encounter substantial suspicion and resistance from current Service members.

B. Approach

This paper summarizes our analysis of the implications of a single-salary system (usually referred to here as a salary system) on the earnings of Service members. The impact of transitioning from a system with allowances to a salary system is complex, and the effects would vary significantly across personnel. To assess these effects, we developed three analytic methods.

First, the IDA Salary System Assessment Tool (SSAT) models the after-tax income effects of transitioning to a salary system. The model focuses on four major individual characteristics: rank, dependency status, receipt of the Basic Allowance for Housing (BAH) versus government-owned housing, and tax liabilities.[16] The model calculates how transferring current funding for allowances to the salary system pay pool affects the take-home pay of each category of Service members. Our analysis is consistent with Congressional guidance not to increase the cost of the military compensation system to the Federal Government—that is, the cost of DoD's budget for compensation minus the tax payments of Service members that flow back to the U.S. Treasury.

The SSAT analyses show how after-tax cash compensation for categories of individuals will change for specified pay policies. The cases examined in this paper demonstrate the modeling concepts embodied in the SSAT and illustrate the general forces at work in transitioning from a compensation system with allowances to a salary system. The output for each policy case shows the distribution of categories of Service members who "win" or "lose" after-tax income (also known as "take-home pay") relative to the current system. To provide a basis for interpreting how individuals would respond to such changes, we pursued two additional lines of research.

In our second line of research, we conduct econometric analyses designed to estimate the likely responses of Service members to the changes in after-tax pay that are being modeled. This work complements and extends a long history of studies of military retention. The econometric analysis uses advanced analytic methods on a sample of all Service members from December 2000 through December 2017. This sample represents personnel records for roughly 1.3 million Service members each year. The econometric estimates are consistent with the field research in proving that many factors other than raw compensation are more likely to influence Service member decisions to remain in the force.

[16] Many Service members live in government-owned housing and do not receive BAH. On the other hand, Service members who live on base in privatized housing are provided BAH. In the latter case, the BAH allowance is paid by allotment to the landlord.

The third line of research entails extensive field fact-finding with individual Service members and focus groups. We engaged with 740 Service members in every Service by visiting Active and Reserve Component installations in four states. The structured interviews and follow-up survey questions distinguish the views of officers and enlisted, and newer versus long-tenured personnel. The results provide individual views on compensation "fairness"; Service members' likely responses to increases and decreases in compensation; and their valuation of alternative forms of cash, in-kind, and deferred compensation. This work is important for understanding Service members' values as well as the nuances of their interpretations of the complex changes associated with the policy cases. This field research confirms and augments existing DoD surveys, as well as previous studies. In addition, we included questions related to a salary system in the 2019 Status of Forces survey for active duty personnel (SOFA) conducted by the DoD Office of People Analytics (OPA). Overall, 78 percent of research participants in the focus groups and 75 percent of SOFA respondents indicated that they "strongly opposed" or "somewhat opposed" a change to a salary system.

The integration of these three lines of research provides a policy analysis platform that allows users to consider a wide range of "what if" policy cases and to assess the implications for individual attitudes and behaviors. This information in turn provides insights about how any given policy case would affect military readiness, as well as pay fairness and efficiency—which are the ultimate benchmarks for assessing alternatives.

C. Scope of the Analysis

Following the language in the FY 2017 NDAA, we define a "single-salary system" as a compensation system without BAH and basic allowance for subsistence (BAS). The implementation of a salary system would have many implications for military compensation, which we summarize here.

Elimination of basic allowances for housing and subsistence would remove the following features of military compensation:

- A large portion of Service member compensation, which would warrant enlargement of active duty basic pay
- The income tax advantage of Regular Military Compensation, which would warrant further enlargement of basic pay
- Variation in pay across localities, which would warrant the introduction of locality pay
- Variation in pay due to dependent status, which could advantage some members while disadvantaging others

Enlargement of basic pay would increase the following features of military compensation:

- Pay to Service members who live in government housing and currently do not receive BAH, which would warrant the introduction of rent for government housing
- Pay to Service members on reserve status who currently do not receive BAH, which would warrant the separation of basic pay tables for inactive duty and active duty and enlargement only of the latter
- The number of Service members subject to Executive Schedule caps, which could warrant the modification or elimination of those caps
- Service members' retirement pay, which would warrant reduction of the retirement pay multiplier
- Service members' marginal tax brackets
- Service members' federal and state income tax liabilities
- Service members' payments of Social Security and Medicare taxes
- Government expenditures on matching contributions and automatic one-percent contributions to Thrift Savings Plans (because each contribution would be based on higher basic pay)
- The range of permissible continuation pay amounts
- The value of the Combat Zone Tax Exclusion (CZTE)

In addition to the wide range of variables that would be directly affected by the transition to a salary system, a number of other important policy alternatives are not directly tied to salary. The implementation of a salary system would be compatible with, but not cause or warrant, changes to the following features of military compensation:

- Variation in pay across occupations, whether within the current system of special and incentive (S&I) pays or a new system linked to market rates
- Pay for performance
- Deployment duration and frequency
- Family Separation Allowance, Hardship Duty Pay, Hazardous Duty Incentive Pay, and Imminent Danger/Hostile Fire Pay
- The rules governing CZTE
- Non-cash benefits such as educational benefits, commissaries, and health care
- The process by which basic pay adjusts over time

- The possibility for basic pay to decrease over time

In our analysis, we assume that most non-salary elements of compensation are unaffected by the repeal of BAH and BAS, including retention incentives, deployment and hazardous duty pay, educational benefits, commissaries, and health care.[17] Further, in Chapter 10, we discuss a potential "pay-for-performance" compensation policy. As described in the following chapters, the complexity of the compensation system makes it necessary to simplify the analysis and to focus on the factors that would be most important for informing the deliberations of the QRMC. The final chapter of this report details the major findings of this study. Several of these findings shaped the work as well as the cases analyzed in the chapters to follow.

D. Structure of this Report

Our report consists of the following chapters:

- Chapter 2 describes the current state of military compensation.
- Chapters 3 through 6 describe the SSAT analytic framework. These chapters also use the framework to show how compensation would change for subgroups of Service members under four policy cases.
- Chapter 7 discusses additional implications of a salary system such as locality pay, retirement benefits, Reserve pay, the combat zone tax exclusion, administrative costs, and federal income tax brackets.
- Chapter 8 describes econometric estimates for the effects of adopting a salary-based pay system on recruiting and retention.
- Chapter 9 describes our methodology for eliciting individual Service members' attitudes toward a potential salary system and, more generally, their compensation.
- Chapter 10 describes options for achieving the objectives of a salary system without actually implementing one.
- Chapter 11 summarizes our findings.

[17] A salary system would also affect the implementation of other elements of compensation that are tied to basic pay such as the death gratuity, accrued leave upon separation, severance pay, readjustment pay, and pay of cadets and midshipmen. The secondary and tertiary effects of a salary system on these compensation elements is beyond the scope of this study. However, any adoption of a salary system would need to account for changes to these pays as well. A recent paper by the Center for Naval Analyses (CNA) identifies and prioritizes potential second- and third-order effects of a salary system (Geraghty et al., "The Single-Salary System for Military Personnel: An Analysis of Second- and Third-Order Effects," Center for Naval Analyses, July 2019).

2. The Current Military Compensation System

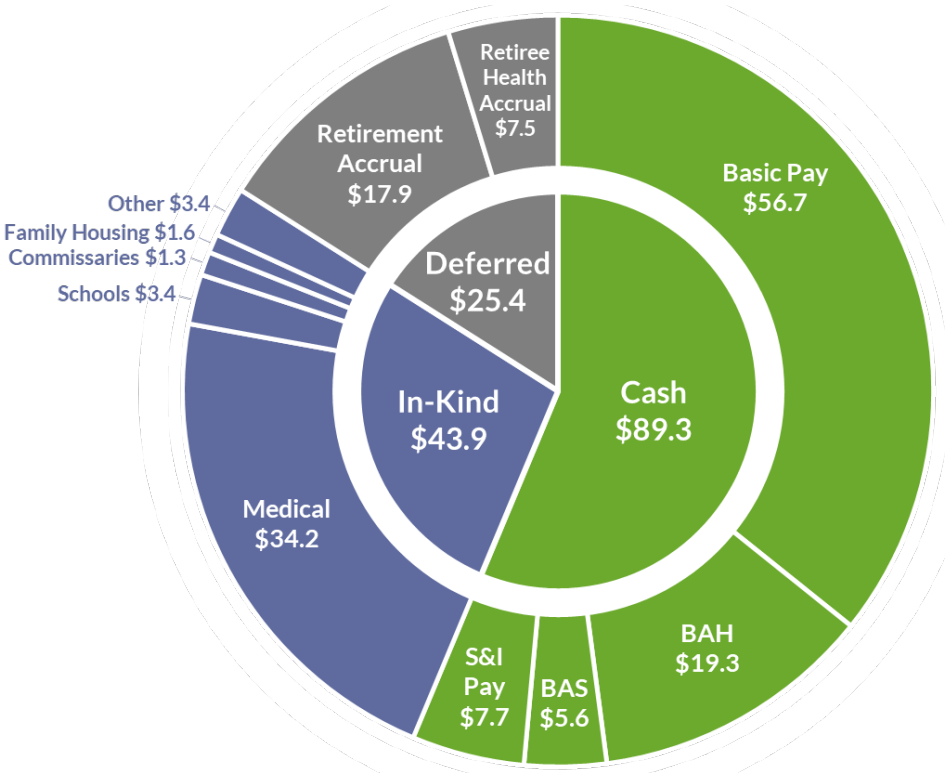
As outlined in the introduction to this report, the fundamental question being posed by the QRMC is whether it is possible to reshape the package of current cash payments provided to military personnel in a way that will yield a more effective—that is, a more ready—military force. To provide the foundation for analyzing this question, it is essential to document the current compensation system and the incentives it creates for shaping individual behaviors of Service members.

A. Description of the System

The budget for military compensation includes current cash income, a range of in-kind benefits, and deferred benefits. Any proposed policy for changing any component of compensation must be evaluated in the context of the overall compensation system. Figure 1 summarizes DoD's current budgetary expenditures for compensation. Cash compensation accounts for 56 percent of DoD's $158.6 billion budget for compensation. In-kind benefits account for 28 percent and deferred benefits account for 16 percent.

Current cash payments consist principally of Basic Pay (BP), which accounts for 63 percent cash payments; BAH, which accounts for 22 percent; BAS, which accounts for 6 percent; and more than 40 types of targeted pays, which account for somewhat less than 9 percent. From the standpoint of a philosophy of compensation, each of these components plays a distinct role:

- Basic pay is embodied in rank and years-of-service pay tables that reward rank and longevity in the military. This pay type is transparent and predictable. Every individual who is an E-4 with 4 years of service gets exactly the same basic pay. Individuals who are promoted through the ranks know what pay and benefits to expect.
- BAH is based on location, rank, and whether a Service member has dependents. Further, BAH is not taxed. DoD's personnel approach requires a mobile workforce; some mechanism to adjust pay across locations is necessary to enable Service members to maintain a degree of consistency in their accommodations and lifestyle across duty assignments. (The determinants of BAH are discussed below. A more detailed discussion of BAH is available in Appendix B.)



Source: Congressional Budget Office, "Approaches to Changing Military Compensation," January 2020.

Figure 1. DoD Budget for Personnel Compensation ($billion, 2019)

- BAS is a per-capita payment that goes to every Service member. In 2020, the flat rate is $256.68 per month for officers and $372.71 per month for enlisted personnel. BAS is not taxed.
- Targeted, flexible pays, which consist of special and incentive pays and attraction and retention pays, provide flexibility to target force readiness issues in selected career fields, to reward duty in onerous or hazardous assignments, and to target specific skills for retention. As discussed next, there are currently 12 categories of special and incentive pays and a total of 60 pays stipulated by Congress within those categories.[18]

B. The Role of Allowances

There has long been a school of thought that Congress should reduce allowances, or eliminate them altogether, and transfer the available funding to basic pay or to targeted, flexible pays. Doing so would provide DoD with a greater pool of available funds to reward

[18] "S&I Pays Currently for Active Duty Service Members," Title 37, Chapter 5, Subchapter I, Department of Defense, https://militarypay.defense.gov/, accessed April 15, 2020.

performance or longevity. This idea reflects the belief that Service members should be paid for performance and not for extraneous considerations.

One critique of the current pay system is that BAH is set by arbitrary judgments regarding housing entitlements according to a Service member's rank and family status. A common critique relates to the "marriage premium" built into housing entitlements. That is, Service members with dependents receive roughly 15 percent to 20 percent higher BAH than single Service members.

BAH and BAS are not taxed.[19] BAH rates are keyed to duty location, within a wide range, depending on the local rental market. Personnel without dependents (called single personnel here) receive less BAH than personnel with dependents (called married personnel here).[20]

To illustrate the logic inherent in the current BAH formula, Figure 2 provides representative data on current BAH allowances. Allowances are displayed for twenty-five California locations identified in DoD's BAH tables for a mid-rank enlisted (E-5) and a mid-rank officer (O-4). California provides a good example because it includes a wide range of high and low cost-of-living locations.

The figure illustrates three main characteristics:

- BAH is intended to neutralize variations in housing costs across assignment locations and thus reflects wide geographic variability. For example, an enlisted E-5 with no dependents receives $813 per month at China Lake, but would receive $3,842 per month in San Francisco—a multiple of more than 4 times between the low-cost and high-cost assignments.
- the variability by rank is also substantial. For example, the average BAH for an O-4 with no dependents across locations is about 36 percent higher than the average for a comparable E-5. Therefore, BAH, like basic pay, rewards rank.
- the additional allowance for Service members with dependents—the so-called "marriage premium"—averages about 20 percent for the E-5 and about 15 percent for an O-4.

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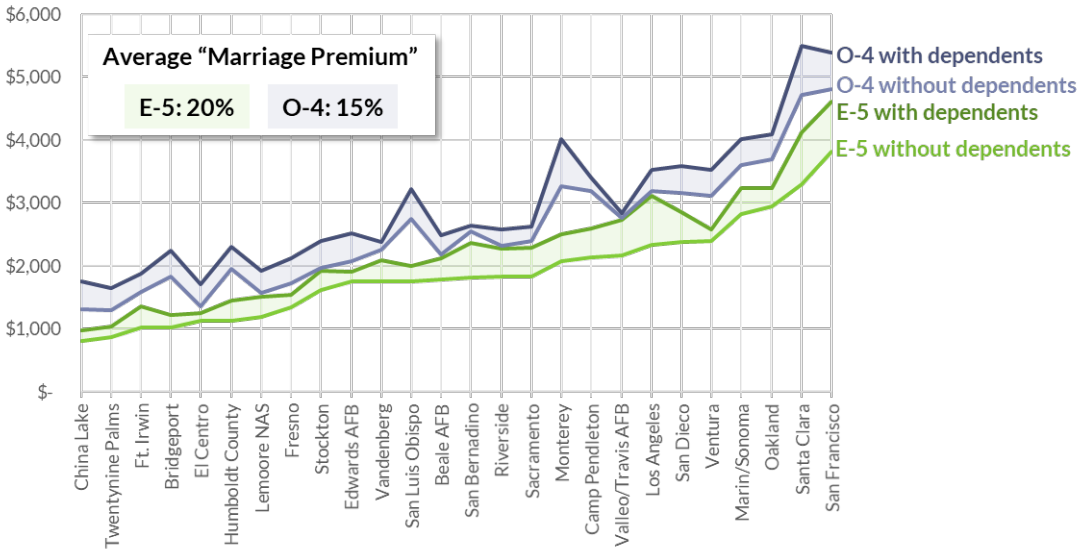
19 The Tax Cuts and Jobs Act of 2017 (TCJA) reduced income tax rates, which in turn reduced the value of the BAH and BAS tax advantage. See Appendix E for our estimates of how the TCJA affected the BAH/BAS tax advantage. All our estimates of the value of the current compensation system and four alternative salary systems use the TCJA rates.

20 Divorced single parents may also qualify for BAH at the higher "with dependent" rate, depending on their custody arrangements and whether they pay child support. See *Basic Allowance for Housing (BAH), Frequently Asked Questions*, "I am divorced with children, what is my BAH allowance?", Defense Travel Management Office, www.defensetravel.dod.mil/site/faqbah.cfm, updated September 20, 2018.



Source: DoD BAH Tables, calendar year 2020.

Figure 2. BAH for E-5 and O-4 at California Assignment Locations, by Dependency

Because the "marriage premium" is not directly linked to performance, it is often the target of criticism and reform efforts. Therefore, it is useful to determine the scale of this payment relative to the overall scale of DoD's compensation budget. As shown in Table 4 later in this chapter, there are currently about 890,000 BAH recipients, and about 70 percent of them are married. Based on these data, we estimate that the average BAH across all Service members equals $21,700 per year. We can further estimate that a "marriage premium" of 20 percent would yield an average payment of about $3,800 per year across all married Service members receiving BAH. The total "marriage premium" paid by DoD is thus $2.4 billion per year. The "marriage premium" is not insignificant, but it is a fairly small component of DoD's compensation system: about 2.6 percent of DoD annual current cash compensation, and about 1.5 percent of the total compensation budget.

As we discuss later in Chapter 9, Service members generally do not support removing the marriage premium. We asked Service members participating in focus groups and Status of Forces Survey for Active Duty Personnel (SOFA) respondents what they thought about the possibility of removing the dependent rate for BAH where the after-tax income of Service members with dependents decreases on average, and the after-tax income of Service members without dependents increases on average. Overall, 71 percent of focus group participants and 66 percent of SOFA respondents opposed the change. Interestingly, 49 percent of single focus-group participants without dependents and 45 percent of single SOFA respondents without children opposed the proposal to equalize BAH for those with and without dependents. In comparison, 34 percent of single focus-group participants without dependents and 31 percent of single SOFA respondents without children supported it.

C. BAH versus Government Housing as Compensation

Personnel living in government-owned quarters do not receive BAH but instead are provided no-cost housing, which has compensation value. The value varies very substantially, from barracks to the substantial homes provided to commanders and senior officers. The value of this housing also depends on the location and off-base housing alternatives. For example, junior sailors stationed in San Diego greatly value access to on-base housing, because affordable alternatives require major commuting time. Additionally, the valuation of on-base housing depends on the individual tastes of Service members.

For all of these reasons, the value of government-provided housing is variable and subjective and cannot be precisely estimated; however, we have developed rules of thumb to provide insight into the average magnitude. We start from two assumptions regarding the quality and valuation of on-base housing. First, senior officers and senior enlisted personnel receive on-base quarters that are worth approximately as much as the BAH they would otherwise receive. Second, we assume that the quarters provided to the most junior, single enlisted personnel have no value as compensation because these personnel often live in regimented, communal barracks. Interpolating between those extremes yields the approximations we use concerning the value of government-provided housing, as shown in Table 1. This assumed scale for valuing on-base housing is, of course, subjective. Based on our discussions with the QRMC sponsors and independent reviewers, we believe these approximations are reasonable; moreover, the overall conclusions of the analysis are not highly sensitive to the assumed scale.

Table 1. Estimate of the Value of Government-Provided Housing as a Percentage of BAH

	Single	Married		Single	Married
O-4 and above	100%	100%	E-6 and above	100%	100%
O-3	80%	100%	E-5	80%	80%
O-2	60%	60%	E-4	60%	60%
O-1	40%	60%	E-3	40%	60%
			E-2	0%	60%
			E-1	0%	60%

D. Taxes and "Regular Military Compensation"

The concept of Regular Military Compensation (RMC) is sometimes used to compare pay with the private sector. RMC consists of BP, BAH, and BAS, plus the estimated tax savings from BAH and BAS. The tax savings are calculated as averages and will vary across Service members depending on other factors that determine a person's tax bracket.

These factors include spousal earnings, investment earnings, and itemized deductions. The average federal tax advantage across DoD equals $4,384 per year.[21]

DoD reports that the federal tax advantage ranges from a few thousand dollars for low-ranking enlisted personnel to about $10,000 for general officers. However, DoD does not report the state-level tax advantage. Therefore, we estimated the average of state taxes to be around 1.7 percent. We also estimated that the current total of the tax payment reductions is approximately $8 billion for federal taxes and $500 million for state taxes.

In addition to BAH and BAS, the CZTE is an important benefit. However, this benefit has no direct budgetary cost for DoD, but can be a very significant cost to the Federal Government in terms of taxes collected. The value of the tax exclusion depends on household total income and other factors that determine the household's usual tax liability.

E. Flexible Targeted Pays

Congress has provided DoD with substantial flexibility to target extra pay where necessary to address readiness issues. In all, there are 12 categories of special and incentive pays and a total of 60 pays stipulated by Congress within those categories.[22] Table 2 identifies the categories to illustrate the range of situations addressed in the existing authorities. As noted in Figure 1, Special and Incentive (S&I) Pays amount to $7.7 billion, which is just under 9 percent of total current cash compensation.

Table 2. Categories of Existing Flexible Pays (Stipulated Pays within Category)

Special and Incentive Pays	Attraction and Retention Pays
Hazardous Duty (12)	Retention Incentives (8)
Hardship Duty (1)	Responsibility (2)
Assignment Incentives (2)	Rehabilitation Pay (1)
Career Incentives (5)	Skill Conversion Incentives (1)
Accession Incentives (4)	Transfer Between Services (1)
Proficiency (1)	Medical Professional Incentives (22)

Source: Department of Defense, Militarypay.defense.gov; "Title 37, Chapter 5, Subchapter I – S&I pays currently for active duty Service members. Site accessed on April 15, 2020.

[21] *Compensation Greenbook*, "Selected Military Compensation Tables," Office of the Under Secretary of Defense (Personnel and Readiness), January 1, 2019, B3, https://militarypay.defense.gov/Portals/3/Documents/Reports/GreenBook%202020.pdf?ver=2020-05-06-170512-543.

[22] "S&I Pays Currently for Active Duty Service Members," Title 37, Chapter 5, Subchapter I, Department of Defense, https://militarypay.defense.gov/, accessed April 15, 2020.

F. The Distribution of Compensation under the Current System

The heart of our analysis is estimating how the take-home pay of various groups of people would be affected by different versions of a single-salary system. To establish the baseline, Table 3 shows the average pre-tax and post-tax compensation for the categories of Service members included in the analysis. The categories include single and married Service members grouped into those who receive BAH versus those who do not. For each group, we perform the analysis for all ranks: officers (O-1 through O-10), warrant officers (W-1 through W-5), and enlisted (E-1 through E-9).

Personnel receiving BAH include those living in privatized on-base housing. DoD treats these personnel as receiving BAH although their housing allowances are usually paid by allotments to their landlords.[23] Personnel living in government-owned, on-base housing do not receive BAH.

The compensation calculations also include an estimated 5 percent government contribution to the Thrift Savings Plan (TSP), although retirement pay accrual is not included. In addition, we deduct estimates of federal and state income taxes to calculate take-home pay as well as the employees' share of Social Security and Medicare taxes.

[23] *Compensation Greenbook*, "Selected Military Compensation Tables," Office of the Under Secretary of Defense (Personnel and Readiness), January 1, 2019, A7, https://militarypay.defense.gov/Portals/3/Documents/Reports/GreenBook%202020.pdf?ver=2020-05-06-170512-543.

Table 3. Average Annual Income of Military Personnel by Category

	Single				Married			
	Receiving BAH		Not Receiving BAH		Receiving BAH		Not Receiving BAH	
	Pre-Tax	After-Tax	Pre-Tax	After-Tax	Pre-Tax	After-Tax	Pre-Tax	After-Tax
O-10	230,778	179,303	202,134	150,659	236,106	194,655	202,134	160,683
O-9	229,250	178,203	200,798	149,752	234,542	193,392	200,798	159,648
O-8	221,044	172,693	192,400	144,049	226,372	187,118	192,400	153,146
O-7	196,280	154,583	167,636	125,939	201,608	167,943	167,636	133,971
O-6	173,355	137,216	144,927	108,788	177,615	149,076	144,927	116,388
O-5	143,930	116,335	117,494	89,899	148,754	128,236	117,494	96,976
O-4	124,568	102,643	99,344	77,419	127,892	111,629	99,344	83,081
O-3	99,694	84,365	77,255	61,926	104,609	92,308	79,856	67,555
O-2	80,011	69,676	60,530	50,194	82,922	74,348	61,527	52,953
O-1	61,667	54,954	44,223	37,510	65,116	59,746	45,435	40,065
W-5	138,598	111,941	114,539	87,883	138,598	118,963	114,539	94,904
W-4	119,326	98,147	96,850	75,671	122,626	106,870	96,850	81,094
W-3	102,606	86,121	81,126	64,641	105,726	93,167	81,126	68,567
W-2	86,559	74,478	66,375	54,294	89,763	80,203	66,375	56,815
W-1	74,736	64,745	59,376	49,385	79,080	70,944	59,376	51,240
E-9	111,985	93,291	89,905	71,211	115,885	101,821	89,905	75,841
E-8	92,869	79,613	71,691	58,435	96,001	85,641	71,691	61,331
E-7	82,012	71,543	62,356	51,887	85,624	77,162	62,356	53,894
E-6	70,619	62,726	51,407	43,514	74,147	67,912	51,407	45,172
E-5	60,199	54,217	42,007	36,025	62,395	57,911	42,007	37,523
E-4	50,019	45,480	34,911	30,372	53,535	50,358	34,911	31,734
E-3	45,236	41,706	29,948	26,418	49,064	46,792	29,948	27,676
E-2	43,903	40,734	28,171	25,002	45,847	43,733	28,171	26,057
E-1	38,417	35,902	24,701	22,186	42,725	40,920	24,701	22,896

We estimated tax rates based on taxable earnings and family size using Defense Manpower Data Center (DMDC) data.

Among personnel receiving BAH, after-tax income is about 25 percent lower for single personnel than for married personnel. This difference occurs because BAH is lower for single than married personnel and because married personnel tend to be of higher rank. In terms of after-tax pay, all BAH recipients fare better than those living in government-owned housing.

Table 4 shows the number of people in each of the twelve categories. While most personnel receive BAH, roughly 430,000, a third of the active force, do not. These Service

members live in government-owned housing provided at no cost.[24] Most non-BAH personnel are single junior enlisted and more than 100,000 are single personnel in pay grades E-1 or E-2. Another 116,000 are single E-3s. Generally, all new recruits are in traditional barracks in boot camp. After that, single enlisted soldiers live in barracks on base when they first complete their training. Life in these barracks is similar to living in a college dorm: each soldier has at least one roommate and uses a communal bathroom and shower. However, many bases provide housing for senior enlisted and officers, and in fact commanders and senior staff are often required to live on base.

Table 5 shows that including the value of government-owned housing as part of the compensation package narrows the apparent gap in compensation between those receiving BAH and those who receive government-owned housing in lieu of BAH—in some cases eliminating the gap entirely. This is our most complete view of how the different populations fare under the current compensation system in terms of the total value of their take-home compensation and housing.

However, the total value of pay and housing for single, junior enlisted personnel remains significantly lower because they are the only Service members to receive a substantial housing benefit. The calculated magnitude of the gap reported in Table 5 reflects the low valuation assigned to government-owned housing in our calculations.

[24] Service members who live on base in privatized housing are provided BAH, but their allowance is paid by allotment to the landlord. Thus, these Service members are counted among the BAH recipients.

Table 4. Numbers of Personnel Receiving and Not Receiving BAH by Category

	Receiving BAH		Not Receiving BAH	
	Single	**Married**	**Single**	**Married**
O-10	0	33	1	2
O-9	3	140	6	0
O-8	2	297	5	2
O-7	6	426	10	2
O-6	335	10,895	363	84
O-5	1,217	25,618	1,213	86
O-4	4,029	38,040	2,466	115
O-3	21,428	47,900	5,062	207
O-2	16,175	11,399	1,997	273
O-1	15,934	5,252	3,002	1,150
Officers	59,129	140,000	14,125	1,921
W-5	34	746	22	1
W-4	97	2,565	82	4
W-3	181	5,017	167	17
W-2	535	6,070	254	29
W-1	320	2,048	107	57
Warrant	1,167	16,446	632	108
E-9	384	9,578	346	20
E-8	1,121	24,531	928	52
E-7	5,696	83,326	4,065	155
E-6	21,218	133,717	9,876	397
E-5	60,010	127,835	32,354	8,962
E-4	62,315	73,601	82,481	18,979
E-3	31,161	21,973	116,426	20,247
E-2	7,916	2,951	57,793	6,100
E-1	3,977	1,236	47,420	2,661
Enlisted	193,798	478,748	351,689	57,573
Total	254,094	635,194	366,446	59,602

Table 5. Average Annual After-Tax Income of Military Personnel by Category Including the Estimated Value of Government-Provided Housing

	Receiving BAH		Not Receiving BAH			
			Without Value of Housing		With Value of Housing	
	Single	Married	Single	Married	Single	Married
O-10	179,303	194,655	150,659	160,683	179,303	194,655
O-9	178,203	193,392	149,752	159,648	178,203	193,392
O-8	172,693	187,118	144,049	153,146	172,693	187,118
O-7	154,583	167,943	125,939	133,971	154,583	167,943
O-6	137,216	149,076	108,788	116,388	137,216	149,076
O-5	116,335	128,236	89,899	96,976	116,335	128,236
O-4	102,643	111,629	77,419	83,081	102,643	111,629
O-3	84,365	92,308	61,926	67,555	79,877	92,308
O-2	69,676	74,348	50,194	52,953	61,883	65,790
O-1	54,954	59,746	37,510	40,065	44,487	51,873
W-5	111,941	118,963	87,883	94,904	111,941	118,963
W-4	98,147	106,870	75,671	81,094	98,147	106,870
W-3	86,121	93,167	64,641	68,567	86,121	93,167
W-2	74,478	80,203	54,294	56,815	74,478	80,203
W-1	64,745	70,944	49,385	51,240	64,745	70,944
E-9	93,291	101,821	71,211	75,841	93,291	101,821
E-8	79,613	85,641	58,435	61,331	79,613	85,641
E-7	71,543	77,162	51,887	53,894	71,543	77,162
E-6	62,726	67,912	43,514	45,172	62,726	67,912
E-5	54,217	57,911	36,025	37,523	50,579	53,833
E-4	45,480	50,358	30,372	31,734	39,436	42,909
E-3	41,706	46,792	26,418	27,676	32,533	39,146
E-2	40,734	43,733	25,002	26,057	25,002	36,663
E-1	35,902	40,920	22,186	22,896	22,186	33,711

3. Analysis of a Baseline Salary System

A. Baseline Assumptions

This paper follows the guidance of Congress in requiring that any salary system should not appreciably alter the cost of military compensation to the Federal Government. From a cash flow perspective, moving to a salary system involves shifting funds from tax-free allowances to basic pay (BP). Merely redistributing current amounts spent on allowances as basic pay would leave Service members in aggregate with substantially less take-home pay because the additional basic pay would be taxable. Cost to the Federal Government would be reduced because of the extra tax flow from Service members to the Government. Neutralizing the system and avoiding the transfer from Service members (paying more taxes) to the Federal Government (collecting more taxes) requires that basic pay be increased by more than current expenditures on allowances. Of course, the DoD budget would have to be increased to finance the new system.

The shift toward taxable compensation also has implications for the states. Twenty states have no income tax for military personnel, while sixteen exempt at least some military earnings. The remaining states tax military earnings in full. When Service members move to a new state, they may choose whether to change their state of legal residence. Many Service members move to states that do not tax military earnings and choose to make those states their legal residences. As a result, DMDC data show that the average state tax rate for military personnel is only 1.7 percent, which is the value we use in our analyses. The states that tax military earnings would experience an increase in collections under a shift to a salary system. Viewed from a Service member's perspective, the requirement to pay state taxes as well as federal taxes implies that a given redistribution of tax-free allowances to BP results in lower take-home pay compared to a hypothetical world in which all state taxes were zero.[25]

[25] Service members in states that do not tax military income will fare better under a salary system than personnel in other states. As a result, some personnel would likely move to these tax-free states and establish them as their homes of record. This behavior would somewhat reduce the average state tax rate paid by military personnel.

For DoD to keep Service members unharmed, the boost in BP must be large enough to compensate not only for the incremental federal taxes that they now must pay, but also the incremental state taxes. However, such an increase in Service member pay would result in an overall increase of compensation cost to the Federal Government. Because the congressional guidance precludes such an increase, the salary systems that we consider would result in a net decrease in compensation to Service members.

We analyze several possible single-salary systems. They largely differ according to how the extra expenditures on basic pay are distributed among various categories of Service members: those with and without dependents, those in different pay grades, and those who are currently eligible for the basic allowance for housing versus those who are not. The baseline analysis presented in this chapter assumes that the basic pay of all Service members will increase by the same percentage. This is a reasonable assumption because it maintains the current percent differences in pay across ranks. We subsequently consider various modifications to the pay structure to adjust for problems with the baseline that are identified in our analysis.

B. Computational Methodology

Our initial goal is to calculate how much basic pay will increase in the baseline salary system. We do this by iteration, first calculating the cost to the Government under the current system and then calculating the cost under baseline salary systems with different percentage increases in basic pay ("pay multiples"). We then can identify the pay multiple that keeps cost constant.

We disaggregate before-tax pay in Table 3 into basic pay, allowances (BAH and BAS), government TSP contributions, federal taxes, and state taxes. We apply the population information in Table 4 to the before-tax income information to calculate the cost of the current system to the DoD: take-home pay plus federal and state taxes. Cost to the Government subtracts out federal taxes. In all our salary system cases, BAH and BAS are removed, saving the Government money. In the baseline case, basic pay is then increased by the same multiple for all pay grades.

Increasing basic pay increases many Service members' federal tax rates. Because tax rates are a complex non-linear function of many variables, we cannot solve for the cost-neutral multiplier as a function of those variables. However, keeping those variables constant, the net cost to the Federal Government is an increasing function of the basic pay multiple. Therefore, there is a unique cost-neutral basic pay multiple, and we can use a simple optimization procedure to compute it:

1. Begin at an arbitrary basic pay multiple.
2. Evaluate the net cost to the Federal Government at the multiple.

3. If the cost is the same as the current cost (within some tolerance), stop—the multiple is cost-neutral.

   Otherwise, continue with step 4.

4. If the cost exceeds the current cost, decrease the multiple, and vice versa.

5. Return to step 2.

C. Take-Home Pay under the Baseline Salary System

Following the procedure just described, we find that a 53.9 percent increase in basic pay under a salary system would yield a cost to the Federal Government equal to that of the current system. The result of these calculations is displayed in Table 6.

In addition, taxable income would rise by $30 billion, pushing some Service members into higher tax brackets. In addition, the average federal income tax rate would increase from 15.1 percent to 17.9 percent.

Starting with current average basic pay, we estimated average tax liabilities by pay grade and marital status. We based these estimations on information on the marginal tax structure from the 2019 tax data table in the DoD Compensation Green Book.[26] We applied the same methodology to estimate the increased tax liabilities associated with the new level of basic pay under the baseline salary system.

The cost of the compensation system to DoD includes basic pay, allowances, TSP contributions, and DoD's FICA contribution. All payments to the federal treasury (federal income tax payments, individual contributions to FICA, and DoD FICA contributions) are removed from the cost to DoD to calculate cost to the Federal Government. Take-home pay equals cost to the Federal Government (outlays net of federal taxes) minus state taxes. By construction we have kept the cost to the Federal Government constant. However, by increasing the amount of taxable pay, we have increased state taxes by roughly $600 million. Therefore, our baseline salary system would reduce the total take-home pay of Service members by the same amount.

Figure 3 shows the percentage changes in take-home pay by rank, dependent status, and BAH status. These calculations do not include any imputed value of government-provided housing to those not receiving BAH.

[26] *Compensation Greenbook*, "Selected Military Compensation Tables," Office of the Under Secretary of Defense (Personnel and Readiness), January 1, 2019, A4, https://militarypay.defense.gov/Portals/3/Documents/Reports/GreenBook%202020.pdf?ver=2020-05-06-170512-543.

Our calculations reveal that people not receiving BAH gain substantially. This result is hardly surprising, because BAH recipients lose an important element of compensation under a salary system whereas non-BAH personnel do not.

Among BAH recipients, officers tend to gain while enlisted personnel in ranks below E-7 have particularly severe losses. This disparity occurs because allowances are a smaller portion of total compensation for higher ranking personnel. Compensating for this asymmetry will be addressed in the next chapter.

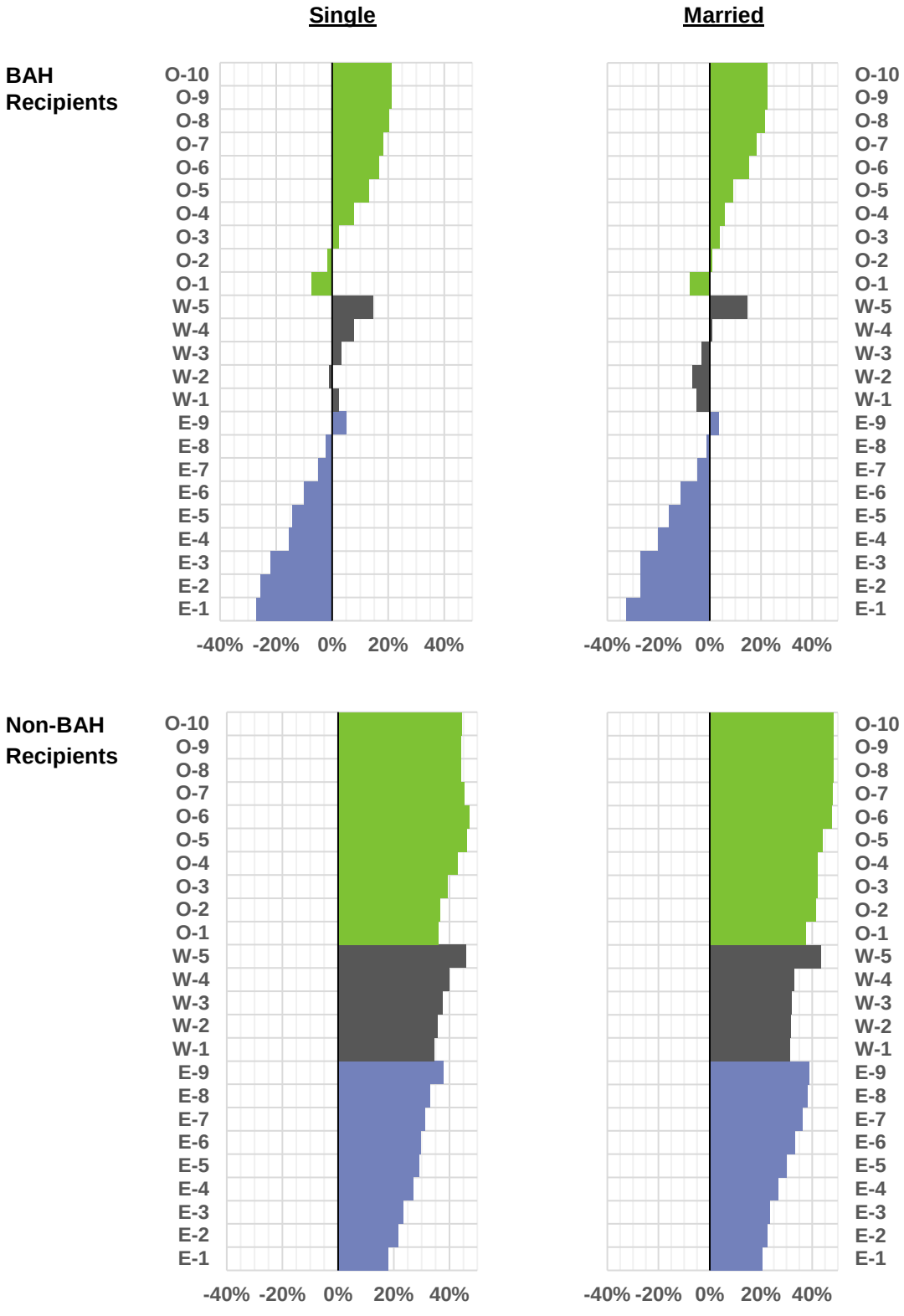
Table 6. Composition of DoD Payments under Current and Baseline Salary Systems ($Bil)

		Current System	Baseline Salary System, Multiple = 1.539
	Basic pay	55.8	85.8
	BAH	19.0	
	BAS	5.5	
	TSP contribution	2.8	4.3
	Employer FICA[a]	4.3	6.6
	Cost to DoD	87.3	96.7
Less	Employer FICA[b]	4.3	6.6
Less	Employee FICA	4.3	6.6
Less	Federal income tax	4.0	8.7
	Cost to Government	74.8	74.8
Less	State income tax	0.9	1.5
	After-tax/take-home pay	73.9	73.3

[a] FICA refers to the Federal Insurance Contributions Act, which mandates payroll taxes to fund Social Security and Medicare.

[b] A definitional issue arises concerning government FICA contributions, which we have excluded from our calculations of cost to the Government. This approach is consistent with the treatment cited in Congressional Budget Office, *CBO's Long-Term Projections for Social Security*, Additional Information, December 2016. Footnote 4 on page 2 of the document states that the Federal Government contributed $17 billion as the employer's share of the payroll tax for federal workers, but that such funds are recorded as offsetting receipts rather than revenues because they are from intragovernmental transfers. We conclude that because these funds are not treated as revenues to the trust funds, they should not be treated as costs to the Government for the purposes of our analysis.

Of course, there would be substantial variation within our broad categories. Service members with low federal tax rates (for example, those who are married with little spousal income, have dependents, and own their own homes rather than renting) will be advantaged over those with higher tax rates, because they will all receive make-up payments based on an average taxation rate.



Note: The value of government-owned housing is not included in take-home pay.

Figure 3. Percent Changes in Take-Home Pay Under the Baseline Salary System

D. Spousal Earnings

The Council of Economic Advisors' 2018 report, *Military Spouses in the Labor Market*, presents information on the earnings of military spouses.[27] Almost 88 percent of all military spouses are not military personnel. Although military spouses are somewhat better educated than other Americans, they are less likely to participate in the labor force—57 percent compared to 76 percent in the general population. Also, military spouses earn an average of 27 percent less than their civilian counterparts.

Because no data are available on spousal income by rank,[28] it is difficult to provide detailed estimates of the effect of spousal income on after-tax income for married people for the 27 ranks and either BAH or non-BAH recipients. However, average data on earnings for all women workers are available in the Bureau of Labor Statistics report, *Highlights of Women's Earnings in 2018*.[29] We expect that the ratio of spousal earning to Service member pay is similar for all ranks. Therefore, we are comfortable that the major insights of this report are independent of spousal income. (Of course, our expectation is unverified and it would be good to incorporate better data if they were available.)

Variation in spousal earnings among individuals of the same rank and BAH status will lead to differences in the incentives facing Service members and, thus, to differences in their likely reactions to a salary system.

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[27] *Military Spouses in the Labor Market*, Council of Economic Advisors, May 2018, https://www.whitehouse.gov/wp-content/uploads/2018/05/Military-Spouses-in-the-Labor-Market.pdf.

[28] The Joint Committee on Taxation (JCT) produces estimates of so-called "tax expenditures"—the costs to the U.S. Government due to non-taxability of certain transactions such as receipt of BAH. However, JCT has extraordinary access to tax records from the Internal Revenue Service. See Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2019-2023*, Table 1, panel on National Defense, https://www.jct.gov/publications.html?func=startdown&id=5238.

[29] *Highlights of Women's Earnings in 2018*, Bureau of Labor Statistics, November 2019, https://www.bls.gov/opub/reports/womens-earnings/2018/home.htm.

4. Salary System with Tailored Increases in Basic Pay That Vary by Rank

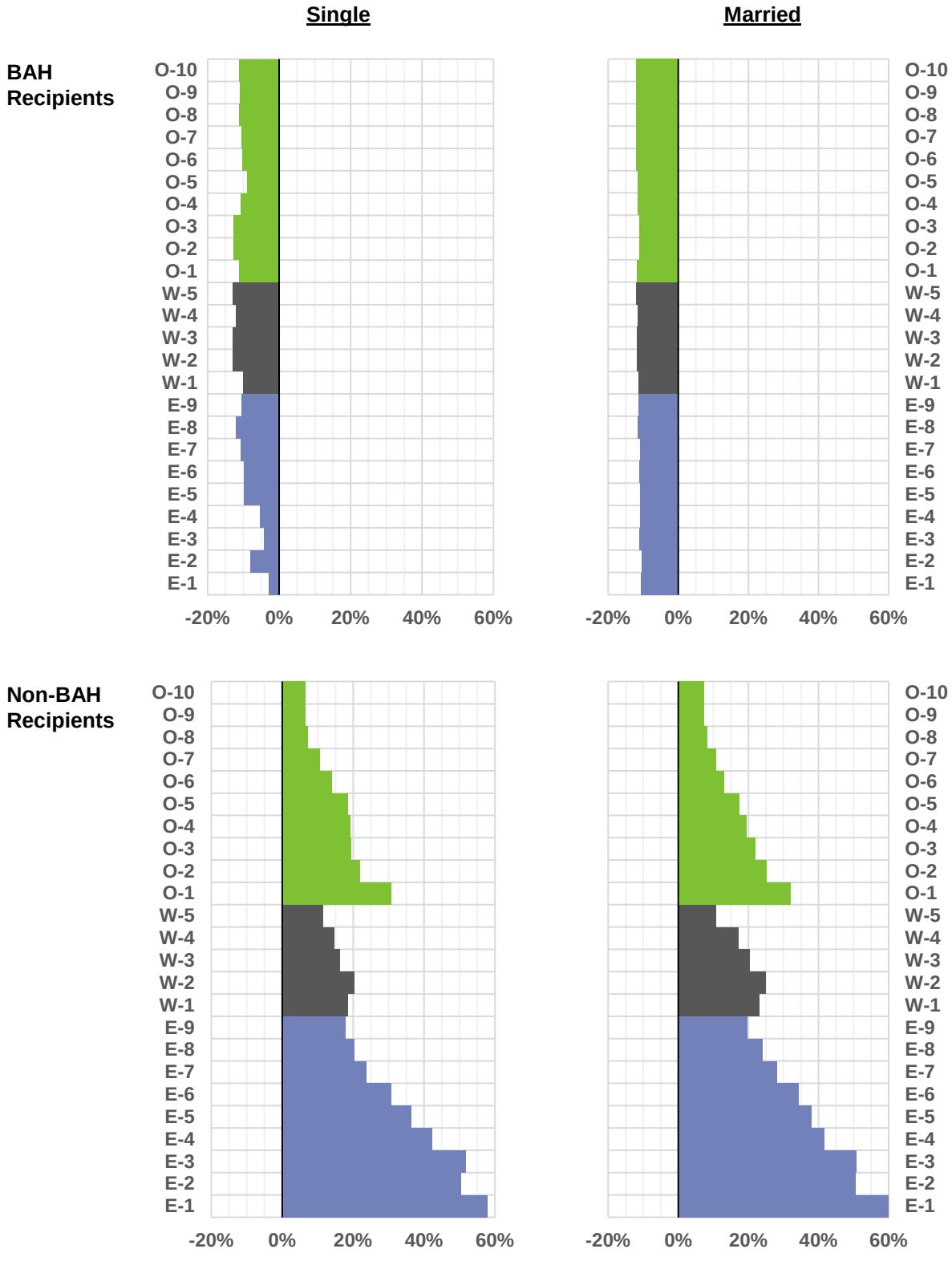
The discrepancies across ranks seen among BAH recipients in Table 5 are due to the design of the baseline salary system that increases basic pay by the same percentage for all Service members. The baseline case affects junior married personnel most because BAH accounts for a larger fraction of their total compensation. The philosophy of salary systems requires that people be paid the same amount regardless of family status. However, the percentage increase in basic pay can still vary by rank in a way that reduces the variation of inter-rank changes in take-home pay.

We derived a tailored set of basic-pay multiples that strive to equate the percentage changes in take-home pay for all married personnel receiving BAH. The multiples are shown in Table 7. Other tailoring options are possible; however, we chose this one because most BAH recipients are married. It is not possible to equalize take-home pay changes for single and married BAH recipients in a pay grade because of differences in BAH levels.

Table 7. Tailored Basic Pay Multiples That Roughly Equalize Percentage Change in Take-Home Pay for All Ranks of Married BAH Recipients

Pay Grade	Tailored Multiple	Pay Grade	Tailored Multiple		Pay Grade	Tailored Multiple
O-10	1.10	W-5	1.18		E-9	1.30
O-9	1.10	W-4	1.25		E-8	1.37
O-8	1.11	W-3	1.28		E-7	1.44
O-7	1.14	W-2	1.35		E-6	1.55
O-6	1.17	W-1	1.34		E-5	1.64
O-5	1.25				E-4	1.74
O-4	1.28				E-3	1.91
O-3	1.30				E-2	1.92
O-2	1.36				E-1	2.09
O-1	1.47					

Figure 4 shows a tailored salary system largely eliminates discrepancies across ranks in the percentage losses in take-home pay faced by married BAH recipients, the largest element of the force.



Note: The value of government-owned housing is not included in take-home pay.

Figure 4. Percent Changes in Take-Home Pay Under a Salary System with Tailored Increases in Basic Pay That Vary by Rank

We observe that, compared to the current system, those receiving BAH lose an average of 10 percent under the tailored salary system. Compared to the baseline, the distribution of losses is more evenly distributed.

Earlier, Table 5 implied that when the value of government-provided housing is counted for at least some categories of personnel, non-BAH recipients currently receive take-home compensation comparable to their BAH-receiving peers. Under a salary system, even a tailored one, the compensation of non-BAH personnel exceeds that of their peers by a considerable amount; Table 8 illustrates this point.

Using Table 8 as an example, consider the situation for E-3 personnel. If we accept that the value of their government-provided housing is less than BAH, the current system treats them worse than their BAH-receiving colleagues. Under the salary systems they would do better than BAH recipients. The benefit to E-3 personnel is greater when we tailor the basic pay multiple by pay grade. Doing so avoids giving disproportionate increases in benefits to senior personnel that the baseline salary system would entail. However, this approach introduces a different inequity. Service-members in government-owned housing would receive the same higher basic pay as previous BAH recipients, and they would still receive value in the form of their rent-free housing. In the next chapter, we address the distributional effect of charging rent.

Table 8. After-Tax Income of Military Personnel by Category, Including the Estimated Value of Government-Provided Housing under Different Systems ($K)

	Single						Married					
	Current	BAH Baseline	Tailored	Current	Non-BAH Baseline	Tailored	Current	BAH Baseline	Tailored	Current	Non-BAH Baseline	Tailored
O-10	$179,303	$217,306	$160,436	$179,303	$245,950	$189,080	$194,655	$238,385	$172,356	$194,655	$272,357	$206,328
O-9	$178,203	$215,968	$159,480	$178,203	$244,420	$187,932	$193,392	$236,832	$171,246	$193,392	$270,576	$204,990
O-8	$172,693	$207,561	$154,505	$172,693	$236,205	$183,149	$187,118	$227,071	$165,675	$187,118	$261,043	$199,647
O-7	$154,583	$182,771	$139,137	$154,583	$211,415	$167,781	$167,943	$198,288	$148,481	$167,943	$232,260	$182,453
O-6	$137,216	$160,037	$123,866	$137,216	$188,465	$152,294	$149,076	$171,892	$131,688	$149,076	$204,580	$164,376
O-5	$116,335	$131,427	$106,445	$116,335	$157,863	$132,881	$128,236	$139,690	$113,828	$128,236	$170,950	$145,088
O-4	$102,643	$110,574	$92,218	$102,643	$135,798	$117,442	$111,629	$118,061	$99,224	$111,629	$146,609	$127,772
O-3	$84,365	$86,263	$73,967	$79,877	$104,214	$91,918	$92,308	$95,910	$82,470	$92,308	$120,663	$107,224
O-2	$69,676	$68,547	$61,135	$61,883	$80,236	$72,824	$74,348	$74,852	$66,288	$65,790	$87,689	$79,124
O-1	$54,954	$50,944	$49,038	$44,487	$57,921	$56,015	$59,746	$55,122	$52,893	$51,873	$66,931	$64,702
W-5	$111,941	$128,236	$97,985	$111,941	$152,295	$122,044	$118,963	$136,169	$105,152	$118,963	$160,228	$129,211
W-4	$98,147	$105,842	$86,720	$98,147	$128,318	$109,196	$106,870	$107,676	$95,053	$106,870	$133,452	$120,829
W-3	$86,121	$88,837	$75,183	$86,121	$110,317	$96,663	$93,167	$90,328	$82,561	$93,167	$114,928	$107,161
W-2	$74,478	$73,705	$65,308	$74,478	$93,889	$85,492	$80,203	$74,836	$71,026	$80,203	$98,224	$94,414
W-1	$64,745	$66,332	$58,465	$64,745	$81,692	$73,825	$70,944	$67,301	$63,084	$70,944	$87,005	$82,788
E-9	$93,291	$98,098	$83,939	$93,291	$120,178	$106,019	$101,821	$105,268	$90,714	$101,821	$131,248	$116,694
E-8	$79,613	$77,743	$70,304	$79,613	$98,921	$91,482	$85,641	$84,711	$76,041	$85,641	$109,021	$100,351
E-7	$71,543	$68,022	$64,227	$71,543	$87,678	$83,883	$77,162	$73,427	$69,078	$77,162	$96,695	$92,346
E-6	$62,726	$56,455	$56,860	$62,726	$75,667	$76,072	$67,912	$60,175	$60,639	$67,912	$82,915	$83,379
E-5	$54,217	$46,524	$49,128	$50,579	$61,078	$63,681	$57,911	$48,797	$51,780	$53,833	$65,108	$68,091
E-4	$45,480	$38,549	$43,193	$39,436	$47,614	$52,258	$50,358	$40,207	$44,981	$42,909	$51,382	$56,155
E-3	$41,706	$32,542	$40,086	$32,533	$38,658	$46,201	$46,792	$34,110	$41,744	$39,146	$45,579	$53,214
E-2	$40,734	$30,392	$37,593	$25,002	$30,392	$37,593	$43,733	$31,904	$39,251	$36,663	$42,510	$49,857
E-1	$35,902	$26,191	$35,001	$22,186	$26,191	$35,001	$40,920	$27,597	$36,631	$33,711	$38,412	$47,446

5. Charging Rent for Government-Owned Housing

Charging rent for government-owned housing could eliminate the asymmetric treatment of Service members living in such housing. Currently, personnel not receiving BAH occupy government-furnished housing and do not pay rent. If after the salary system were adopted they were to pay rent, the cost to the government would be reduced by their rent. In addition, the multiple of BP could be much higher while keeping cost to the Government the same.

As noted in Chapter 2, government-owned quarters vary quite a bit in value. Our assumption, shown in Table 1, is that for higher-ranking officers, enlisted personnel, and all warrant officers, the on-base quarters would rent for roughly the amount of BAH. For the lower-ranking officer and enlisted personnel, the implied rents would be much lower. We have assumed that the quarters provided to single E-1s and E-2s, presumably barracks, would have no value on the open market.

Of course, our assumptions about the value of government-owned housing are arbitrary and require deeper examination before a system of rents for such housing was instituted. However, from our perspective the specifics of market-value rents are less important to this analysis than the impact of a system of charging rents on the distribution of gains and losses associated with a salary system.

We calculate that if non-BAH recipients had to pay rent, the level of basic pay that would keep Government cost the same as it now would be 62.6 percent above its current level. This percentage assumes that occupants of government-provided housing would pay rents equal to our assumed values of their quarters. By contrast, our earlier analysis derived a smaller increase of 53.9 percent without the introduction of rent for government-owned housing.

When rents are charged, Figure 5 shows the impact of the baseline salary system, where all ranks receive a 63 percent increase in basic pay. BAH recipients suffer smaller losses in take-home pay because of the larger basic pay increase. On the other hand, non-recipients see smaller gains because they now pay rent.

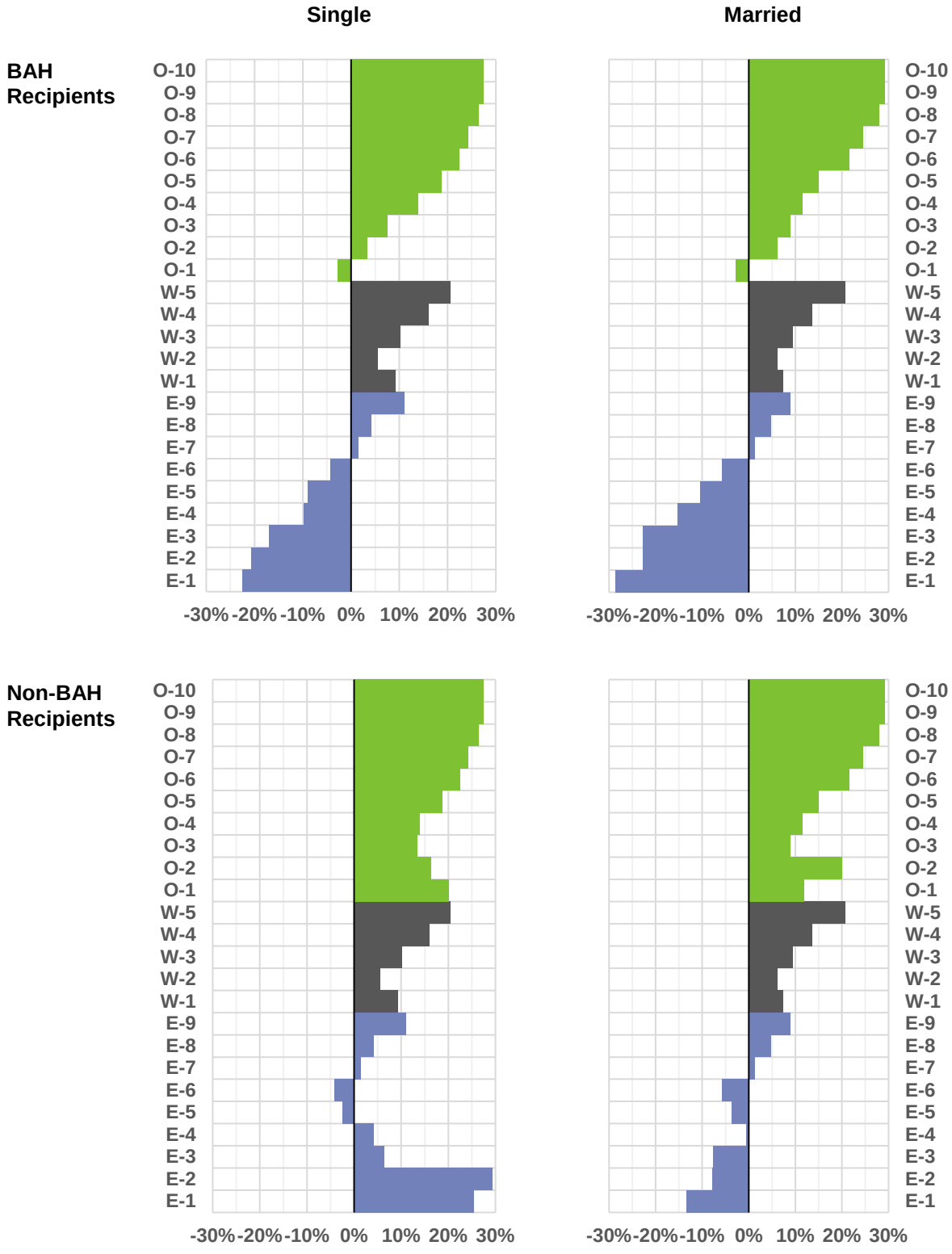


Figure 5. Percentage Changes in Take-home Pay under the Baseline System, with Rental Payment

Under this alternative, junior BAH recipients suffer the largest losses, while others gain. As in Chapter 4, this disparity occurs because BAH is a larger fraction of their total compensation in the current system. In addition, the larger cash payment does not compensate them as well for the loss of their tax advantage. To adjust for this, we reintroduce basic pay increases tailored to largely eliminate variation in changes in take-home pay among different categories of married BAH recipients.

Table 9 is analogous to Table 7, showing the basic pay multiples associated with every pay grade under the tailored salary system with rents charged to occupants of government-provided housing.[30]

Table 9. Tailored Basic Pay Multiples that Roughly Equalize Percent Change in Take-Home Pay for All Ranks of Married BAH Recipients in a Salary System with Rental Payments

Pay Grade	Tailored Multiple	Pay Grade	Tailored Multiple	Pay Grade	Tailored Multiple
O-10	1.20	W-5	1.29	E-9	1.44
O-9	1.20	W-4	1.37	E-8	1.49
O-8	1.21	W-3	1.41	E-7	1.55
O-7	1.25	W-2	1.47	E-6	1.67
O-6	1.28	W-1	1.46	E-5	1.76
O-5	1.36			E-4	1.88
O-4	1.41			E-3	2.08
O-3	1.43			E-2	2.08
O-2	1.49			E-1	2.21
O-1	1.63				

The results of this calculation are shown in Figure 6. Compared to Figure 5, the change is dramatic. Most pay grades experience much smaller changes in take-home pay. However, the losses for most would not be negligible. Although the specifics vary by rank, on average married BAH recipients face larger losses than single BAH recipients—5.5 percent versus 2.5 percent. This difference is driven by moving from a system where married personnel get higher compensation to one where they do not.

Only junior enlisted personnel who live in government-owned housing gain substantially. However, Table 5 showed that, under our assumptions about the value of government-owned housing, they are worse off relative to the vast majority of personnel who receive a valuable housing benefit under the current system.

[30] These multiples are influenced by the assumptions about the value of government-owned housing. For example, if the values used are too low for junior personnel, the amount of rent income available to increase basic pay will actually be greater and the multiples will be higher.

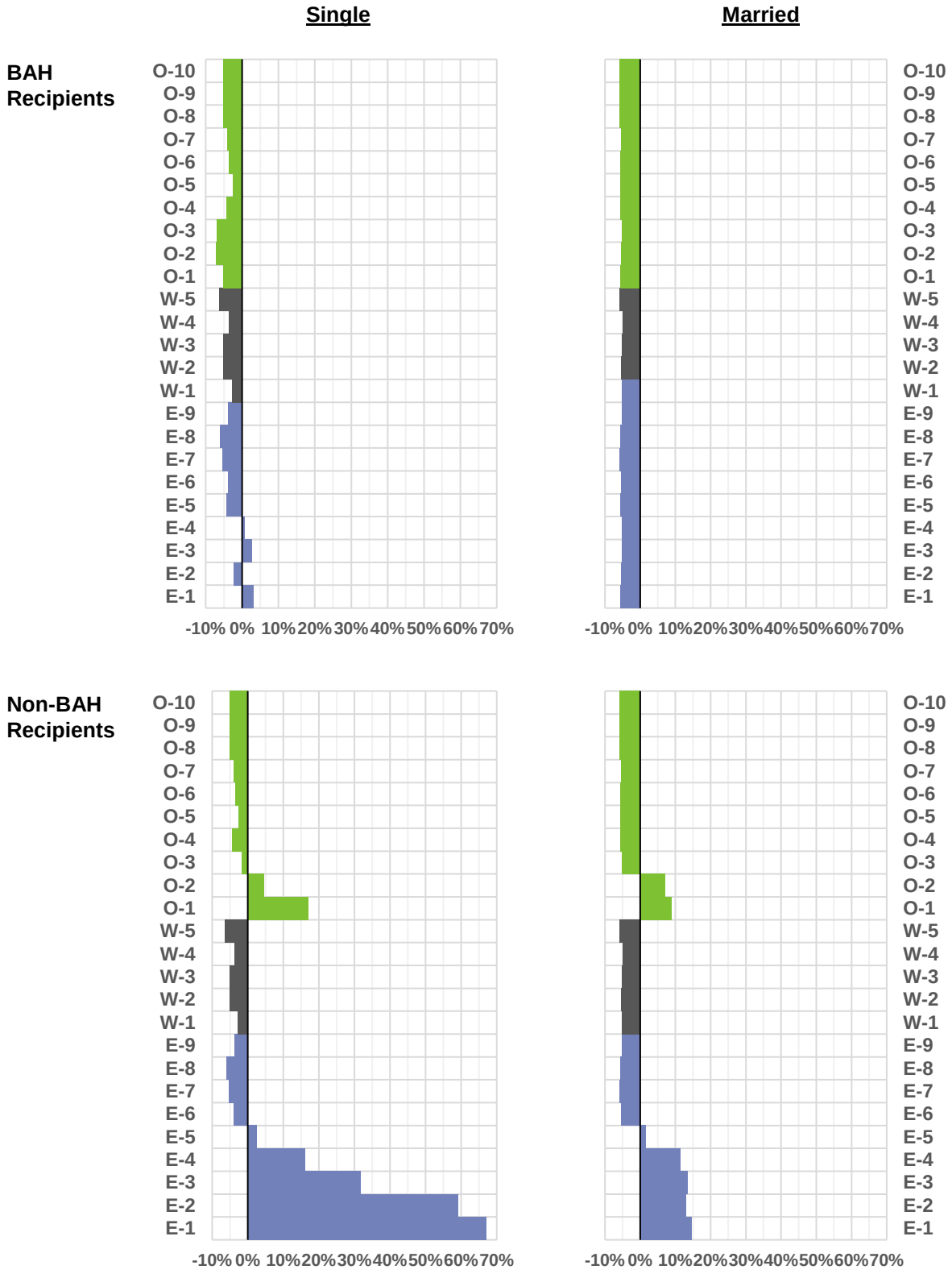


Figure 6. Changes in Take-home Pay (including the Value of Government-Provided Housing) in a Salary System with Rental Payments and Tailored Increases in Basic Pay That Vary by Rank

In a salary system that charges rent to occupants of government-owned housing, the take-home pay (including the value of such housing) is the same for BAH recipients as for non-recipients of any given rank. Both groups receive the same basic pay. Former BAH recipients give up BAH and get higher BP. Residents of government-owned housing also get the higher BP, but now the net value of living in government housing is zero because they have to pay for it at a market rate. Both groups receive net take-home pay equal to basic pay plus the government TSP contribution minus taxes. Introducing rents eliminates the difference in compensation between occupants of government-owned housing and other Service members, which has been noted as a source of serious differences in compensation throughout this paper.

However, a salary system with rent would have very different impacts on different parts of the force. This system would eliminate parts of the current compensation system designed to reward continued service, support military families, and compensate members for anticipated costs of military living. Overall, married members would fare worse than single members, BAH recipients would fare far worse than junior residents of government-owned housing, and mid-grade officers and senior enlisted would fare far worse than junior officers and junior enlisted. Moreover, the marriage transfer would average about $2,000 for officers O-1 to O-6 and more than $3,000 for enlisted members E-1 to E-6. The BAH transfer would average about $6,000 for officers O-1 to O-3 and more than $8,000 for enlisted members E-1 to E-5. Further, the transfer from mid-grade officers (O-4 to O-6) to junior officers (O-1 to O-3) would average almost $7,000, and the transfer from senior enlisted (E-5 and E-6) to junior enlisted (E-1 to E-4) would average almost $5,000. The losers in these income transfers would most likely feel that the change was unfair.

Moreover, even beyond the distributional effects of a salary system, some Service members could object to having to pay rent for on-base housing, particularly if they do not have a choice about where they live. As we show later in Chapter 9, we asked Service members participating in focus groups how they thought people might respond to a requirement to pay rent for on-base housing if a salary system were implemented. Across the enlisted force and officer communities, regardless of rank or component, participants expressed mostly negative views about a potential requirement to pay rent for on-base housing.

Finally, because total cost to the Government has been held constant at $74.7 billion throughout our analysis, total take-home pay to all military personnel is lower under all of our alternatives than it is under the current system. Taken together, the overall reduction in compensation and the transfers between various categories of the force are likely to be perceived as unfair. This perception could be expected to impact retention adversely.

6. Comparing Alternative Compensation Systems

A. Summary of Distributional Analyses

Table 10 and Table 11 summarize our analysis of the distributional effects of alternative compensation systems for single and married military personnel, respectively. From a fairness perspective, the system of rank-specific multiples with rent payments for government-owned housing impacts military compensation significantly less than other systems we considered, although that impact may still be significant. It changes take-home pay by a smaller amount for most categories of personnel while eliminating the differences between those who live in government-provided housing and others. Even so, some ranks and categories—and some individuals within ranks and categories—would fare considerably better or worse than others. Those who are disadvantaged by the new system are likely to see it as unfair.

Figure 7 and Figure 8 show how the level and composition of annual compensation varies across the alternative systems we analyzed for E-4s and O-3s. The gray-scale portions of the bars represent basic pay, and the colored portions represent other parts of military pay. The lengths of the bars represent total annual compensation, including the value of government-owned housing. The portions of the bars below zero represent the part of basic pay that Service members pay to governments in the form of taxes and rent for government-owned housing. The height of the bars above zero shows annual take-home pay, including the remainder of basic pay after paying taxes and rent for government-owned housing, TSP contributions from the Government, and the value of government-provided housing. In the current system, a large fraction of compensation of the E-4s receiving BAH consists of allowances. This percentage is somewhat less so for the O-4s.

Of course, under the salary systems there are no allowances, and basic pay would be increased to compensate for the difference. Taxes, which are shown below the line, increase in all cases for the salary systems. Major takeaways of the comparative analysis illustrated by Table 10, Table 11, Figure 7, and Figure 8 include the following:

- If Government spending is not allowed to increase, the total take-home compensation of military personnel would fall under a salary system due to increases in state taxes associated with higher basic pay. The two criteria specified by Congress, that compensation not fall and that cost to the Government not rise, cannot be satisfied simultaneously.

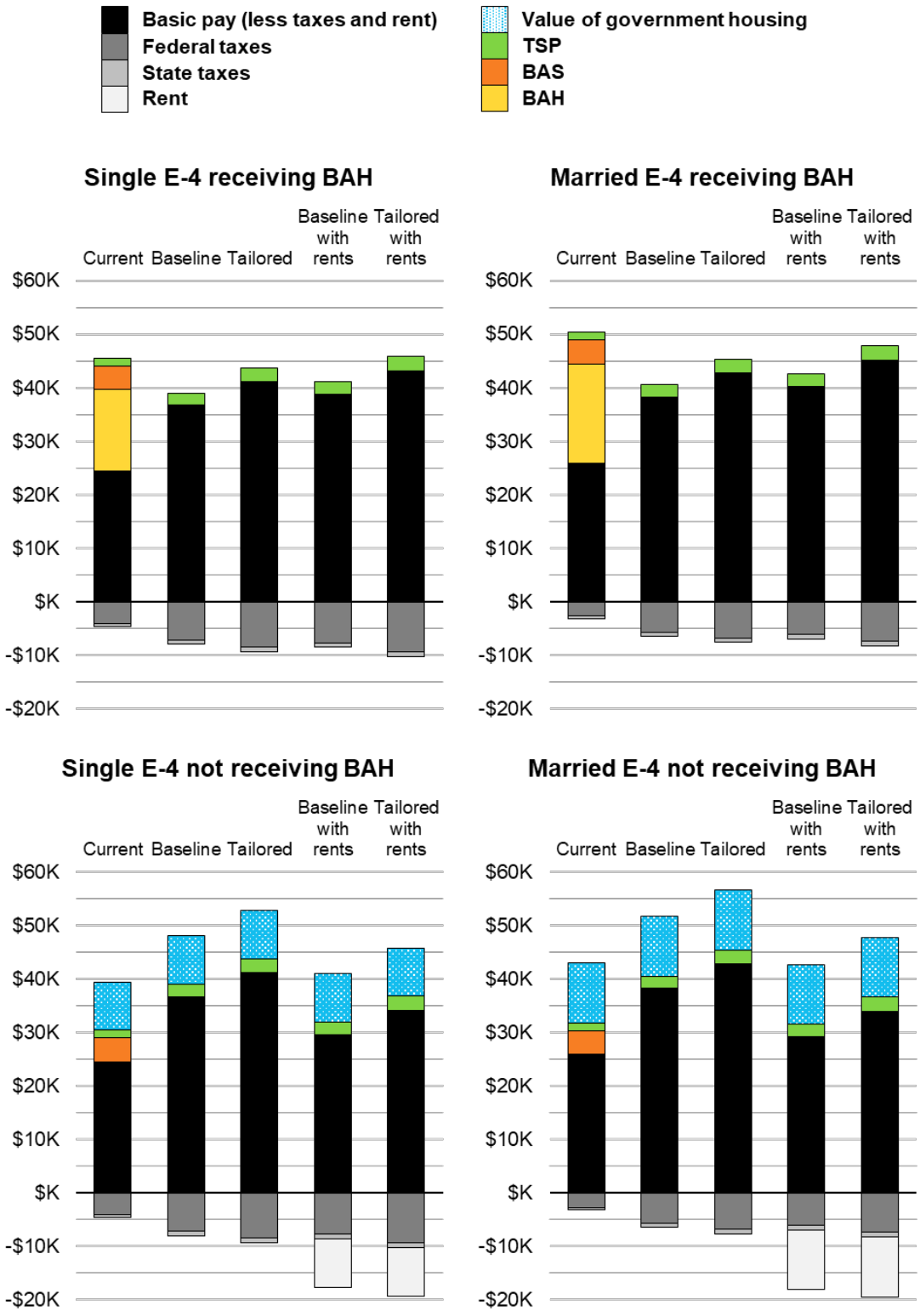
- Under the current system, personnel not receiving BAH have lower total compensation than BAH recipients, especially junior personnel. This disparity is only partially mitigated by the value of Government housing received under the assumptions we used to determine the valuation.
- When people in government-owned housing are not charged rent, they benefit from a salary system at the expense of other Service members. They get free housing and the others do not, while everyone in a given rank and years of service gets the same basic pay.
- The baseline systems, with the same salary system multiple for all ranks, favor senior personnel more than the current system.
- The tailored systems reduce discrepancies among BAH recipients, particularly married ones.
- Charging market rents for government-owned housing eliminates the unequal gains Service members in such housing receive under a salary system.
- A tailored salary system with market rents largely equalizes compensation within a pay grade regardless of marriage status and occupancy of government-owned housing. Remaining differences are due to factors like marriage-based differences in tax rates, the extent to which individuals are pushed into higher tax brackets, and the relevance of state taxes.
- Even in a tailored salary system with rents, the degree of gains and losses would vary across elements of the Service population. For example, married BAH recipients would have their compensation reduced by 5.5 percent, while single BAH recipients would lose 2.5 percent. This discrepancy is a necessary consequence of moving to a system that does not differentially compensate Service members with dependents.
- The tabulations we presented are averages for the rank, BAH status, and dependency status categories. Changes in compensation would also vary with individual circumstances. Service members with low federal tax rates (for example, those who are married, have dependents, and own their own homes) would be advantaged over those with higher tax rates, because they would all receive make-up payments based on an average taxation rate. On the other hand, the additional basic pay of Service members with high-earning spouses would be taxed more heavily.

Table 10. Take-Home Pay of Single Military Personnel (including the value of government-provided housing) under Alternative Compensation Systems

	BAH					Non-BAH				
	Current	Baseline	Tailored	Baseline with Rents	Tailored with Rents	Current	Baseline	Tailored	Baseline with Rents	Tailored with Rents
O-10	$179,303	$217,306	$160,436	$228,572	$170,037	$179,303	$245,950	$189,080	$228,572	$170,037
O-9	$178,203	$215,968	$159,480	$227,159	$169,017	$178,203	$244,420	$187,932	$227,159	$169,017
O-8	$172,693	$207,561	$154,505	$218,277	$163,789	$172,693	$236,205	$183,149	$218,277	$163,789
O-7	$154,583	$182,771	$139,137	$192,085	$148,410	$154,583	$211,415	$167,781	$192,085	$148,410
O-6	$137,216	$160,037	$123,866	$168,066	$132,346	$137,216	$188,465	$152,294	$168,066	$132,346
O-5	$116,335	$131,427	$106,445	$138,188	$113,429	$116,335	$157,863	$132,881	$138,188	$113,429
O-4	$102,643	$110,574	$92,218	$116,901	$98,121	$102,643	$135,798	$117,442	$116,901	$98,121
O-3	$84,365	$86,263	$73,967	$90,668	$78,500	$79,877	$104,214	$91,918	$90,668	$78,500
O-2	$69,676	$68,547	$61,135	$72,054	$64,693	$61,883	$80,236	$72,824	$72,054	$64,693
O-1	$54,954	$50,944	$49,038	$53,456	$52,074	$44,487	$57,921	$56,015	$53,456	$52,074
W-5	$111,941	$128,236	$97,985	$134,925	$104,794	$111,941	$152,295	$122,044	$134,925	$104,794
W-4	$98,147	$105,842	$86,720	$113,839	$94,565	$98,147	$128,318	$109,196	$113,839	$94,565
W-3	$86,121	$88,837	$75,183	$94,963	$81,647	$86,121	$110,317	$96,663	$94,963	$81,647
W-2	$74,478	$73,705	$65,308	$78,595	$70,611	$74,478	$93,889	$85,492	$78,595	$70,611
W-1	$64,745	$66,332	$58,465	$70,739	$62,949	$64,745	$81,692	$73,825	$70,739	$62,949
E-9	$93,291	$98,098	$83,939	$103,615	$89,717	$93,291	$120,178	$106,019	$103,615	$89,717
E-8	$79,613	$77,743	$70,304	$82,963	$74,806	$79,613	$98,921	$91,482	$82,963	$74,806
E-7	$71,543	$68,022	$64,227	$72,563	$67,712	$71,543	$87,678	$83,883	$72,563	$67,712
E-6	$62,726	$56,455	$56,860	$60,076	$60,305	$62,726	$75,667	$76,072	$60,076	$60,305
E-5	$54,217	$46,524	$49,128	$49,355	$51,844	$50,579	$61,078	$63,681	$49,355	$51,844
E-4	$45,480	$38,549	$43,193	$41,060	$45,793	$39,436	$47,614	$52,258	$41,060	$45,793
E-3	$41,706	$32,542	$40,086	$34,631	$42,839	$32,533	$38,658	$46,201	$34,631	$42,839
E-2	$40,734	$30,392	$37,593	$32,329	$39,814	$25,002	$30,392	$37,593	$32,329	$39,814
E-1	$35,902	$26,191	$35,001	$27,834	$37,050	$22,186	$26,191	$35,001	$27,834	$37,050

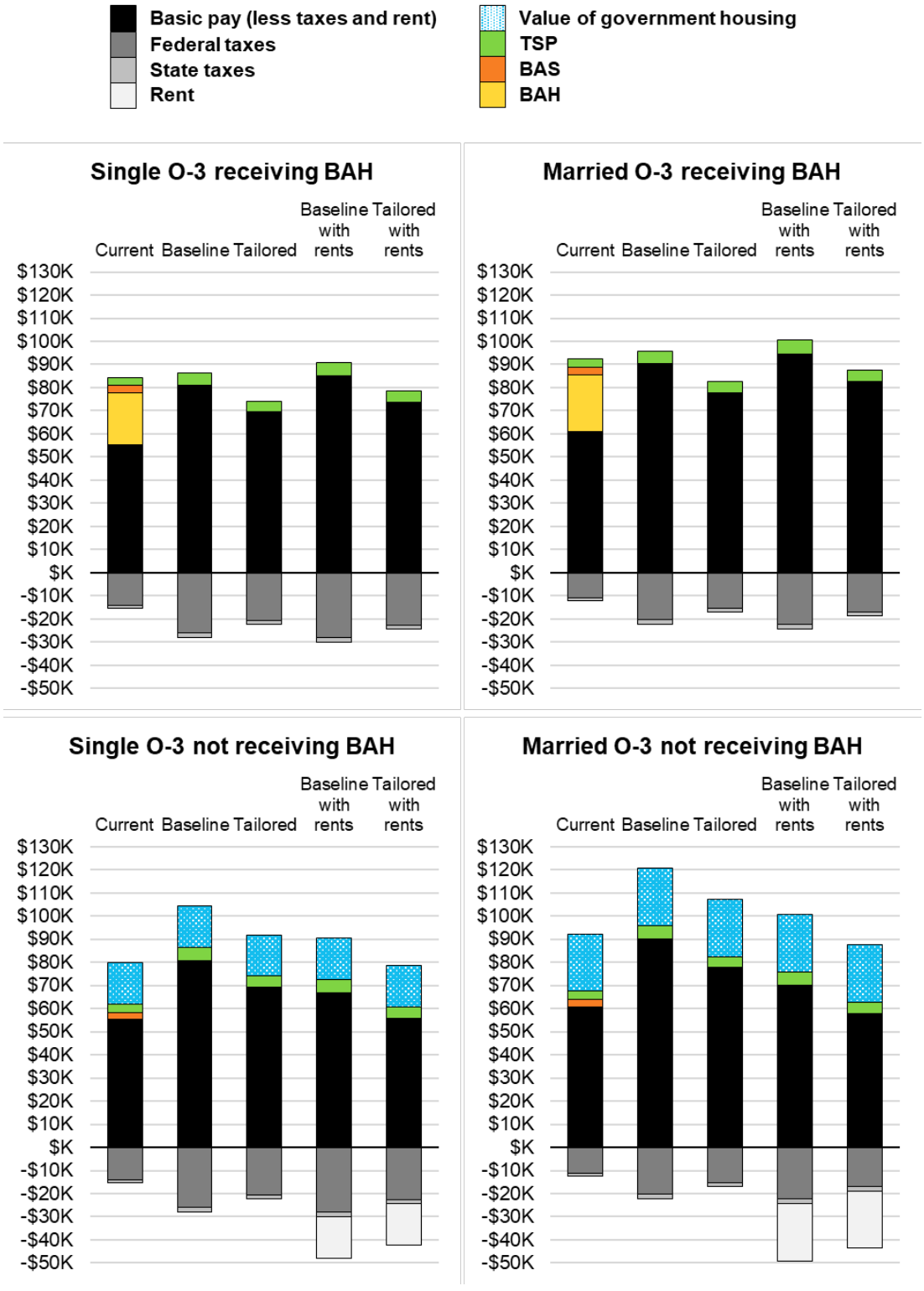
Table 11. Take-Home Pay of Married Military Personnel (including the value of government-provided housing) under Alternative Compensation Systems

	BAH					Non-BAH				
	Current	Baseline	Tailored	Baseline with Rents	Tailored with Rents	Current	Baseline	Tailored	Baseline with Rents	Tailored with Rents
O-10	$194,655	$238,385	$172,356	$251,466	$183,503	$194,655	$272,357	$206,328	$251,466	$183,503
O-9	$193,392	$236,832	$171,246	$249,825	$182,319	$193,392	$270,576	$204,990	$249,825	$182,319
O-8	$187,118	$227,071	$165,675	$239,512	$176,249	$187,118	$261,043	$199,647	$239,512	$176,249
O-7	$167,943	$198,288	$148,481	$209,102	$158,897	$167,943	$232,260	$182,453	$209,102	$158,897
O-6	$149,076	$171,892	$131,688	$181,214	$140,738	$149,076	$204,580	$164,376	$181,214	$140,738
O-5	$128,236	$139,690	$113,828	$147,399	$120,988	$128,236	$170,950	$145,088	$147,399	$120,988
O-4	$111,629	$118,061	$99,224	$124,548	$105,292	$111,629	$146,609	$127,772	$124,548	$105,292
O-3	$92,308	$95,910	$82,470	$100,596	$87,650	$92,308	$120,663	$107,224	$100,596	$87,650
O-2	$74,348	$74,852	$66,288	$78,905	$70,399	$65,790	$87,689	$79,124	$78,905	$70,399
O-1	$59,746	$55,122	$52,893	$58,059	$56,443	$51,873	$66,931	$64,702	$58,059	$56,443
W-5	$118,963	$136,169	$105,152	$143,679	$112,135	$118,963	$160,228	$129,211	$143,679	$112,135
W-4	$106,870	$107,676	$95,053	$121,409	$101,636	$106,870	$133,452	$120,829	$121,409	$101,636
W-3	$93,167	$90,328	$82,561	$102,046	$88,358	$93,167	$114,928	$107,161	$102,046	$88,358
W-2	$80,203	$74,836	$71,026	$85,184	$75,973	$80,203	$98,224	$94,414	$85,184	$75,973
W-1	$70,944	$67,301	$63,084	$76,118	$67,272	$70,944	$87,005	$82,788	$76,118	$67,272
E-9	$101,821	$105,268	$90,714	$110,926	$96,653	$101,821	$131,248	$116,694	$110,926	$96,653
E-8	$85,641	$84,711	$76,041	$89,710	$80,760	$85,641	$109,021	$100,351	$89,710	$80,760
E-7	$77,162	$73,427	$69,078	$78,190	$72,680	$77,162	$96,695	$92,346	$78,190	$72,680
E-6	$67,912	$60,175	$60,639	$64,008	$64,268	$67,912	$82,915	$83,379	$64,008	$64,268
E-5	$57,911	$48,797	$51,780	$51,831	$54,658	$53,833	$65,108	$68,091	$51,831	$54,658
E-4	$50,358	$40,207	$44,981	$42,639	$47,785	$42,909	$51,382	$56,155	$42,639	$47,785
E-3	$46,792	$34,110	$41,744	$36,166	$44,431	$39,146	$45,579	$53,214	$36,166	$44,431
E-2	$43,733	$31,904	$39,251	$33,809	$41,393	$36,663	$42,510	$49,857	$33,809	$41,393
E-1	$40,920	$27,597	$36,631	$29,207	$38,629	$33,711	$38,412	$47,446	$29,207	$38,629



The gray-scale portions of the bars represent basic pay. The lengths of the bars represent total annual compensation. The portions of the bars below zero represent the part of basic pay paid to governments in taxes and rent. The heights of the bars above zero show annual take-home pay.

Figure 7. Composition of Annual Compensation for an E-4 under Each Alternative



The gray-scale portions of the bars represent basic pay. The lengths of the bars represent total annual compensation. The portions of the bars below zero represent the pay paid to governments in taxes and rent. The heights of the bars above zero show annual take-home pay.

Figure 8. Composition of Annual Compensation for an O-3 under Each Alternative

B. Some Cost Implications

Throughout this paper, we assumed that cost to the Federal Government would not change by introducing a salary system. To fund such a system under DoD's current budget levels ("top-line") would require offsetting reductions in other areas, with corresponding risks to capabilities and readiness. Alternatively, DoD's budget could increase through offsetting reductions to other federal departments and spending programs, or the overall federal budget could increase.[31] The latter courses of action would require concurrence among the Administration and the Congressional committees of jurisdiction.

The cost to DoD is equal to the cost to the Government plus federal taxes, including the employer's share of Social Security and Medicare taxes. In the current system we estimate this cost to be $89 billion. This cost would rise to roughly $97 billion under the salary systems we examined.

Congress was concerned that a salary system could appreciably increase the cost of military compensation to the Government. Additionally, Congress was concerned about maintaining the level of compensation to military personnel. Under all the salary systems we considered, the total level of take-home pay would fall due to increased state tax payments under a salary system. To the extent that increases to basic pay are larger than BAH expenditures because of increased federal tax liability, there is no extra cost to the Federal Government. However, state taxes would rise under a salary system. They are a cost to Service members that is not returned to the Federal Government and they reduce take-home pay.

The largest losers in moving to a salary system are those who now receive BAH. The extent of losses varies considerably by rank, with some ranks gaining on average under some notional salary systems. There would also be differential impacts on individuals within ranks, depending on factors like marital status, housing status, state of residence, and overall taxable income. We considered alternative salary systems that would leave the population of BAH recipients with no average losses. Such a system would increase the cost to the Government by $8 billion and the cost to DoD by $10 billion. Holding all individual members harmless against reductions in compensation would cost even more.

[31] An increase in the overall federal budget would be offset by the increased tax revenues collected from Service members.

7. Additional Implications of a Salary System

This paper emphasizes the implications of a salary system for compensating active duty military personnel. However, we have not addressed the possible indirect effects of a salary system. This chapter considers the implications of the more significant issues: locality pay, increased military retirement benefits, and increased pay for members of the reserve components; costs of the combat zone tax exclusion; administrative costs of a salary system; and the effects of a salary system on federal income taxes.

A. Introducing Locality Pay into a Salary System

Service member compensation currently varies over time and space. For example, basic pay adjusts each year, and BAH varies according to housing costs across locations. In this section, we consider how Service member compensation could vary over time and space under a salary system. In the dimension of time, our answer is simple—basic pay would adjust by the same process it does today. In the dimension of space, our answer is more involved—a locality pay system would replace BAH.

Basic pay currently adjusts annually according to percentage changes in the Employment Cost Index compiled by the U.S. Bureau of Labor Statistics (BLS). Congress may ratify a Presidential proposal for an alternative adjustment and may modify such a proposal.[32] In either case, the implementation of a salary system would not warrant a change to how basic pay adjusts over time. Salaries would be no more or less likely than today's basic pay to decrease annually due to changes in economic conditions.

1. Basing Locality Pay on Conditional Wages

By eliminating BAH, a salary system would change how Service members' compensation varies by location. With equity (in the sense of "fairness") being a principle underlying the basic philosophy of military compensation,[33] the implementation of a salary system might warrant a new locality pay program. A Service member's BAH currently depends on the cost of housing in the location of his or her duty station and whether he or she has dependents. One way to describe fairness would be for DoD to expect a Service member of unknown characteristics to be equally happy in each possible location. A system

[32] "Adjustments of monthly basic pay," 37 U.S. Code, § 1009, 2011, https://www.govinfo.gov/app/details/USCODE-2011-title37/USCODE-2011-title37-chap19-sec1009.

[33] *Military Compensation Background Papers*, Eighth Edition, Undersecretary of Defense for Personnel and Readiness, July 2018, https://www.loc.gov/rr/frd/pdf-files/Military_Comp-2018.pdf.

of locality pay using this approach would not need to consider the cost of housing or number of dependents. Such a system would follow two principles:

- All Service members that perform a given set of duties at a given level should receive the same compensation.
- DoD should expect a Service member of unknown characteristics to be equally satisfied at any duty location.

The first principle precludes the use of any factors beyond a Service member's nature and quality of service, including number of dependents, in determining compensation. The second principle is incompatible with using only cost of housing to determine locality pay. For Service members compensated for the cost of housing to be equally satisfied at any duty location, they would need to be equally satisfied with a given quantity and quality of housing in each location. For example, they would need to be just as happy with a 3- bedroom, 2-bathroom house in San Diego, California, as with a 3-bedroom, 2-bathroom house in Minot, North Dakota.

Higher costs of housing in part reflect individuals' greater willingness to pay to live in one locality than another. Individuals are more willing to pay to live in localities with greater natural, cultural, industrial, and other amenities. Some locations have better weather, more fascinating museums, and more robust labor markets for family members to join. Individuals bid up the cost of housing in those locations. When Service members in higher-amenity locations are compensated based on their cost of housing, they enjoy those amenities without paying more for housing than Service members stationed in locations with poorer amenities. All else equal, DoD can expect a Service member in a poorer-amenity location to be worse off.

We do not propose that pay should be equal across localities or that Service members should not be compensated for housing costs. Instead, we propose to make differences in locality pay account for other location-specific characteristics *in addition* to housing costs. Doing so would, on average, make assignments in low-amenity locations more attractive and assignments in high-amenity locations less attractive relative to the current compensation system, balancing a Service member's expected satisfaction in those assignments.

Wages offer a way to measure the compensation individuals will accept to live in one location instead of another. For a given job, job market, and skillset, individuals will accept a lower wage to live in a location with greater amenities and/or lower cost of living (which includes the cost of housing). Assuming individuals choose their locations to maximize their satisfaction, wages adjust across locations to equalize how well off an individual would be in each location. In other words, if the distribution of wages were such that an individual would be better off in another location, they would be in that location instead.

This concept is known in economics as "spatial equilibrium" (Roback, 1982[34]; Rosen, 1986[35]; Glaeser and Gottlieb, 2008[36]; Graves, 2013[37]). Unlike the cost of housing, basing locality pay on wages (conditional on job, job market, and skillset) would serve the principle of expecting a Service member of unknown characteristics to be equally satisfied at any duty location.

DoD cannot ensure that every Service member would be equally satisfied at any duty location. Every Service member has idiosyncratic preferences that a locality pay program cannot account for. The principle requires only that disparities in location satisfaction do not appear on average.

One pitfall of basing Service members' locality pay on the conditional wages of civilians is that Service member preferences may systematically differ from the preferences of civilians. For example, those who choose to serve in the Army may be more willing to live in rural areas. In that case, Service members stationed in rural areas would be overcompensated. Service members may also differ from other wage-earners in their ability to take advantage of local amenities. For example, the local installation and cultural amenities may be on opposite ends of the locality.

That Service members do not choose their locations does not invalidate a locality pay system. Service members enjoy the amenities (or rue the lack of amenities) in their respective locations regardless of whether they are in those locations voluntarily. A straightforward solution to even out the satisfaction levels of Service members as they are assigned to high- and low-amenity areas is to increase the pay of members assigned to less desirable areas. Carrell and West (2005)[38] argue that adjusting military wages according to local civilian wages would stabilize the force across locations, generate more volunteers for high-cost or low-amenity areas, and increase retention. Similarly, Carrell (2007)[39] studied how the difference in military and civilian wages across locations and occupations affects the retention of Service members in the Air Force. He found that retention is significantly higher for Airmen stationed in locations where the military pay is competitive with civilian pay.

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34 Jennifer Roback, "Wages, Rents, and the Quality of Life," *Journal of Political Economy* 90, no. 6, 1982, 1257–1278.

35 Sherwin Rosen, "The Theory of Equalizing Differences," *Handbook of Labor Economics* 1, 1986, 641–692.

36 Edward L. Glaeser and Joshua D. Gottlieb, "The Wealth of Cities: Agglomeration Economies and Spatial Equilibrium in the United States," *Journal of Economic Literature* 47, no. 4, 2009, 983–1028.

37 "Spatial Equilibrium in the Labor Market," *The Handbook of Regional Science*, 2013.

38 Scott E. Carrell and James E. West, "Optimal Compensating Wages for Military Personnel," *Journal of Policy Analysis and Management* 24, no. 4, 2005, 803–822.

39 Scott E. Carrell, "The National Internal Labor Market Encounters the Local Labor Market: Effects on Employee Retention," *Labour Economics* 14, 2007, 774–787.

Locality pay based on conditional wages would be a radical departure from the current approach. Under the current system, the Services seek to "recruit an individual, but retain a family" by offering wrap-around support that considers the full needs of military families, including not only housing but health care, childcare, education, and other family services. Locality pay based on conditional wages would be incompatible with an alternative version of fairness—one which seeks to provide for each Service member according to their respective needs, accounting for family status and other unique considerations. Accordingly, the change could be perceived as unfair and prejudicial by those who rely on the current system to meet their needs and enable them to serve, and who would be asked to take on substantial new costs.

2. Adapting the Federal Civilian Locality Pay Adjustment

A locality pay program based on wages exists in the form of the General Schedule Locality Pay Tables, which determine locality pay for federal civilian employees. The tables reflect pay levels for non-federal workers in 53 locality pay areas measured annually by the BLS. The tables were originally designed to match federal wages to non-federal wages by locality. In principle, therefore, the federal locality pay program could provide a fairer locality pay program for Service members than BAH. Indeed, in section 604(b)(1) of the 2017 National Defense Authorization Act, which led to the examination of a salary system for the Thirteenth QRMC, Congress requested that the Secretary of Defense consider a salary system "adjusted by the same cost-of-living adjustment that the Department of Defense uses worldwide for civilian employees."

Federal locality pay is relatively simple. Each locality is associated with a percentage increase to the General Schedule (GS) base pay of each person working in the locality. For example, workers in the Colorado Springs, CO, locality in 2020 receive 17.79 percent more than the GS base pay defined by their grade and step. Adaptation of federal locality pay to military pay would be similarly simple. Each Service member's basic pay would be increased by the percentage associated with the locality of their duty station. In other words, the percentage increase associated with a locality would apply to each entry in the basic pay table, just as it currently applies to each entry in the GS base pay table. DoD would not be limited to the federal locality definitions and percentages and could devise its own localities and definitions to suit its principles. However, to illustrate a specific policy option and to address Congress' request directly, our analysis directly adapts the federal locality definitions and percentages to military basic pay.

Like BAH, locality pay would cause Service member incomes to vary across localities. Under the hypothesis that the current system overly rewards Service members stationed in high-amenity locations, and that those locations tend to have high costs of housing, a salary system with locality pay would cause less variation in after-tax income across localities than the current system. To investigate that hypothesis, we compute the

after-tax incomes of Service members under a salary system that is cost-neutral to the Federal Government. We first multiply each Service member's basic pay by the federal locality pay multiplier associated with their assigned location. Next, we find the additional constant multiplier of all Service members' basic pay that would make the elimination of allowances cost-neutral to the Federal Government. Finally, we compute each Service member's after-tax income.[40] We find that a salary system with locality pay would have about 1 percent less variation (in terms of standard deviation) in after-tax income than the current system. However, much of that variation is due to variation in pay grade. After we stratify by pay grade, we find that a salary system with locality pay would have less variation in after-tax income for almost all Service members. Only cadets, O-6s, O-8s, O-9s, and W-5s would have greater variation in after-tax income. Because we stratify by pay grade, our finding of less variation in after-tax income for locality pay than for BAH is not sensitive to tailored basic pay multiples or rents by pay grade.

As an example, we estimate that in 2018, E-5s stationed in the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA locality had a mean after-tax income of $54,633. In addition, we estimate that E-5s stationed in the baseline "Rest of United States" locality had a mean after-tax income of $41,565. Under a salary system with locality pay, E-5s stationed in the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA locality would have had a mean after-tax income of $45,328. Also, E-5s stationed in the baseline "Rest of United States" locality would have had a mean after-tax income of $40,594.[41] Thus the difference in mean E-5 after-tax income across the two localities would shrink from roughly $13,000 to $5,000.

For another example, we estimate that O-4s stationed in the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA locality had a mean after-tax income of $102,818 and that O-4s stationed in the baseline "Rest of United States" locality had a mean after-tax income of $87,755. Under a salary system with locality pay, O-4s stationed in the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA locality would have had a mean after-tax income of $105,208. We also estimate that O-4s stationed in the baseline "Rest of United States" locality would have had a mean after-tax income of $98,176.[42] Thus the difference

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[40] We compute taxes using a local executable copy of TAXSIM version 27 software provided by the National Bureau of Economic Research. See https://users.nber.org/~taxsim/taxsim27.

[41] After-tax income falling for E-5s in both locations is the result of the baseline salary system with a single basic pay multiple that is cost-neutral to the Government. A different multiple for E-5s would cause different changes in basic pay for a given location. However, our finding of less variation in after-tax income across locations for locality pay than for BAH is not sensitive to the multiple.

[42] After-tax income increasing for O-4s in both locations is the result of the baseline salary system with a single basic pay multiple that is cost-neutral to the Government. A different multiple for O-4s would cause different changes in basic pay for a given location. However, our finding of less variation in after-tax income across locations for locality pay than for BAH is not sensitive to the multiple.

in mean O-4 after-tax income across the two localities would shrink from roughly $15,000 to $7,000.

In implementation, the federal locality pay program is flawed. Most importantly, the locality pay areas are coarse: each area is either a metropolitan area, the entire states of Alaska or Hawaii, or the massive "Rest of United States." All stations in the continental United States not in a metropolitan area would be associated with the lowest locality pay according to the federal locality pay program. In addition, Congress and the President have exercised power to override the statutory locality pay formula throughout its history. Thus, political actions have hindered the program's ability to serve the principle of equal satisfaction across locations.

An ideal locality pay program for Service members would be granular, data-driven, and regularly updated to reflect changes in economic geography and Service members' preferences. DoD already collects data on Service members' preferences through the assignment preference sheets Service members complete prior to receiving a new assignment. DoD could directly pursue the principle of equal satisfaction across locations (on average) by regularly raising locality pay in locations of low average preference and decreasing locality pay in locations of high average preference. Such a program would require only basic data analysis on an annual basis.

Locality pay could be considered a modification of basic pay or as separate from basic pay. This consideration would impact the value of elements of pay that are tied to basic pay. Retirement pay, in particular, is a multiple of the retired Service member's highest 36 months of basic pay. Thus, considering locality pay as a modification of basic pay would increase the value of retirement pay and cause that value to depend on where Service members were stationed late in their careers. Alternatively, DoD could consider some part of locality-adjusted pay to be separate from basic pay. Options under that alternative, in increasing order of benefit to retirement pay, include the following:

1. Preserving the current basic pay table and considering all compensation above it to be locality pay
2. Considering the federal locality pay multiplier to represent locality pay
3. Normalizing the multiplier for the "Rest of United States" locality pay area to one
4. Normalizing the mean locality pay multiplier to one

Option 1 has the advantage of preserving the values of retirement pay and other pays that are tied to basic pay. Option 1 would also be relatively easy to explain to Service members. This option would effectively mean the replacement of BAH and BAS with a larger but taxable pay that does not depend on dependent status. Instead, this pay would account for

all aspects of a locality, not just the cost of housing. Under other options, the retirement pay multiplier could be adjusted to keep retirement pay similar to previous levels.

3. Comparing Locality Pay to BAH

Table 12 illustrates how allowances and locality pay would differ for two example Service members in selected localities. We use the basic pay multiples tailored by pay grade defined in Table 7.[43] We define locality pay according to option 1: the entire increase in basic pay is due to the salary system and locality pay multipliers. This definition of locality pay allows the closest comparison to allowances. However, locality pay is taxable. The take-home value of locality pay depends on all of the inputs to an individual's income tax liability, and therefore varies by individual.

Table 12 shows that some localities have relatively high BAH but would have relatively low locality pay, and vice versa. Honolulu typifies localities with relatively high BAH but relatively low locality pay; it is high in natural and cultural amenities that workers are willing to accept in lieu of higher pay. San Diego has similar BAH as Honolulu but would have higher locality pay. The locality pay in San Diego would be significantly lower than the sum of allowances, reflecting a high value of amenities although not as high as Honolulu. Anchorage, AK, has significantly lower BAH than San Diego, but would have similar locality pay to San Diego, reflecting a low value of amenities in Anchorage.

Table 12. Examples of Monthly Allowances and Locality Pay

	E-5, 6 YOS*, married		O-4, 12 YOS*, married	
	BAH & BAS	**Locality Pay**	**BAH & BAS**	**Locality Pay**
Atlanta, GA	2,635	2,087	2,882	2,337
Honolulu, HI	3,286	1,977	3,959	2,121
San Diego, CA	3,223	2,410	3,839	2,971
Lawton, OK	1,261	1,824	1,763	1,820
Anchorage, AK	2,440	2,406	2,957	2,963

*YOS: Years of service.

Computed using the 2020 General Schedule locality pay multipliers and the 2020 basic pay table.

Lawton, OK, is one of many locations with low BAH that fall into the "Rest of United States" locality, which has the lowest multiplier. These locations would experience the greatest gains from replacing allowances with locality pay. The high locality pay relative to allowances reflects the low value of amenities in these locations. On average, workers

[43] Alternative multiples, such as the baseline constant multiple, would scale locality pay proportionately. Residents of government housing would receive the same locality pay as other Service members. Any rent they would pay represents the value of the housing they currently receive in-kind and is analogous to the current value of BAH for comparison with locality pay.

assigned to low-BAH, low-amenity locations need additional compensation beyond the cost of housing to be as satisfied as they would be working in a higher-amenity location.

Table 12 reinforces our finding earlier in this section that locality pay would vary less across locations than BAH. Compared to BAH, locality pay would redistribute more compensation to low-amenity locations and less compensation to high-amenity locations. In spatial equilibrium theory, this redistribution is the primary advantage of locality pay because it improves fairness in satisfaction across locations. Whether this redistribution is truly an advantage or disadvantage of locality pay compared to BAH depends on Service members' perceptions and concepts of fairness. If Service members consider the current system to be fair, they may perceive deviations from it to be unfair. That Service members stationed in high-amenity locations would lose more income than others may exacerbate Service members' perceptions of unfairness. On the other hand, Service members may believe that those stationed in low-BAH, low-amenity locations deserve more compensation.

From Service member responses, detailed in Chapter 9, we found that many Service members are dissatisfied with BAH amounts. However, they did not single out low-BAH areas. We expect that Service members whose untaxed allowances are replaced with a lower amount of taxable locality pay would be particularly dissatisfied. As a result, any overall benefits to fairness may not be worth the discontent of Service members stationed in San Diego or Honolulu. In fact, Service members who do not value the amenities in such high-amenity locations may experience the most dissatisfaction.

Independent of personal implications, we expect that Service members will be skeptical of replacing BAH with a new system. Although the primary advantage of BAH is that it is not taxable, its familiarity is another important advantage. Service member responses indicate that they are generally averse to extensive compensation changes.

4. Incorporating Assignment Preferences into Locality Pay

A potential advantage of locality pay over BAH is its simplicity and consistency. Each locality is associated with a single multiplier. Similarly, each BAH location is associated with 48 values to differentiate BAH by pay grade and dependent status. BAH may be higher in one city than another for married E-5s but not for married O-4s (for example, Atlanta and Anchorage). The simplicity of locality pay comes at the cost of specificity, however, because federal locality pay multipliers do not vary by grade. A locality pay system that accommodates differing locational preferences by pay grade could not be so simple. However, such a system would be possible and could be uniquely effective if informed by the assignment preferences of Service members.

Information on assignment preferences could facilitate a very different and possibly much more effective locality pay system than the system described thus far. If Service

members could quantify their preferences for assignments in terms of the minimum additional pay that would make each assignment desirable to them, the Services could serve those preferences with special pays. In fact, the Navy uses Assignment Incentive Pay (AIP) in this fashion.[44] Sailors submit AIP bids through the Navy online career management system. A Sailor selected for an AIP assignment receives their bid for each month they serve in that assignment.

The rationale for this bidding system generalizes the rationale for locality pay. Consider this excerpt from a Navy memo on the AIP program:

> *Sailors do not view all assignments as equally desirable. This can be attributed to factors such as geographic location, type of job, or nature of duty (e.g., time away), particularly when preceded and followed by arduous sea tours. The Assignment Incentive Pay (AIP) program has been initiated in the attempt to make all assignments desirable to at least one qualified volunteer. By increasing the volunteer rates for hard-to-fill jobs and locations, the AIP program also aims to increase member satisfaction and retention from filling these jobs voluntarily.*[45]

This memo applies a different concept of fairness: "all assignments desirable to at least one qualified volunteer." Achieving this concept requires information on assignment desirability at the individual level, and through a bidding process, this information is obtainable. Just as Sailors bid for AIP, all Service members could bid for locality pay. Service members that do not value the amenities in a given location could avoid being assigned there without additional compensation by submitting high bids. Similarly, those that particularly value the same amenities could improve their probability of being selected by submitting low bids. As a result, Service members would sort into assignments according to their willingness to serve in those assignments, increasing member satisfaction.

Using a bidding system to determine locality pay is a theoretically attractive approach. However, applying it broadly would require a major change in assignment policy, and administering it on a large scale might prove cumbersome. Administration on a broad scale would be essential to a bid-based locality pay system to allow each individual to reveal their own preferences and have those preferences served. A system that largely relies on involuntary assignments cannot expect the preferences revealed in bids by those assigned voluntarily to reflect accurately the tastes of others assigned involuntarily to the same locations.

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[44] "Policy Decision Memorandum 003-06: Assignment Incentive Pay (AIP) Program," Chief of Naval Operations to Assistant Commander, Naval Personnel Command, December 7, 2006.

[45] Ibid.

B. The Cost of Military Retirement Benefits

The 2017 National Defense Authorization Act (NDAA) that mandated a DoD study of a salary system specified that the retirement system would be modified to ensure that under the new pay structure members of the armed forces would receive retirement benefits similar to those they are entitled to under the current system.[46] This section documents why the level of retirement benefits is a concern.

Under the relatively new Blended Retirement System (BRS), military retirement benefits are calculated as a fraction of retirees' final basic pay. Those who retire with 20 years of service receive 40 percent of the average of their highest 3 years of basic pay. The multiple increases by 2 percent for every additional year of service. Because basic pay would increase dramatically under a salary system, this salary system would yield a large increase in retirement benefits.

Retirement benefits are financed through an accrual fund; a fraction of basic pay is put into the fund. The DoD Actuary calculates the appropriate multiple to use under assumptions about the return that the money in the fund will earn. Currently, the multiple is .304. We assume that under a salary system with no legislative changes to the retirement system, the same multiple would pertain. Table 13 shows the cost implications to retirement benefits under a salary system.

Table 13. Increased Retirement Costs under a Salary System ($Billion)

	Current Basic Pay	Basic Pay under Salary System	Current Retirement Accrual	Retirement Accrual under Salary System	Increased Retirement Accrual
Without Rental Payments	55.8	85.8	17.0	26.1	9.1
With Rental Payments	55.8	90.8	17.0	27.6	10.6

In a salary system that did not involve rental payments from residents of government-owned housing, we estimated that basic pay would rise by 53.9 percent. This percentage implies an increased retirement accrual cost of $9.1 billion. Under a system with rental payments, we estimated a 62.6 percent increase in basic pay, implying an increased retirement accrual cost of $10.6 billion.

There are two ways that the retirement formula could be changed to maintain the current level of retirement pay. The multiples used to calculate retirement pay for every

[46] National Defense Authorization Act for Fiscal Year 2017, Public Law 114–328, December 23, 2016, 2000–2968.

year of service could be reduced to compensate for the increased level of basic pay. Under a salary system, basic pay would likely vary across locations because it would incorporate locality pay. In this case, an average pay table would have to be used to avoid the perverse incentive for Service members to retire from areas with high locality pay.

Alternatively, the simplicity of the current retirement multiples could be maintained by continuing to use a version of the current basic pay table, perhaps termed the "legacy pay table," to calculate retirement benefits. Of course, the legacy table would have to be modified every year to incorporate annual pay increases. Introducing a separate pay table for retirement would add complexity and reduce the transparency of the military compensation system. Retirement pay would be calculated on the basis of this separate pay table rather than on the actual pay of retiring Service members.

An additional element of the BRS is the inclusion of continuation pay (CP), which is an incentive pay offered to personnel between the 8th and 12th years of service. CP is meant to induce personnel to stay in the military until they reach the 20-year retirement point. The Services have considerable discretion over how to implement continuation pay. They can choose the precise point between year 8 and year 12 to offer it, choose the amount to offer, and vary the timing and level of the pay by occupation.

The level of CP can vary between 2.5 and 13 months of basic pay. If the Services chose to offer levels of continuation pay toward the high end of this scale, the introduction of a salary system would not affect it. The Services could still offer the same amount of CP by lowering the number of months of basic pay associated with continuation pay. However, the Services have tended to implement CP at the low end of the range. In 2020, all Services are offering CP equal to 2.5 months of basic pay to active component personnel. This means that continuation pay would rise by the same proportion as basic pay unless the rules were changed legislatively to permit lower basic pay multiples. A recent RAND paper calculates that the total cost of CP using the minimum multiplier is a bit over $300 million. This result means that the cost of continuation pay might rise by roughly $175 million under a salary system unless the minimum multiple were changed. On the other hand, RAND estimates that the Services would be well served by increasing the levels of CP in order to induce higher retention.[47]

C. Increased Cost of the National Guard and Reserves

Unless members of the Selected Reserves (SELRES) are activated, they report to duty or "drill" a notional 39 days per year: 1 weekend (2 days) per month (= 24 days), plus 2 weeks (= 15 days) once per year. SELRES consists of approximately 740,000 members

[47] Beth J. Asch, Michael G. Mattock, and James Hosek, "The Blended Retirement System: Retention Effects and continuation Pay Cost Estimates for the Armed Services," RAND Corporation, 2017, https://www.rand.org/pubs/research_reports/RR1887.html.

who draw basic and other types of pay during their drill days, but are not ordinarily eligible for BAH. However, SELRES personnel who are activated for shorter periods for training or operational purposes are generally eligible for some form of BAH. (This concept is elaborated on in Appendix B.) Under a salary system, they would forego BAH and receive higher basic pay.

Members of the Active Guard Reserves (AGRs) consist of members of the Army National Guard, Army Reserve, Air National Guard, and Air Force Reserve. These personnel are on active duty status to support the following functions of the Army National Guard and the Air National Guard: organizing, administering, recruiting, instructing, or training. The Navy has a similar category called Training and Administration of the Reserve (TARs). There was a total of 79,000 members in those categories during 2018.[48] AGRs receive the same pay and benefits, including BAH, as their counterparts in the active components (ACs). Presumably, under a salary system AGRs would continue to be treated like their AC peers, receiving increased basic pay and foregoing allowances.

If a salary system is adopted, activated SELRES personnel will experience the same kinds of gains or losses in take-home pay as AC personnel, depending on the details of the system and their rank and marital status. On the other hand, the situation for non-activated SELRES personnel is different. Under a salary system, their basic pay would rise by the same proportion as that of active duty personnel with no offsetting loss in BAS and BAH. This approach would obviously benefit them substantially, but it would impose an extra cost on the Federal Government.

Currently the cost of basic pay to members of the reserve components is $5.7 billion. Table 14 shows how this cost would increase under a salary system.

Table 14. Increased Costs of Reserve Component Pay under a Salary System ($B)

	Current Reserve Pay	Reserve Pay under Salary System	Change in Reserve Pay
Without Rental Payments	5.7	8.8	3.1
With Rental Payments	5.7	9.3	3.6

Unless the method of determining pay to the Guard and Reserve was changed under a salary system, their cost could rise between $3.1 billion and $3.6 billion per year. Perhaps the most straightforward adaptation method would be to keep the Guard and Reserve under a legacy basic pay table (adjusted for future cost-of-living changes), as proposed in the previous section on retirement pay, except when they are on active duty. Conceptually, the maintenance of a legacy pay table for inactive duty reservists would maintain the current

[48] *Compensation Greenbook*, "National Defense Budget Estimates for FY 2019," Table 7-5, Under Secretary of Defense (Comptroller), https://comptroller.defense.gov/Budget-Materials/Budget2019/.

difference in pay between inactive duty Service members who are not eligible for BAH and active duty Service members who are. In practice, however, the Reserve Components may be unwilling to accept separate pay tables if they believe they are not being paid the same as their active duty counterparts.

D. Costs of the Combat Zone Tax Exclusion

The implementation of a salary system would not directly affect deployment duration and frequency. More generally, it would not affect the time Service members spend away from their home location ("PERSTEMPO"). Pay associated with deployment, including Family Separation Allowance, Hardship Duty Pay, and Imminent Danger/Hostile Fire Pay, are not tied to basic pay and would not be affected by the implementation of a salary system. Further, the rules concerning the Combat Zone Tax Exclusion (CZTE) would not change. Military pay earned by an enlisted member or warrant officer in the same month the Service member served in a combat zone is exempt from income taxes. The exemption for commissioned officers is limited to the highest rate of enlisted pay plus Imminent Danger/Hostile Fire Pay.

By increasing Service members' taxable income, the implementation of a salary system would increase the value of CZTE. The value of CZTE is the additional amount of taxes Service members would pay if CZTE did not exist. Although BAH and BAS are not taxable under the current system—regardless of whether a Service member qualifies for CZTE—a salary system requires DoD to increase basic pay by *more* than the sum of BAS and BAH to compensate Service members for the additional cost of taxes. That additional pay would also be tax exempt under CZTE and would be an additional cost of the salary system.[49] We measure the value of CZTE in 2018 by computing 2018 income taxes for all active duty Service members, then doing so again but treating CZTE-exempted income as if it were taxable. The difference in taxes paid is the value of CZTE. We then measure the value of CZTE under a salary system that is cost-neutral to the Federal Government. To determine each Service member's tax liability in each case we apply TAXSIM27, a tax simulation model developed by the National Bureau of Economic Research (NBER), to DMDC personnel data.[50,51]

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[49] We do not account for this additional cost of CZTE in our estimates of a cost-neutral system in Chapters 3 through 6. A true cost-neutral salary system would have a lower basic-pay multiple.

[50] An internet-based version of NBER's TAXSIM27 model is available at http://users.nber.org/~taxsim/taxsim27/. NBER provided to IDA a version of TAXSIM that computes on the local system for use with our sensitive personnel data. TAXSIM accounts for many elements of income tax liability, including state taxes, the Child and Dependent Care Tax Credit, and the Earned Income Tax Credit.

[51] We observe elements of military pay, marital status, and dependent status in DMDC personnel data. We impute non-military and spousal income by training machine-learning models on a public dataset of

We estimate that Service members paid a mean income tax (federal, FICA, and state) of $7,484 in 2018. Without CZTE, this mean would have been $7,942. Therefore, CZTE was worth $458 per Service member in 2018, a total of $671 million. The amount of $458 per Service member is the mean value of CZTE over all active duty Service members, including those that were not eligible for CZTE in some or all months. Considering only those member-months for which members were eligible for CZTE, CZTE had a mean value of $857 per month of eligibility.

Under a cost-neutral salary system, however, we estimate that Service members would have paid a mean income tax of $11,194 in 2018. Without CZTE, this mean would have been $11,920. Therefore, the CZTE tax advantage under a cost-neutral salary system would have been $726 per Service member in 2018, a total of $1.06 billion. CZTE would have been $268, or 58.5 percent, more valuable per Service member under a salary system. Considering only those member-months for which members were eligible for CZTE, CZTE would have had a mean value of $1,358 per month under a cost-neutral salary system. Therefore, CZTE would have been $501 more valuable per month of eligibility under a salary system.

The cost of CZTE to the Federal Government is the amount of federal income taxes exempted, which is equal to the total CZTE benefit less the amount of state income taxes exempted. Some states fully exempt military income earned in a combat zone, but other states only partially exempt or do not exempt such income.[52] After accounting for state exemptions of military income, we use TAXSIM to estimate that CZTE saved Service members a total of $41 million in state income taxes in 2018 and would have saved them $65 million in state taxes under a cost-neutral salary system. Therefore, we estimate that CZTE costed the Federal Government $630 million in 2018 and would have cost the Federal Government $995 million under a cost-neutral salary system.[53]

E. Administrative Costs of a Salary System

The implementation of a salary system would eliminate some administrative costs and likely create other administrative costs. The primary administrative savings associated

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married active duty Service members from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC). Section 8.D provides details on our imputation method.

52 "Ask Military Pay: Combat Zone Tax Exclusion," Defense Finance Accounting Service, https://corpweb1.dfas.mil/askDFAS/faqView.do?faq.faqId=253&pgModId=4.

53 Our estimate is consistent with Joint Committee on Taxation (JCT) estimates of the federal tax expenditure associated with CZTE in fiscal years 2018 through 2022 of $600 million to $700 million per year. See Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2018-2022*, Table 1, panel on National Defense, https://www.jct.gov/publications.html?func=startdown&id=5148.

with moving to a salary system is the cost of determining BAH. The Defense Travel Management Office determines BAH each year by a labor-intense process:

> *We obtain current residential vacancies from local newspapers and real estate rental listings. We also contact apartment and real estate management companies to identify units for rental pricing. We consult with real estate professionals in each MHA [military housing area] to confirm market rental prices and obtain additional data. Where available, we also contact fort/post/base housing referral offices and installation leadership. We tap the local housing office knowledge and gain insights into the concerns of our members. Current, up-to-date rental information from telephone interviews and the internet is utilized from contacts provided by the local housing offices. Properties are subjected to additional screening and validation processes.*[54]

Under a salary system, this BAH determination process would no longer be necessary to determine military pay. Currently, however, the BAH of Service members living in privatized military housing is paid by allotment to the housing owners according to the public-private partnership agreements formed under the Military Housing Privatization Initiative (MHPI). Completely eliminating the BAH determination process would require the Services to renegotiate how the MHPI partners are compensated. Furthermore, a very similar process would be necessary to determine rents that DoD would charge Service members living in government housing. Indeed, the most cost-effective method for introducing rent determination would likely be to assign it to the same office currently responsible for determining BAH with modest changes to that office's activities and the services for which they contract. In that case, the administrative costs of determining rent under a salary system would likely be similar to the current costs of determining BAH.

The elimination of a clearly defined "housing" component of Service members' compensation would require changes in how they pay for on-base housing. As mentioned previously, Service members living in government-provided housing under the current system effectively "pay" for their housing by not receiving BAH. Under a salary system, the Services would need to develop new financial processes and systems to collect rent from members living in government-owned housing. Similarly, under the current system, Service members living in privatized on-base housing "pay" for their housing by an allotment of BAH to their landlords. Under a salary system, either the Services could continue collecting rent directly from members' paychecks to pay by allotment to the MHPI partners, or the Services could require the private housing partners to collect rent from Service members directly. The latter option would pass some of the administrative

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54 "Basic Allowance for Housing (BAH), Frequently Asked Questions," Defense Travel Management Office, updated September 20, 2018, https://www.defensetravel.dod.mil/site/faqbah.cfm. The "BAH Primer" offers further detail: "A Primer on the Basic Allowance for Housing (BAH) for the Uniformed Services," Office of Military Compensation Policy, updated January 2019, www.defensetravel.dod.mil/Docs/perdiem/BAH-Primer.pdf.

costs of collecting rent to the MHPI partners, but would require the partners to agree to amend their current partnership agreements.

The elimination of BAS would not result in appreciable administrative savings because yearly BAS is based on the food cost index computed by the United States Department of Agriculture (USDA). We can assume that the USDA would continue to compute the food cost index after the elimination of BAS. Contrary to BAH, BAS is extremely simple to adjust. In each year there are only two BAS rates: one for officers and one for enlisted. Yearly adjustments consist of multiplying each rate by the USDA-computed increase in the cost of food.

Similar to BAS, the introduction of locality pay would not result in appreciable administrative costs if it was based on locality pay for federal civilians as suggested by Congress in the 2017 NDAA. Federal locality pay multipliers are already determined yearly as defined in law (see section 7.A of this paper) and could be applied to Service members at negligible marginal cost. More complicated locality pay systems, such as a system of yearly adjustments based on Service members' preferences, would entail administrative costs roughly proportionate to their level of complication.

The elimination of BAH and BAS and the introduction of locality pay and rent are unlikely to appreciably change the administrative costs of providing compensation to Service members. Administrative costs would remain relatively unchanged because a salary system would effectively replace the determination of allowances with the determination of rent and locality pay without changing the administration of the vast majority of other sources of compensation. These sources, which complicate the system, include special and incentive pays, pays associated with deployment, retention bonuses, TSP, and so on.

The administrative costs of a salary system would be affected by implementing retirement pay and reserve pay. For example, if retirement pay is tied to a legacy pay table (based off the current basic pay tables), then there would be additional administrative costs. These costs would include maintaining this separate pay table, updating it each year to account for annual pay increases, and calculating the "legacy basic pay" of retiring Service members (which would no longer be equivalent to their actual pay) to determine their level of retirement benefits. Likewise, if inactive duty reservists are paid according to this same "legacy pay" table, then the complexity of maintaining two pay systems for reserve personnel would increase the overall administrative costs of implementing a salary system. DoD would likely need to develop and maintain educational materials so that, for example, retiring Service members know not to expect retirement pay in proportion to their full high-three earnings.

F. Salary System Effects on Federal Income Taxes

A salary system would increase Service members' federal income tax liabilities. Because the U.S. income tax system is progressive, federal income tax liabilities would increase not only in dollar amount but as a share of taxable income. An exception to the progressive nature of federal taxes are Social Security taxes (more formally known as the Old-Age, Survivors, and Disability Insurance program), which individuals pay at a flat rate of 6.2 percent of wages up to an annually adjusted wage cap. Table 15 shows how a salary system that is cost-neutral to the Federal Government would have changed Service members' marginal federal income tax brackets and Social Security taxes in 2018. The values in Table 15 represent means by pay grade. Tax brackets and Social Security taxes vary within pay grade due to military pay other than basic pay and allowances, marital and dependent status, and imputed non-military and spousal income.[55] We determine each Service member's individual tax liability using TAXSIM27 (described in section 7.D) and then aggregate to the pay grade level.

The mean marginal federal income tax rate would increase from 11.2 percent to 13.3 percent of taxable income and increase most for E-6s through E-9s, O-1s through O-3s, and W-1s through W-3s. We estimate that a salary system would push 33 percent of Service members into a higher tax bracket. Members affected most include cadets in years 2 through 4; E-8s; and prior enlisted O-2s, O-3s, O-6s, O-7s, and W-2s.

Service members would pay an average of $778 more in Social Security taxes, a 29.1 percent increase. We cannot equate increases to Social Security taxes with increases to Social Security benefits because Social Security benefits are a complicated function of Social Security taxes paid. Further, the Social Security program is likely to change in the decades between Service members' tax payments and their receipt of any benefits.

Our analyses in this and other sections assume that basic pay would be allowed to exceed current Executive Schedule caps. Raising or eliminating these caps would require Congressional action. Moreover, because the salary caps are tied to politically sensitive Congressional pay rates, past proposals for such Congressional action have not been successful. However, the implementation of a salary system with the current caps would produce a highly distorted basic pay table with a significant reduction in total compensation for senior officers.

Currently, the basic pay of O-6s and below is capped at Level V of the Executive Schedule, which was $153,800 per year in 2018 and is $160,100 in 2020. The basic pay of O-7s and above was capped at $189,600 in 2018 and is capped at $197,300 in 2020. The

[55] We observe military pay other than basic pay and allowances, marital status, and dependent status in DMDC personnel data. We impute non-military and spousal income by training machine-learning models on a public dataset of married active duty Service members from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC). Section 8.D provides details on our imputation method.

caps are divided by 12 and applied to the monthly basic pay tables. Given the 2020 basic pay tables and 2020 Executive Schedule, a salary system would make many more Service members subject to the caps. At the cost-neutral, constant basic pay multiple of 1.539, all O-7s and above would be subject to the caps. Additionally, the following Service members would be subject to the caps: O-6s with 14 or more years of service (99 percent as of December 2018), O-5s with 16 or more years of service (87 percent as of December 2018), and W-5s with 24 or more years of service (87 percent as of December 2018). Even with the basic pay multiples tailored by pay grade as specified in Table 7, all O-6s with 24 or more years of service (65 percent as of December 2018), all O-8s with 22 or more years of service (99 percent as of December 2018), and all O-9s and O-10s would be subject to the caps. Therefore, the implementation of a fair salary system is incompatible with the current Executive Schedule caps. We recommend that the implementation of a salary system eliminate Executive Schedule caps.

Table 15. Effects of a Cost-Neutral Salary System on 2018 Federal Income Taxes

		Mean Marginal Federal Income Tax Rate			Mean Social Security Taxes	
Pay Grade	Count	Status Quo	Salary System	Share Shifted to Higher Tax Bracket	Status Quo	Salary System
C01	3,810	11.8	10.1	14.8%	$453	$676
C02	3,613	10.3	12.0	71.7%	$743	$1,116
C03	3,373	10.4	12.0	72.3%	$753	$1,129
C04	3,353	10.4	12.0	69.7%	$792	$1,164
E01	80,514	1.8	4.1	27.0%	$420	$582
E02	79,083	7.4	9.3	41.6%	$930	$1,297
E03	205,552	9.7	10.8	27.9%	$1,435	$1,976
E04	292,904	9.7	11.0	28.9%	$1,793	$2,419
E05	259,431	10.6	12.5	27.7%	$2,470	$3,251
E06	175,555	11.9	14.4	27.0%	$3,419	$4,452
E07	104,045	13.1	17.0	41.5%	$4,131	$5,379
E08	31,103	14.2	18.9	51.6%	$4,582	$5,958
E09	12,480	17.9	20.6	38.0%	$5,535	$6,881
O01	19,742	11.3	14.9	44.0%	$1,937	$2,758
O01E	2,083	13.0	16.5	36.6%	$3,804	$5,089
O02	22,351	14.8	18.6	41.8%	$3,161	$4,412
O02E	2,975	15.3	20.0	54.8%	$4,641	$6,153
O03	53,470	17.3	20.7	53.4%	$4,721	$6,194
O03E	11,674	19.3	21.6	38.4%	$5,860	$7,227
O04	43,397	20.7	22.3	35.1%	$6,383	$7,384
O05	29,478	21.5	23.1	47.4%	$7,015	$7,617
O06	12,781	22.5	24.6	60.5%	$7,452	$7,685
O07	473	23.3	25.1	51.8%	$7,669	$7,817
O08	363	23.2	24.4	39.7%	$7,664	$7,775
O09	185	23.9	25.0	29.7%	$7,641	$7,699
W01	391	13.5	17.5	41.7%	$4,299	$5,722
W02	1,886	14.0	19.0	54.8%	$4,520	$5,949
W03	4,492	16.4	20.1	46.9%	$5,133	$6,562
W04	3,288	18.6	20.7	35.8%	$5,793	$6,997
W05	954	21.0	22.6	49.5%	$6,802	$7,481
Total	**1,464,799**	**11.2**	**13.3**	**33.0%**	**$2,674**	**$3,452**

8. Econometric Analysis of Behavioral Responses to a Compensation Change

The preceding chapters describe how a salary system would change compensation for different categories of Service members. We may expect compensation changes to affect both recruiting and retention. In the next section, we discuss previous estimates of the effect of changes in military compensation on recruiting and retention and their applicability to a salary system. In the remainder of the chapter, we describe a strategy for estimating the causal effect of changes in after-tax income on retention using data on all 3.5 million active duty Service members over the 17-year period from December 2000 to December 2017. Finally, we present our results.

A. Empirical Estimates of the Effects of Pay Changes on Recruiting and Retention

Previous papers have used military pay data to estimate effects of compensation changes on both recruiting and retention. We focus here on such papers published since 2001.

Goldberg (2002) finds that most point estimates imply that a 1 percent increase in military compensation increases the probability of first-term reenlistment by 1.2 percent to 2.2 percent. Estimates for the second term tend to be moderately lower than estimates for the first term.[56] Further, Goldberg (2002) summarizes point estimates of the effect of a 1-unit increase in the Selective Retention Bonus (SRB) multiplier on reenlistment rates as falling between 1 and 4 percentage points.[57] Similarly, Joffrion and Wozny (2015) estimate that increasing the SRB multiplier by 1 unit (more than double the mean multiplier) increases the retention of Air Force enlistees in the last year of their contracts by 0.8 percentage points.[58]

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56 Matthew S. Goldberg, *Staff paper for The Ninth Quadrennial Review of Military Compensation (2002),* "A Survey of Enlisted Retention: Models and Findings," Volume III, Chapter II, http://militarypay.defense.gov/References/QRMC.aspx.

57 Ibid.

58 Justin L. Joffrion and Nathan Wozny, *Upjohn Institute Working Paper*, No. 15-226, "Military Retention Incentives: Evidence from the Air Force Selective Reenlistment Bonus," 2015.

Mattock et al. (2014) find that a $20,900 bonus in the 10th year of service would increase retention of Army officers to the 10th year of service by 10 percent.[59] They also find that a 10 percent increase in RMC would increase year-to-year retention rates by multiple percentage points between the 6th and 13th years of service, causing retention to the 20th year of service to increase from under 20 percent to about 30 percent. As discussed previously, a constant-cost salary system will lower average military compensation. For example, the tailored salary system with rent would lower average officer compensation by about 5 percent. A simple application of Mattock et al.'s (2014) estimates would imply that such a salary system might reduce retention of officers at the 20th year of service by about 5 percentage points. This calculation assumes that officers would respond equally to a decrease in compensation as they do to an increase in compensation. However, beginning with Kahneman and Tversky (1979),[60] numerous economists and psychologists have recognized that the dissatisfaction that people feel from a loss tends to be greater than the satisfaction they get from an equivalent gain; this concept is known as "loss aversion." Consequently, the negative retention effects of a pay cut are likely to be greater than the positive retention effects from a pay raise. Retention is affected not just by the overall level of pay but also by the difference in pay across ranks. The promise of future higher pay (e.g., in the form of retention bonuses or promotion raises) may incentivize high performers to remain in the service. However, as Figure 9 shows, a tailored salary system that incorporates rents reduces the income growth from promotions for officer and enlisted, which may further reduce the retention rates. (The pay raise from promotions decreases only slightly for warrant officers.)

[59] Michael G. Mattock, Beth J. Asch, James Hosek et al., "Toward Improved Management of Officer Retention: A New Capability for Assessing Policy Options," RAND National Defense Research Institute, Santa Monica, CA, 2014.

[60] Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica* 47, no. 2, 1979, 263–91.

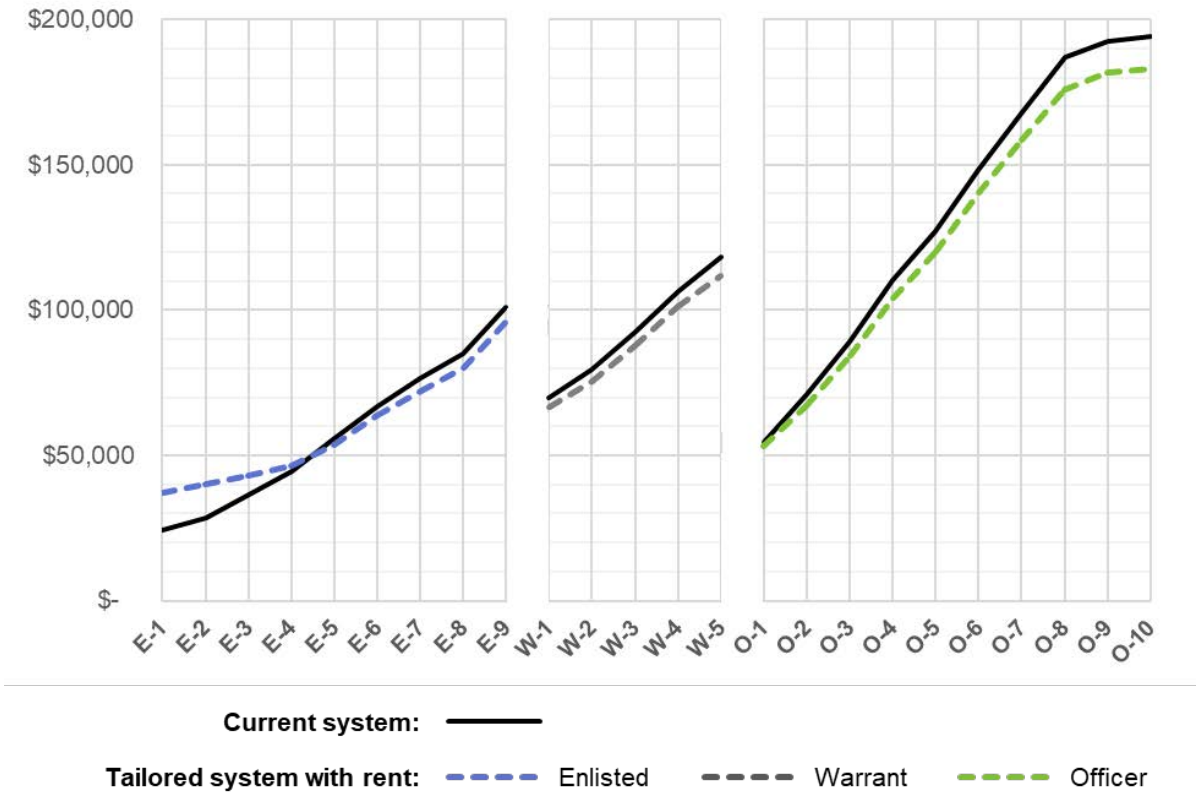

Figure 9. Average Annual After-Tax Income of Military Personnel by Rank for Tailored Salary System with Rent (compared to the current compensation system)

Asch et al. (2010) estimate that the Army recruited an additional soldier for every $44,900 spent on enlistment bonuses between FY 2005 and FY 2008, while the Navy recruited an additional sailor for every $89,100.[61] John Warner's review for the 11th QRMC finds Asch et al. (2010) estimates of the effectiveness of enlistment bonuses on Army and Navy recruiting to be consistent with prior estimates.[62] Warner summarizes estimates of the effect of a permanent 10 percent increase in military compensation as increasing the supply of high-quality enlisted recruits by six to 11 percent.[63] Although officer recruitment is likely to suffer in response to a decline in overall take-home pay, enlisted pay actually increases on average under a tailored salary system with rent—and these increases are substantial for the most junior enlisted. Depending on how much new enlisted recruits discount the value of future income, we can use Warner's (2012) numbers to estimate how enlisted recruiting would respond to a tailored salary system. Table 16 shows that, if

[61] Beth J. Asch, Paul Heaton, James Hosek et al., "Cash Incentives and Military Enlistment, Attrition, and Reenlistment," RAND National Defense Research Institute, Santa Monica, CA, 2010.

[62] John T. Warner, "The Effect of the Civilian Economy on Recruiting and Retention," *Report of the Eleventh Quadrennial Review of Military Compensation, Supporting Research Papers*, Part 1, Chapter 2, June 2012, https://go.usa.gov/xVBxq.

[63] Ibid.

enlisted recruits care about the average pay to all enlisted ranks, then recruitment might increase by 5 percent to 10 percent. However, potential recruits are more likely to place a lower value on pay beyond the next few years. If they primarily care about the pay in the junior ranks, then high-quality enlistment might increase by as much as 7 percent to 12 percent. Although enlisted recruitment is likely to be positively affected by a substantial increase in pay for junior enlisted, the flattening of the pay across enlisted ranks is likely to result in more retention challenges after they join.

Table 16. Potential Change in High-Quality Enlisted Recruitment Based on Average Salary Change from Implementing a Tailored Salary System with Rents

Relevant Ranks	Average Salary Increase	Percent Change in Supply of High-Quality Enlisted Recruits (min and max)	
E-1 to E-4	11%	7%	12%
E-1 to E-9	9%	5%	10%

A salary system would permanently change Service members' RMC through an increase in pre-tax compensation to offset a loss in tax advantage. Thus, two issues impair the relevance of prior estimates to understanding the effects of a salary system. First, some prior estimates (most importantly, estimates of the effects of bonuses) do not estimate the effects of permanent changes to compensation. Second, prior estimates do not estimate the effects of changes to tax advantage. Moreover, an extensive labor and behavioral economics literature summarized in Rebitzer and Taylor (2011) documents that compensation policies also serve an important role in communicating (or "signaling") employers' values to employees.[64] The estimates from the literature do not separate the signaling effects of compensation from the raw compensation effects. For a new compensation policy to be effective, it must accomplish two purposes: (1) it must adequately compensate Service members for their efforts (the raw compensation effect), and (2) it must not break the trust Service members have that DoD is committed to the mission of national defense and to treating Service members fairly (the communication effect). In the remainder of this chapter, we use variations in state tax rates to estimate how compensation alone (independent of communication) affects retention. In Chapter 9, we present our findings from focus groups conducted with Service members so that we can understand their perceptions of the current military compensation package as well as a potential salary system.

[64] James B. Rebitzer and Lowell J. Taylor, "Extrinsic Rewards and Intrinsic Motives: Standard and Behavioral Approaches to Agency and Labor Markets," *Handbook of Labor Economics*, 4, Part A, 2011, 701–772, https://doi.org/10.1016/S0169-7218(11)04114-1.

B. Econometric Strategy

Ideally, we would like to estimate the retention effects of a specific implementation of a salary system. However, this goal cannot be accomplished through quantitative analysis. A salary system would be unprecedented and so would its effects. Instead, our goal in this section is to estimate the effects of permanent changes in after-tax military compensation on Service members' separation behavior. This analysis complements estimates of the effects of compensation changes from prior work and Service-member attitudes revealed through qualitative research described in Chapter 9. The unique contribution of this analysis is to isolate after-tax compensation effects from signaling, selection, and pre-tax compensation effects in a way that does not rely on structural assumptions about how Service members decide to continue their military service.

To accomplish this estimation, we use a novel combination of econometric techniques, machine-learning tools, survival analysis methods, and nearly two decades of individual-level active duty personnel data. We estimate the effect of a change in expected after-tax compensation on the probability that an individual remains on active duty for up to 5 years.

There are two key obstacles to estimating the relationship between compensation and separation behavior. First, we only observe Service members' actual compensation. Second, a simple analysis of compensation and retention may be biased by related omitted factors. We explain both of these obstacles and how we circumvent them in more detail next.

Because we seek to estimate the effects of a permanent compensation change, we must estimate the effects of changes in expected future after-tax income, as opposed to income realized by the time of the separation decision. We do not observe expected future after-tax income in our data, so we predict it at the individual level for each of the 12 years following the given observation. Our predictions represent the take-home pay a Service member with given features may expect to earn in each of the next 12 years should the member remain on active duty.

Turning to the second challenge, relationships we observe in personnel data between expected after-tax income and separation generally do not represent causal effects. As a result, they do not represent how Service member behavior would respond to a compensation change. This difference between observed and causal relationships arises because one or more unobserved features affect both expected after-tax income and the probability of separation. Such a feature is called a "confounder" of the relationship of interest.

Suppose, for example, that Service members with a greater "taste for service" exert more effort to attain excellence in their positions, are therefore more likely to be promoted sooner, and therefore expect to have higher future after-tax income. If Service members

with greater taste for military service choose longer careers independent of their after-tax incomes, the observed relationship between after-tax income and career duration will include this independent effect, and therefore overstate the causal relationship.

On the other hand, suppose that more naturally skilled individuals tend to choose more difficult jobs that offer bonuses. These individuals can expect higher future after-tax income if they stay on active duty. However, they can also expect higher income if they leave active duty. If having a greater "outside option" causes more skilled individuals to choose shorter career durations independent of their after-tax incomes, the observed relationship between after-tax income and career duration will understate the causal relationship.

To estimate the causal effects of expected after-tax income on the probability of separation, we may isolate a specific cause of variation in expected after-tax income. We believe this cause is not confounded by unobserved features in its effect on the probability of separation. Such a cause is called an instrumental variable, or instrument. The observed relationship between expected after-tax income and career duration due to a valid instrument reflects the causal relationship we seek. The primary weakness of this strategy is that it reduces the amount of empirical variation available for analysis, thereby reducing precision. However, to counteract this loss of precision, we analyze a large volume of data.

We use the state income tax liability that a Service member would incur if his or her state of legal residence and home of record state were the same (home of record state income tax liability, or HORSITL). This tax liability is conditional on individual controls including gross pay and home of record state as an instrument for expected after-tax income. Thus, we rely on variation in expected after-tax income due to changes in how states tax military income during the period of our data. We assume that, conditional on our controls, changes to home of record state income taxes are related to career choices only through their effect on expected after-tax income. Because it is a claim regarding the causal effects of unobserved features, this assumption is fundamentally unverifiable.

Crucially, we rely on tax changes in the home of record state, not the state of legal residence. While Service members may change their state of legal residence during their military careers, in particular to decrease their income tax liabilities, they may not change their home of record. At the start of a military career, home of record state and state of legal residence state are the same. Under specific conditions and only with conscious effort, a Service member has the option to change their state of legal residence. Our instrument will not be relevant for Service members who have changed their state of legal residence to a state that does not tax military income. Our instrument will also not be relevant for Service members from states that did not change how they tax military income during the respective members' careers. Our analysis thus focuses on the subset of Service members whose income was affected by state income tax changes and uses other Service members as control units.

C. Data and Summary Statistics

Our key data sources are maintained by the Defense Manpower Data Center (DMDC). We use the universe of active duty personnel records from December 2000 through December 2017, which capture 3,594,482 unique individuals. The records contain two broad categories of information: outcome variables and explanatory (also known as "feature") variables.

1. Outcome Variables

The main outcome in our analysis is the duration of a person's active duty career. Measured in years, we construct this variable by noting the appearance and exit of personnel from the DMDC's Active Duty Payments (ADP) database. The ADP tracks every cash payment to active duty personnel during the 18 years in our sample. We consider a person's initial year of active service to be the first December they receive an active duty paycheck. A Service member is considered to have left the military in the year where they do not receive a December active duty pay check. Because this approach confirms a Service members' presence only once a year, it reduces the complexity and amount of computational resources needed for our analysis.[65]

One potential concern with this approach is that the ADP database does not reflect the actual movement of individuals in and out of military service. We test this concern by using a separate database, the Active Duty Transactions (ADT) file. The ADT tracks changes in the Active Duty Master (ADM) personnel database, which is used to track the status and strength of the total military force. If an individual enters or exits active duty service, the central ADM database is changed and the ADT records a "gain" or "loss" transaction (Department of Defense, 2009). Not only do we successfully match 98.3 percent of ADP personnel, there is broad agreement on the timing of a Service member's exit from the military. Some 91.5 percent of matched individuals identified as leaving by our ADP-based strategy also separate less than 12 months later in the ADT database. Such a high level of agreement between these two data sources gives us confidence that using the ADP to track accession and separation behavior is appropriate.[66]

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[65] This strategy focuses our analysis on Service members who have been on the active duty payroll for at least 1 year. Individuals who join and exit in the same calendar year would largely be excluded from our analysis. This approach also helps mitigate potential complications regarding individuals intermittently appearing in the ADP due to longer-term reservist activations or other reasons.

[66] Only 72 percent of the personnel listed in the ADT appear in the ADP-derived dataset we use for our analysis. This result supports our view that we sidestep many of the additional complications inherent in a more granular analysis, while not sacrificing our ability to answer the fundamental policy question. A potential robustness check for our analysis is to rerun our December analysis with a different cut-off month. For the 8.5 percent of individuals whose ADT exit does not fall less than 12 months after their ADP exit, nearly all exit within 12 months *before* their ADP exit. We have not examined this phenomenon in detail, but it could be the subject of further analysis.

2. Explanatory Variables

Monetary and non-monetary factors likely influence a Service member's decision to separate from the military. We calculate each Service member's gross annual military wages as the sum of monthly basic pay, special pay, bonus pay, incentive pay, other taxable pay, and non-taxable allowances such as Basic Allowance for Housing (BAH) and Basic Allowance for Subsistence (BAS).[67] Service members' year-to-date federal taxable wages are reported in the DMDC data. We determine each Service member's individual tax liability using TAXSIM27.[68]

We are particularly interested in state tax liability because it is the mechanism through which our instrument affects after-tax income. Among our 18.5 million observations of Service members from 2000 through 2017, 58.4 percent would have benefitted from a state military income tax exemption if single and 55.3 percent would have benefitted if married. The share that would not have benefitted had a state of legal residence that did not tax income or otherwise did not have enough taxable military income to incur a positive liability. Among those who would have benefitted, the mean annual after-tax income gain was $1,066 if single and $975 if married, with first and third quartiles of ($444, $1,195) and ($385, $1,404), respectively. Therefore, our analysis relies on changes in after-tax income on the order of $1,000 per person per year.

We control for several variables that could confound the relationship between income and retention, including a Service member's age, marital status, race, ethnicity, education level, number of children, number of dependents, home of record state, state of legal residence, rank, military occupation, military service branch, and number of months spent in a combat zone during the past year.

D. Construction of Explanatory Variables

As mentioned in the previous sections, our goal is to estimate the effects of a permanent change in after-tax military income on retention behavior. A permanent change affects after-tax military income in each future year of service. We expect Service members to consider future after-tax military income as well as all other sources of household income in their retention decisions.[69]

However, we do not observe Service members' expectations of their future after-tax military income. For some Service members, we observe actual future military income,

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[67] The Internal Revenue Service provides a list of taxable and non-taxable military wage components in Table 1 and Table 2 of the *2018 Armed Forces' Tax Guide*, https://www.irs.gov/pub/irs-pdf/p3.pdf.

[68] We describe TAXSIM27 in more detail in section 7.D.

[69] Although we expect Service members' retention decisions to depend on their expected after-tax income, an advantage of our method compared to a structural econometric method is that we need not *assume* so.

which may differ from Service members' prior expectations. For those that leave military service or are observed in more recent years of our sample, we observe a relatively short window of their military income. Therefore, we must impute each Service member's expected after-tax income as if they stayed on active duty. To do so, we use a machine-learning method to predict after-tax income up to 17 years after the time of observation. Using machine learning to predict unobserved features is not novel. Deryugina et al. (2019) use a similar strategy to predict an important feature in their research: a person's remaining life expectancy.

We begin by predicting future military gross income conditional on remaining on active duty. Then, we train a machine-learning model on the DMDC personnel database to predict each Service member's military income up to 17 years into the future based on individual characteristics. Next, we apply the tax regime in the year following the year of observation to the predicted incomes, obtaining predicted after-tax income and HORSITL in each future year.[70] Determinants of tax liability are uncertain in future years. In particular, for each given number of years into the future, each Service member has a probability of being married and of having a state of legal residence that does not tax income.[71] For each probability, we train a machine-learning model to predict the probability using individual characteristics. Next, we obtain the Service member's after-tax income and HORSITL in each of the four possible scenarios defined by marital and state income tax statuses. Finally, we take the mean after-tax income and HORSITL over the four scenarios weighted by the scenarios' predicted probabilities.

We face a similar imputation problem for other external sources of income: non-military and spousal income. We do not observe either potential income source, currently or in the future. These sources of income are important to our calculations of after-tax income. A Service member who earns substantial income outside their military service will have a higher marginal tax rate. All else equal, these personnel will experience a greater gain in after-tax income when their state exempts their military income. We expect a similar effect for married Service members with high-earning spouses.

We use a similar prediction strategy to address the lack of information on non-military and spousal income in our personnel data. We train machine-learning models on a public dataset of married active duty Service members from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC). While the CPS-ASEC does not directly

[70] By applying the next year's tax regime, we assume that Service members are informed of tax policy changes one year in advance, but do not anticipate tax regime changes.

[71] Factors such as numbers of dependents under specific ages and the specific state of legal residence also affect tax liability, but present too many combinations for us to simulate. We assume that the Service member does not anticipate changes in tax liability due to these factors.

target military personnel responses, it reports information on a participant's spouse, even if the spouse is on active duty.[72]

We use the 10,701 observations of individuals surveyed between 2000 and 2018 who were married to an active duty Service member. We train a model for each of eight categories of non-military income: spousal wages, income from dividends, interest, retirement benefits, unemployment benefits, Social Security, other government transfers, and all other sources. Each model predicts income based on Service member characteristics available in both the CPS-ASEC and the DMDC personnel database: year of observation, sex, age, race, number of children, education, and income.[73]

We do not have observations of future non-wage or spousal income that we could use to train a model. Instead, we predict future non-wage and spousal income by inflating the current predictions by the 12-month moving average of median U.S. wage growth in the year of observation. For example, suppose our model predicts spousal income of $30,000 for a 2004 observation with a 12-month moving average of median U.S. wage growth of 3.5 percent. Then we would predict 2007 spousal income for that observation to be $30,000 times 1.035 raised to the third power.

E. Model Specification

We estimate in two stages following the control function method introduced by Blundell and Powell (2003) and explained by Wooldridge (2015). First, we use predicted HORSITL to instrument for predicted future after-tax income in the retention decision year and each of the 12 following years. Second, we model retention decisions as depending on current and predicted future after-tax income and on controls.

The first stage is a set of ordinary least squares regressions, one for each year from 0 to 12 years beyond the retention decision year, of predicted after-tax income on predicted HORSITL, predicted income net of federal taxes, and a set of individual-level controls. The controls are each represented by one-hot encodings ("dummy variables"). The second stage is a set of neural networks, each trained on the 12 predicted after-tax incomes, the controls used in the first stage, and the residuals from the first stage. Wooldridge (2015) emphasizes the importance of a flexible second-stage specification to the control function method. We use neural networks because they offer a supremely flexible specification.

The first-stage residuals represent the "control function" that, under our assumptions, accounts for confounders of the relationship between predicted after-tax income and retention. Each neural network outputs a retention probability for each observation a given number of years ahead. Because we predict income up to 12 years after the retention

[72] The CPS and its supplements generally do not survey active duty Service members.

[73] Due to differences in data structure, we manually mapped CPS-ASEC categories for race and education to categories in the DMDC personnel data, aggregating where necessary.

decision year, and we observe retention up to 17 years ahead, we can predict retention decisions only up to 5 years ahead of the current observation. We train each neural network only on those individuals for whom we can observe the retention decision. For example, to predict retention 3 years after the current observations, we are limited to observations at least 3 years prior to 2017.

Each neural network consists of a set of parallel embedding layers, one for each categorical feature. These layers are followed by two consecutive sets of 64-node, densely connected, rectified linear unit layers, followed by a densely connected sigmoid output layer. Each embedding layer outputs a one-dimensional array. Thus, each embedding layer is a map from the set of natural numbers to the reals. We use 1-dimensional embeddings instead of higher dimensional embeddings for computational efficiency. We then use the AMSGrad variant of the Adam optimizer to train each neural network with a learning rate of 0.001 (see Kingma and Ba (2014); Reddi, Kale, and Kumar (2018)). We train on batches of 512 observations, randomly sampled without replacement, for 19 epochs. To choose the number of epochs, we computed the standard deviation of estimates over a 5-epoch rolling window. We then chose the number of epochs that minimized the sum of the computed standard deviations over all 5 retention horizons. By choosing the number of epochs this way, we seek to obtain estimates that are stable over modest variations in the number of epochs.

A more conventional method of estimating the effects of permanent changes in expected future after-tax income on retention through HORSITL is two-stage least squares (2SLS). The 2SLS method allows us to estimate the local average treatment effects (LATE) of changes in expected future after-tax income. However, 2SLS does not allow us to estimate effects on individuals who would not be affected by changes in HORSITL, namely those Service members who are from a state without income taxes or have changed their state of legal residence. Also, 2SLS does not allow us to estimate different effects for different individuals. An even simpler method of estimating relationships between expected future after-tax income and retention would be ordinary least squares (OLS). However, we cannot expect relationships estimated by OLS to be causal. Therefore, we report 2SLS and OLS estimates for comparison with the average treatment effect estimates we obtain by the control function method.[74]

F. Estimation

We estimate the effect of a permanent change in after-tax income on retention by calculating the difference between Service members' retention probabilities under baseline

[74] OLS may produce predicted probabilities outside the unit interval, which is a problem we could address with a non-linear probability model such as probit or logit. However, estimates from a non-linear model would be no more justifiable as causal as OLS estimates. We use OLS estimates because they provide a more direct comparison to 2SLS estimates than those from a non-linear model.

and treatment scenarios. Our model produces a probability of remaining on active duty for up to 5 years in the future for every Service member, conditional on his or her specific feature values and predicted after-tax income. We then simulate a $1,000 increase in every Service member's after-tax income in all future periods and use those simulated values to predict new retention probabilities. Subtracting each Service member's baseline retention probability from his or her treated retention probability gives us the expected treatment effect for each individual. We then take the mean over all Service members to determine the average treatment effect.

We quantify the uncertainty of our point estimates through bootstrapping, which produces a distribution of estimates based on many resamples of the data. To significantly reduce the computation time required for the bootstrapping procedure, we implement the Bag of Little Bootstraps (BLB) technique outlined in Kleiner et al. (2014). First, we take 10 samples without replacement, each with a number of observations equal to the number of observations in the original dataset raised to the seven-tenths power. Next, we resample with replacement for 80 iterations from each subsample.[75] For each iteration, we use the same model specification and estimation procedure outlined in the previous sections to determine the average treatment effect across all individuals. Next, we compute a bias-corrected 95 percent confidence interval of the average treatment effect for every subsample, and then average the upper and lower bounds of the 95 percent confidence interval across all subsamples. Finally, we repeat this procedure for each future year.

G. Results

Table 17 reports our estimates of the mean effect of a $1,000 annual increase in expected future after-tax income in the retention decision year and each of the 12 following years on the probability of retention in each of the next 5 years. We report each effect estimate in terms of percentage points and report estimates for three methods: OLS, 2SLS, and the control function method. Our OLS estimates represent the correlation between expected future after-tax income and the probability of retention conditional on individual characteristics. Although these estimates do not inform us about how compensation changes would affect retention, they are useful as prelude and comparison to the causal effect estimates. All else equal, a Service member with $1,000 greater expected future after-tax income was 0.23 percentage points more likely to be on active duty 1 year later. However, these Service members were slightly *less* likely to remain on active duty through their second, third, and fourth years into the future. These estimates include any effects of unobserved confounders such as taste for service and outside options.

Our 2SLS estimates represent the mean causal effect of a state military income tax exemption over those Service members being taxed by their home of record state. Using

[75] Each resampled dataset is the same size as the subsample from which it was drawn.

this method, we estimate that a Service member with $1,000 greater expected future after-tax income due to an exemption was 1 percentage point *less* likely to be on active duty 1 year later. We estimate that an exemption decreased the probability of retention in the second and third years but increased the probability of retention in the fourth and fifth years. Only the effect on retention in the fifth year exceeds 1 percentage point.

Our control function estimates represent the mean causal effect of a $1,000 annual increase in expected future after-tax income due to a state military income tax exemption over all Service members. For Service members in states that already do not tax income, the $1,000 increase could be considered a hypothetical tax credit. Further, under an assumption that Service members value a change in income of a given amount independently of its source, our control function estimates represent the effect of a $1,000 increase in after-tax income on retention. By using our control function method, we estimate that a Service member with $1,000 greater expected future after-tax income due to an exemption was 1.9 hundredths of a percentage point *less* likely to be on active duty 1 year later.[76] Conditional on being on active duty 1 year later, the same Service member was 2.3 hundredths of a percentage point more likely to remain on active duty for an additional year. Our estimates of effects on retention in later years are statistically insignificant and no larger in magnitude.

Our results do not provide evidence that state tax exemptions of military income substantially increased active duty retention. Therefore, our prior expectation that retention decisions depend on future after-tax income clashes with our proposed assumption that Service members value a change in future income of a given amount independently of its source. We hypothesize that our proposed assumption is false—Service member responses to a change in income depend on how and why the income is changing in addition to how much. For example, we expect that Service members would be more aware of a change in the DoD compensation system than a change to the policy that determines their state income taxes, and therefore more responsive.

We may also expect an individual's decision to remain with an organization to be more responsive to a change in income due to decisions made by that organization than to any other change in future income of the same magnitude. In particular, we may expect a Service member to be more responsive to a change in their DoD compensation than a change to their state taxes, even if the two changes affect their after-tax income identically. This difference in responsiveness may arise not only due to increased probability of awareness, but from resulting changes in sentiments toward the organization. As a corollary of our conclusion that an income change does not affect Service member behavior

[76] Despite bias correction, we compute a confidence interval on the 1-year effect that is entirely below the point estimate. This result is peculiar, but not impossible, and we plan to investigate it further.

only through its magnitude, we expect that DoD can implement compensation changes in a way that encourages preferred behaviors and attitudes in Service members.

Table 17. Estimated Mean Percentage-Point Effects of a $1,000 Permanent Increase in After-Tax Income on Probability of Retention

Retention Horizon	Point Estimate	95% Lower Bound	95% Upper Bound
OLS			
1 year	0.230	0.198	0.261
2 years	-0.003	-0.045	0.039
3 years	-0.346	-0.392	-0.299
4 years	-0.189	-0.238	-0.140
5 years	0.109	0.062	0.156
2SLS			
1 year	-1.019	-1.078	-0.961
2 years	-0.124	-0.202	-0.045
3 years	-0.156	-0.245	-0.067
4 years	0.011	-0.086	0.108
5 years	1.437	1.333	1.541
Control Function			
1 year	-0.019	-0.040	-0.027
2 years	0.023	0.002	0.050
3 years	0.004	-0.022	0.024
4 years	-0.016	-0.039	0.013
5 years	-0.019	-0.049	0.010

The distributional changes resulting from a move to a salary system, as explored in Chapters 3 through 6, would likely undermine DoD efforts to encourage desirable attitudes and behaviors in response to a salary system. Moving to a salary system would, on average, adversely impact Service members with dependents and those that currently receive BAH. Table 4 indicates that 53 percent of the force is married and 67 percent of the force currently receives BAH. Therefore, each of these categories alone represents a majority of Service members with reason to believe that a salary system is targeted against them. Other categories of members, such as members in specific pay grades or assigned to specific locations, may have similar beliefs. This widely perceived, adverse impact would likely affect retention well beyond that of the average pay cut alone. The next chapter of this paper describes current Service members' perceptions toward their compensation and toward potential changes to it.

9. Service Member Attitudes to Military Compensation

As we noted in the previous chapter, Service members' reactions to a change in military compensation may be driven as much (or more) by their perceptions about the new system as by the actual financial impact of the change. In this chapter, we describe our methodology for examining these perceptions through focus groups and surveys, and present research findings. We examined these perceptions and reactions in the Active and Reserve Components of the Army, Navy, Air Force, and Marine Corps, and across grades, occupational specialties, geographic locations (i.e., with and without state taxes), and family demographics.

Research questions supporting this task were as follows:

1. How do Service members perceive compensation?
2. How do Service members react to a proposed change to a single salary system?

A. Methodology

One method to answer these questions entailed the inclusion of QRMC-related questions in the 2019 Status of Forces survey for active duty personnel (SOFA), conducted by the DoD Office of People Analytics (OPA). Additionally, we worked with the sponsoring office within DoD to have each military Service identify units for field data collection. The field data includes responses to both open-ended questions that we asked Service members during focus groups, and the same set of closed-ended survey questions that were included in the SOFA. Prior to conducting site visits, we developed a minimally intrusive research methodology that would not stress the operational tempo of the units included in the sample. Although the SOFA would entail a large sample frame, the intent of the field research was to rapidly ascertain some depth in Service member attitudes in order to identify themes related to military compensation.

We collected and analyzed quantitative and qualitative data in the field, using a mixed-methods approach to address research questions. We took a focused approach, visiting Active component (AC) and Reserve component (RC) units across four states (i.e., two states with income taxes and two without income taxes), to administer surveys and conduct focus groups with enlisted personnel and officers, each represented at three career stages (first-term, mid-career, and advanced). This approach allowed us to obtain greater

granularity in the perceptions and reactions of Service members. The sections below describe our research process.

1. Engagement Preparation

Prior to the engagements, we developed a research protocol, which included data collection instruments (i.e., survey and focus group questions); gathered information about the selected units from a variety of sources; and obtained Institutional Review Board approval for the ethical inclusion of human participants in the research project. Points of contact were then identified for each military Service, AC and RC, in two states with state income tax (California and Virginia) and two states without state income tax (Texas and Washington). Our contacts helped recruit participants and acted as coordinators/support liaisons for our field research teams. In the related engagement preparation, we also reviewed prior research, reports, policy, law, and doctrine to develop a research protocol and focus group questions.

2. Field Interview Protocols

For each military Service, component, and state, we conducted focus groups with military officers and with enlisted personnel, each at three career stages (first-term, mid-career, and advanced). At the conclusion of the field data collection, we had conducted focus groups involving a total of 740 research participants (Table 18). We formed teams of two to three people to conduct each focus group, varying the members on each team in order to limit moderator effects. Teams were composed of at least one person with direct experience serving in the military and at least one person with an academic background and experience conducting field research.

Although we collected data from all military Services, both active and reserve components, we had to suspend operations in March of 2020 due to the global coronavirus outbreak. As a result, we were unable to schedule engagements with the Army Reserve.

Table 18. Numbers of Respondents by Category

	Number of Respondents	Percentage of Respondents
State Type		
Without state tax	363	49%
With state tax	377	51%
Component		
Active	483	65%
Reserve	257	35%
Military Branch		
Army	207	28%
Navy	242	33%
Air Force	190	26%
Marine Corps	101	13%
Military Career Stage		
Junior Enlisted	116	16%
Mid-Grade Enlisted	135	18%
Senior Enlisted	162	22%
Junior Officer	81	11%
Mid-Grade Officer	141	19%
Senior Officer	105	14%
TOTAL Participants	**740**	**100%**

B. Results

One aspect of the field data collection was to administer the same seven survey questions from the 2020 SOFA, permitting us to compare responses to a larger sample frame than the 740 focus group participants. Those questions are listed in Appendix C. For the second aspect, we collected qualitative data through non-attributional focus groups of uniformed members of the military Services. Those discussions were guided by the questions listed in Appendix D.

Of particular interest, comparisons of responses obtained in surveys and themes obtained from focus groups permitted us to identify distinctive features in the responses. These comparisons include:

- By **state type** (i.e., states with state income tax, California and Virginia, vs. states without state income tax, Texas and Washington).
- By **components** (i.e., AC vs. RC), both overall and within state type.
- By **military branch** (i.e., Army vs. Navy vs. Air Force vs. Marine Corps), overall, within state type, and by component.

- By **military career stage** (i.e., first-term vs. mid-career vs. advanced in both enlisted and officer ranks), overall, within state type, by component, and by military branch.

Table 19 provides a brief compilation of the feedback from our open-ended questions. Not surprisingly, Service members were quite forthcoming. Although there is diversity of opinion, there are also a few consistent themes.

Table 19. Compilation of Service Member Feedback on Compensation

Theme	Excerpts from Fact Finding (paraphrased)
Pay, fairness, and benefits are all important	
Pay and major non-cash benefits matter to Service members.	Pay wasn't a factor to join, but to stay it's been a factor. Patriotic duty was the main factor to join, but pay is to stay. I think the biggest incentive is education—I am passing my GI bill to my son. Health care: I am a 10-year attorney and do a non-military civilian job that pays well; I need to make up any missed time, but DoD health care is a big draw.
At the same time, Service members are more concerned with the value of national service, benefits, and stability in compensation than in the exact level of compensation.	My primary concern was not money, but having a stable job.
The current compensation system reinforces the military culture.	The more the military sounds like, feels like, is like the civilian sector, the more it will be treated like the civilian sector. The military insulates itself from the civilian sector so that you feel tied in and it's a big cultural change to leave. But with a salary system, it's not so hard to leave.
Service members support greater differentials in pay—independent of rank—for effort, assignment responsibility, hours, and onerous or risky duty.	Pay grade should not equal rank. If pay grade were a separate function and reflected rank and effort expended, that would be more fair. I was in Iraq and was in charge of a whole airfield as a Corporal. People who do that on the civilian side are going to make upwards of 6 figures, when I was making $20K. While I was deployed I was working 20-hour days; you don't get paid for any of that extra work Pay should be commensurate with responsibilities. The E-1s to E-4s—they mow lawns and pull staff duty. Then some E-4s have responsibilities, yet they get the same pay regardless of the job. Pay should be billet dependent and designator specific.

Theme	Excerpts from Fact Finding (paraphrased)
	For the reserves, you work all month long doing evals and communications; there is no such thing as a part-time Chief, but we get paid like we're part time.
	Some senior enlisted with master's degrees are paid less than junior officers with bachelor's degrees.
	We change positions so much. Some jobs are 17 hours a day, others 8. Depends on the effort expended.
	There is not adequate leadership compensation in the Reserves. Chiefs' pay in the Reserve Components is grossly behind the curve for leadership positions; everyone knows we're not just working 7–4, so they need to relook at the pay structure and percentage; need to reevaluate the time; need to be compensated for the time.
Service members see risks in moving to a salary system	
A salary system would need to account for the Federal assistance benefits available for low-income Service members.	Some assistance is strictly based on your tax bracket. If you're adding BAH, you're going up a tax bracket.
	You'd be surprised the number of your junior Service members who are on food stamps.
	Also consider junior Service members applying for income-based programs? E.g., a Service member who has a spouse applying to go to college, filling out the FAFSA, may no longer qualify for Pell Grants etc.
There is *not* a major, systemic compensation problem that a salary system would fix.	If you adopt a salary system, then my wife would let me get out!
	The current system is not perfect, but it is "fair enough."
	I'm highly negative on this salary pay system. You're paying more in taxes and have less incentive to stay in.
	The resources should focus on fixing our current pay system.

Theme	Excerpts from Fact Finding (paraphrased)
Views on the fairness of the "marriage premium" are mixed	
The "marriage premium" is unfair.	You should be paid based on your rank and your work. This is about life choices; we shouldn't reward Service members based on their personal life choices. I have a wife and kids, but I like the idea of people getting the same whether or not they have kids. Why reward getting married? Men get 10 days for each child, and women get 12 weeks of leave. […] With 30 days of leave per year, you can plan ahead! I like the idea of single and dependent getting paid the same. I know people who got married just to get the BAH, and that is not good for your sanity. Should have incentive pay for sailors who choose to stay single. Because some get married to just get BAH. … how much do you save the DoD for not bringing dependents in?
The "marriage premium" is fair.	Service members with dependents deserve more compensation since they have more mouths to feed, more rooms necessary in their lodging. The military is the only job where you have no/little control over where you go, when you go, and for how long. For deployments, your duration may also be unknown. The impact on military families is far greater. Allowing compensation to reflect this is a good thing and makes the system more fair. There is supposed to be on-base childcare, but the waiting list is longer than their tour length in some places. Spouses can't get jobs because the off-base childcare option is so expensive that it doesn't make sense to work. This is one reason why families need more.

Theme	Excerpts from Fact Finding (paraphrased)
Service members would value improvements in child care, location pay, and on-base housing	
Fix child care and access.	Childcare is the biggest thing.
	Poor on-base childcare, or lack of availability, is an important, far-reaching issue; drives costs, spouse employability.
	Even though childcare at the CDC is cheaper than in town, it's still crazy expensive. They base the cost off of rent. As an E4 I was paying close to $600 a month out of pocket, so it was a crazy amount for just 1 kid. So imagine the ones with multiple kids…more CDC capacity.
	They need to fix that whole CDC system. I have 2 kids in there, it's a lot of money. Childcare is stupid expensive no matter where you are.
	This a major issue, which also relates to how families should be compensated.
Improve location pay.	The research isn't done properly to see what the quality of life would be when they set BAH. The numbers aren't accurate regionally.
	There's no way that BAH in San Diego is going to cover anything more than a box, living by yourself in a good neighborhood.
	BAH doesn't even remotely reflect the rent for the area.
	A lot of people rely on that extra income; housing markets in here are higher than in the capital city.
Improve on-base housing; don't require rent for substandard housing.	The quality of on-base housing varies greatly and BAH overpays in some cases.
	If a salary system provides extra money, can junior enlisted get out of the barracks? The attraction wouldn't be in the money, it would be in getting out of the barracks.
	Maybe paying rent for government housing would be OK if they updated the housing, making it worth the pay. We're living back in the 70s right now.
	Our houses on bases have all kinds of problems, they are asbestos ridden, don't make code.
	For privatized housing, BAH is forfeited regardless of rank. This means that an E5 and an E7 living in the same neighborhood, perhaps the same sized house, each forfeit their entire BAH.

1. Observations from Open-Ended Questions

The following tables summarize responses to each open-ended question by military Service.

Table 20. Summary of Responses to Question, "To what extent was pay a factor that influenced your decision to join the military?"

	Tax	No Tax
	Army	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 59 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 73 percent specified that pay was not the factor that influenced their decision to enlist. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 43 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 100 percent specified that pay was not the factor that influenced their decision to enlist.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 60 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 53 percent specified that pay was not the factor that influenced their decision to enlist. Among Reserve Component junior enlisted and mid-grade NCOs in low tax states, 40 percent specified that medical benefits, not pay, was the factor that influenced their decision to enlist.
Officer	Among Active Duty junior and mid-grade officers in high tax states, 39 percent specified that pay was not the factor that influenced their decision to join; the same percentage stated that pay was either a small factor, or a factor. Among the senior officers, 62.5 percent specified that pay was not the factor that influenced their decision. Among Reserve Component junior and mid-grade officers in high tax states, 84.6 percent specified that pay was not the factor that influenced their decision. Among the senior officers, 50 percent specified that pay was not the factor that influenced their decision.	Among Active Duty junior and mid-grade officers in low tax states, 75 percent specified that pay was not the factor that influenced their decision to join; the same percentage stated that pay was either a small factor, or a factor. Among the senior officers, 100 percent specified that pay was not the factor that influenced their decision. Among Reserve Component junior and mid-grade officers in low tax states, 62.5 percent specified that pay was not the factor that influenced their decision. Among the senior officers, 60 percent specified that pay was not the factor that influenced their decision.
	Navy	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 44 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 36 percent specified that pay was not the factor that influenced their decision to enlist. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 70 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 50 percent specified that pay was not the factor that influenced their decision to enlist, with the other 50 percent identifying pay as a factor.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 53.8 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 55.5 percent specified that pay was not the factor that influenced their decision to enlist. Among Reserve Component junior enlisted and mid-grade NCOs in low tax states, 43 percent specified that pay was not a factor that influenced their decision to enlist. Among senior enlisted, 81.8 percent stated that pay was not a factor.

	Tax	No Tax
Officer	Among Active Duty junior and mid-grade officers in high tax states, 26.6 percent specified that pay was not the factor that influenced their decision to join; the same percentage stated that pay was either a small factor, or a factor. Among the senior officers, 63.6 percent specified that pay was not the factor that influenced their decision. Among Reserve Component junior and mid-grade officers in high tax states, 77.7 percent specified that pay was not the factor that influenced their decision. Among the senior officers, 66.6 percent specified that pay was not the factor that influenced their decision.	Among Active Duty junior and mid-grade officers in low tax states, 75 percent specified that pay was not the factor that influenced their decision to join; the same percentage stated that pay was either a small factor, or a factor. Among the senior officers, 100 percent specified that pay was not the factor that influenced their decision. Among Reserve Component junior and mid-grade officers in low tax states, 62.5 percent specified that pay was not the factor that influenced their decision. Among the senior officers, 60 percent specified that pay was not the factor that influenced their decision.
	Air Force	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 62.5 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 33 percent specified that pay was not the factor that influenced their decision to enlist; the only response that ranked higher was "having a job" (44 percent). Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 50 percent specified that pay was not the factor that influenced their decision to enlist.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 63.6 percent specified that pay was a factor that influenced their decision to enlist, with the largest number stating that pay was somewhat a factor (36 percent of the total number of respondents). Among the senior NCOs, 58.8 percent specified that pay was not the factor that influenced their decision to enlist. Among Reserve Component junior enlisted and mid-grade NCOs in low tax states, 62 percent stated that pay was not a factor; educational benefits were (33 percent). Among the senior NCOs, 33 percent specified that benefits, not pay, were the factor that influenced their decision to enlist. One-third of senior NCOs specified that pay was not a factor.
Officer	Among Reserve Component junior and mid-grade officers in high tax states, 57 percent specified that pay was not the factor that influenced their decision.	Among Active Duty junior and mid-grade officers in low tax states, 72 percent specified that pay was one factor among many that influenced their decision. Among Reserve Component junior and mid-grade officers in low tax states, 47 percent specified that pay was not the factor that influenced their decision. Among the senior officers, 100 percent specified that pay was not the factor that influenced their decision.
	Marine Corps	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 66.6 percent specified that pay was not the factor that influenced their decision to enlist. Among the senior NCOs, 83 percent specified that pay was not the factor that influenced their decision to enlist. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 91 percent specified that pay was not the factor that influenced their decision to enlist.	

	Tax	No Tax
Officer	Among Active Duty junior and mid-grade officers in high tax states, 85 percent specified that pay was not the factor that influenced their decision to join. Among the senior officers, 100 percent specified that pay was not the factor that influenced their decision.	

Source: IDA Analysis of Research Participant Responses.

Table 21. Summary of Responses to Question, "Overall, do you think you are fairly paid for the work you do? Why do you feel that way? Are there changes you would like to see in the pay system to make it fairer?"

	Tax	No Tax
	Army	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 29.6 percent stated that they felt fairly paid with the current benefits and allowances. The same percentage, 29.6 percent, stated that compensation should be commensurate with the level of responsibility. Among the senior NCOs, 46.6 percent stated they were fairly paid. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 57 percent stated they did not feel they were fairly paid. Among the senior NCOs, 100 percent stated they felt they were undercompensated.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 85 percent stated that they felt they were not fairly paid. Among the senior NCOs, there were mixed views, with the majority stating that compensation should be commensurate with the level of responsibility (33 percent). Among Reserve Component junior enlisted and mid-grade NCOs in low tax states, 100 percent stated they did not feel they were fairly paid.
Officer	Among Active Duty junior and mid-grade officers in high tax states, 50 percent stated that they felt fairly paid with the current benefits and allowances. Among the senior officers, 100 percent stated they were fairly paid. Among Reserve Component junior and mid-grade officers in high tax states, there were mixed views, with 38 percent stating they would earn more in the civilian world. Among the senior officers, there were mixed views, with 50 percent stating that travel costs should be reimbursed.	Among Active Duty junior and mid-grade officers in low tax states, 50 percent stated that they felt fairly paid with the current benefits and allowances. Among the senior officers, 50 percent stated they were fairly paid as long as allowances were not taxed. Among Reserve Component junior and mid-grade officers in high and low tax states, 75 percent stated they spent too much uncompensated time working and traveling for drills. Among the senior officers, 80 percent stated they felt fairly paid.
	Navy	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 61 percent stated that they felt fairly paid with the current benefits and allowances; 52.7 percent specified that they felt fairly paid as long as they were not on a ship. Among the senior NCOs, 27 percent stated they were not fairly paid. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 20 percent stated they were fairly paid because of benefits. Among the senior NCOs, 100 percent stated they felt they were undercompensated.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 34.6 percent stated that they felt they were not fairly paid. Among the senior NCOs, 50 percent felt they were not fairly paid. Among Reserve Component junior enlisted and mid-grade NCOs in low tax states, 30 percent stated they did not feel they were fairly paid. All senior NCOs felt they were not fairly paid given the hours worked.

	Tax	No Tax
Officer	Among Active Duty junior and mid-grade officers in high tax states, 56.6 percent stated that they felt fairly paid with the current benefits and 81 percent stated they were fairly paid.	Among Active Duty junior and mid-grade officers in low tax states, 62.5 percent stated that they felt fairly paid with the current benefits and allowances. Among the senior officers, 75 percent stated they were fairly paid as long as allowances were not taxed. Among Reserve Component junior and mid-grade officers in low tax states, 39 percent stated they were not fairly paid. With senior officers, 100 percent stated they felt fairly paid.
	Air Force	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 25 percent stated that they felt they were not fairly paid. The only response with greater frequency was that compensation should be commensurate with the level of responsibility (31 percent). Among the senior NCOs, 44 percent stated they were not fairly paid. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, there was a mixed response, with most individuals stating it depended on the Air Force Specialty Code.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 54 percent stated that they felt they were not fairly paid. Among the senior NCOs, there were mixed views, with a slight majority stating they felt they were not fairly paid (41 percent). Among Reserve Component junior enlisted and mid-grade NCOs in low tax states, a slight majority stated they felt they were fairly paid (33 percent). Senior NCOs largely felt they were fairly paid (77.7 percent).
Officer	Among Reserve Component junior and mid-grade officers in high tax states, 62.5 percent stated they felt they were not fairly paid given the uncompensated time spent.	In low tax states, among Active Duty senior officers, 72.7 percent stated they were fairly paid, given the benefits. Among Reserve Component junior and mid-grade officers in low tax states, 76 percent stated they were fairly paid. Among the senior officers, 88.8 percent stated they felt fairly paid.
	Marine Corps	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 50 percent stated that they felt they were not fairly paid. The next most common response was that compensation should be commensurate with the level of responsibility (44 percent). Among the senior NCOs, 58 percent stated they were not fairly paid. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 66.6 percent stated they did not feel they were fairly paid. In every case (rank, component), uncompensated hours of work were a major concern.	

	Tax	No Tax
Officer	Among Active Duty junior and mid-grade officers in high tax states, 55 percent stated that they felt fairly paid with the current benefits and allowances. Among the senior officers, the most common response was that they were not fairly paid due to the long hours worked (33 percent). Among Reserve Component junior and mid-grade officers in high tax states, there were mixed views, with 38 percent stating they would earn more in the civilian world. Among the senior officers, there were mixed views, with 50 percent stating that travel costs should be reimbursed.	

Source: IDA Analysis of Research Participant Responses.

Table 22. Summary of Responses to Question, "How does your compensation for what you do compare to what you would earn as a civilian?"

	Tax	No Tax
	Army	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 74 percent stated that civilians earn more. Among the senior NCOs, 40 percent stated that civilians earn more. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 61.5 percent stated that civilian pay is higher. Reserve Component senior NCOs emphasized the non-reimbursed travel costs.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, there was a mixed response, with 50 percent 60 percent stating that civilians earn more. Among the senior NCOs, the emphasis was more on the benefits than the base pay.
Officer	Among Active Duty junior and mid-grade officers in high tax states, 38.8 percent stated that military compensation was higher due to the benefits. Among the senior officers there was uncertainty and mixed views. Among Reserve Component junior and mid-grade officers in high tax states, 69 percent stated that civilian pay is higher. Reserve Component senior officers largely viewed civilian and military compensation as comparable (75 percent).	Active Duty junior and mid-grade officers in low tax states had mixed views regarding the comparison between civilian and military compensation. Reserve senior officers largely viewed civilian and military compensation as comparable (40 percent).
	Navy	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 36 percent stated that civilians earn more. Among the senior NCOs, 50 percent stated that civilians earn more. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 30 percent stated that civilian pay is higher. 75 percent of Reserve Component senior NCOs stated that civilian pay was more.	Among Active Duty junior enlisted and mid-grade NCOs 38 percent state that civilians earn more. Among the senior NCOs, 66.6 percent state that civilians earn more. In the Reserve Component, 26 percent of the junior and mid-grade NCOs feel civilians earn more. The majority of the senior NCOs feel civilians earn more (72 percent).

	Tax	No Tax
Officer	Among Active Duty junior and mid-grade officers in high tax states, 36.6 percent stated that civilian compensation was higher. Among the senior officers over half felt civilian pay was higher (54 percent).	Half of the Active Duty junior and mid-grade officers in low tax states viewed civilian compensation as higher (50 percent). A smaller percentage of senior officers viewed civilian compensation as higher (41.6 percent).
	Air Force	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was that civilians earn more. Among the senior NCOs, there was a mixed response; the most common statement was that civilian pay is more, but there were frequent references to military benefits. Among Service members in the Reserve Component, there was a mixed response, with junior and mid-grade split 50/50, and senior NCOs stating that military pay was more because of the benefits.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, the most common response was that civilians earn more (45 percent). Among the senior NCOs, there was a mixed response; the most common statement was that civilian pay is more, but there were frequent references to military benefits on the one hand, and longer hours on the other. Among Service members in the Reserve Component, there was a mixed response, with junior and mid-grade split 50/50, and senior NCOs stating that military pay was more because of the benefits.
Officer	Among Reserve Component junior and mid-grade officers in high tax states, responses were evenly split between civilian pay being higher and military pay being higher. Several respondents stated that they lose money being in the National Guard.	Among Active Duty junior enlisted and mid-grade officers in low tax states, the most common response was that civilians earn more (54.5 percent). Among Reserve Component junior and mid-grade officers in low tax states, responses were evenly split between civilian pay being higher and military pay being higher. Among senior officers, 44 percent stated that military pay was more than civilian pay given the benefits; 22 percent stated that civilian pay was higher.
	Marine Corps	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 27.7 percent stated that civilians earn more. Among the senior NCOs, 41.6 percent stated that civilians earn more. Among Reserve Component junior enlisted and mid-grade NCOs in high tax states, 91.6 percent stated that civilian pay is higher. Reserve Component enlisted emphasized the unreimbursed travel costs.	
Officer	Among Active Duty junior and mid-grade officers in high tax states, 40.7 percent stated that military compensation was higher due to the benefits. Among the senior officers, slightly more stated that with benefits, military pay is on par with civilian pay (50 percent).	

Source: IDA Analysis of Research Participant Responses.

Table 23. Summary of Responses to Question, "What do you think if the DoD moved to a single-salary system that combines basic pay, BAS, and BAH?"

	Tax	No Tax
	Army	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was negative (44 percent). Among the senior NCOs, 66.6 percent had a negative response. Among Reserve Component junior enlisted and mid-grade, the views expressed focused on needing to know more.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 70 percent of soldiers had a negative response. Senior NCOs also had a negative response (73 percent). Among the Reserve Component junior enlisted and mid-grade NCOs, the response was also largely negative (80 percent).
Officer	Among Active Duty junior and mid-grade officers in high tax states, the most common response was negative (83 percent). Among the senior officers, 100 percent had a negative response. Among Reserve Component junior and mid-grade officers, 61.5 percent had a negative response. Half of the senior officers had a negative response.	Among Active Duty junior and mid-grade officers in low tax states, the most common response was negative (50 percent). Among the senior officers, 75 percent had a negative response. Among Reserve Component junior and mid-grade officers, 62.5 percent had a negative response. All senior officers had a negative response (100 percent).
	Navy	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was negative (44 percent). Among the senior NCOs, 31.8 percent had a negative response. Among the majority of Reserve Component junior enlisted and mid-grade, the views expressed focused on there being a positive response only if salary is not taxed (40 percent). The senior enlisted had a 50 percent negative response.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 38 percent of Sailors had a negative response. Senior NCOs also had a negative response (50 percent). Among the Reserve Component junior enlisted and mid-grade NCOs, the response was also largely negative (34.7 percent). Senior NCOs had a 45 percent negative response rate.
Officer	Among Active Duty junior and mid-grade officers in high tax states, the most common response was negative (63 percent). Among the senior officers, 36 percent had a negative response. A large percentage of senior officers, 63.6 percent, focused on whether sailors with dependents should earn a higher salary. The majority felt sailors should be compensated for their performance, not on the number of dependents.	Among Active Duty officers in low tax states, regardless of rank, the most common response was negative (75 percent). Among Reserve Component officers in low tax states, regardless of rank, the most common response was negative (55.5 percent of junior and mid-grade officers; 100 percent of senior officers).
	Air Force	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, there was a mixed response. The two most frequent responses were "neutral" (18.7 percent), and "depends on the outcome" (18.7 percent) Among the senior NCOs, 66.6 percent had a negative response, many citing detrimental tax implications. Among Reserve Component junior enlisted and mid-grade NCOs, 87.5 percent had a negative response.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 81.8 percent of Airmen had a negative response. Among Senior NCOs, the most common response was negative (47 percent). Among the Reserve Component junior enlisted and mid-grade NCOs, the response was negative (100 percent).

	Tax	No Tax
Officer	Among Reserve Component junior and mid-grade officers in high tax states, the most common response was that Airmen should be paid more for dependents negative (71 percent); 57 percent had a negative response regarding any change to the salary system.	Among Active Duty junior and mid-grade officers in low tax states, the most common response was negative (45.5 percent). Among Reserve Component junior and mid-grade officers, 88 percent had a negative response. Among the senior officers the most common response was negative (44 percent).
	Marine Corps	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was negative (72 percent). Among the senior NCOs, 66.6 percent had a negative response. Reserve Component junior enlisted and mid-grade expressed mixed views.	
Officer	Among Active Duty junior and mid-grade officers in high tax states, the most common response was negative (29.6 percent). The second most common response was that Marines with dependents should not earn more (26 percent). Among the senior officers, 100 percent had a negative response.	

Source: IDA Analysis of Research Participant Responses.

Table 24. Summary of Responses to Question, "How important to your standard of living are BAH and BAS?"

	Tax	No Tax
	Army	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 70 percent stated that BAH was very important to their standard of living. Among the senior NCOs, 66.6 percent stated that BAH was either important or very important.	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 80 percent stated that BAH was important or very important to their standard of living. Among the senior NCOs, 100 percent stated that BAH was either important or very important.
Officer	Among Active Duty junior and mid-grade officers in high tax states, 50 percent stated that BAH was important for their standard of living, but some noted it was too low in high-cost areas. Among the senior officers, 87.5 percent viewed BAH as very important.	Among Active Duty junior and mid-grade officers in low tax states, 87.5 percent stated that BAH was important for their standard of living. Among the senior officers, 100 percent viewed BAH as very important.
	Navy	
Enlisted	Among Active Duty enlisted in high tax states, regardless of rank, the most common response was that BAH was very important to their standard of living.	Among Active Duty enlisted in low tax states, regardless of rank, the most common response was that BAH was very important to their standard of living. In the Reserve Component, there were mixed views; roughly one-third of junior enlisted and mid-grade NCOs stated it was very important. Nearly half, 45 percent, of the senior NCOs focused on the poor condition of on-base housing and privatized housing companies with predatory practices.

	Tax	No Tax
Officer	Among Active Duty officers in high tax states, regardless of rank, the most common response was that BAH was important for their standard of living; junior and mid-grade officers regarded it as very important, while senior officers regarded it as important.	Among Active Duty officers in low tax states, regardless of rank, the most common response was that BAH was important for their standard of living. Some junior and mid-grade officers expressed the view that while it is important, BAH is inadequate and inaccurate (18.7 percent). In the Reserve Component, there were mixed views; roughly one-quarter of junior and mid-grade officers stated it was very important. Senior officers expressed the view that BAH was important for Active Duty Service members.
	Air Force	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, 93.7 percent stated that BAH was very important to their standard of living. Among the senior NCOs, 100 percent stated that BAH was either important or very important. Among Reserve Component junior enlisted and mid-grade NCOs, 87.5 percent regarded BAH/BAS as very important.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 72.7 percent stated that BAH was important or very important to their standard of living. That BAH was important was also the most common response among senior enlisted. In low tax states, among the junior enlisted and mid-range NCOs, 33 percent stated BAH/BAS was important. Among the senior enlisted, 88.8 percent stated BAH/BAS was important to their standard of living.
Officer	[Did not really answer the question]	Among Active Duty junior and mid-grade officers in low tax states, 91 percent stated that BAH was important for their standard of living. Among the junior and mid-grade officers in the Reserve Component, 47 percent viewed BAH/BAS as important. Senior officers stated BAH was huge if on Active Duty (66.6 percent).
	Marine Corps	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was that BAH was very important to their standard of living, but too low (38.8 percent). Among the senior NCOs, 58.3 percent stated that BAH was either important or very important. Among Reserve Component junior enlisted and mid-grade, 66.6 percent stated BAH/BAS was very important.	
Officer	Among Active Duty junior and mid-grade officers in high tax states, 62.9 percent stated that BAH was important or very important for their standard of living, with many noting it was too low in high-cost areas. Among the senior officers, 50 percent expressed negativity about any change.	

Source: IDA Analysis of Research Participant Responses.

Table 25. Summary of Responses to Question, "Under a salary system, people who live on base may be required to pay rent for their on-base housing. How do you think people would respond to paying rent for their housing?"

	Tax	No Tax
	Army	
Enlisted	Issues that were prominently referenced include: poor conditions in on-base housing and barracks; the predatory practices of the companies running privatized housing; leaders' inability to do inspections if soldiers had to pay rent for their barracks; the barracks would be empty if soldiers had to pay rent (they would live elsewhere if given a choice).	No difference
Officer	Issues that were prominently referenced include: poor conditions in on-base housing and barracks; the predatory practices of the companies running privatized housing; leaders' inability to do inspections if soldiers had to pay rent for their barracks; the barracks would be empty if soldiers had to pay rent (they would live elsewhere if given a choice).	No difference
	Navy	
Enlisted	Issues that were prominently referenced by the Active Duty Enlisted in high tax states included: poor conditions in on-base housing and barracks; the impact of such a requirement on retention; and (among Senior NCOs) concerns regarding the need for your Sailors to live in the barracks as they are for purposes of "conditioning."	Issues that were prominently referenced by the Active Duty Enlisted in low tax states included: poor conditions in on-base housing and barracks; the impact of such a requirement on retention; and (among Senior NCOs) concerns regarding barracks inspections. Reserve Component Enlisted in low tax states expressed the view that no one would live on base due to the poor quality of on-base housing if there were rent requirements. Reserve Component Senior Enlisted referenced financial literacy issues.
Officer	Issues that were prominently referenced by Active Duty officers in high tax states included: poor conditions in on-base housing and barracks and the need for oversight of young sailors. A small number of officers regardless of rank favored the requirement for there to be rent associated with on-base housing (16.6 percent of junior and mid-grade, 27 percent of senior officers).	Issues that were prominently referenced by Active Duty officers in low tax states included: poor conditions in on-base housing and barracks, the need for there to be barracks inspections, issues with financial literacy, and other concerns regarding discipline issues and safety/security. Reserve Component officers in low tax states had mixed responses. Some officers expressed the view that the condition of on-base housing varies by location.

	Tax	No Tax
	Air Force	
Enlisted	Issues that were prominently referenced by the Active Duty enlisted in high tax states included: poor conditions in on-base housing and barracks and the importance of having a choice regarding living on base. Junior enlisted and mid-grade NCOs in both components had a negative response to the question.	Issues that were prominently referenced by the Active Duty enlisted in low tax states emphasized the poor conditions in on-base housing and barracks. Senior enlisted referenced concern regarding the ability for leaders to conduct barracks inspections and issues with the quality of life in base housing. Both groups had a generally negative response to the question. Reserve Component enlisted in low tax states expressed concern about issues with the quality of life in base housing. Both junior enlisted and mid-grade and senior NCOs had a generally negative response to the question.
Officer	Issues that were prominently referenced by the Reserve Component junior and midgrade officers in low tax states included poor conditions in on-base housing and barracks, the importance of having a choice regarding living on base. Across both components in low tax states there was a negative response to the question in general.	No difference
	Marine Corps	
Enlisted	Among Active Duty junior enlisted and mid-range NCOs, 100 percent had a negative view of this question. Half of the Reserve Component junior enlisted and mid-range NCOs voiced a negative response to this question. Issues that were prominently referenced include: poor conditions in on-base housing and barracks; the opinion that Marines should have options.	
Officer	Among Active Duty junior and mid-range officers, 29.6 percent had a negative view of this question. Senior officers' responses were even more negative (83 percent). Issues that were prominently referenced include: poor conditions in on-base housing and barracks; leaders' inability to do inspections if Marines had to pay rent for their barracks; widespread financial illiteracy.	

Source: IDA Analysis of Research Participant Responses.

Table 26. Summary of Responses to Question, "Are there any non-monetary benefits that would help offset the elimination of allowances?"

	Tax	No Tax
	Army	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was "None" (26 percent). Among the senior NCOs, multiple individuals referenced improved access to childcare and tuition assistance. Among Reserve Component enlisted, benefits such as the elimination of state income taxes were referenced, as was Tricare for Life.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, the two most common responses were "None" and gas/transportation costs subsidies (both 15 percent). The second most common response was increased leave accrual. Senior NCOs also identified greater flexibility for geographic stability as a benefit to consider (20 percent). Among the Reserve Component junior enlisted and mid-grade NCOs, compensation for time spent traveling to drill and lodging was the most common response (40 percent).
Officer	Among Active Duty junior and mid-grade officers in high tax states, the most common response was "None" (22 percent). Among the senior officers, the most common response was "None" (25 percent). Among Reserve Component junior and mid-grade officers, the most common response was "None" (23 percent).	Among Active Duty junior and mid-grade officers in low tax states, the most common response was telecommuting (12.5 percent). Among the senior officers, the most common response was "None" (75 percent). Among the Reserve Component senior officers, compensation for time spent traveling to drill and lodging was the most common response (60 percent).
	Navy	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was subsidized and improved access to childcare (22 percent). Among the senior NCOs, multiple individuals referenced subsidized childcare (27 percent). Reserve Component enlisted identified benefits such as subsidized childcare, improved access to health insurance, transportation subsidies, and the elimination of 29-day orders.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, the two most common responses were "None" and gas/transportation costs subsidies (both 15 percent). The second most common response was increased leave accrual. Senior NCOs also identified greater flexibility for geographic stability as a benefit to consider (20 percent). Among the Reserve Component junior enlisted and mid-grade NCOs, compensation for time spent traveling to drill and lodging was the most common response (40 percent).
Officer	Among Active Duty junior and mid-grade officers in high tax states, the most common response focused on having greater flexibility with assignment locations; the second benefit identified was increased leave accrual. Among the senior officers, the most common response was improved access to childcare and improvements to childcare facilities.	Among Active Duty junior and mid-grade officers in low tax states, the most common response was improved access to tuition assistance (25 percent). Senior officers referenced a wide variety of benefits, to include improvements to the retirement benefits and facilities improvements. Among the Reserve Component junior and midgrade officers, subsidized childcare was the benefit referenced most (33 percent).

	Tax	No Tax
	Air Force	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was improved medical care (25 percent). Senior NCOs referenced numerous benefits, to include exemption from state income tax and expanded family benefits. Reserve Component enlisted referenced benefits such as improved access to entitlements and health care.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, the two most common responses were greater flexibility with choice of assignment location and telecommuting (both 27percent). The second most common response was subsidized childcare. Senior NCOs also identified greater flexibility for geographic stability as a benefit to consider. The most common response from the senior enlisted was that there were no non-monetary benefits that would offset. Among the Reserve Component junior enlisted and mid-grade NCOs, additional education benefits were the most common response. Reserve Component senior NCOs mentioned expanded medical insurance benefits, expanded education benefits, and more annual leave accrual.
Officer		Among Active Duty junior and mid-grade officers in low tax states, the most common response was telecommuting (18 percent). Among the Reserve Component junior and mid-grade officers, expanded healthcare benefits for the Reserve Component was the most common response. Compensation for time spent traveling to drill and travel costs, to include lodging, was also referenced by multiple individuals.
	Marine Corps	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was "None" (38.8 percent); two respondents mentioned childcare (11 percent). Among the senior NCOs, individuals referenced improved access to childcare; BAH reform; flexibility with extending tours and switching assignments; and additional compensation for college degrees. Among Reserve Component enlisted, benefits such as improvements in Tricare for Life (16.6 percent) and improvements in education benefits (16.6 percent) were referenced; 16.6 percent of Reserve Component respondents stated that there were no non-monetary benefits that would offset the elimination of allowances.	

	Tax	No Tax
Officer	Among Active Duty junior and mid-grade officers in high tax states, the most common response was addressing spouse employment issues (18.5 percent); the second most common statement regarded options for extended tours (14.8 percent). Among the senior officers, the most common response regarded options for extended tours (33 percent). Individuals also referenced: childcare subsidies; comp time; better training (more ammo, better ranges, better systems); more annual leave; and telecommuting options	

Source: IDA Analysis of Research Participant Responses.

Table 27. Summary of Responses to Question, "How would changes to the compensation system affect your plans to stay in uniform?"

	Tax	No Tax
	Army	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the two most common responses were that "changes would have no impact" (15 percent) and "negative changes would have a negative impact" (15 percent). Among the senior NCOs, 33 percent indicated that changes would have no impact.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 75 percent specified that negative changes would have a negative impact. Among the senior NCOs, 13 percent indicated that changes would have no impact.
Officer	Among Active Duty junior and mid-grade officers in high tax states, 22 percent stated that negative changes would have a negative impact. Among the senior officers, the most common response was that negative changes would have a negative impact (50 percent). Among Reserve Component junior and mid-grade officers in high tax states, the most common response was that negative changes would have a negative impact (30.7 percent). Among the senior officers, 50 percent specified that negative changes would have a negative impact.	Among Active Duty junior and mid-grade officers in low tax states, 54 percent stated that changes would have no impact. Among the senior officers, 100 percent stated that it would depend on the changes. Among Reserve Component junior and mid-grade officers in low tax states, significant changes were identified as potentially having an impact (12.5 percent).
	Navy	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was that any negative changes would have a negative impact.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 53.8 percent specified that negative changes would have a negative impact. Senior NCOs expressed concerns regarding changes. Half of the Reserve Component enlisted stated changes would have no impact (52 percent).

	Tax	No Tax
Officer	Among Active Duty junior and mid-grade officers in high tax states, the most common response was that negative changes would have a negative impact.	Among Active Duty junior and mid-grade officers in low tax states, the most common responses were that changes would have no impact, and that there are concerns with financial literacy. Among the senior officers, 25 percent stated that it would depend on the changes. Among Reserve Component junior and mid-grade officers in low tax states, changes were identified as having no impact (16.6 percent).
	Air Force	
Enlisted	Among Active Duty junior enlisted and mid-grade NCOs in high tax states, the most common response was that negative changes would have a negative impact (43.7 percent). Among the senior NCOs, the only response was that it would depend on the change (22 percent). All the Reserve Component junior enlisted and mid-grade NCOs stated that negative changes would have a negative impact on their plans (100 percent). In the Reserve Component, junior enlisted NCOs had mixed responses.	Among Active Duty junior enlisted and mid-grade NCOs in low tax states, 100 percent specified that negative changes would have a negative impact. Among the senior NCOs, 47 percent indicated that changes would have no impact. In the Reserve Component, junior enlisted and mid-range NCOs stated that there would be an impact (19 percent). Senior NCOs had mixed responses. The two most frequent responses were that it would depend and that changes would have no impact (each with 22 percent).
Officer	Among Reserve Component junior and mid-grade officers in high tax states, the most common response was that negative changes would have a negative impact (71.4 percent).	Among Active Duty junior and mid-grade officers in low tax states, respondents largely indicated that it depends on the changes (63.6 percent). Among Reserve Component junior and mid-grade officers in high tax states, the most common response was changes would have some impact, but would depend on the change (17.6 percent).
	Marine Corps	
Enlisted	Answers provided focused on the blended retirement system.	
Officer	Among Active Duty junior and mid-grade officers in high tax states, 18.5 percent stated that negative changes would have no impact. Among the senior officers, the most common response was that changes would have no impact (50 percent). The next most common response from senior officers was that changes would have an impact depending on whether positive or negative (33 percent).	

Source: IDA Analysis of Research Participant Responses.

We now consider service member responses to the close-ended questions comparing these with the responses from the SOFA.

2. Close-Ended Questions and the SOFA

At the conclusion of each focus group session, research participants were asked to complete a close-ended instrument consisting of the same seven questions that were developed via interaction with the Office of People Analytics (OPA) for inclusion in the 2019 SOFA. The survey was fielded in late November 2019 through mid-February 2020, with preliminary tabulations received in April of 2020. According to OPA, the sample size consisted of 122,090 active service members, with a final weighted response rate of 13 percent. It is through these instruments that we were able to compare responses, based on various demographic information. For the purposes of this analysis, Reserve component members currently on a full-time military status were treated as part of the Active component. Results associated with each question are depicted first by focus group participants, followed by SOFA response.

1. Suppose DoD increased basic pay but removed the dependent rate on the Basic Allowance for Housing. This would mean
   - Service members with dependents and without dependents would receive the same pay.
   - On average, Service members with dependents would see a decrease in their earnings (after taxes); and Service members without dependents would see an increase in their earnings (after taxes).

   a. Would you support or oppose the change described above?

1. Strongly oppose	2. Somewhat oppose	3. Neither oppose nor support	4. Somewhat support	5. Strongly support

Table 28 provides a compilation of responses to question 1a. Overall, more than 70 percent of those service members responding to the question either “strongly opposed” or “somewhat opposed” the proposed change in compensation. Subpopulations are represented in the table, parsing responses by Service, component, pay grade, location, and family status. It is interesting to note that 34 percent of the research participants having a family status of single without dependents supported this proposed change. Now, we consider responses to the same question in the SOFA shown in Table 29.

Table 28. Focus Group Responses to Removal of Dependent BAH Rate

	Percentages				
Overall and Service	**1**	**2**	**3**	**4**	**5**
Total	52%	19%	10%	13%	6%
Army	62%	15%	9%	11%	3%
Active Component	61%	17%	10%	9%	3%
Reserve Component	63%	10%	4%	19%	4%
Navy	40%	20%	13%	16%	11%
Active Component	42%	20%	8%	17%	13%
Reserve Component	35%	18%	29%	12%	6%
Marine Corps	48%	22%	10%	16%	4%
Active Component	46%	23%	10%	17%	4%
Reserve Component	50%	25%	17%	8%	0%
Air Force	57%	19%	9%	10%	5%
Active Component	56%	19%	9%	11%	5%
Reserve Component	61%	17%	9%	9%	4%
Pay Grade					
Enlisted	51%	18%	13%	12%	6%
E1-E4	40%	18%	18%	17%	8%
E5-E9	56%	18%	11%	11%	4%
Officers	52%	20%	7%	15%	6%
W1-W5	67%	13%	8%	12%	0%
O1-O3	53%	20%	6%	14%	7%
O4-O6	49%	20%	9%	16%	6%
Location					
State with Tax	49%	21%	11%	14%	5%
State without Tax	54%	17%	9%	13%	7%
On Base	50%	21%	7%	16%	6%
Off Base	52%	18%	11%	13%	6%
Family Status					
Single	33%	20%	16%	19%	12%
With Dependents	46%	17%	13%	18%	6%
Without	27%	22%	17%	20%	14%
Married	61%	18%	7%	10%	4%
Working Spouse	59%	18%	9%	10%	4%
Dual Service Spouse	65%	19%	4%	9%	3%

Source: IDA Analysis of Research Participant Responses.

Table 29. Responses to Removal of Dependent BAH Rate SOFA

179. Suppose DoD increased basic pay but removed the dependent rate on the Basic Allowance for Housing. This would mean: Service members with dependents and without dependents would receive the same pay. On average, Service members with dependents would see a decrease in their earnings (after taxes); and Service members without dependents would see an increase in their earnings (after taxes). Would you support or oppose this change?

1. Strongly oppose 2. Somewhat oppose 3. Neither support nor oppose
4. Somewhat support 5. Strongly support

	% Resp.	Percentages 1	2	3	4	5	Max ME	Percentage Reporting Somewhat Support/Strongly Support	
OVERALL AND SERVICE									
Total DoD	77	48	18	15	9	10	±2	19.0	±2.0
Army	73	47	17	17	8	10	±3	19.0	±3.0
Navy	78	51	18	13	8	10	±3	18.0	±3.0
Marine Corps	72	39	18	19	12	13	±5	24.0	±5.0
Air Force	83	52	18	13	9	9	±3	17.0	±2.0
PAYGRADE									
Enlisted	75	47	17	17	9	10	±2	19.0	±2.0
3 to 5 Years of Service	72	39	18	19	12	12	±4	25.0	±4.0
6 to 9 Years of Service	77	55	16	14	6	9	±5	15.0	±4.0
E1–E4	71	36	19	22	10	13	±3	23.0	±3.0
E5–E9	78	57	16	12	7	8	±3	15.0	±2.0
Officers	85	52	19	10	9	9	±2	19.0	±2.0
W1–W5	83	63	14	10	7	7	±4	13.0	±3.0
O1–O3	84	45	23	11	10	10	±3	20.0	±3.0
O4–O6	87	59	15	9	8	9	±2	17.0	±2.0
LOCATION									
U.S. (Incl. Territories)	77	49	18	14	9	10	±2	18.0	±2.0
Overseas	76	41	18	20	9	12	±4	21.0	±4.0
Europe	81	46	18	17	8	11	±5	19.0	±5.0
Asia and Pacific	75	39	18	19	11	13	±5	24.0	±5.0
On Base	73	39	19	20	10	12	±3	22.0	±3.0
Off Base	79	54	17	12	8	8	±2	16.0	±2.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	77	49	18	15	8	10	±3	18.0	±3.0
Not Deployed in Past 24 Months	76	48	18	15	9	10	±2	19.0	±2.0
EDUCATION									
No College	70	37	18	24	10	11	±4	21.0	±4.0
Some College	77	51	17	14	9	10	±3	19.0	±2.0
4-Year Degree	80	50	21	11	8	9	±3	17.0	±2.0
Grad/Prof Degree	86	56	16	9	9	10	±2	18.0	±2.0
FAMILY STATUS									
Single	75	27	22	21	14	17	±3	30.0	±3.0
With Child(ren)	73	58	17	9	7	9	±6	16.0	±5.0
Without Child(ren)	75	23	22	23	14	17	±3	32.0	±3.0
Married	78	66	15	10	5	5	±2	10.0	±2.0
With Child(ren)	79	71	13	9	4	4	±2	8.0	±2.0
Without Child(ren)	76	56	18	13	7	7	±4	14.0	±3.0
Working Spouse	77	63	15	11	6	5	±3	11.0	±2.0
Dual Service Spouse	76	57	17	9	9	8	±5	17.0	±4.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

Similar to the close-ended responses during the field research, we observe an overall opposition to the proposed change to compensation. During the field research, 71 percent of research participants indicated that they "strongly opposed" or "somewhat opposed" the change. With the larger sample frame of the SOFA, 66 percent of survey respondents indicated an opposition to the suggested change to compensation. We also observe that 31 percent of those reporting that they are single without children support this proposal to varying levels.

Additional queries associated with question 1a were made regarding perceptions of retention and recruiting. Table 30 summarizes the responses to this question from the focus groups, and Table 31 summarizes the responses to the same question in the SOFA.

b. Would the change described above make you more likely to stay, more likely to leave, or have no impact on your decision to remain in service at the end of your service obligation/commitment?

1. Much more likely to leave	2. Somewhat more likely to leave	3. No impact	4. Somewhat more likely to stay	5. Much more likely to stay

Table 30. Retention Perceptions Related to Removing the Dependent BAH rate (Focus Groups)

	Percentages				
	1	**2**	**3**	**4**	**5**
Total	25%	27%	40%	7%	1%

Source: IDA Analysis of Research Participant Responses.

Although "no impact" received the largest percentage of any response, it should be noted that the distribution of responses was more skewed towards the "much more likely to leave" and "somewhat more likely to leave" than to the combined "likely to stay" responses. In the final part of the first question, research participants were asked for their thoughts regarding how the described change would impact recruiting those not already in the military. Now we consider responses to the same question in the SOFA.

Table 31. Retention Perceptions Related to Removing the Dependent BAH Rate (SOFA)

180. Would the change described in Q179 make you more likely to stay, more likely to leave, or have no impact on your decision to remain in service at the end of your service obligation/commitment?

1. Much more likely to leave
2. Somewhat more likely to leave
3. No impact
4. Somewhat more likely to stay
5. Much more likely to stay

	% Resp.	Percentages 1	2	3	4	5	Max ME	Percentage Reporting Somewhat More Likely to Stay/Much More Likely to Stay	
OVERALL AND SERVICE									
Total DoD	76	28	23	37	8	5	±2	13.0	±2.0
Army	73	28	21	36	8	7	±3	15.0	±3.0
Navy	78	30	23	37	7	3	±3	11.0	±2.0
Marine Corps	72	22	19	41	13	5	±5	18.0	±5.0
Air Force	82	29	26	35	5	5	±3	10.0	±2.0
PAYGRADE									
Enlisted	74	28	21	36	9	6	±2	15.0	±2.0
3 to 5 Years of Service	72	26	17	38	13	6	±4	19.0	±4.0
6 to 9 Years of Service	77	33	25	31	7	5	±4	11.0	±4.0
E1–E4	71	22	17	40	12	8	±4	21.0	±3.0
E5–E9	78	33	25	32	6	4	±3	10.0	±2.0
Officers	85	26	28	39	4	3	±2	7.0	±1.0
W1–W5	82	39	25	30	4	2	±4	6.0	±2.0
O1–O3	84	22	27	42	5	3	±3	8.0	±2.0
O4–O6	87	30	29	37	2	2	±2	4.0	±1.0
LOCATION									
U.S. (Incl. Territories)	76	29	23	36	7	5	±2	12.0	±2.0
Overseas	76	23	19	41	9	8	±4	17.0	±4.0
Europe	80	26	22	38	7	6	±5	13.0	±5.0
Asia and Pacific	75	22	18	42	10	7	±5	17.0	±5.0
On Base	72	23	19	39	11	8	±3	19.0	±3.0
Off Base	79	31	25	35	6	3	±2	9.0	±2.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	77	29	22	37	7	4	±3	11.0	±3.0
Not Deployed in Past 24 Months	76	27	23	37	8	6	±2	14.0	±2.0
EDUCATION									
No College	70	21	18	40	12	8	±4	21.0	±4.0
Some College	77	31	22	35	7	5	±3	12.0	±2.0
4-Year Degree	80	28	27	38	5	3	±3	8.0	±2.0
Grad/Prof Degree	86	30	27	37	4	3	±2	7.0	±2.0
FAMILY STATUS									
Single	74	13	16	48	14	9	±3	23.0	±3.0
With Child(ren)	73	34	26	32	5	2	±6	8.0	±5.0
Without Child(ren)	75	11	15	50	14	10	±3	24.0	±3.0
Married	78	40	28	27	3	2	±2	5.0	±2.0
With Child(ren)	79	43	29	25	2	2	±3	4.0	±2.0
Without Child(ren)	76	34	26	32	5	2	±4	7.0	±3.0
Working Spouse	77	39	27	30	3	2	±3	5.0	±2.0
Dual Service Spouse	76	33	24	35	5	3	±5	8.0	±4.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

As with the focus group responses, “no impact” also had the single largest response at 37 percent. Here also we see that “much more likely to leave” and “somewhat more likely to leave” combine for 51 percent of the responses, compared to 52 percent of focus group responses. The next question asks perceptions as they relate to recruiting those not already in the military. Table 32 summarizes the responses to this question from the focus groups, and Table 33 summarizes the responses to the same question in the SOFA.

c. For those considering joining the military, do you think the change described above would make them more likely to join, less likely to join, or have no impact on their decision to join?

1. Much less likely to join	2.Somewhat less likely to join	3. No impact	4. Somewhat more likely to join	5. Much more likely to join

Table 32. Recruiting Perceptions Related to Removing the Dependent BAH Rate (Focus Groups)

	Percentages				
	1	**2**	**3**	**4**	**5**
Total	14%	28%	35%	18%	5%

Source: IDA Analysis of Research Participant Responses.

Again, the "no impact" response received the greatest number of responses; however, the next two largest responses were "somewhat less likely to join" followed by "somewhat more likely to join." Next, we look at the responses to the same question in the SOFA.

Table 33. Recruiting Perceptions Related to Removing the Dependent BAH Rate (SOFA)

181. For those considering joining the military, do you think the change described in Q179 would make them more likely to join, less likely to join, or have no impact on their decision to join?

1. Much less likely to join
2. Somewhat less likely to join
3. No impact
4. Somewhat more likely to join
5. Much more likely to join

	% Resp.	Percentages 1	2	3	4	5	Max ME	Percentage Reporting Somewhat More Likely to Join/Much More Likely to Join	
OVERALL AND SERVICE									
Total DoD	76	20	26	36	12	5	±2	17.0	±2.0
Army	73	20	25	36	13	6	±3	19.0	±3.0
Navy	78	21	26	35	13	4	±3	17.0	±3.0
Marine Corps	71	15	22	38	18	7	±5	25.0	±5.0
Air Force	82	22	30	35	9	4	±3	13.0	±2.0
PAYGRADE									
Enlisted	74	21	25	35	13	6	±2	19.0	±2.0
3 to 5 Years of Service	72	21	24	34	15	6	±4	21.0	±4.0
6 to 9 Years of Service	76	24	26	34	11	4	±5	16.0	±4.0
E1–E4	71	19	23	33	17	8	±3	25.0	±3.0
E5–E9	78	23	27	36	10	4	±3	14.0	±2.0
Officers	85	16	31	42	9	3	±2	12.0	±2.0
W1–W5	82	23	24	40	10	3	±4	13.0	±3.0
O1–O3	84	16	32	40	9	3	±3	12.0	±2.0
O4–O6	87	16	30	44	8	2	±2	10.0	±2.0
LOCATION									
U.S. (Incl. Territories)	76	21	27	36	12	5	±2	17.0	±2.0
Overseas	76	18	25	36	15	7	±4	22.0	±4.0
Europe	80	20	27	35	13	5	±5	18.0	±5.0
Asia and Pacific	75	18	23	38	14	7	±5	21.0	±5.0
On Base	72	18	24	34	16	8	±3	24.0	±3.0
Off Base	79	22	28	37	10	3	±2	13.0	±2.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	77	20	25	39	11	5	±3	16.0	±3.0
Not Deployed in Past 24 Months	76	20	27	35	13	5	±2	18.0	±2.0
EDUCATION									
No College	70	18	22	36	15	8	±4	23.0	±4.0
Some College	76	23	26	34	13	5	±3	18.0	±2.0
4-Year Degree	80	20	30	38	10	3	±3	13.0	±2.0
Grad/Prof Degree	86	17	29	42	8	3	±2	11.0	±2.0
FAMILY STATUS									
Single	74	15	25	35	17	8	±3	25.0	±3.0
With Child(ren)	73	23	29	33	10	5	±6	15.0	±5.0
Without Child(ren)	74	14	24	36	18	8	±3	26.0	±3.0
Married	78	25	27	36	8	3	±2	11.0	±2.0
With Child(ren)	79	25	27	37	8	3	±2	11.0	±2.0
Without Child(ren)	76	24	28	36	9	4	±4	13.0	±3.0
Working Spouse	77	24	27	38	8	3	±3	11.0	±2.0
Dual Service Spouse	76	26	28	36	7	3	±5	10.0	±4.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

When queried about recruiting perceptions associated with this proposed compensation change, 46 percent of SOFA survey respondents indicated a perception that the proposed change would result in a less likelihood to join the military, with 36 percent suggesting that the change would have no impact to recruiting at all. These results are comparable to those in Table 32 where 42 percent of focus group participants responded that the proposed change in compensation would result in a less likelihood to join the military, with 35 percent indicating that they perceived that there would be no impact to such a change.

Next, we asked focus group and SOFA participants to respond to a second question:

2. Suppose DoD increased basic pay for Service members but removed the Basic Allowance for Housing. This would mean

- Service members living in civilian/privatized housing that they own or rent would receive the same pay as Service members living in rent-free, government-owned housing.
- On average, Service members living in civilian/privatized housing that they own or rent would see a decrease in their earnings (after taxes).
- On average, Service members living in government-owned housing that they do not pay rent for would see an increase in their earnings (after taxes); however, they may have to start paying rent for their housing.

a. Would you support or oppose the change described above?

1. Strongly oppose	2. Somewhat oppose	3. Neither oppose nor support	4. Somewhat support	5. Strongly support

Table 34. Focus Group Responses to a Single-Salary System

	Percentages				
Overall and Service	**1**	**2**	**3**	**4**	**5**
Total	55%	23%	12%	8%	2%
Army	65%	18%	11%	5%	1%
Active Component	65%	19%	10%	5%	1%
Reserve Component	65%	17%	12%	4%	2%
Navy	42%	28%	12%	14%	4%
Active Component	48%	24%	12%	12%	4%
Reserve Component	20%	43%	15%	18%	4%
Marine Corps	48%	27%	10%	10%	5%
Active Component	43%	29%	11%	12%	5%
Reserve Component	84%	8%	8%	0%	0%
Air Force	66%	19%	10%	4%	1%
Active Component	68%	18%	10%	3%	1%
Reserve Component	61%	20%	10%	7%	2%
Pay Grade					
Enlisted	50%	22%	15%	10%	3%
E1-E4	35%	25%	18%	16%	6%
E5-E9	54%	22%	14%	8%	2%
Officers	62%	23%	6%	7%	2%
W1-W5	79%	13%	4%	4%	0%
O1-O3	60%	24%	9%	6%	1%
O4-O6	60%	25%	6%	7%	2%
Location					
State with Tax	52%	24%	12%	10%	2%
State without Tax	57%	21%	10%	7%	5%
On Base	54%	19%	12%	10%	5%
Off Base	57%	23%	11%	7%	2%
Family Status					
Single	44%	28%	13%	12%	3%
With Dependents	52%	25%	12%	10%	1%
Without	40%	29%	16%	12%	3%
Married	61%	20%	10%	7%	2%
Working Spouse	60%	21%	8%	8%	3%
Dual Service Spouse	66%	16%	9%	6%	3%

Source: IDA Analysis of Research Participant Responses.

As Table 34 shows, overall, 78 percent of research participants indicated that they "strongly opposed" or "somewhat opposed" this particular proposed change. Again,

subpopulations associated with Service, grade, location, and family status are also depicted. Now we compare these responses to those in the SOFA as shown in Table 35.

Table 35. SOFA Responses to a Single-Salary System

182. Suppose DoD increased basic pay for Service members but removed the Basic Allowance for Housing. This would mean: Service members living in civilian/privatized housing that they own or rent would receive the same pay as Service members living in rent-free government-owned housing; on average, Service members living in civilian/privatized housing that they own or rent would see a decrease in their earnings (after taxes); and on average, Service members living in government-owned housing that they do not pay rent for would see an increase in their earnings (after taxes); however, they may have to start paying rent for their housing. Would you support or oppose the change described above?

1. Strongly oppose
2. Somewhat oppose
3. Neither support nor oppose
4. Somewhat support
5. Strongly support

	% Resp.	Percentages 1	2	3	4	5	Max ME	Percentage Reporting Somewhat Support/Strongly Support	
OVERALL AND SERVICE									
Total DoD	75	61	14	16	5	4	±2	9.0	±2.0
Army	72	55	16	17	6	5	±3	11.0	±3.0
Navy	77	65	11	14	5	4	±3	9.0	±2.0
Marine Corps	71	49	15	23	5	7	±5	13.0	±4.0
Air Force	82	69	13	13	3	2	±3	5.0	±1.0
PAYGRADE									
Enlisted	73	58	14	18	5	5	±2	10.0	±2.0
3 to 5 Years of Service	71	51	15	21	7	5	±4	12.0	±3.0
6 to 9 Years of Service	75	69	10	14	3	4	±5	7.0	±3.0
E1–E4	69	46	17	23	7	7	±3	14.0	±3.0
E5–E9	77	68	12	14	4	3	±3	7.0	±2.0
Officers	85	73	14	7	3	2	±2	5.0	±1.0
W1–W5	82	72	12	10	4	2	±4	7.0	±3.0
O1–O3	84	74	14	7	3	2	±3	4.0	±2.0
O4–O6	87	72	14	8	4	3	±2	7.0	±2.0
LOCATION									
U.S. (Incl. Territories)	76	62	14	15	5	4	±2	9.0	±2.0
Overseas	75	53	17	21	5	5	±4	10.0	±3.0
Europe	79	63	15	14	5	3	±6	8.0	±4.0
Asia and Pacific	74	49	18	22	5	5	±5	11.0	±4.0
On Base	71	44	18	23	8	8	±3	16.0	±3.0
Off Base	78	72	12	11	3	2	±2	5.0	±1.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	76	64	13	16	4	3	±3	7.0	±2.0
Not Deployed in Past 24 Months	75	59	15	16	5	5	±2	10.0	±2.0
EDUCATION									
No College	69	46	15	25	6	7	±4	13.0	±4.0
Some College	76	62	14	15	5	4	±3	9.0	±2.0
4-Year Degree	79	70	14	9	4	3	±3	7.0	±2.0
Grad/Prof Degree	86	72	13	8	3	3	±2	7.0	±2.0
FAMILY STATUS									
Single	73	50	16	19	7	7	±3	14.0	±3.0
With Child(ren)	72	66	14	11	5	3	±6	8.0	±4.0
Without Child(ren)	73	49	17	20	7	7	±3	14.0	±3.0
Married	77	69	12	13	3	2	±2	6.0	±1.0
With Child(ren)	78	70	12	13	3	3	±2	6.0	±2.0
Without Child(ren)	75	68	13	13	3	2	±4	5.0	±2.0
Working Spouse	77	72	12	11	3	2	±3	5.0	±2.0
Dual Service Spouse	75	76	14	7	2	2	±5	3.0	±2.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

When the proposed compensation change regarding a single salary system was provided to Service members via the 2019 SOFA, 75 percent of survey respondents opposed such a change to varying degrees, compared to 78 percent of the Service members that participated in focus groups.

As with question 1, service members were then asked the extent to which enactment of such a proposal would impact their retention and the recruiting of others not yet in the military. Table 36 summarizes the responses to this question from the focus groups, and Table 37 summarizes the responses to the same question in the SOFA.

b. Would the change described above make you more likely to stay, more likely to leave, or have no impact on your decision to remain in service at the end of your service obligation/commitment?

1. Much more likely to leave	2. Somewhat more likely to leave	3. No impact	4. Somewhat more likely to stay	5. Much more likely to stay

Table 36. Retention Perceptions Related to a Single-Salary System (Focus Groups)

	Percentages				
	1	**2**	**3**	**4**	**5**
Total	33%	29%	34%	3%	1%

Source: IDA Analysis of Research Participant Responses.

While "no impact" received the greatest number of responses to this question regarding retention perceptions, 62 percent of research participants indicated that they would be "much more likely to leave" or "somewhat more likely to leave" as a response to the proposed change. We now consider responses to the same question in the SOFA.

Table 37. Retention Perceptions Related to a Single-Salary System (SOFA)

183. Would the change described in Q182 make you more likely to stay, more likely to leave, or have no impact on yo decision to remain in service at the end of your service obligation/commitment?

1. Much more likely to leave
2. Somewhat more likely to leave
3. No impact
4. Somewhat more likely to stay
5. Much more likely to stay

	% Resp.	Percentages					Max ME	Percentage Reporting Somewhat More Likely to Stay/Much More Likely to Stay	
		1	2	3	4	5			
OVERALL AND SERVICE									
Total DoD	75	45	21	28	4	2	±2	6.0	±1.0
Army	72	41	21	30	5	4	±3	8.0	±3.0
Navy	77	49	21	24	3	2	±3	6.0	±2.0
Marine Corps	71	38	16	38	5	3	±5	8.0	±4.0
Air Force	82	51	24	22	2	1	±3	3.0	±1.0
PAYGRADE									
Enlisted	73	44	19	30	4	3	±2	7.0	±2.0
3 to 5 Years of Service	71	43	15	34	6	3	±4	8.0	±3.0
6 to 9 Years of Service	75	52	20	24	1	3	±5	4.0	±3.0
E1–E4	69	35	18	36	7	4	±4	11.0	±3.0
E5–E9	77	51	20	24	2	2	±3	4.0	±2.0
Officers	84	51	28	19	1	1	±2	2.0	±1.0
W1–W5	81	56	22	18	2	1	±4	3.0	±2.0
O1–O3	83	51	29	18	1	1	±3	2.0	±1.0
O4–O6	86	49	28	21	2	1	±2	2.0	±1.0
LOCATION									
U.S. (Incl. Territories)	75	47	21	26	3	3	±2	6.0	±2.0
Overseas	75	38	20	34	5	2	±4	7.0	±3.0
Europe	79	45	21	28	4	2	±5	6.0	±4.0
Asia and Pacific	74	37	20	36	5	3	±5	7.0	±3.0
On Base	71	31	20	38	7	5	±3	11.0	±3.0
Off Base	78	55	22	21	1	1	±2	3.0	±1.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	76	50	19	26	3	2	±3	5.0	±2.0
Not Deployed in Past 24 Months	75	43	22	28	4	3	±2	7.0	±2.0
EDUCATION									
No College	69	34	18	37	7	4	±4	11.0	±4.0
Some College	76	48	19	27	3	2	±3	5.0	±2.0
4-Year Degree	79	50	25	20	2	2	±3	4.0	±2.0
Grad/Prof Degree	85	50	26	21	2	1	±2	3.0	±1.0
FAMILY STATUS									
Single	73	35	22	34	6	4	±3	10.0	±2.0
With Child(ren)	72	49	20	26	3	2	±6	5.0	±5.0
Without Child(ren)	73	33	22	34	7	4	±3	11.0	±3.0
Married	77	54	20	23	2	1	±2	3.0	±1.0
With Child(ren)	78	54	21	23	2	1	±3	3.0	±1.0
Without Child(ren)	75	54	20	23	2	1	±4	3.0	±2.0
Working Spouse	76	56	20	22	1	1	±3	2.0	±1.0
Dual Service Spouse	75	60	21	17	1	1	±5	2.0	±2.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

In terms of retention, 66 percent of SOFA respondents indicated a proclivity to leave military service, compared to 62 percent of those participating in the focus groups. Here, "much more likely to leave" received the largest percentage of responses at 45 percent. Next, we ask for perceptions associated with recruiting. Table 38 summarizes the responses to this question from the focus groups, and Table 39 summarizes the responses to the same question in the SOFA.

c. For those considering joining the military, do you think the change described above would make them more likely to join, less likely to join, or have no impact on their decision to join?

1. Much less likely to join	2. Somewhat less likely to join	3. No impact	4. Somewhat more likely to join	5. Much more likely to join

Table 38. Recruiting Perceptions Related to a Single-Salary System (Focus Groups)

	Percentages				
	1	**2**	**3**	**4**	**5**
Total	20%	33%	31%	12%	4%

Source: IDA Analysis of Research Participant Responses.

Focus group participants indicated that they thought the proposed change to compensation would potentially have an adverse impact on recruiting (53 percent "much less likely to join" or "somewhat less likely to join"). However, roughly one-third (31 percent) indicated that there would be "no impact" to recruiting at all.

Table 39. Recruiting Perceptions Related to a Single-Salary System (SOFA)

184. For those considering joining the military, do you think the change described in Q182 would make them more li join, less likely to join, or have no impact on their decision to join?

1. Much less likely to join
2. Somewhat less likely to join
3. No impact
4. Somewhat more likely to join
5. Much more likely to join

	% Resp.	Percentages					Max ME	Percentage Reporting Somewhat More Likely to Join/Much More Likely to Join	
		1	2	3	4	5			
OVERALL AND SERVICE									
Total DoD	75	35	24	31	6	3	±2	9.0	±1.0
Army	72	32	24	33	7	4	±3	11.0	±3.0
Navy	77	38	23	28	7	3	±3	10.0	±2.0
Marine Corps	71	26	23	38	11	3	±5	14.0	±4.0
Air Force	81	42	27	27	3	1	±3	5.0	±1.0
PAYGRADE									
Enlisted	73	35	23	32	7	3	±2	11.0	±2.0
3 to 5 Years of Service	71	34	21	33	9	4	±4	13.0	±3.0
6 to 9 Years of Service	75	41	23	28	5	3	±5	8.0	±3.0
E1–E4	69	29	23	34	10	4	±4	14.0	±3.0
E5–E9	77	40	23	30	5	3	±3	8.0	±2.0
Officers	84	38	31	27	3	1	±2	4.0	±1.0
W1–W5	82	40	22	31	6	1	±4	7.0	±3.0
O1–O3	83	41	31	24	3	1	±3	4.0	±1.0
O4–O6	87	33	33	30	3	1	±2	5.0	±1.0
LOCATION									
U.S. (Incl. Territories)	75	36	25	30	6	3	±2	9.0	±2.0
Overseas	75	31	24	35	8	3	±4	11.0	±3.0
Europe	79	35	25	30	8	2	±5	10.0	±5.0
Asia and Pacific	74	31	24	36	5	4	±5	9.0	±4.0
On Base	71	26	23	36	10	5	±3	14.0	±3.0
Off Base	78	41	25	27	4	2	±2	6.0	±1.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	76	38	24	31	5	3	±3	7.0	±2.0
Not Deployed in Past 24 Months	75	34	25	31	7	3	±2	10.0	±2.0
EDUCATION									
No College	69	29	22	36	9	4	±4	13.0	±3.0
Some College	76	37	22	31	7	3	±3	10.0	±2.0
4-Year Degree	79	40	29	25	4	2	±3	6.0	±2.0
Grad/Prof Degree	85	35	31	28	4	2	±2	5.0	±2.0
FAMILY STATUS									
Single	73	30	25	32	8	4	±3	12.0	±2.0
With Child(ren)	72	37	23	33	6	2	±6	7.0	±4.0
Without Child(ren)	73	29	26	32	9	4	±3	13.0	±3.0
Married	77	40	24	30	5	2	±2	7.0	±2.0
With Child(ren)	78	38	24	31	5	2	±3	7.0	±2.0
Without Child(ren)	75	43	23	27	4	3	±4	7.0	±2.0
Working Spouse	77	41	23	30	4	2	±3	6.0	±2.0
Dual Service Spouse	75	45	27	24	3	2	±5	5.0	±3.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

When queried about impacts to recruiting, 59 percent of SOFA respondents indicated a negative (less likely to join) impact to varying degrees, while 31 percent, just like in the focus group responses, indicated that there would be no impact.

In the final section of the close-ended instrument and in the SOFA, research participants were asked a series of questions regarding their retention perceptions based on after-tax impacts to their income due to a change to a salary system. First, participants were asked to comment on their perceptions based on a 5 percent increase to their earnings,

followed by the same question, only with a 5 percent decrease in their earnings. The questions were asked again at the 10 percent level, followed by a final query regarding a 20 percent increase in earnings. Responses are exhibited in Table 40 below.

1. Much more likely to leave	2. Somewhat more likely to leave	3. No impact	4. Somewhat more likely to stay	5. Much more likely to stay

Table 40. Retention Perceptions with Changes in Earnings (Focus Groups)

	Percentages				
Change to Earnings	**1**	**2**	**3**	**4**	**5**
Increase 5%	5%	5%	39%	37%	14%
Decrease 5%	32%	44%	22%	1%	1%
Increase 10%	3%	4%	22%	43%	28%
Decrease 10%	56%	27%	15%	1%	1%
Increase 20%	3%	3%	15%	26%	53%

Source: IDA Analysis of Research Participant Responses.

With a 5 percent increase in earnings, one can observe that 39 percent of research participants indicated that this would have "no impact" in terms of their retention perceptions. At the same time, 37 percent indicated that they would be "somewhat more likely to stay," with another 14 percent indicating that they would be "much more likely to stay." With a 5 percent decrease in earnings, we observe a very different response from research participants. Instead of 39 percent indicating that a 5 percent increase in earnings would have "no impact" on their retention perceptions, and a combined 51 percent indicating a likelihood to stay, we see that only 22 percent indicated that a 5 percent decrease would have "no impact" and a combined 76 percent suggest that they would have a likelihood to leave.

At the 10 percent increase in earnings query, 22 percent of research participants indicated that such an increase would have "no impact" on their retention perceptions. Additionally, 71 percent indicated a likelihood to stay. When the same question is posed with a 10 percent decrease in earnings, 56 percent of focus group participants indicated that they would be "much more likely to leave," the largest number of responses to this question. Finally, with a 20 percent increase in earnings, we observe likelihood-to-stay responses by research participants similar to that of the likelihood-to-leave responses with a 10 percent decrease in earnings. As we next observe in Table 41 through Table 45, responses in the SOFA were not too dissimilar from the responses obtained during focus group sessions.

Table 41. Retention Perceptions with a 5 percent Increase in Earnings (SOFA)

185. If a change to a salary system....

a. Increased your earnings (after taxes) by 5%, how would that impact your decision to remain in service?

1. Much more likely to leave
2. Somewhat more likely to leave
3. No impact
4. Somewhat more likely to stay
5. Much more likely to stay

	% Resp.	Percentages					Max ME	Percentage Reporting Somewhat More Likely to Stay/Much More Likely to Stay	
		1	2	3	4	5			
OVERALL AND SERVICE									
Total DoD	74	7	6	43	32	13	±2	44.0	±2.0
Army	70	6	5	42	31	15	±3	47.0	±3.0
Navy	76	9	6	43	32	11	±3	43.0	±3.0
Marine Corps	70	6	5	49	30	10	±5	41.0	±5.0
Air Force	80	8	6	42	32	12	±3	44.0	±3.0
PAYGRADE									
Enlisted	72	7	6	42	31	14	±2	45.0	±2.0
3 to 5 Years of Service	70	8	4	48	30	9	±4	40.0	±4.0
6 to 9 Years of Service	74	8	6	40	28	18	±5	46.0	±5.0
E1–E4	68	5	4	44	33	14	±4	47.0	±4.0
E5–E9	76	9	7	41	29	14	±3	43.0	±3.0
Officers	84	6	5	46	35	8	±2	42.0	±2.0
W1–W5	80	9	10	42	29	10	±4	39.0	±4.0
O1–O3	83	5	4	47	35	8	±3	43.0	±3.0
O4–O6	86	7	6	45	35	7	±2	42.0	±2.0
LOCATION									
U.S. (Incl. Territories)	74	8	6	42	32	12	±2	44.0	±2.0
Overseas	74	5	4	46	30	14	±4	44.0	±4.0
Europe	79	6	6	49	26	14	±5	40.0	±5.0
Asia and Pacific	73	6	4	44	33	13	±5	47.0	±5.0
On Base	70	6	5	44	32	14	±3	46.0	±3.0
Off Base	77	8	6	43	31	11	±2	43.0	±2.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	74	8	6	42	31	13	±3	44.0	±3.0
Not Deployed in Past 24 Months	74	7	5	43	32	13	±2	44.0	±2.0
EDUCATION									
No College	68	6	4	42	33	15	±4	48.0	±4.0
Some College	74	8	6	43	30	13	±3	43.0	±3.0
4-Year Degree	78	8	5	43	33	11	±3	44.0	±3.0
Grad/Prof Degree	85	7	7	45	34	7	±2	41.0	±2.0
FAMILY STATUS									
Single	72	5	4	45	33	13	±3	46.0	±3.0
With Child(ren)	71	10	8	35	30	17	±6	47.0	±6.0
Without Child(ren)	72	4	4	46	33	12	±3	46.0	±3.0
Married	76	9	7	41	30	13	±2	43.0	±2.0
With Child(ren)	77	9	7	40	31	13	±3	44.0	±3.0
Without Child(ren)	73	10	6	43	29	12	±4	42.0	±4.0
Working Spouse	75	9	7	42	30	11	±3	42.0	±3.0
Dual Service Spouse	73	9	8	41	29	13	±5	42.0	±5.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

With a 5 percent increase in earnings, we observe that 45 percent of survey participants indicated, to varying degrees, an intent to remain in service with 43 percent, the largest number of responses, indicating that such a change would have no impact. When we ask the same question with a 5 percent loss of earnings, we obtain the following responses.

Table 42. Retention Perceptions with a 5 percent Decrease in Earnings (SOFA)

185. If a change to a salary system....

b. Decreased your earnings (after taxes) by 5%, how would that impact your decision to remain in service?

1. Much more likely to leave
2. Somewhat more likely to leave
3. No impact
4. Somewhat more likely to stay
5. Much more likely to stay

	% Resp.	Percentages					Max ME	Percentage Reporting Somewhat More Likely to Stay/Much More Likely to Stay	
		1	2	3	4	5			
OVERALL AND SERVICE									
Total DoD	74	40	36	22	1	0	±2	2.0	±1.0
Army	70	41	34	23	2	1	±3	2.0	±2.0
Navy	76	41	35	21	2	0	±3	2.0	±2.0
Marine Corps	70	33	37	28	2	1	±5	2.0	±2.0
Air Force	80	41	40	18	1	1	±3	1.0	±1.0
PAYGRADE									
Enlisted	72	40	35	23	2	1	±2	2.0	±1.0
3 to 5 Years of Service	70	42	33	23	1	0	±4	1.0	±1.0
6 to 9 Years of Service	74	41	35	21	2	1	±5	3.0	±2.0
E1–E4	68	37	33	27	2	1	±3	3.0	±2.0
E5–E9	76	43	36	20	1	0	±3	2.0	±1.0
Officers	84	40	42	18	1	0	±2	1.0	±1.0
W1–W5	80	51	34	13	1	1	±4	1.0	±2.0
O1–O3	83	39	42	18	0	0	±3	1.0	±1.0
O4–O6	86	39	43	17	1	0	±2	1.0	±1.0
LOCATION									
U.S. (Incl. Territories)	74	41	36	21	1	0	±2	2.0	±1.0
Overseas	74	34	37	28	2	1	±4	2.0	±2.0
Europe	79	35	42	21	2	0	±5	2.0	±2.0
Asia and Pacific	73	37	33	29	1	0	±5	1.0	±1.0
On Base	70	36	34	27	2	1	±3	3.0	±2.0
Off Base	77	43	37	19	1	0	±2	1.0	±1.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	74	45	34	19	1	0	±3	2.0	±1.0
Not Deployed in Past 24 Months	74	38	37	23	1	1	±2	2.0	±1.0
EDUCATION									
No College	67	32	35	29	2	1	±4	3.0	±2.0
Some College	74	43	35	21	1	0	±3	1.0	±1.0
4-Year Degree	78	43	37	18	1	1	±3	2.0	±1.0
Grad/Prof Degree	85	40	42	17	1	0	±2	1.0	±1.0
FAMILY STATUS									
Single	72	33	37	27	2	1	±3	3.0	±2.0
With Child(ren)	70	41	40	18	1	0	±6	1.0	±2.0
Without Child(ren)	72	33	37	28	2	1	±3	3.0	±2.0
Married	76	45	35	18	1	0	±2	1.0	±1.0
With Child(ren)	77	46	35	17	1	0	±3	1.0	±1.0
Without Child(ren)	73	44	35	20	1	0	±4	1.0	±1.0
Working Spouse	75	46	35	17	1	0	±3	1.0	±1.0
Dual Service Spouse	73	51	34	14	1	0	±5	1.0	±2.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

With a 5 percent decrease in earnings, 76 percent of survey respondents indicated a likelihood to leave service, with 22 percent indicating that this level of decrease would have no impact on their decision. An interesting observation is that a 5 percent decrease in earnings impacted survey respondent likelihood to leave service (76 percent) much more than a 5 percent increase impacted respondent likelihood to remain in service (45 percent). We now pose the same set of questions at the 10 percent level of earnings.

Table 43. Retention Perceptions with a 10 Percent Increase in Earnings (SOFA)

185. If a change to a salary system....
c. Increased your earnings (after taxes) by 10%, how would that impact your decision to remain in service?

1. Much more likely to leave
2. Somewhat more likely to leave
3. No impact
4. Somewhat more likely to stay
5. Much more likely to stay

	% Resp.	Percentages 1	2	3	4	5	Max ME	Percentage Reporting Somewhat More Likely to Stay/Much More Likely to Stay	
OVERALL AND SERVICE									
Total DoD	74	6	4	26	41	23	±2	63.0	±2.0
Army	70	5	4	28	38	26	±3	63.0	±3.0
Navy	76	8	4	25	41	21	±3	63.0	±3.0
Marine Corps	70	5	3	33	40	19	±5	59.0	±5.0
Air Force	80	6	5	22	44	23	±3	67.0	±3.0
PAYGRADE									
Enlisted	72	6	4	27	39	24	±2	63.0	±2.0
3 to 5 Years of Service	70	6	4	34	36	20	±4	56.0	±4.0
6 to 9 Years of Service	74	7	4	23	39	26	±5	66.0	±5.0
E1–E4	68	4	3	30	40	24	±4	63.0	±4.0
E5–E9	76	8	5	25	38	24	±3	62.0	±3.0
Officers	84	5	4	25	47	19	±2	66.0	±2.0
W1–W5	80	8	7	25	42	20	±4	61.0	±4.0
O1–O3	83	5	4	26	48	18	±3	66.0	±3.0
O4–O6	86	5	4	23	48	19	±2	67.0	±2.0
LOCATION									
U.S. (Incl. Territories)	74	6	5	26	41	23	±2	64.0	±2.0
Overseas	74	5	3	30	39	23	±4	62.0	±4.0
Europe	79	5	4	28	42	22	±5	64.0	±5.0
Asia and Pacific	73	5	3	29	40	23	±5	63.0	±5.0
On Base	70	4	3	29	39	24	±3	63.0	±3.0
Off Base	77	7	5	25	41	22	±2	64.0	±2.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	75	7	4	26	40	23	±3	63.0	±3.0
Not Deployed in Past 24 Months	74	5	5	27	41	23	±2	64.0	±2.0
EDUCATION									
No College	67	3	3	30	39	24	±4	63.0	±4.0
Some College	74	7	4	26	38	24	±3	63.0	±3.0
4-Year Degree	78	6	5	24	44	20	±3	65.0	±3.0
Grad/Prof Degree	85	6	5	24	47	19	±2	66.0	±2.0
FAMILY STATUS									
Single	72	4	3	30	42	22	±3	64.0	±3.0
With Child(ren)	71	7	6	22	37	27	±6	65.0	±6.0
Without Child(ren)	72	4	2	30	42	21	±3	64.0	±3.0
Married	76	7	6	24	40	24	±2	63.0	±2.0
With Child(ren)	77	7	6	23	39	24	±2	64.0	±3.0
Without Child(ren)	73	8	5	26	40	22	±4	62.0	±4.0
Working Spouse	75	8	6	24	40	22	±3	62.0	±3.0
Dual Service Spouse	72	9	5	24	40	23	±5	63.0	±5.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

With a 10 percent increase in earnings, 64 percent of survey respondents indicated a likelihood to remain in service, with 26 percent indicating that there would be no impact on their retention perceptions. The largest number of respondents, 41 percent, indicated that they would be "somewhat more likely to stay." Next, we look at responses associated with a 10 percent decrease in earnings.

Table 44. Retention Perceptions with a 10 Percent Decrease in Earnings (SOFA)

185. If a change to a salary system....
d. Decreased your earnings (after taxes) by 10%, how would that impact your decision to remain in service?

1. Much more likely to leave
2. Somewhat more likely to leave
3. No impact
4. Somewhat more likely to stay
5. Much more likely to stay

	% Resp.	Percentages					Max ME	Percentage Reporting Somewhat More Likely to Stay/Much More Likely to Stay	
		1	2	3	4	5			
OVERALL AND SERVICE									
Total DoD	74	57	26	15	1	1	±2	2.0	±1.0
Army	70	55	26	17	1	1	±3	2.0	±2.0
Navy	76	59	24	15	1	1	±3	2.0	±2.0
Marine Corps	69	49	29	19	2	1	±5	3.0	±3.0
Air Force	80	59	29	11	1	1	±3	1.0	±1.0
PAYGRADE									
Enlisted	72	55	26	17	1	1	±2	2.0	±1.0
3 to 5 Years of Service	70	56	24	17	2	1	±4	2.0	±2.0
6 to 9 Years of Service	73	58	26	14	1	1	±5	2.0	±2.0
E1–E4	68	49	28	21	2	1	±4	3.0	±2.0
E5–E9	76	60	25	13	1	0	±3	2.0	±1.0
Officers	84	62	27	10	0	0	±2	1.0	±1.0
W1–W5	81	69	20	9	1	1	±4	2.0	±2.0
O1–O3	83	61	29	9	0	0	±3	1.0	±1.0
O4–O6	86	63	27	10	0	0	±2	1.0	±1.0
LOCATION									
U.S. (Incl. Territories)	74	58	26	14	1	1	±2	2.0	±1.0
Overseas	73	50	28	20	1	1	±4	2.0	±2.0
Europe	78	54	30	15	2	0	±5	2.0	±2.0
Asia and Pacific	73	53	26	20	1	0	±5	1.0	±1.0
On Base	70	50	27	20	2	1	±3	3.0	±2.0
Off Base	77	61	26	12	1	0	±2	1.0	±1.0
DEPLOYMENT STATUS									
Deployed in Past 24 Months	75	63	22	13	1	0	±3	2.0	±1.0
Not Deployed in Past 24 Months	74	54	28	16	1	1	±2	2.0	±1.0
EDUCATION									
No College	67	45	29	24	2	1	±4	3.0	±2.0
Some College	74	59	25	14	1	0	±3	2.0	±1.0
4-Year Degree	78	61	26	11	1	0	±3	2.0	±1.0
Grad/Prof Degree	85	62	27	10	1	0	±2	1.0	±1.0
FAMILY STATUS									
Single	72	49	30	19	1	1	±3	2.0	±1.0
With Child(ren)	71	61	24	14	1	0	±6	1.0	±2.0
Without Child(ren)	72	47	31	20	1	1	±3	2.0	±2.0
Married	76	63	24	12	1	0	±2	2.0	±1.0
With Child(ren)	77	64	23	12	1	0	±3	1.0	±1.0
Without Child(ren)	73	60	25	13	1	1	±4	2.0	±2.0
Working Spouse	75	64	24	11	1	0	±3	1.0	±1.0
Dual Service Spouse	72	67	22	11	1	0	±5	1.0	±2.0

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

With a 10 percent decrease in earnings, 83 percent of survey respondents indicated a likelihood to leave service, with 57 percent of those indicating that they would be much more likely to leave. Fifteen percent of respondents indicated that such a decease would have no impact on their retention decision. In the final survey question, we again ask retention perceptions with a 20 percent increase in earnings.

Table 45. Retention Perceptions with a 20 Percent Increase in Earnings (SOFA)

185. If a change to a salary system....
e. Increased your earnings (after taxes) by 20%, how would that impact your decision to remain in service?

1. Much more likely to leave
2. Somewhat more likely to leave
3. No impact
4. Somewhat more likely to stay
5. Much more likely to stay

	% Resp.	Percentages 1	2	3	4	5	Max ME	Percentage Reporting Somewhat More Likely to Stay/Much More Likely to Stay		
OVERALL AND SERVICE										
Total DoD	74	5	3	18	25	49	±2	74.0	±2.0	
Army	70	4	2	19	24	50	±3	74.0	±3.0	
Navy	76	6	3	19	26	46	±3	73.0	±3.0	
Marine Corps	69	4	3	25	26	42	±5	68.0	±5.0	
Air Force	80	5	3	14	25	52	±3	77.0	±2.0	
PAYGRADE										
Enlisted	72	5	3	20	24	48	±2	72.0	±2.0	
3 to 5 Years of Service	70	5	2	24	28	40	±4	69.0	±4.0	
6 to 9 Years of Service	73	6	3	15	24	52	±5	76.0	±4.0	
E1–E4	68	4	2	23	25	46	±4	72.0	±3.0	
E5–E9	76	6	4	17	23	50	±3	73.0	±2.0	
Officers	84	4	3	14	30	50	±2	80.0	±2.0	
W1–W5	80	6	4	14	23	53	±4	76.0	±4.0	
O1–O3	82	3	2	14	32	48	±3	80.0	±3.0	
O4–O6	86	4	3	14	28	52	±2	79.0	±2.0	
LOCATION										
U.S. (Incl. Territories)	74	5	3	18	25	49	±2	74.0	±2.0	
Overseas	73	4	2	22	25	47	±4	72.0	±4.0	
Europe	79	4	3	19	24	50	±5	74.0	±5.0	
Asia and Pacific	72	5	2	21	27	46	±5	73.0	±5.0	
On Base	70	4	2	22	25	47	±3	71.0	±3.0	
Off Base	77	5	3	16	26	50	±2	75.0	±2.0	
DEPLOYMENT STATUS										
Deployed in Past 24 Months	74	6	2	18	25	49	±3	74.0	±3.0	
Not Deployed in Past 24 Months	74	4	3	19	25	48	±2	74.0	±2.0	
EDUCATION										
No College	67	4	2	24	25	45	±5	70.0	±4.0	
Some College	74	6	3	19	23	50	±3	73.0	±3.0	
4-Year Degree	78	5	3	14	30	48	±3	78.0	±2.0	
Grad/Prof Degree	85	4	4	14	29	50	±2	79.0	±2.0	
FAMILY STATUS										
Single	72	4	2	21	27	46	±3	72.0	±3.0	
With Child(ren)	71	6	3	16	23	52	±6	75.0	±5.0	
Without Child(ren)	72	4	2	22	27	45	±3	72.0	±3.0	
Married	76	5	3	16	24	51	±2	75.0	±2.0	
With Child(ren)	77	5	4	16	23	52	±3	75.0	±2.0	
Without Child(ren)	73	6	3	17	25	49	±4	74.0	±4.0	
Working Spouse	75	6	3	16	25	50	±3	75.0	±3.0	
Dual Service Spouse	73	7	3	15	26	49	±5	75.0	±5.0	

Note. Percent responding are active duty members who answered the question.

Source: OPA SOFA Survey 2019.

Here, we see that 74 percent of survey respondents indicated a likelihood to remain in service with a 20 percent increase in earnings. Another 18 percent of respondents indicated that at this level, there would be no impact on their retention decision.

C. Conclusion

We observed a concordance between the responses of focus group participants and those completing the SOFA survey. Both in focus group sessions and SOFA responses,

service members indicated an overall negative view of the two proposed changes to compensation, with various subpopulations taking a more negative position than others. Research participants also indicated that there would be impacts to the proposed changes both in terms of retention and to the potential recruitment of those not yet in the military. When queried about retention perceptions associated with earning levels as a result of a proposed change to a salary system, research participants responded in an asymmetric way. Any loss of earnings resulted in more unfavorable responses compared to the favorable responses associated with the same percentage of increased earnings.

10. Alternatives for Achieving the Objectives of a Salary System

As noted at the beginning of this paper, the goal of the QRMC is to determine whether the structure of the current military compensation system remains appropriate, or whether an alternative compensation structure, such as a salary system, would enhance readiness and better enable the Department of Defense to recruit and retain tomorrow's military force.

A salary system would replace BAH and BAS with an increase in basic pay. Advocates of a salary system assert that it would improve readiness by increasing the efficiency and fairness of the compensation system:

- **Efficiency**: How well compensation is targeted to support the recruitment and retention of high-quality Service members.[77] Compensation should be no higher or lower than necessary to fulfill the basic objective of attracting, retaining, and motivating a sufficient quantity and quality of Service personnel.[78]
- **Fairness**: How well compensation supports readiness by providing similar compensation for Service members making comparable contributions. In other words, the compensation should be impartial. This principal requires that all Service members be allowed to compete equally for pay and promotion according to their abilities.[79]

Past QRMC studies have examined portions of the salary system (e.g., removing the marriage premium). Examining the system as a whole, however, uniquely reveals the complex interactions among variables and the parallel policy changes necessary to establish a salary system without inducing radical swings in compensation or cost. These interactions and policy changes include the following:

- DoD's budget would need to be increased by about $9 billion.

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[77] The Fifth QRMC defines the objectives of military compensation as follows: The Uniformed Services compensation system should provide inducements and incentives which will help to attract and retain in the nation's Uniformed Services career motivated personnel with the intelligence, leadership and dedication necessary to insure successful accomplishment of the United States national security objectives. *Fifth Quadrennial Review of Military Compensation*, DoD, January 1984, I-3.

[78] Fifth QRMC, II-2.

[79] Fifth QRMC, II-2.

- Pays that are tied to basic pay, including retirement pay, would need to be recalibrated.
- Executive pay caps would need to be lifted.
- Congress would need to establish a separate pay table for inactive duty Reservists—and the Reserve Components would need to be willing to accept separate pay tables for active and inactive duty.
- The introduction of multiple pay tables (e.g., for retirement and inactive duty reserves) would introduce additional complexity and reduce the transparency of military compensation.
- A shift to federal locality pay would create significant winners and losers—and the losers are likely to feel more strongly about their losses than the winners do about their gains.
- The increased value of the Combat Zone Tax Exclusion (CZTE) would be an additional cost to the Federal Government.
- Pay-as-you-go (PAYGO) provisions would need to be adjusted to account for increases in deferred compensation.
- Rental policies and rates would need to be established for on-base housing.
- Military Housing Privatization Initiative (MHPI) agreements written with privatized housing owners would need to be renegotiated to address the elimination of BAH.
- Medicare and Social Security costs would increase, while benefit changes would be uncertain.

In weighing the transition to a salary system, it is also essential to consider alternative mechanisms—short of adopting a salary system—for improving the efficiency and fairness of the current system, and thereby enhancing readiness.

This chapter describes several compensation reforms that that do not entail the complexity and risks of unintended consequences associated with the wholesale transition to a salary system. These reforms represent fundamental but more narrowly focused improvements that lend themselves to incremental adoption, pilot testing, and experimentation more readily than a transition to a salary system. We provide these improvements not to advocate for particular alternatives. Instead, we mean to suggest that the QRMC's task of evaluating initiatives for improving readiness need not be limited to an all-or-nothing choice between a salary system and the status quo.

In sum, these narrower reform alternatives demonstrate two significant points. First, as noted, there are reasonable alternatives for reforming current compensation to improve efficiency and fairness short of the wholesale transition to a salary system. Second, even

the limited alternatives described here raise significant tradeoffs that require careful thought and analysis. Given limited budgets for compensation, careful analysis would be needed to ensure that any reallocation of available pay would increase readiness sufficiently in targeted areas to offset the potential readiness losses within communities that would lose pay.

A. Observations on the Current Cash Payment System and Ideas for Reform

To illustrate our examples, the salient characteristics of the current cash compensation system are summarized in Table 46. Based on CBO's data, total cash compensation equals $89 billion annually (2019 dollars).[80] The various components of compensation—basic pay (63 percent), allowances for subsistence (6 percent), allowances for housing (22 percent), and special and incentive pays (8.6 percent)—contribute in varying degrees to the efficiency and perceived fairness of compensation.

Each component's contribution to readiness depends on how well the component is targeted to members whose readiness is sensitive to that component of compensation (efficiency), while balancing this against considerations of fairness. For example, the field fact-finding for this study, reported in the previous chapter, found that most Service members believe those with significant responsibilities should be compensated accordingly. Most also believe those who have onerous duty assignments, or are pulling unusually long hours, should be compensated fairly. Therefore, compensation that encourages significant contributions is considered "efficient" while compensation for difficult duty is considered "fair." However, striking the right balance between the two is largely a matter of subjective judgement.

As analyzed in the preceding chapters, the transition to a salary system would have complex implications for the compensation system, Service member welfare, and Service member behaviors. Not surprisingly, as we have shown, those implications can vary greatly across subpopulations of the force, depending on their current situation and the nature of the alternative salary system. In the remainder of this section, we evaluate how several major components of military pay contribute to readiness.

Basic pay ($56.7 billion; 63.5 percent of cash pay): Each Service member's basic pay depends on pay grade and years of service. Basic pay is also tied to other compensation components, such as retirement pay and continuation pay. The basic pay tables are intended to reward professional performance as a means to promotion and career longevity. Additionally, the pay tables are intended to foster fairness: the exact same pay is provided to every Service member of a given rank and career longevity. The basic pay tables thus

[80] "Approaches to Changing Military Compensation," Congressional Budget Office, January 2020.

are intended to provide both fairness as well as career progression incentives to foster readiness.

BAH ($19.3 billion; 21.6 percent of cash pay): BAH is an allowance based on an index of housing costs near the Service member's assigned location. This allowance is geared to an entitlement to a standard size of house that varies by rank and whether the Service member has dependents. BAH is available to all Service members who are not provided government-owned housing. As shown in Chapter 2, the variability in BAH across Service members mainly reflects the substantial variations in the cost of housing across DoD's assignment locations. Housing costs are, of course, a major element of the cost of living. Providing a comparable housing benefit across locations is required to enable DoD to move Service members to new assignments without radically altering their ability to afford a reasonably stable lifestyle. Therefore, the locality pay component of BAH contributes to compensation stability and predictability across assignments, and, by supporting mobility, also contributes to readiness.

BAS ($5.6 billion; 6.3 percent of cash pay): BAS depends only on whether the Service member is an officer or enlisted. Within those categories, BAS is set at a flat rate for all Service members. BAS, therefore, provides no direct behavioral incentives. However, its contribution to raising the overall level of compensation no doubt contributes to DoD's competitiveness in recruiting and retaining personnel.

Table 46. Observations on Components of Current Cash Compensation

Cash Compensation Component	Amount ($ Billion in 2019)	Incentive Effects	External Linkages and Interdependencies	Common Reform Ideas
Basic Pay	56.7	• Performance (readiness) • Promotion (rank) • Longevity	• Federal and state income tax liabilities • Retirement benefits • Eligibility for federal and college assistance • Earned income tax credit	• Steepen progression to incentivize productivity • Create multiple pay tables to tailor by occupation • Expand the basic pay pool by transferring funds from allowances with weak readiness incentives
BAH	19.3	• Equalizes cost of living across locations; incentivizes mobility • Weakly rewards rank and thus performance and readiness	• Avoids taxation • Not paid when Service member uses government-owned housing	• Eliminate all BAH and transfer funds to pay for readiness incentives; provide locality pay by adjusting basic pay • Eliminate “dependents’ premium” ($2.4B) & transfer funds to pay for readiness incentives • Equalize the benefit for BAH recipients and those in government-owned housing (i.e., equalize pay for everyone and charge rent for government owned-housing)
BAS	5.6	• No readiness incentives; per capita allowance for every Service member	• Tax-free BAS determines tax liability	• Eliminate BAS and transfer funds to pay for readiness incentives
Targeted, Flexible Pays	7.7	• Targets DoD readiness needs	• Most pays are taxable • Combat zone tax exclusion determines tax liability	• Improve targeting to focus on the most important readiness issues; remove outdated pays • Expand the pool by transferring funds from allowances with weak readiness incentives

Targeted, Flexible Pays ($7.7 billion; 8.6 percent of cash pay): Used effectively, the targeted, flexible pays have the clearest and most direct influence on readiness. DoD’s current cash compensation system already incorporates a high degree of flexibility, particularly through the many categories of special and incentive pays. As described in Chapter 2, Congress has provided DoD with substantial flexibility to target extra pay where necessary to address readiness issues.

1. Taxation, Federal Benefits, and Other Interdependencies

The fourth column of Table 46 identifies the major linkages and interdependencies that must be accounted for when analyzing possible changes in the components of compensation. Each Service member's tax liability depends on his or her military income other than allowances, months of service in a combat zone, non-military income, marital status, spousal income, home-of-record state, years of service, and number of dependents. In addition, compensation in the form of tax savings can be a significant component of compensation. Social Security and retirement benefits are also significant forms of compensation that are tied to basic pay, as are a household's eligibility for federal benefits, such as food assistance or college tuition relief.

2. Common Pay Reform Ideas

The right-hand column of Table 46 identifies several common ideas for reforming current cash compensation. It is worth noting that most of these reforms are not inherently tied to the idea of converting allowances to a salary system—that is, these reforms could be pursued whether or not a salary system is adopted.

We discuss four major reform examples here:

- Market-based adjustments to basic pay
- Assignment pay that better reflects Service member preferences
- Better use of targeted and flexible pays
- Better quality and equitable accessibility of in-kind benefits, particularly housing and childcare

B. Market-Based Adjustments to Basic Pay

Consistent with the 2017 NDAA, this paper treats a single-salary system as using the same pay table for all people of a given rank and years of service, with the exception of locality variations. However, as part of its work for the Thirteenth QRMC, we were asked to consider two related topics that could involve revisions of basic pay tables:

- How a salary system might introduce market competitive pay to better compete with the civilian market for skills in high demand
- How a salary system might incorporate pay for performance

1. Market-Based Competitive Pay

A common reform idea is to create alternatives of the basic pay table tailored to the competitive market conditions for specific occupations. Such a salary system is currently used for civilian physicians and dentists by both the Department of Veterans Affairs and

DoD. The DoD Civilian Physicians and Dentists Pay Plan (PDPP) applies to DoD civilian physicians and dentists at GS-15 and below who provide direct patient care services or services incident to direct patient care.[81] The GS system, with its pay grades and steps, is conceptually similar to the military basic pay system. The PDPP supplements basic pay with market pay. Market pay for individual employees is determined by evaluating seven criteria: level of experience, need for specialty, healthcare labor market, board certifications, professional accomplishments, unique circumstances, qualifications or credentials, and compliance with merit system principles. In other words, the PDPP system is a hybrid pay-banded system designed to compete for high-demand skills and reward outstanding accomplishments.

DoD follows the pay table and tier structure, shown in Table 47, established by the Secretary of the Department of Veterans Affairs. Four pay tables cover market pay for different medical specialties and two tables cover specified management assignments. Tiers incorporate pay ranges within a table based on factors pertaining to the position, such as scope and complexity, level of responsibility, location of practice, teaching responsibilities, and level of expertise.

Local Activity Compensation Panels and Authorized Management Officers have authority to determine the compensation of individual personnel. The pay range within each table and tier is quite large, allowing the flexibility to compensate physicians according to market conditions and individual qualifications.

[81] "DoD Civilian Personnel Management System: DoD Civilian Physicians and Dentists Pay Plan (PDPP)," DoD Instruction 1400.25, Volume 543, OUSD (P&R), February 12, 2018.

Table 47. Specialty-Based Pay Tables for the Civilian Physicians and Dentists Pay Plan (PDPP)

Final Approved Pay Ranges for Physicians and Dentists
Effective January 7, 2018

Pay Table 1	Specialty/Assignment	Pay Table 2	Specialty/Assignment
Tier 1: **$103,395** - 225,000 Tier 2: $110,000 - 234,000 Tier 3: $120,000 - 262,000	Endocrinology Endodontics General Practice – Dentistry Geriatrics Infectious Diseases Internal Medicine / Primary Care / Family Practice Palliative Care Periodontics Preventive Medicine Prosthodontics Rheumatology All other specialties or assignments not requiring a specific specialty training or certification	Tier 1: **$103,395** - 264,000 Tier 2: $115,000 - 292,000 Tier 3: $130,000 - 320,000	Allergy and Immunology Hospitalist Nephrology Neurology Pathology PM&R / SCI Psychiatry
Pay Table 3	**Specialty/Assignment**	**Pay Table 4**	**Specialty/Assignment**
Tier 1: **$103,395** - 348,000 Tier 2: $120,000 - 365,000 Tier 3: $135,000 - 385,000	Anesthesiology Pain Management Cardiology (Non-Invasive) Emergency Medicine Gynecology Hematology – Oncology Nuclear Medicine Ophthalmology Oral Surgery Pulmonary	Tier 1: **$103,395** - 400,000 Tier 2: $125,000 - 400,000	Anesthesiology Cardiology (Invasive/Non-Interventional) Cardio-Thoracic Surgery Critical Care Dermatology Dermatology MOHS Gastroenterology General Surgery Interventional Cardiology Interventional Radiology Neurosurgery Orthopedic Surgery Otolaryngology Plastic Surgery Radiology (Diagnostic) Radiation Oncology Urology Vascular Surgery
Pay Table 5	**Specialty/Assignment**	**Pay Table 6**	**Specialty/Assignment**
Tier 1: $150,000 - 309,000 Tier 2: $145,000 - 289,000 Tier 3: $140,000 - 270,000	VHA Chiefs of Staff – Tier assignments are based on published facility complexity level Tier 1 – Complexity Levels 1a & 1b Tier 2 – Complexity Levels 1c & 2 Tier 3 – Complexity Level 3, facilities with no designated level, Deputy Chiefs of Staff at Complexity Levels 1a and 1b	Tier 1: $145,000 - 265,000 Tier 2: $145,000 - 245,000 Tier 3: $130,000 - 235,000	Tier 1 – Principal Deputy; other Deputy Under Secretaries for Health; Chief Officers; Network Directors; Medical Center Directors; Network Chief Medical Officers Tier 2 – Executive Directors; other Assistant Under Secretaries for Health; VACO Chief Consultants; National Directors; National Program Managers Tier 3 – All VACO physicians or dentists not otherwise defined

Minimum annual rates of pay for Pay Tables 1 through 4 adjusted to reflect increase made to the Physician and Dentist Base and Longevity Pay Schedule effective Jan 7, 2018.

Although this flexibility could be built into a single-salary system for military personnel, it also could be built into the current system of pay and tax-free allowances. DoD could establish a "standard" pay table for all ranks and occupation-based pay tables for different occupations or specialties. Each table would have "tiers" that represent increasing levels of responsibility or onerous working conditions (e.g., long hours or risky work). Each tier could have a minimum and maximum value that would be multiplied by the standard pay for an individual of that rank to define the appropriate pay band.[82] For example, suppose the standard pay table assigns $3,000 per month to an E-5. A particular E-5 could be assigned to Pay Table 1 (based on occupation) and Tier 3 (based on level of responsibility), which might have a multiple range of 1.3 to 1.8 or a pay band of $3,900 to $5,400 per month. More accomplished Service members, or members in billets with greater responsibilities or more strenuous duties, could be paid on the higher end of the pay band for their table and tier. Leaders could evaluate critical occupations annually and assign

[82] Alternatively, a singular factor could be used (e.g., 1.2) for each tier, eliminating the flexibility of pay bands but simplifying the administrative requirements of such a system.

occupations to new tables as market conditions change; pay levels could be similarly adjusted.

Such alternative pay tables could be adopted for occupations where the current uniform table does not account for the value of experience and the competitiveness of external markets for needed skills. Examples include language skills, cyber workforce skills, and other areas where education and experience are more important than youth and vigor. It is not clear, however, that introducing a "market pay" element into pay tables would be as flexible as or any more effective than the current system of special and incentive pays.

This alternative system would grant flexibility; however, it would also come at some cost. New administrative processes would have to be set up annually both to determine the pay multiples for each table and tier, and to determine the specific pay for each Service member within his or her respective pay band. In addition, rules would have to be set up to determine when and how to evaluate each Service member's pay.

2. Pay for Performance

Pay-for-performance systems represent another dimension of a market-based compensation system. They are designed to be competitive in attracting and retaining high achievers—those who would be in the top deciles of earners in national markets. In practice, such systems are designed to reward individuals for achieving specific organizational objectives or for exceptional achievement. These systems can take many forms, including merit increases in base salary or discretionary bonuses that are tied to performance evaluations.

Generally speaking, pay for performance contradicts the military ethos, which mainly emphasizes national service and duty, and the subjugation of individual ambition to the good of the Service and unit. In DoD, the acknowledged reward for exceptional achievement is greater responsibility—to rise through the ranks with the accompanying growth in duties, responsibility, and rank.

One common recommendation for strengthening pay for performance within the military culture is to "steepen" the base pay versus rank structure to more strongly reward advancement. The basic pay table built on rank is already geared to reward professional performance to achieve promotions and career longevity. However, the basic pay table could be recalibrated by steepening the progression of pay with rank to incentivize advancement. This steepening could be implemented to different extents for enlisted, officers, and warrant officers to meet DoD requirements for numbers of high-quality personnel over the distribution of ranks and career lengths. Because this approach would be administered within the existing personnel system, it would not require new administrative mechanisms.

For the reasons noted earlier, the current compensation system does not provide a direct mechanism to pay for performance. Outstanding achievers can expect to get better assignments and to be promoted more rapidly, with corresponding increases in pay and benefits. However, other avenues for increasing their compensation are not available. If pay for performance were deemed desirable, a system incorporating pay banding, like the PDPP described above, could provide the needed mechanism. In essence, this pay banding would arise from incorporating an additional factor to the compensation process described earlier. That is, the pay-banding system would need to evaluate achievements and to determine the appropriate compensation. The administration of a pay-for-performance mechanism would be challenging, and would require extensive training to ensure the new authorities are implemented effectively and fairly.

To return to the underlying theme of this chapter, it must be noted that the example of pay banding for military medical professions shows that the adoption of pay bands is already feasible within the current compensation system. If pay banding is deemed desirable—to strengthen market-based pay or to adopt pay-for-performance incentives—it could be incorporated into the current compensation system just as readily as it could be adopted as a feature of a single-salary system.

C. Convert BAH to "Assignment Pay" to Reflect Service Member Preferences

As outlined in Chapter 2, BAH is determined by a Service member's rank and local housing costs. However, Service members' relative preferences across possible assignments depend on many other factors. DoD could use individuals and available funding more effectively if it could better match individuals with assignments.

DoD already has the authority to provide assignment incentives.[83] For example, beginning December 1, 2019, the Army instituted Assignment Incentive Pay for soldiers reporting for extended duty in Alaska. Incoming soldiers at Wainwright and Greely without command-sponsored dependents receive a $2,000 lump sum; those with command-sponsored dependents receive $4,000.[84] As another example, Service members who involuntarily extend their tours in Iraq and Kuwait combat zones receive an additional $200 in hardship duty pay and another $800 in assignment incentive pay monthly. Additionally,

[83] The National Defense Authorization Act for Fiscal Year 2003, Public Law No. 107-314, 116 Stat. 2569 (2002), provided for a new type of special pay, called assignment incentive pay (AIP), to be offered to volunteers for duty in hard-to-fill positions specifically designated by the Secretary concerned. Current rates of pay authorized: not to exceed $3,000 per month.

[84] Jim Absher, "Army Authorizes Assignment Incentive Pay for Alaska," March 26, 2020, https://www.military.com/daily-news/2020/03/26/army-authorizes-assignment-incentive-pay-alaska.html.

Service members with certain skills who have served 12 months in Iraq and Afghanistan and volunteer to extend their tours receive this assignment incentive military pay.[85]

The Navy has an intriguing assignment incentive system that allows Service members to bid online for a monthly incentive pay associated with hard-to-fill assignments. The system specifies a maximum for each location, occupational qualification, and pay grade. Service members who submit a "winning" bid receive that amount. For example, certain sailors in grades E-4 to E-9 may bid up to $600 per month for duty aboard the USS Emory S. Land home ported in Guam.[86]

Independent of whether DoD adopts a salary system, the locational component of pay could be converted to assignment pay. This pay could be calibrated to better reflect locational factors beyond the cost of housing. For example, an assignment pay for each location could be established that clears the market by balancing the talent needed in a given location with the willingness of Service members to serve in each location. Desirable locations would have relatively low assignment pays; less-desirable locations would have relatively high assignment pays. An effective assignment-pay mechanism would improve both efficiency and fairness.

D. Convert BAS and the Dependents' Allowances to Pays that Strengthen Readiness Incentives

BAS is provided to all Service members. This allowance lifts the overall level of compensation and so influences Service members' stay-versus-leave decisions. The $5.5 billion provided through BAS might better contribute to readiness if the BAS were shifted into targeted, flexible pays such as special and incentive pays. Overall readiness would be enhanced if the marginal improvement to recruiting and retention of those receiving targeted pays more than offset the reductions in recruiting and retention associated with the reduction in BAS. This mechanism would involve the same tax-related issues that affect a full-blown salary system.

The $2.4 billion "dependent's premium" in BAH is a frequently cited flaw in current allowances. However, the field work described in Chapter 9 shows that Service members have mixed views on the fairness of this premium. BAH could be reformed to remove the premium by establishing a single level of BAH for each location and rank: single Service members and Service members with dependents would receive an equal BAH allowance. However, as shown in Chapter 2, the premium represents only about 12 percent of BAH

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85 "Assignment Incentive Pay (AIP)," Department of Defense, https://militarypay.defense.gov/Pay/Special-and-Incentive-Pays/AIP/.

86 "AIP Eligibility Chart," Navy Bureau of Personnel, https://www.public.navy.mil/bupers-npc/career/payandbenefits/Documents/AIP%20Eligibility%20Chart%2024%20Jan%202020.pdf.

and only 2.6 percent of total cash compensation. It would be easier to reform the "dependents' premium" than to revamp the entire pay system.

The combined allocation of $7.9 billion for BAS and the "dependents premium" in BAH represents about 9 percent of the total pool of DoD cash compensation. These funds could, in concept, be reallocated to support payments with greater marginal readiness contributions than those achieved under current policy. For example, such funds might be allocated to expand the available pool of targeted, flexible pays. Although such a transfer represents a much smaller and narrowly focused reallocation than transitioning to a salary system, it nevertheless could represent meaningful changes in income for some Service members. Careful analysis would be needed to ensure that the increased readiness of those who receive reallocated pay would more than offset the potential readiness losses within the communities that would lose pay. Even these limited alternatives of eliminating BAS and the "dependents' premium" raise significant tradeoffs that require careful thought and analysis.

E. Improve the Targeting of Flexible Pays to Increase Readiness

Used effectively, the targeted, flexibly pays have the clearest and most direct influence on readiness. Although there are dozens of specific categories, in general these pays serve one of four purposes:

- Compensate occupational groups to recruit and retain high-competency Service members (e.g., aviation, medical, nuclear occupations)
- Incentivize Service members to acquire demanding skills (e.g., language proficiency)
- Compensate for onerous duty (e.g., hardship, hazardous duty)
- Meet force structure requirements

Today's military compensation system deals with market differences across occupations through a system of special and incentive pays. These pays include selective reenlistment bonuses (SRBs) that vary by occupation and term of service, flight pay, and various special pays for physicians. SRBs are calculated as a multiple of monthly basic pay.

The current system of special and incentive pays provides significant flexibility in dealing with variations in market conditions. Arguably it provides more flexibility than a system with multiple, occupation-oriented pay tables as outlined earlier in this chapter. In particular, the Services have extensive experience tailoring selective reenlistment bonuses to adjust to changes in either the supply of people or their need for people in specific fields and years of service.

Ongoing attention is required to ensure the use of flexible pays is efficient and fair. For example, the Twelfth QRMC examined ways to improve the targeting of Hazardous Duty pay and the Combat Zone Tax Exclusion (CZTE). The supporting analysis found there was a negative relationship between the risk a Service member faced within a combat zone and the member's targeted compensation.[87]

To a great degree, the policies for using targeted pays are under continual review. A large body of work exists of the accession, education and training, career management, and retention of career fields such as aviators, medical professionals, language and cultural experts, cyber specialists, and STEM degree holders. Similarly, the Military Departments continually adjust targeted pays associated with Service member recruitment and retention to meet their current needs and market conditions, and to channel Service members into needed occupations.

The purpose here is not to critique DoD's use of targeted, flexible pays but rather to note this is a powerful tool already at DoD's disposal. In addition, this tool can and should be employed effectively and efficiently to address readiness, regardless of whether a salary system is adopted.

F. Improve the Quality and Availability of In-Kind Benefits

One powerful theme from the field fact-finding for this study, summarized in the preceding chapter, is that Service members would prefer DoD to improve basic in-kind services than to embark on a complex reform of the pay system. The junior ranks, in particular, greatly appreciate the stability of DoD employment and health benefits. These Service members also expressed a strong desire for improvements in the quality and availability of childcare and on-base housing.

Strictly speaking, in-kind benefits such as housing and childcare are not within the scope of consideration in the creation of a salary system. Nevertheless, they are highly valued components of compensation that must be factored into any overall restructuring of the compensation system. Most relevant to the current discussion is the fact that policies and programs for in-kind benefits can be addressed whether or not a salary system is adopted.

G. Summary

The analyses presented in earlier chapters amply demonstrate that the current cash compensation system is complex and offers many different kinds of incentives. The brief survey in this chapter reveals that many compensation reform ideas are not inherently tied

[87] Stanley A. Horowitz et al., "Risk and Combat Compensation," IDA Paper P-4747 (Alexandria, VA: Institute for Defense Analyses, August 2011).

to the idea of converting allowances to a salary system—that is, these reforms could be pursued whether or not a salary system is adopted.

To summarize:

- A salary system could incorporate pay for performance while adjusting to occupation-related market differences by using the flexible salary-based compensation approach embodied in the PDPP. One could argue, though, that this would not be a *single*-salary system.
- The possibility of incorporating pay for performance and occupation-based pay is not unique to a salary system. The current system could introduce an element of market pay to address pay for performance and adjust to market differences related to occupation.
- The current system already has a variety of time-tested mechanisms for addressing occupational market differences. These mechanisms may well provide greater flexibility than a PDPP-based system would.

Given these significant lessons, one important, overall conclusion of our work is that the DoD would be well served to broaden the range of alternatives to be considered for improving compensation. To the extent that there are problems with the efficiency and fairness of the current compensation system, it is far from clear that moving to a salary system is an important part of the solution.

11. Conclusions

The goal of the QRMC analyses has been to determine whether a salary-based compensation system promises to be more effective than the current system in creating ready military forces. The existing military compensation system has many components, including basic pay, allowances for housing and subsistence, special and incentive pays, pays associated with deployment, continuation pay, retirement pay, and non-cash compensation. These components contribute in varying degrees to "readiness." Further, a component's contribution to readiness depends on how well that component targets members whose readiness is sensitive to it ("efficiency"). Its contribution also depends on whether the component offers equal opportunity and treatment across the force ("fairness"). A pay system that shifts pay from inefficient or unfair components of compensation to those that are more efficient or fairer would improve readiness by encouraging the accession of better personnel and their retention.

Advocates of a salary system have asserted that it would improve the efficiency and fairness of the compensation system. This paper evaluates that assertion and does not find support for it. A salary system would replace basic allowances for housing (BAH) and subsistence (BAS) with an increase in basic pay. However, this transaction would have complex implications for the compensation system and for the welfare and behaviors of Service members. Not surprisingly, as we have shown, those implications can vary across subpopulations of the force, depending on their current situation and the assumptions of the alternative salary system. Each Service member's basic pay depends on pay grade and years of service. Other compensation components, such as retirement pay and continuation pay, are tied to basic pay. BAS depends on whether the Service member is an officer or enlisted. BAH depends on housing costs near the Service member's assigned location, pay grade, whether the Service member has dependents, and whether the Service member lives in government housing. Each Service member's tax liability depends on their military income other than allowances, months of service in a combat zone, non-military income, marital status, spousal income, home-of-record state, years of service, and number of dependents.

This paper reports on three major lines of research into how a salary system might work in comparison to the current compensation system. The first focuses on creating a Salary System Assessment Tool (SSAT). We apply the tool to representative cases to illustrate how moving to a salary system would affect the after-tax income of various categories of Service members, paying particular attention to variations in effect by rank, dependents' status, and receipt of BAH. The second line of research provides an

econometric analysis for predicting likely Service member retention behavior in response to the take-home pay changes. The third involves field research to investigate the attitudes of more than 700 military personnel toward a potential salary system. We summarize our major findings here:

1. **Simple reallocations of allowances to a salary system in proportion to current basic pay would greatly skew after-tax income toward higher pay grades and Service members who do not currently receive BAH, creating major swings in after-tax income.**
    - Eliminating allowances and increasing all members' basic pay by a constant multiple would be unfair to junior personnel now receiving BAH because allowances are a greater share of their income.
    - Service members who live in government housing do not currently receive BAH and would enjoy an increase in after-tax income if not given special treatment.
2. **As illustrated by the alternative cases examined, the rules for a salary system could be adjusted to neutralize the skewing observed in the simple base case.**
    - The salary system could be tailored to offset imbalances between junior and senior ranks.
    - The salary system could institute rent payments for personnel in government-owned housing to offset imbalances between those Service members and those who now receive BAH.
3. **Any salary system must incorporate several policy changes to avoid major swings in after-tax income and thereby serve the concepts and principles of military compensation.**
    - Rent on government-owned housing, to equalize after-tax income across housing situations.
    - A basic pay table specific to reservists not on active duty, to maintain balance across reserve and active duty compensation.
    - Locality pay, to balance Service member satisfaction across locations.
    - Elimination or substantial enlargement of the Executive Schedule pay caps, to maintain increases in compensation with pay grade for senior officers.
    - Revision of the retirement pay formula or use of a pay table like that suggested for reservists, to maintain the magnitude of retirement pay relative to after-tax, active duty compensation.

- A $9 billion increase in DoD's budget to compensate Service members for the additional cost of federal taxes, including Social Security and Medicare taxes.

4. **Any salary system that holds cost to the Federal Government constant will entail a reduction in the aggregate after-tax income of Service members.**
    - This effect is due to the increase in required state tax payments, which introduces a gap between after-tax income of Service members and cost to the Government.
    - Under a salary system that incorporates rents for government-owned housing and increases in basic pay that are tailored by rank, married BAH recipients would suffer a 5.5 percent average reduction in after-tax income. Single BAH recipients would suffer a 2.5 percent loss.
5. **The two criteria specified by Congress, that compensation not fall and that cost to the Federal Government not rise, cannot be satisfied simultaneously.**
    - A salary system that is cost-neutral to the Federal Government would increase Treasury receipts by about $8 billion per year.
    - Service members' state income tax liabilities would increase by about $500 million per year, and their after-tax income would decline by the same amount.
6. **The field research indicates that Service members in the main**
    - Value pay and benefits, but also join for the employment stability and education and career development opportunities in the military. Service members are more concerned with the value of national service, childcare, health care, education benefits and loan forgiveness, and stability in compensation than the precise level of compensation.
    - Strongly favor fairness in pay that reflects work demands, risks, and rank. There is wide support for greater differentials in pay for assignment responsibility, hours, and onerous or risky duty.
    - Express strong concerns about "fixing" childcare and housing allowances while hoping for improvements in other non-cash benefits. Service members see inadequate childcare as a particularly major issue that also relates to the fairness of family compensation.
    - Express strong skepticism about major restructuring of the military compensation system. Service members view the current system as imperfect but "fair enough." They see uncertainty in how a salary system

would work, and its implications for themselves. Their major feedback focused on the needed improvements within the current system.

7. **Prior research implies that a salary system would strongly affect accessions and retention. This study, however, has not established reliable statistical predictions of the responses of Service members to the adoption of a salary system.**
    - Financially, there will be "winners" and "losers" in the transition to a salary system.
    - A long history of prior econometric estimates finds that retention and recruiting are sensitive to changes in pre-tax compensation. In the cases examined, a salary system would substantially increase the pay of junior personnel and therefore should improve recruiting. At the same time, pay cuts to career enlisted personnel receiving BAH could well lead to retention problems.
    - These estimates from the literature may not generalize to the specific implementation of a salary system for two main reasons:
        - The literature examines the effect of changes in pre-tax compensation only. Our econometric study of retention responses to *after-tax* compensation differentials did not find a significant response to modest changes in after-tax income across jurisdictions.
        - Behavioral economic theory and evidence from our field fact-finding suggests that (1) the responses to pay losses may exceed the responses to gains in income, and (2) the uncertainty created in changing to a salary system could undermine Service members' valuations of their compensation in transitioning to such a system.
8. **On balance, the changes inherent to a salary system would be unprecedented in nature and magnitude, so Service member responses cannot confidently be predicted with existing econometric tools and data.**
    - In modeling the transition to a salary system, the study identified many possible mechanisms—short of adopting a salary system—for improving the efficiency and fairness of the current system, and thereby enhancing readiness.
    - Shift BAS and the "marriage premium" portion of BAH into basic pay and targeted, flexible pays such as special and incentive pays.
    - Target flexible pays, such as special and incentive pays, more precisely to resolve readiness issues.

- Tailor the basic pay table by occupation to target readiness issues.
- Reform BAH to reflect locational factors beyond the cost of housing.
- None of these mechanisms requires a salary system.

The tools and methods created for this study provide an analytic platform for evaluating "what if" scenarios for transitioning to a salary system. The SSAT provides a means to evaluate a wide range of policies that shift budget dollars across categories of pays, or that shift relative compensation across individuals. This compensation depends on an individual's rank, location, dependents' status, and living situation. The cases presented in this study illustrate the complex interactions among variables. In addition, the study demonstrates that it would also be possible to examine many other cases in which salary system rules target occupations, demographic groups, or locations where readiness is a challenge.

One important lesson for identifying possible cases for analysis is that state tax considerations can make the reallocation of funding between the Federal Government and Service members a less-than-zero-sum game. There is a budgetary cost to the Federal Government (and to DoD specifically) of reducing tax-exempt allowances and shifting the monies to pay categories that are taxed. This cost must be weighed against any improved incentive effects of a reformed pay system.

Another important lesson is that several policy changes must be adopted within any salary system to ensure it is efficient and fair. These changes are highlighted in finding 3 above. It is important to note that, although the current approach for calculating BAH may be flawed, it nevertheless plays an essential role in leveling living standards for Service members who frequently move. If BAH were eliminated altogether, then it would have to be replaced by another form of locality pay.

This study has not generated precise estimates of the likely response of Service members to the adoption of a salary system. However, we find that the Service members who participate in the fact-finding are generally skeptical of major systemic changes in the pay system. Instead, they are focused on a range of specific improvements that could be made in the current system. Although a long history of experience and studies argue that Service members will predictably respond to adjustments in their cash compensation, it will be far more challenging to predict with confidence their responses to a systemic change to a salary system that will create a great deal of uncertainty as well as both "winners" and "losers" within the ranks.

Finally, it must be noted that DoD's current system of cash compensation already incorporates a high degree of flexibility, particularly through the many categories of special and incentive pays and enlistment and retention pays. Moreover, many of the mechanisms

by which a salary system could improve efficiency and fairness could be individually implemented.

Given these significant lessons, one important overall conclusion of our work is that the DoD would be well served to broaden the range of alternatives it considers for improving compensation beyond the wholesale elimination of BAH and BAS and the adoption of a salary system.

Appendix A.
FY 2017 NDAA Excerpt and September 2017 Presidential Memo on a Single-Salary Pay System

FY2017 NDAA Instructions for a Report on a Single-Salary Pay System

SEC. 604. REPORTS ON A NEW SINGLE-SALARY PAY SYSTEM FOR MEMBERS OF THE ARMED FORCES.

(a) Report on Plan To Implement New Pay Structure.--Not later than March 1, 2017, the Secretary of Defense shall submit to the Committees on Armed Services of the Senate and the House of Representative a report that sets forth the following:
(1) The military pay tables as of January 1, 2017, reflecting the Regular Military Compensation of members of the Armed Forces as of that date in the range of grades, dependency statuses, and assignment locations.
(2) A comprehensive description of the manner in which the Department of Defense would begin, by not later than January 1, 2018, to implement a transition between the current pay structure for members of the Armed Forces and a new pay structure for members of the Armed Forces as provided for by this section.

(b) Report on Elements of New Pay Structure.--Not later than January 1, 2018, the Secretary shall submit to the Committees on Armed Services of the Senate and the House of Representative a report that sets forth the following:
(1) A description and comparison of the current pay structure for members of the Armed Forces and a new pay structure for members of the Armed Forces, including new pay tables, that uses a single-salary pay system (as adjusted by the same cost-of-living adjustment that the Department of Defense uses worldwide for civilian employees) based on the assumptions in subsection (c).
(2) A proposal for such legislative and administrative action as the Secretary considers appropriate to implement the new pay structure, and to provide for a transition between the current pay structure and the new pay structure.
(3) A comprehensive schedule for the implementation of the new pay structure and for the transition between the current pay structure and the new pay structure, including all significant deadlines.

(c) New Pay Structure.--The new pay structure described pursuant to subsection (b)(1) shall assume the repeal of the basic

allowance for housing and basic allowance subsistence for members of the Armed Forces in favor of a single-salary pay system, and shall include the following:

(1) A statement of pay comparability with the civilian sector adequate to effectively recruit and retain a high-quality All-Volunteer Force.

(2) The level of pay necessary by grade and years of service to meet pay comparability as described in paragraph (1) in order to recruit and retain a high-quality All-Volunteer Force.

(3) Necessary modifications to the military retirement system, including the retired pay multiplier, to ensure that members of the Armed Forces under the pay structure are situated similarly to where they would otherwise be under the military retirement system that will take effect on January 1, 2018, by reason part I of subtitle D of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92; 129 Stat. 842), and the amendments made by that part.

(d) Cost Containment.--The single-salary pay system under the new pay structure provided for by this section shall be a single-salary pay system that will result in no or minimal additional costs to the Government, both in terms of annual discretionary outlays and entitlements, when compared with the continuation of the current pay system for members of the Armed Forces.

September 2017 Presidential Memo Establishing the Thirteenth Quadrennial Review of Military Compensation

THE WHITE HOUSE

WASHINGTON

September 15, 2017

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Thirteenth Quadrennial Review of Military Compensation

In addition to our support and gratitude, we owe our men and women in uniform the tools, equipment, resources, and training they need to fight and win. Our military compensation system must recognize their sacrifices and adequately and fairly reward them for their efforts and contributions. It also must encourage the next generation of men and women to answer the call to serve their fellow citizens as members of our uniformed services. Although the world and the threats to our Nation have changed over time, the structure of our military compensation system, with the exception of recent changes to military retirement, has remained largely the same.

Pursuant to the authority vested in me by the Constitution and the laws of the United States, including section 1008(b) of title 37, United States Code, I hereby determine that you shall be my Executive Agent for the Thirteenth Quadrennial Review of Military Compensation, conducting the review required by section 1008(b). As directed by statute, the review should assess the principles and concepts of the compensation system for members of the uniformed services.

At a minimum, the review should:

1. assess the adequacy of military compensation and each of its underlying components;

2. determine whether the structure of the current military compensation system, as a system of basic pay, housing, and subsistence allowances, remains appropriate, or whether an alternate compensation structure, such as a salary system, would enhance readiness and better enable the Department of Defense to recruit and retain tomorrow's military force; and

3. survey the usage of Supplemental Nutrition Assistance Program benefits, as well as any other supplemental sources of income or support you deem significant, by military members on active service and their families, and consider the results of the review in assessing the adequacy of overall military compensation.

As Executive Agent, you shall ensure representatives of other executive departments and agencies participate in this review, as appropriate.

Appendix B.
Background on Basic Allowance for Housing (BAH)

This appendix provides an overview of BAH, including the authorities for administering it, rules for dispersing it, recent legislation affecting it, and guidelines for determining the eligibility of reserve component members to receive it.

Statutory Authority for BAH

Statutory authority for DoD to pay BAH is contained in Section 403 of title 37, United States Code (37 USC 403). The current description is based on that source, on information available at the Defense Travel Management Office's website, and on a primer published by DoD's Office of Military Compensation Policy.[1]

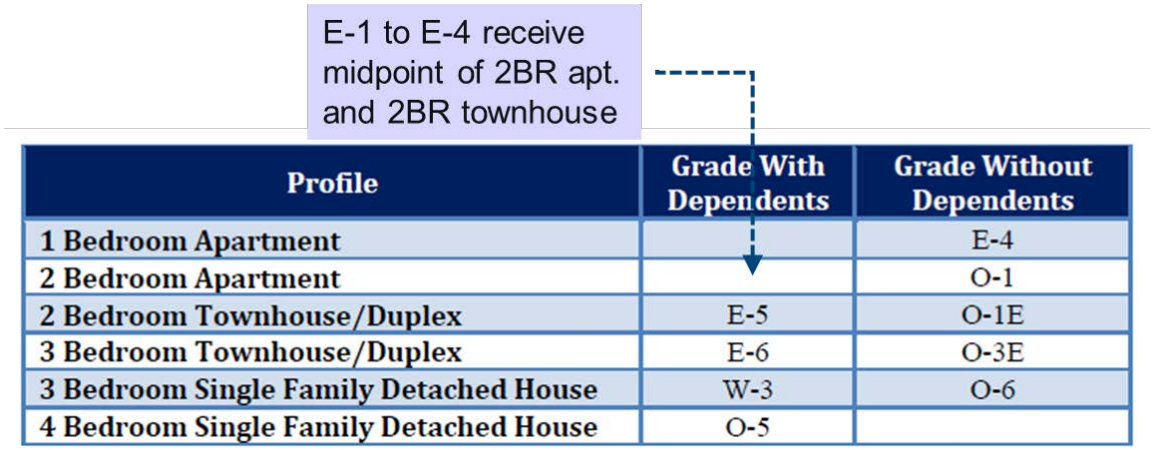
BAH is potentially available to members of all the "uniformed services," including the Army, Navy, Air Force, and Marine Corps (all under the Department of Defense); the Coast Guard (under the Department of Homeland Security); and the Commissioned Corps of the National Oceanic and Atmospheric Administration (NOAA, under the Department of Commerce); and the Public Health Service (under the Department of Health and Human Services).

BAH rates are calibrated to median market rents on housing units, plus average expenditures on utilities (electricity, water, sewer, and heating fuel) in each local market area. Since 2015, renter's insurance is no longer included in the calculation. Housing costs are estimated and applied in about 340 military housing areas (MHAs)—each defined as a collection of zip codes—and less-populous County Cost Groups. MHAs are named for the military installation or closest city (e.g., Fort Hood; Wright-Patterson AFB; Washington, DC; or Denver). New BAH rates take effect on January 1st of each year.

A Service member who is assigned to permanent duty within the 50 states and is not furnished government housing is eligible for BAH. The amount of BAH is determined by a member's pay grade, dependency status, and zip code of the member's permanent duty station. The two values of dependency status are either "with dependents" or "without

[1] "Basic Allowance for Housing (BAH), Frequently Asked Questions," updated September 20, 2018, Defense Travel Management Office, www.defensetravel.dod.mil/site/faqbah.cfm; and "A Primer on the Basic Allowance for Housing (BAH) for the Uniformed Services," updated January 2019, Office of Military Compensation Policy, www.defensetravel.dod.mil/Docs/perdiem/BAH-Primer.pdf.

dependents." No further distinction is made based on the Service member's actual family size; the "with dependents" rate is based on the average family size among comparable civilians. DoD applies a complex algorithm to map a member's pay grade and dependency status into a type of housing unit, such as a 2-bedroom townhouse/duplex or a 3-bedroom, single-family, detached house. The "anchor points" at which a member's BAH corresponds to a larger housing unit are illustrated in Figure B-1. The complexity arises in that BAH rates for members between anchor points are interpolated. The member's BAH rate is set equal to the sum of the median market rent and the average costs of utilities for the prescribed type of unit within the MHA.

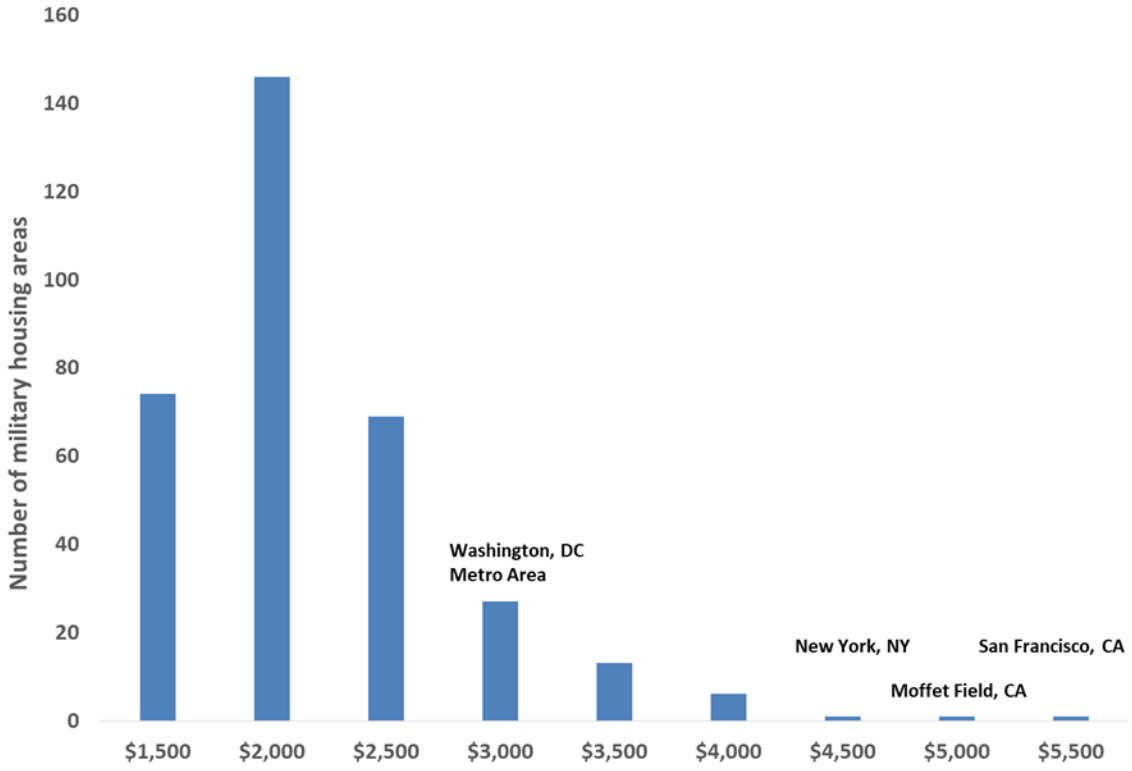


Profile	Grade With Dependents	Grade Without Dependents
1 Bedroom Apartment		E-4
2 Bedroom Apartment		O-1
2 Bedroom Townhouse/Duplex	E-5	O-1E
3 Bedroom Townhouse/Duplex	E-6	O-3E
3 Bedroom Single Family Detached House	W-3	O-6
4 Bedroom Single Family Detached House	O-5	

Source: Adapted from DoD, Office of Military Compensation Policy, "A Primer on the Basic Allowance for Housing (BAH) for the Uniformed Services," p. 2, www.defensetravel.dod.mil/Docs/perdiem/BAH-Primer.pdf.

Figure B-1. Anchor Points that Determine a Service Member's BAH

BAH rates vary by a factor of about 5 across the range of MHAs. That variation is illustrated in Figure B-2 for an E-8 with dependents in 2019.



Note: Although not many military personnel are stationed in New York City, there is a four-service recruiting station in Manhattan's Times Square. Recruiters may live within the city boundaries.

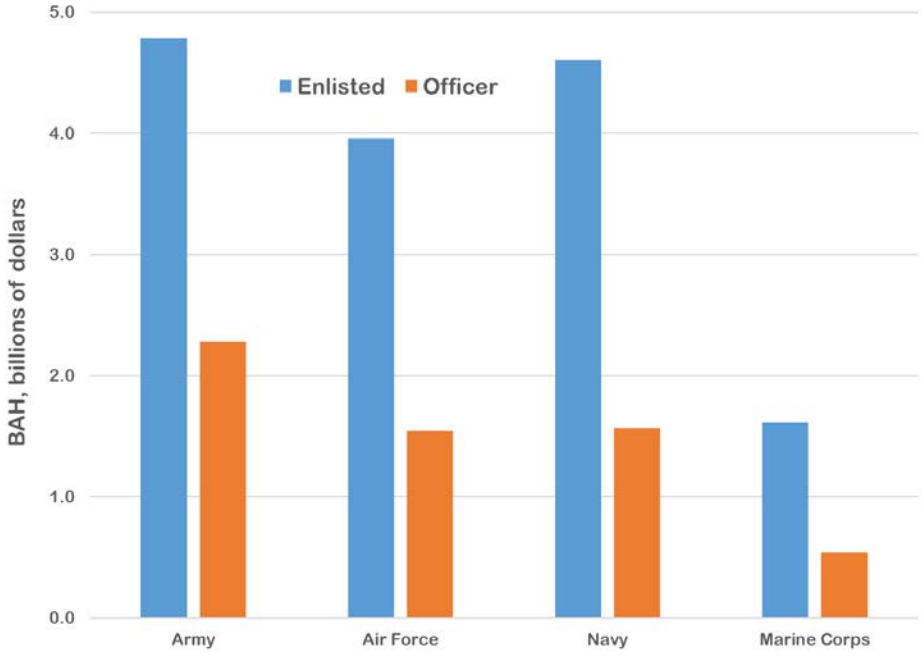
Figure B-2. Monthly BAH Rates for an E-8 with Dependents, 2019

One important feature of BAH is *rate protection*. This feature ensures that even if housing costs in a member's location decline from one calendar year to the next, the member's BAH rate does not decline as long as he or she remains in the same location and does not have a reduction in pay grade or a change in dependency status. However, BAH may decline if the member moves to a lower-cost housing area in his or her next assignment.

Section 604 of the National Defense Authorization Act (NDAA) for FY 2015 (Public Law 113-291) authorized a reduction of a maximum 1 percent in BAH relative to market-based housing costs, as determined by the Secretary of Defense. The following year, section 603 of the NDAA for FY 2016 (Public Law 114-92) extended the maximum reduction to 5 percent, phased in over 5 years. In effect, rather than fully compensating for market-based costs, the 2016 NDAA decreased BAH to cover only 98 percent of those costs in 2016, 97 percent in 2017, 96 percent in 2018, and 95 percent from 2019 on (codified at 37 USC 403(b)(3)(B)). The process of paying less than 100 percent BAH is known as *absorption*.

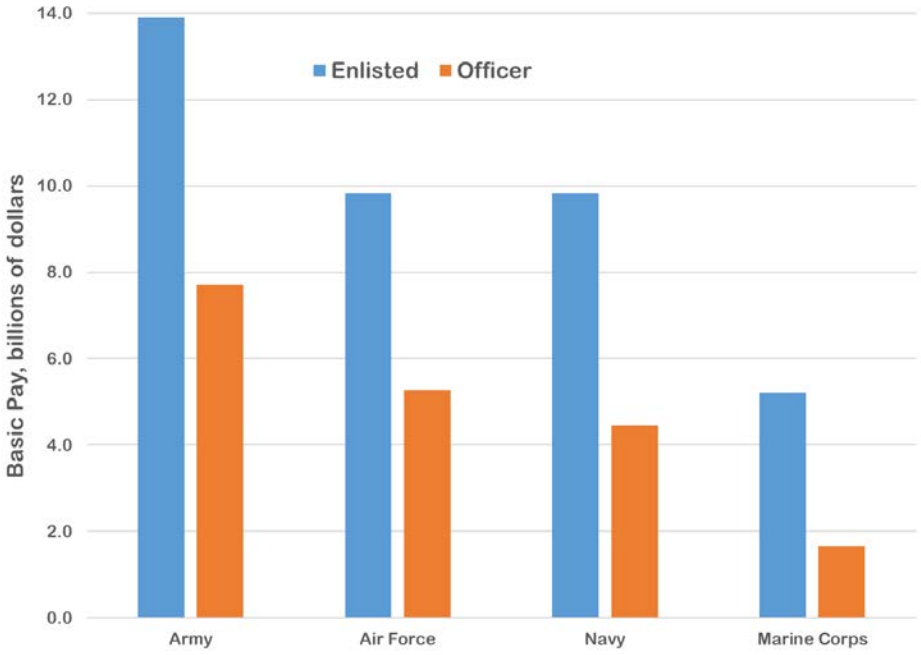
The distribution by military branch of the $20.9 billion that DoD spent on BAH in FY 2019 is shown in Figure B-3. That total is 36 percent as large as basic pay of $57.9

billion in the same year (see Figure B-4). The U.S. Coast Guard (not included in either figure) paid $871 million in BAH in FY 2019, some 40 percent as much as the $2.19 billion in basic pay. Much smaller amounts of BAH were paid by the Commissioned Corps of NOAA and of the Public Health Service.



Source: Department of Defense, "Defense Budget Materials – FY2021, Military Personnel Programs (M-1)," https://comptroller.defense.gov/Budget-Materials/.

Figure B-3. Appropriations for BAH by Military Branch, 2019



Source: Department of Defense, "Defense Budget Materials – FY2021, Military Personnel Programs (M-1)," https://comptroller.defense.gov/Budget-Materials/.

Figure B-4. Appropriations for Basic Pay by Military Branch, 2019

Disbursement of BAH

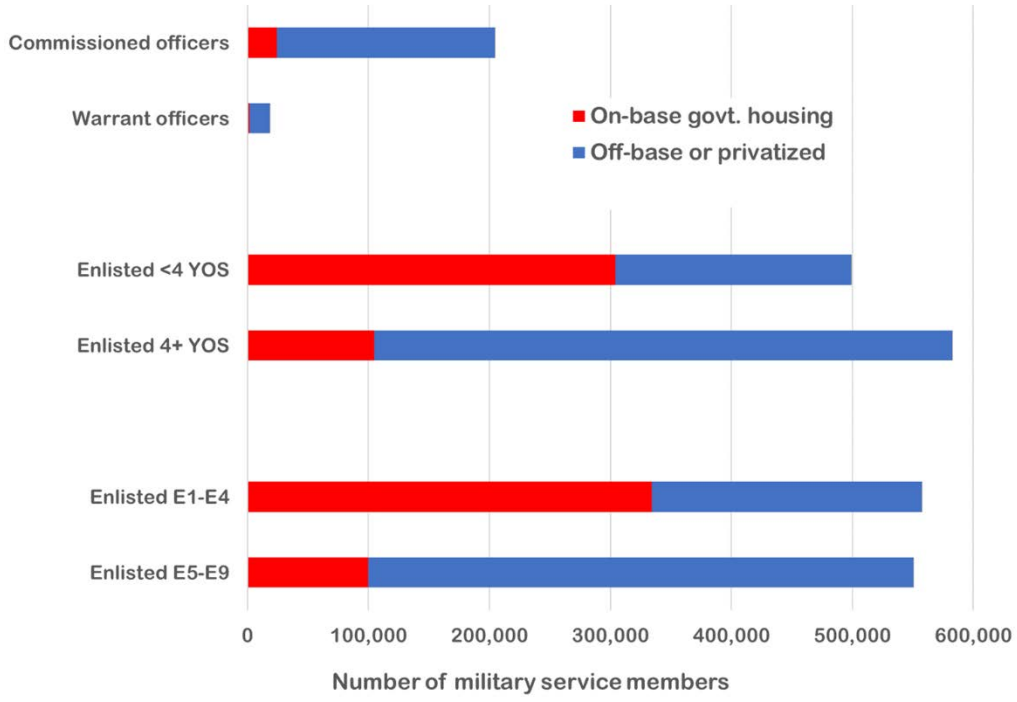
The disbursement of BAH depends on where and in which type of housing the Service member lives. At any time, a member who is potentially eligible for BAH (for example, all members of the active military components) is assigned to exactly one of those three categories:

- On-base, receiving quarters in kind
- On-base, in privatized housing
- Off-base, in commercial housing

In addition, special rules apply to members who are deployed overseas, depending on whether they are accompanied by family members.

On-base, quarters in kind

In the first case, Service members receiving on-base government housing ("quarters in kind") are not paid BAH. Depending on the Service branch, most unmarried enlisted members with fewer than 4 years of service or in the lowest 4 or 5 pay grades are typically required to live in barracks. (Those two criteria are highly correlated; see the red bars in Figure B-5). At the high end, quarters in kind include large, single-family, detached houses for senior officers.



Source: Department of Defense, "Selected Military Compensation Tables, 1 January 2019," Directorate of Compensation, Tables A-7 and A-8, https://militarypay.defense.gov/References/Greenbooks/.

Figure B-5. Distribution of Military Members by On-Base or Off-Base Housing, 2019

An exception is that some single, junior enlisted sailors receive *partial BAH*. This exception occurs under a program that allows sailors to share apartments on base rather than living aboard the ships to which they are assigned. Two such apartment projects were built in Hampton Roads, Virginia (project known as Homeport), and in San Diego, California (project known as Pacific Beacon), under authority granted in Section 2803 of the FY 2003 NDAA (Public Law 107-314) and codified at Title 10 U.S. Code, Section 2881a. The authority to run as many as three such pilot programs was initially granted through September 30, 2007, and extended to September 30, 2009, in Section 2812 of the FY 2007 NDAA (Public Law 109–364). The Navy had not yet established a third program when the authority expired, so only the two listed apartment projects were completed.

On-base, privatized housing

In the mid-1990s, DoD determined that more than 60 percent of its domestic family housing stock needed repair or complete replacement. DoD estimated that completing these activities would take 30 years at a total cost of $20 billion. Rather than pursuing that approach, Congress provided DoD with new authorities in Sections 2801 through 2802 of the NDAA for FY 1996 (Public Law 104-106).[2] The new authorities enabled DoD to "obtain private-sector financing and management to repair, renovate, construct, and operate military housing."[3] In response to that Congressional action, DoD launched the still-ongoing Military Housing Privatization Initiative (MHPI), under which DoD has currently privatized 99 percent of its domestic family housing stock.

Members who live in privatized housing are eligible for BAH. However, the BAH payment is not included in their paycheck, and they are not expected to pay the MHPI partners themselves. Rather, BAH is treated as an *allotment*, bypassing the member's paycheck and instead being paid to the housing partner through a third-party vendor. The current vendor is Fort Knox National Company through its subsidiary, Military Assistance Company (also known as MAC). In addition, the housing partners sometimes negotiate discounts with members to maintain occupancy rates in their developments, and charge monthly rents below BAH rates (though never more than BAH rates). When discounts are offered, the allotment covers the discounted rent and the member retains the discount.

For about 4 years, absorption caused the MHPI partners to receive at most a few percentage points less than the sum of median market rents and the average costs of utilities for comparable housing units in their local areas. Although the loss of a few percentage points of revenue certainly does not justify the situation, numerous complaints have recently surfaced about the quality of privatized base housing, including severe health and safety concerns.[4]

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2 "Military Construction and Military Family Housing", Subchapter IV, codified as amended at 10 U.S. Code, Chapter 169, "Alternative Authority for Acquisition and Improvement of Military Housing", §§ 2871–2886.

3 "Military Housing Privatization: DOD Should Take Steps to Improve Monitoring, Reporting, and Risk Assessment," Government Accountability Office," GAO-18-218, March 2018, 6.

4 "Preliminary Research Report: Living Conditions of Families in Privatized Military Housing," Military Family Advisory Network, Report to the United States Committee on Armed Services, Joint Subcommittee on Personnel, Readiness, and Management Support, February 13, 2019. That report was covered in the *Washington Post* on the day of its release, www.washingtonpost.com/national-security/2019/02/13/survey-military-families-paints-slum-like-picture-housing-bases-across-country/?utm_term=.442651c3c8b8. The Senate Committee on Armed Service conducted a hearing on March 7, 2019, with testimony from the three Secretaries of the military departments and the four uniformed Service chiefs, www.armed-services.senate.gov/hearings/19-03-07-chain-of-commands-accountability-to-provide-safe-military-housing-and-other-building-infrastructure-to-servicemembers-and-their-families.

The Congress provided MHPI partners with partial, temporary relief in 2018; with full, permanent relief in 2019; but then backtracked somewhat in 2020. Section 603 of the NDAA for FY 2018 (Public Law 115-91) required DoD to pay MHPI partners an additional 1 percent of housing costs in calendar year 2018, boosting the effective BAH rate from 96 percent of housing costs to 97 percent:

> *For each month during 2018, the Secretary of Defense shall pay to a lessor of covered housing 1 percent of the amount calculated under section 403(b)(3)(A)(i) of title 37, United States Code, for the area in which the covered housing exists.*[5]

Section 606 of the NDAA for FY 2019 (Public Law 115-232) boosted the additional payments to 5 percent of housing costs and made them permanent, beginning in September 2018 (the month after enactment). The BAH amount that is both credited to and debited from the Service member's paycheck (through allotment) would remain at 95 percent of housing costs. However, DoD would supplement that payment to the MHPI partner with an additional 5 percent of housing costs, effectively "making the partner whole":

> *Payment authority.—Each month beginning on the first month after the date of the enactment of this Act, the Secretary shall pay a lessor of covered housing 5 percent of the amount calculated under section 403(b)(3)(A)(i) of title 37, United States Code, for the area in which the covered housing exists. Any such payment shall be in addition to any other payment made by the Secretary to that lessor.*[6]

There were additional developments in the FY 2020 NDAA (Public Law 116-92). Sections 3036 and 3067 divide the 5 percent subsidy into 2.5 percent for all covered housing units and a second 2.5 percent more narrowly targeted at *older* (built pre-FY 2015), *underfunded* units:

> *"… housing procured, acquired, constructed, or for which any phase or portion of a project agreement was first finalized and signed, under the … Military Housing Privatization Initiative, on or before September 30, 2014."*
>
> *"… to make additional payments to certain lessors responsible for underfunded MHPI housing projects identified … for the purposes of*

[5] National Defense Authorization Act for Fiscal Year 2018, Public Law 115-91, Section 603, December 12, 2017.

[6] National Defense Authorization Act for Fiscal Year 2019, Public Law 115-232, Section 606, August 13, 2018.

future sustainment, recapitalization, and financial sustainability of the projects. …[7]

The Chief Housing Officer of the Department of Defense, in conjunction with the Secretaries of the military departments, shall assess MHPI housing projects for the purpose of identifying all MHPI housing projects that are underfunded. Once identified, the Chief Housing Officer shall prioritize for payments … those MHPI housing projects most in need of funding to rectify such underfunding."[8]

Implementation of the subdivision of the 5 percent subsidy into two components has been delayed from FY 2020 until FY 2021.

Off-base, commercial housing

The third case is actually the most numerous, with about 80 percent of Service members living off base and receiving BAH in their paychecks. Those members pay their full housing and utility costs plus renter's insurance (if they choose to purchase it). BAH is paid according to a formula and does not reimburse actual rental expenditures. As a result, members must pay net out-of-pocket costs if they choose to rent larger housing units than are assumed in the BAH calculation (which is based on the member's pay grade and dependency status). This stipulation also applies if members choose more expensive units than the median of the prescribed size. Conversely, members may choose to rent smaller or less expensive units without forfeiting any of their BAH payments. Further, members who own rather than rent housing may face higher monthly expenditures for expenses such as homeowners' association fees.

Deployed overseas

For Service members who have dependents, an overseas tour is classified as either *accompanied* (with dependents) or *unaccompanied* (without dependents). For example, an accompanied tour to the Eighth Army (based in the Republic of Korea) lasts for 24 months. Command sponsorship of dependents must be approved before an Army family moves overseas. Additionally, the full name of each dependent must be listed on the soldier's orders. Conversely, consider an unaccompanied Eighth Army tour that lasts for 12 months.

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7 National Defense Authorization Act for Fiscal Year 2020, Public Law 116-92, Section 3036, December 20, 2019.

8 Sections 3036 and 3037 of the FY 2020 NDAA reflect the House language rather than an alternative subdivision of the 5 percent subsidy proposed by the Senate. See "Conference Report 116-333 to accompany S. 1790, National Defense Authorization Act for Fiscal Year 2020," December 9, 2019, 1516, www.congress.gov/116/crpt/hrpt333/CRPT-116hrpt333.pdf.

Soldiers may elect an unaccompanied tour if they are unable to move their families or if command sponsorship of dependents is denied.[9]

A member on an *accompanied* tour overseas (including U.S. protectorates but excluding Alaska and Hawaii) who is not furnished government housing is eligible for an Overseas Housing Allowance (OHA) at the "with dependents" rate. However, that member no longer draws BAH. If the member and his or her family had been living in a residence in the U.S. that they own—and retain for investment purposes—it is up to that family to rent out their residence to preserve cash flow.

A member without dependents on an *unaccompanied* overseas tour, who is not furnished government housing, is eligible for OHA at the "without dependents" rate. Married members on unaccompanied tours are also eligible for the same OHA at the "without dependents" rate, plus BAH at the "with dependents" rate based on their dependent's U.S. residence zip code.[10] Thus, provision is made for married members to both rent a housing unit overseas and maintain a housing unit for their families back in the United States.

Unlike BAH—which is paid as an allowance regardless of actual expenses incurred—OHA is a reimbursement system with caps. OHA consists of three components:

- Rental allowance
- Utility and recurring maintenance allowance
- Move-in housing allowance (one time only)

The rental allowance is calibrated so that 80 percent of members have their rental payments fully reimbursed. The "without dependent" rental allowance is set at 90 percent of the "with dependent" rental allowance.[11]

Recent Legislative Proposals Regarding BAH

Recent legislative proposals from the Senate Committee on Armed Services (SASC) would have modified the payment structure for BAH. Although the proposals did not survive to the final versions of the respective NDAAs, they illustrate that the structure of BAH remains an active topic of policy debate.

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9 "Eighth Army: PCS Orders," https://8tharmy.korea.army.mil/site/newcomers/pcs-orders.asp, accessed April 5, 2019.

10 "Different Types of BAH," Office of Military Compensation Policy, https://militarypay.defense.gov/PAY/Allowances/bah_types.aspx; and "Overseas Housing Allowance (OHA)," Defense Travel Management Office, www.defensetravel.dod.mil/site/oha.cfm.

11 "Overseas Housing Allowance Fact Sheet," Defense Travel Management Office, www.defensetravel.dod.mil/Docs/Fact_Sheet_OHA.pdf; and "Overseas Housing Allowance (OHA) Briefing Sheet," www.defensetravel.dod.mil/Docs/AB-OHABRIEF-01.pdf.

The policy proposals in question involve dual-military couples—Service members who are married to other Service members—as well as Service members who choose to live with other Service members to whom they are not married. Aside from the recent legislative activity, dual-military couples continue to receive two BAH payments. Couples who have children receive one payment at the higher "with dependents" rate and a second payment at the lower "without dependents" rate. Couples who do not have children receive two payments, each at the "without dependents" rate. Service members who are not married but choose to live with other Service members each receive their BAH at the full monthly rate.[12] Particularly noteworthy is the proposal in the NDAA for FY 2017, under which the BAH rate would still vary by pay grade and geographic location, but would remove the distinction between members with and without dependents.

2016 NDAA

Section 604 of the SASC version of the NDAA for FY 2016 would have modified BAH in the following way: dual-military couples whose duty stations were within "normal commuting distance" of each other (as defined in Service regulations) would receive only a single BAH payment, which would be set at the "with dependents" rate regardless of whether they had children. Couples who lived in military housing, or whose duty stations were outside normal commuting distance, would not be affected by this proposal.

> *SINGLE ALLOWANCE FOR MARRIED MEMBERS ASSIGNED FOR DUTY WITHIN NORMAL COMMUTING DISTANCE. at the "without dependents" rate. In the event two members of the uniformed services entitled to receive a basic allowance for housing under this section are married to one another and are each assigned for duty within normal commuting distance, basic allowance for housing under this section shall be paid only to the member having the higher pay grade, or to the member having rank in grade if both members have the same pay grade, and at the rate payable for a member of such pay grade with dependents (regardless of whether or not such members have dependents).*

Section 604 would also have capped BAH for unmarried Service members who chose to live together.

> *Reduced allowance for members living together.—(1) In the event two or more members of the uniformed services who are entitled to receive a basic allowance for housing under this section live together, basic allowance for*

[12] The rules for BAH are complex and are detailed in Chapter 10 of the DoD Joint Travel Regulations, www.defensetravel.dod.mil/Docs/perdiem/JTR_Chapters(8-10).pdf. This description of current policy is adapted from "Cost Estimate for S. 1376: National Defense Authorization Act for Fiscal Year 2016, as reported by the Senate Committed on Armed Services on May 19, 2015," Congressional Budget Office (CBO), June 3, 2015, www.cbo.gov/sites/default/files/114th-congress-2015-2016/costestimate/s13761.pdf.

housing under this section shall be paid to each such member at the rate as follows:

(A) In the case of such a member in a pay grade below pay grade E-4, the rate otherwise payable to such member under this section [i.e. no change from then-current law].

(B) In the case of such a member in a pay grade above pay grade E-3, the rate equal to the greater of—

(i) 75 percent of the rate otherwise payable to such member under this section; or

(ii) the rate payable for a member in pay grade E-4 without dependents.

2017 NDAA

Section 604 of the SASC version of the NDAA for FY 2017 would have modified BAH in three ways:

- Service members would be reimbursed for their actual cost of housing up to a maximum BAH rate.
- Service members who share housing with other Service members, including those who are married to other Service members, would receive a monthly BAH payment divided by the number of members who live together.
- The maximum BAH rate would vary by pay grade and geographic location, without regard to whether or not a member has dependents.

The Congressional Budget Office (CBO) presented an interesting perspective on how DoD might implement this section—particularly the third bullet point—had it been enacted. In response to the clause "without regard to whether or not a member has dependents," DoD might react by boosting the "without dependents" rate to match the "with dependents" rate. Conversely, DoD could reduce the "with dependents" rate to match the "without dependents" rate. CBO deemed the former a more likely outcome, with attendant increased cost.

On the basis of information from DoD, CBO expects that DoD would implement those changes in a way that provides the most favorable outcome for Service members. Following that reasoning, CBO assumes that DoD would no longer provide two BAH rates—one for those with dependents and one for those without dependents—and thus would pay one BAH at the higher of the two rates. Therefore, the … third change [i.e., removing the

connection to dependent status] would increase BAH payments, compared to such payments under current law.[13]

Here follows the exact legislative proposal.

Basic allowance for housing inside the United States.—

(1) IN GENERAL.—The monthly rate of basic allowance for housing payable under this section to a member of the uniformed services covered by this section who is assigned to duty in the United States shall be the rate prescribed by the Secretary of Defense for purposes of this section.

(2) ELEMENTS.—Subject to the provisions of this subsection, the rates of basic allowance for housing payable under this subsection shall meet the following requirements:

(A) A maximum amount of the allowance shall be established for each military housing area, based on the costs of adequate housing in such area, for each pay grade.

(B) The amount of the allowance payable to a member may not exceed the lesser of—

(i) the actual monthly cost of housing of the member; or

(ii) the maximum amount determined under subparagraph (A) for members in the member's pay grade.

(C) In the event two or more members occupy the same housing, the amount of the allowance payable to such a member may not exceed—

(i) the amount of the allowance otherwise payable to such member pursuant to subparagraph (B); divided by

(ii) the total number of members occupying such housing.

(D) So long as a member on [BAH] retains uninterrupted eligibility to receive the allowance and the actual monthly cost of housing for the member is not reduced, the monthly amount of the allowance may not be reduced as a result of changes in housing costs in the area or the promotion of the member ["rate protection"].

2018 NDAA

By law, dual-military couples with children who are assigned duty in the same area receive one BAH payment at the "with dependents" rate and a second BAH payment at the "without dependents" rate. Under section 603 of the SASC version of the NDAA for FY

13 "Cost Estimate for S. 2943: National Defense Authorization Act for Fiscal Year 2017, as Reported by the Senate Committed on Armed Services on May 18, 2016," Congressional Budget Office (CBO), June 10, 2016, www.cbo.gov/sites/default/files/114th-congress-2015-2016/costestimate/s2943.pdf.

2018, those couples would have earned two BAH payments but both would be at the lower "without-dependents" rate.[14]

> *Ineligibility for with dependents rate of certain members.—A member who is married to another member, is assigned to the same geographic location as such other member, and has one or more dependent children with such other member is not eligible for a basic allowance for housing at the with dependents rate.*

2019 NDAA

Neither the Senate (SASC) nor the House Armed Services Committee (HASC) versions of the 2019 NDAA included language that would curtail the generosity of BAH from the Service members' perspective.

BAH for Reserve Component Members

Under certain circumstances, reserve component (RC) members who are called to active duty ("activated") qualify for BAH. Whether the amount of BAH they receive is adequate to cover their median housing costs depends broadly on three factors:

- Whether they are Selected Reserves (members of SELRES) or Active Guard Reserves (AGRs)
- The type of duty for which they are activated
- The duration of their active duty assignment

For the purposes of this report, the Selected Reserves include members of all six military Guard and Reserve components: Army National Guard, Army Reserve, Air National Guard, Air Force Reserve, Navy Reserve, and Marine Corps Reserve.

Selected Reserves versus Active Guard Reserves

SELRES numbers about 740,000 members who report to duty or "drill" a notional 39 days per year: 1 weekend (2 days) per month (= 24 days), plus 2 weeks (= 15 days) once per year. They draw basic pay and other types of pay during their drill days, but they are not ordinarily eligible for BAH.

AGRs are members of the Army National Guard, Army Reserve, Air National Guard, and Air Force Reserve who are activated for 180 or more days to support the following functions of the Army National Guard and the Air National Guard: organizing, administering, recruiting, instructing, or training. The Navy has a similar category called

[14] This summary is adapted from "Cost Estimate for S. 1519: National Defense Authorization Act for Fiscal Year 2018, as Reported by the Senate Committed on Armed Services on July 10, 2017," Congressional Budget Office (CBO), August 3, 2017, www.cbo.gov/system/files?file=115th-congress-2017-2018/costestimate/s1519_1.pdf.

Training and Administration of the Reserve (TARs). There was a total of 79,000 members in those categories during 2018.[15] AGRs receive the same pay and benefits, including BAH, as their counterparts who initially enlisted or commissioned in the active components.

Types of duty for which RC members are activated

BAH may become problematic when RC members are activated for long periods of duty in any one of these categories:

- **Active duty for training (ADT)**. A tour of active duty for training RC members to fill the needs of the Armed Forces in time of war or national emergency and such other times as the national security requires.[16]
  - *Initial skills training*. Not initial active duty training (IADT, which would include basic military training and technical skill training), but training for mid-grade personnel who are transitioning to a new occupational specialty.
  - *Other training duty (OTD)*. Full-time attendance at organized and planned specialized skill training, refresher and proficiency training, and professional development programs.
- **Active duty other than training (ADOT)**. Training authorized under 14 USC 721, "Active duty for emergency augmentation of regular forces." RC members may perform a variety of service types, ranging from deploying overseas to backfilling active or reserve personnel who have already deployed overseas.
  - *Active duty operational support (ADOS)*. All voluntary active duty authorized by section 10 USC 12301(d) ("Reserve components generally") other than AGR duty. ADOS also includes all 1-year or multi-year voluntary tours of active service by RC Service members; or
  - *Involuntary active duty*. Active duty performed by RC members, including Title 10 of U.S. Code, sections 331 through 332, 12301(a), 12301(b), 12302, 12304, 12304a, 12304b, and 12406.

Duration of active duty assignment

The duration of an RC member's active duty assignment determines which type of BAH they receive. This rule applies whether the member is expected to execute a

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[15] *Compensation Greenbook*, "National Defense Budget Estimates for FY 2019 ()," Table 7-5, Under Secretary of Defense (Comptroller), https://comptroller.defense.gov/Budget-Materials/Budget2019/.

[16] This and the subsequent block of definitions are taken from "Duty Status: Terms of Reference," Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs), 2018.

permanent-change-of-station (PCS) move, and whether his or her BAH is paid at the prevailing rate at their home station or the rate at their destination location.

Reservists who are activated for 30 or fewer days receive BAH Reserve Component/Transit (BAH RC/T). That type of pay is based on national average housing costs and does not vary with geographic location; however, it does vary with pay grade and dependency status.[17] Reservists with mid-length training assignments (ADT for 31 to 139 days) or other-than-training assignments (ADOT for 31 to 180 days) receive BAH at the rate prevailing at their home station.[18]

Reservists with long training assignments (more than 140 days) are placed in PCS status at the training destination. Likewise, reservists with long periods of ADOT (more than 181 days) are placed in PCS status at the new duty location. Active component personnel who rotate through training or duty assignments of similar length are presumed to move their families and household goods to the new location. From there they would most likely move to yet a third location, rather than immediately returning to their original location. (However, it is not uncommon for members to retain and rent a home they may have purchased at the original location). Reservists, on the other hand, generally do not bring their families to the new training or duty location; bring only limited amounts of household goods; and immediately return to their original location at the completion of their assignments.

Nonetheless, reservists who are activated to long assignments for any type of duty described previously begin to receive BAH at the prevailing rate in the new training or duty location. Whether the amount of BAH is adequate to meet their housing costs depends on whether, prior to activation, the RC members were AGRs or drilling reservists. Next, we examine both cases.

Active Guard Reservist

In the first case, consider an Army National Guard staff sergeant (grade E-6) with dependents who lives in Springfield, Virginia, in the National Capital Region (NCR).[19] She is an AGR supporting the Army National Guard, assigned to the Temple Army National Guard Readiness Center in Arlington, Virginia, also in the NCR. As a full-time soldier she receives BAH of $2,595 per month.

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[17] "Different Types of BAH," Office of Military Compensation Policy, https://militarypay.defense.gov/PAY/Allowances/bah_types.aspx.

[18] "Joint Travel Regulations," Chapter 10 ("Housing Allowances"), Defense Travel Management Office, updated January 1, 2019, www.defensetravel.dod.mil/Docs/perdiem/JTR_Chapters(8-10).pdf.

[19] These cases are adapted from "Reserve Component Travel: DoD Should Assess the Effect of Reservists' Unreimbursed Out-of-Pocket Expenses on Retention," Government Accountability Office, GAO-18-181, October 2017, 13.

Then, she is activated to a training assignment of more than 140 days in Fort Huachuca, AZ. She is placed in PCS status at that location even though she does not bring her family or move substantial amounts of household goods. In addition, she intends to immediately return to Springfield at the completion of her assignment.

Her prior BAH of $2,595 per month is replaced by the Fort Huachuca rate of $1,113 per month. The new (lower) BAH rate is calibrated to local housing costs around Fort Huachuca and is only 43 percent of the NCR rate. Now she maintains two residences with only the one, smaller BAH payment. If she breaks even between her rental expenses and the BAH at Fort Huachuca, she still has to pay an uncompensated expense on the order of $2,595 per month to maintain her permanent residence in Springfield, (that being the median cost at the latter location).

The financial hardship would be eased if she had moved, instead, from a low-cost housing area to a higher-cost one. For example, suppose she moved from Draper, Utah, (BAH = $1,593) to Fort Meade, Maryland, (BAH = $2,604). If she broke even between her rental expenses and the BAH at Fort Meade, she would still have uncompensated costs but now on her (presumably) lower-cost permanent residence in Draper.

Member of SELRES

The parameters of the second case differ in that our staff sergeant still lives in Springfield, Virginia, but is a part-time Guardsman who drills with the 3rd Battalion, 116th Infantry Regiment in Warrenton, Virginia, some 44 miles from home. As a part-timer she does not receive BAH.

Then, as in the previous case, she is activated to a training assignment of more than 140 days in Fort Huachuca, Arizona. She is placed in PCS status to that location and the Army no longer considers her a resident of Springfield in the NCR.

Our staff sergeant either is provided with base housing or must rent housing in the Fort Huachuca area while receiving BAH of $1,113 per month. BAH rates are calibrated to median market rents, so the staff sergeant may or may not break even on local housing costs around Fort Huachuca. She still maintains her home in Springfield, to which she intends to return. She did not receive BAH related to that home before her PCS and does not now. Her ability to maintain that home is not related to BAH policy or rates. Instead, it is more a matter of *income replacement*: Are her earnings as a full-time, activated E-6 higher than the sum of her civilian earnings in the Springfield area plus the drill pay she received as a part-time Guardsman?

A civilian dentist who also serves as a part-time Guardsman might lose so much income while activated that she has difficulty maintaining her home in the NCR. However, a civilian handyman who works only sporadically may earn considerably more when

activated to full-time status, so that he can break even with BAH in Fort Huachuca while *more easily* affording his house in Springfield.

Evidence on earnings losses

Whether activated reservists earn more or less than they did as civilians appears to depend on their education level and, especially, their civilian occupation. Further, survey data on civilian earnings tend to show earnings losses during periods of activation. On the other hand, administrative data show lower civilian earnings than the activated reservist's military earnings.

A 2005 IDA study by Colin Doyle and Glenn Gotz found higher military earnings during activation except for reservists in a few high-end civilian occupations. Doyle and Gotz relied on DoD's Civilian Employer Information database, in which reservists self-reported information on their civilian employer, position, dates of employment, and occupation:

> *Median civilian earnings in most occupations—representing a large majority of reservists—were less than median military incomes while on active duty ... Occupations with median earnings losses for officers included physicians and surgeons, lawyers, and dentists. Occupations with median earnings losses for senior enlisted personnel with bachelor's degrees included various types of engineers, managers, and other professionals.*
>
> *Median income comparisons cannot tell us the actual percentages of reservists who experienced losses or gains when called to active duty. There surely were reservists in "loss" occupations who actually gained income on active duty and reservists in "gain" occupations who lost income. The results are clear, however, that income losses are not widespread and suggest that losses are likely to be concentrated in a small group of occupations, e.g., physicians, engineers, and other professionals.*[20]

A 2011 study by RAND researchers Jacob Klerman and David Loughran matched the pay records of activated reservists to their civilian earnings subject to Medicare taxes as recorded by the Social Security Administration. They, too, found a pattern in which most reservists earn more when activated than they did in their civilian employment:

> *The results presented in this paper indicate that activation leads to large average earnings gains for reservists. Averaging across all reservists, our estimates imply that activation increases the average earnings of reservists by $9,252. This figure represents an increase of 23% over earnings prior to activation. For reservists serving for 271 or more days on active duty, a group about whom policy makers might be particularly concerned, the average increase in earnings attributable to activation is even larger,*

[20] Colin M. Doyle and Glenn A. Gotz, "Income Gains and Losses of Mobilized Reservists," IDA Paper P-4013 (Alexandria, VA: Institute for Defense Analyses, August 2005).

> *$23,844, or 60% over earnings prior to activation. We stress here that these results apply only to the earnings of reservists during their period of active-duty service. Additional research is needed to assess how activation affects the earnings of reserve spouses (and, therefore, household earnings) and whether the civilian earnings of reservists suffer when they return from active-duty service.*[21]

Klerman and Loughran contrasted their findings from administrative data on civilian earnings to those of Martorell et al., which were based instead on reservists' self-reported responses to the Defense Manpower Data Center's 2004 Status of Forces Survey of the Reserve Components (SOFRC).[22] As summarized by Klerman and Loughran:

> *For example, about half of reservists surveyed by the 2004 [SOFRC] reported that their earnings declined while serving on active duty. The average change in earnings among surveyed reservists was a loss of $287 per month, about 8% of pre-activation earnings...*[23]

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[21] Jacob A. Klerman and David S. Loughran, "What Happens to the Earnings of Military Reservists When They Are Activated? Evidence from Administrative Data," *Defense and Peace Economics* 22, no. 1, 2011, https://doi.org/10.1080/10242694.2010.491685.

[22] Paco Martorell, Jacob A. Klerman, and David S. Loughran, "A Reconciliation of Estimates Derived from Survey and Administrative Data," RAND Corporation, TR-565-OSD, 2008.

[23] Jacob A. Klerman and David S. Loughran, "What Happens to the Earnings of Military Reservists When They Are Activated? Evidence from Administrative Data," *Defense and Peace Economics* 22, no. 1, 2011, https://doi.org/10.1080/10242694.2010.491685.

Appendix C.
Survey/Closed-Ended Focus Group Questions

Section 1:

1. What is your Service?
    - o Army
    - o Navy
    - o Marine Corps
    - o Air Force

2. What is your Component?
    - o Active Component
    - o Reserve Component

2. If Reserve Component, what is your Reserve Status?
    - o Traditional Reservist
    - o Technician
    - o Individual Mobilization Augmentee
    - o Active Guard & Reserve
    - o Other, please specify: _____

3. What is your legal state of residence for tax purposes? _____

4. What is your current pay grade? _____

5. How many years have you been in military service? _____

6. What is your primary military occupational specialty code, career branch, or designator? _____

7. How would you describe where you live?
    - o On-base housing (barracks/dorms, base housing)
    - o Private or contracted military housing
    - o Off base (house, townhouse, or apartment)

8. What is your marital status?
    - o Married
    - o Separated
    - o Divorced

- o Widowed
- o Never married

9. Do you have children or other legal dependents?
   - o Yes
   - o No

10. (*Skip if not applicable to you*) Is your family a single- or dual-income family?
    - o Single
    - o Dual

    i. [If a dual income family] Is your spouse also in the military?
    - o Yes
    - o No

11. Do you currently receive Basic Allowance for Housing (BAH)?
    - o Yes
    - o No
    - o Do not know

12. Are you planning to continue in service for the next 5 years?
    - o Yes
    - o No
    - o Do not know

13. Are you planning to continue in service until you reach retirement?
    - o Yes
    - o No
    - o Do not know

Section 2:

Every four years, DoD is asked by Congress to review the military pay system. As part of this research, DoD wants to know how Service members would react if their pay changed. The questions below describe hypothetical changes to pay—no changes are currently taking place and there are currently no plans to make such changes in the future. DoD wants Service member input to help decide whether changes should be made and how to make potential changes.

1. Suppose DoD increased basic pay but removed the *dependent rate* on the Basic Allowance for Housing. This would mean:

   - Service members *with dependents* and *without dependents* would receive the same pay

- On average, Service members *with dependents* would see a <u>decrease</u> in their earnings (after taxes); and Service members *without dependents* would see an <u>increase</u> in their earnings (after taxes)

b. Would you support or oppose the change described above?

Strongly support	*Somewhat support*	*Neither support nor oppose*	*Somewhat oppose*	*Strongly oppose*
O	O	O	O	O

c. Would the change described above make you more likely to stay, more likely to leave, or have no impact on your decision to remain in service at the end of your service obligation/commitment?

Much more likely to stay	*Somewhat more likely to stay*	*No impact*	*Somewhat more likely to leave*	*Much more likely to leave*
O	O	O	O	O

d. For those considering joining the military, do you think the change described above would make them more likely to join, less likely to join, or have no impact on their decision to join?

Much more likely to join	*Somewhat more likely to join*	*No impact*	*Somewhat less likely to join*	*Much less likely to join*
O	O	O	O	O

2. Suppose DoD increased basic pay for Service members but removed the Basic Allowance for Housing. This would mean:

- Service members living in civilian/privatized housing that they own or rent would receive the *same pay* as Service members living in rent-free government-owned housing

- On average, Service members living in civilian/privatized housing that they own or rent would see a <u>decrease</u> in their earnings (after taxes)

- On average, Service members living in government-owned housing that they do not pay rent for would see an <u>increase</u> in their earnings (after taxes); however, they may have to start paying rent for their housing

a. Would you support or oppose the change described above?

Strongly support	*Somewhat support*	*Neither support nor oppose*	*Somewhat oppose*	*Strongly oppose*
○	○	○	○	○

b. Would the change described above make you more likely to stay, more likely to leave, or have no impact on your decision to remain in service at the end of your service obligation/commitment?

Much more likely to stay	*Somewhat more likely to stay*	*No impact*	*Somewhat more likely to leave*	*Much more likely to leave*
○	○	○	○	○

c. For those considering joining the military, do you think the change described above would make them more likely to join, less likely to join, or have no impact on their decision to join?

Much more likely to join	*Somewhat more likely to join*	*No impact*	*Somewhat less likely to join*	*Much less likely to join*
○	○	○	○	○

<u>Section 3:</u>

Suppose DoD changed military pay to a **salary system** such that basic pay would increase but the Basic Allowance for Housing (with or without dependents) and the Basic Allowance for Subsistence would be removed. As a result, some Service members would see a decrease in their earnings, after tax, due to a loss of tax benefits (unless Congress authorized DoD to compensate members for the additional tax they would pay). Other Service members would see an increase in their earnings, after tax.

Please read the following scenarios and indicate (X) whether the hypothetical changes in pay would make you more likely to leave, more likely to stay, or have no impact on your decision to remain in service at the end of your service obligation/commitment. The questions below describe hypothetical changes to pay—no changes are currently taking place and there are currently no plans to make such changes in the future.

	Much more likely to stay	Somewhat more likely to stay	No impact	Somewhat more likely to leave	Much more likely to leave
If a change to a salary system increased your earnings (after taxes) by 5%, how would that impact your decision to remain in service?					
If a change to a salary system decreased your earnings (after taxes) by 5%, how would that impact your decision to remain in service?					
If a change to a salary system increased your earnings (after taxes) by 10%, how would that impact your decision to remain in service?					
If a change to a salary system decreased your earnings (after taxes) by 10%, how would that impact your decision to remain in service?					
If a change to a salary system increased your earnings (after taxes) by 20%, how would that impact your decision to remain in service?					

Appendix D.
Open-Ended Focus Group Questions

1. To what extent was pay a factor that influenced your decision to join the military?

2. Overall, do you think you are fairly paid for the work you do? Why do you feel that way?

    a. [If not fair] Are there changes you would like to see in the pay system to make it fairer?

3. How does your compensation for what you do compare to what you would earn as a civilian?

As part of a review of military compensation that takes place every 4 years, Congress wants to understand Service members' general attitudes and opinions about military pay and the pay system. This study is part of that and no specific policy decision has been made; any concrete proposal would receive further study and input from the military Services anyway.

4. What do you think if the DoD moved to a single-salary system that combines basic pay, BAS, and BAH? A single-salary system would mean:

    a. Overall, the system would be revenue neutral to the Federal Government (i.e., this is not about saving money; the Government would not be spending more or less on compensation in total).
    b. Service Members with and without dependents would receive the same or equal pay.
    c. Basic pay would increase and change, depending on the cost of living where you are stationed.
    d. Bonuses, special pays, and other benefits would remain as separate pays (i.e., it would remain the same).
    e. All salary would be taxable.

5. [If RC] What would you think if the salary rate remains the same regardless of your active duty status?

6. How important to your standard of living are housing and subsistence allowances [Basic Allowance for Housing (BAH) and Basic Allowance for Subsistence (BAS)]?

7. How much would you estimate that your basic pay would need to be increased to offset a reduction or elimination of these allowances?

8. Under a salary system, people who live on-base may be required to pay rent for their on-base housing. (This includes those people who live in barracks). How do you think people would respond to paying rent for their housing?

9. Are there any non-monetary benefits that would help offset the elimination of allowances? For example, being able remain in the same geographic location for multiple tours? Or being allowed to telecommute? Is there anything else that might offset an elimination of allowances?

10. How likely are you to stay in uniform 5 years from now? [Whatever response is provided] What are some of the reasons for that?

11. How much does your pay factor into your decision to stay or not?

12. How would changes to the compensation system affect your plans to stay in uniform?

Appendix E.
How the Tax Cuts and Jobs Act Affected the BAH/BAS Tax Advantage

The BAH/BAS tax advantage is the additional amount of taxes Service members would pay if BAH and BAS were taxable. The tax advantage depends on federal and state tax regimes. The Tax Cuts and Jobs Act of 2017 (TCJA) changed the federal tax regime in many ways, most importantly by reducing income tax rates. Thus, the TCJA reduced the BAH/BAS tax advantage beginning in 2018.

We measure the BAH/BAS tax advantage in 2018 by computing 2018 income taxes for all active duty Service members, then doing so again treating BAH/BAS as taxable income.[1] The difference in taxes paid is the tax advantage. We then measure the tax advantage under the 2017 tax regime for the same set of Service members. The difference in the tax advantages we measure represents the effect of the TCJA. We compute tax advantages of $3,682 and $4,092 per Service member under the 2018 and 2017 tax regimes, respectively.[2] Therefore, the TCJA reduced the allowance tax advantage by about $410 per Service member, or about 10 percent of what the tax advantage would have been without the TCJA.

Table E-1 shows how the effects of the TCJA vary by pay grade. The TCJA decreased the tax advantage most for senior officers in absolute and percentage terms. Each grade of O-6 and above experienced a decrease in tax advantage of more than 15 percent. All grades below O-6 experienced a decrease in tax advantage between 6 percent and 13 percent, except cadets in years 2 through 4, who experienced a decrease around 14 percent. Because cadets usually do not receive BAH, their mean tax advantages are on the order of $100 per year. As a share of basic pay, the tax advantage decreased most for E-5s, E-6s, O-1s, O-2s, and O-7s. The same pay grades experienced the greatest decrease in tax advantage as a share of all military pay. The decrease in tax advantage over all Service members was 0.81

[1] We compute taxes using a local executable copy of TAXSIM version 27 software provided by the National Bureau of Economic Research. See https://users.nber.org/~taxsim/taxsim27.

[2] An allowance tax advantage in calendar year 2018 of $3,682 per Service member corresponds to a total allowance tax advantage of $5.4 billion. That estimate agrees with a Joint Committee of Taxation estimate of a total allowance tax advantage in fiscal year 2018 of $5.5 billion. See *Estimates of Federal Tax Expenditures for Fiscal Years 2018-2022*, Table 1, Joint Committee on Taxation, panel on National Defense, https://www.jct.gov/publications.html?func=startdown&id=5148.

percent of all military pay. No pay grade experienced a decrease in tax advantage greater than 1.15 percent of all military pay.

Table E-1. Effects of the Tax Cuts and Jobs Act (TCJA) on the 2018 Allowance Tax Advantage

Pay Grade	Count	Allowance Tax Advantage ($)	Tax Advantage without TCJA ($)	TCJA Effect as Share of: Tax Advantage	Basic Pay	All Military Pay
C01	3,810	30	27	-9.90%	-0.04%	-0.04%
C02	3,613	104	90	-14.08%	-0.12%	-0.12%
C03	3,373	98	85	-13.94%	-0.11%	-0.11%
C04	3,353	103	88	-14.12%	-0.11%	-0.11%
E01	80,514	229	202	-11.50%	-0.44%	-0.36%
E02	79,083	737	659	-10.64%	-0.58%	-0.45%
E03	205,552	1,641	1,466	-10.69%	-0.86%	-0.63%
E04	292,904	2,734	2,435	-10.94%	-1.22%	-0.83%
E05	259,431	4,374	3,883	-11.22%	-1.58%	-1.00%
E06	175,555	5,950	5,357	-9.97%	-1.46%	-0.92%
E07	104,045	6,377	5,877	-7.84%	-1.01%	-0.69%
E08	31,103	6,965	6,516	-6.45%	-0.80%	-0.57%
E09	12,480	8,027	7,452	-7.17%	-0.81%	-0.62%
O01	19,742	3,458	3,023	-12.59%	-1.48%	-1.03%
O01E	2,083	6,513	5,914	-9.20%	-1.25%	-0.84%
O02	22,351	6,092	5,441	-10.69%	-1.36%	-0.99%
O02E	2,975	7,037	6,527	-7.25%	-0.85%	-0.61%
O03	53,470	7,302	6,685	-8.45%	-0.97%	-0.71%
O03E	11,674	8,472	7,849	-7.36%	-0.79%	-0.60%
O04	43,397	8,904	8,060	-9.48%	-1.00%	-0.73%
O05	29,478	9,577	8,492	-11.32%	-1.09%	-0.81%
O06	12,781	10,202	8,631	-15.40%	-1.30%	-1.01%
O07	473	10,721	8,808	-17.84%	-1.32%	-1.15%
O08	363	10,282	8,387	-18.43%	-1.20%	-1.06%
O09	185	9,066	7,437	-17.97%	-0.98%	-0.87%
W01	391	6,353	5,894	-7.24%	-0.86%	-0.59%
W02	1,886	6,582	6,147	-6.60%	-0.75%	-0.54%
W03	4,492	7,057	6,606	-6.39%	-0.67%	-0.50%
W04	3,288	7,503	6,923	-7.73%	-0.75%	-0.58%
W05	954	8,917	8,058	-9.63%	-0.91%	-0.72%
Total	**1,464,799**	**4,092**	**3,682**	**-10.00%**	**-1.17%**	**-0.81%**

Illustrations

Figures

Tables

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Abbreviations

2SLS	Two-Stage Least Squares
AC	Active Component
ADM	Active Duty Master
ADOS	Active Duty Operational Support
ADOT	Active Duty Other than Training
ADP	Active Duty Payments
ADT	Active Duty Transactions
AFB	Air Force Base
AGR	Active Guard Reserve
AIP	Assignment Incentive Pay
BAH	Basic Allowance for Housing
BAS	Basic Allowance for Subsistence
BLB	Bag of Little Bootstraps
BP	Basic Pay
CBO	Congressional Budget Office
CNA	Center for Naval Analyses
CP	Continuation Pay
CPS ASEC	Current Population Survey Annual Social and Economic Supplement
CZTE	Combat Zone Tax Exclusion
DMDC	Defense Manpower Data Center
DoD	Department of Defense
FICA	Federal Insurance Contributions Act
GS	General Schedule
HASC	House Armed Services Committee
HORSITL	Home of Record State Income Tax Liability
IADT	Inactive Duty Training
IDA	Institute for Defense Analyses
JCT	Joint Committee on Taxation
LATE	Local Average Treatment Effects
MHA	Military Housing Area
MHPI	Military Housing Privatization Initiative
NBER	National Bureau of Economic Research
NCR	National Capital Region
NDAA	National Defense Authorization Act
NOAA	National Oceanic and Atmospheric Administration

OHA	Overseas Housing Allowance
OLS	Ordinary Least Squares
OPA	Office of People Analytics
OTD	Other Training Duty
OUSD (P&R)	Office of the Under Secretary of Defense (Personnel and Readiness)
PAYGO	Pay-As-You-Go
PCS	Permanent Change of Station
PDPP	Physicians and Dentists Pay Plan
PERSTEMPO	Personnel Tempo
QRMC	Quadrennial Review of Military Compensation
RC	Reserve Component
RC/T	Reserve Component/Transit
RMC	Regular Military Compensation
SASC	Senate Armed Services Committee
SELRES	Selected Reserves
SOFA	Status of Forces Survey for Active Duty Personnel
SOFRC	Status of Forces Survey of the Reserve Components
SRB	Selective Retention Bonus
SSAT	Salary System Assessment Tool
TAR	Training and Administration of the Reserve
TCJA	Tax Cuts and Jobs Act of 2017
TSP	Thrift Savings Plan
U.S. BLS	United States Bureau of Labor Statistics
USDA	United States Department of Agriculture
YOS	Years of Service

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14. ABSTRACT

This paper supports the goal of the Quadrennial Review of Military Compensation (QRMC) of understanding how a compensation system that combines basic pay, housing, and subsistence allowances into a single taxable "salary" would affect Service members' earnings and behavior. This paper also considers the readiness, cost, and tax-revenue implications of such a system. We undertook three lines of effort. First, we modeled the after-tax income effects of transitioning to a salary system. We found that any salary system that maintains constant Federal Government costs will reduce Service members' aggregate after-tax income. Second, we used econometric models to estimate the likely responses of Service members to changes in after-tax income. We found no significant effect of state military tax exemptions on retention, suggesting that other factors are more influential than raw compensation changes. Third, we conducted focus groups with 740 Service members in every Service by visiting Active and Reserve Component installations in four states. Service members generally expressed strong skepticism of major restructuring of military compensation systems; they view the current system as imperfect, but "fair enough." Finally, we discuss other possible mechanisms—short of adopting a salary system—that could improve the efficiency and fairness of the current system.

15. SUBJECT TERMS

Military compensation; salary; basic pay; basic allowance for housing; basic allowance for subsistence; military retirement benefits; locality pay; military housing; Quadrennial Review of Military Compensation; Service member attitudes to military compensation

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The Single-Salary System for Military Personnel: An Analysis of Second- and Third-Order Effects

Thomas M. Geraghty, Lauren Malone, Tom Woo, and Christopher Gonzales

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Abstract

This report presents our findings on identifying and prioritizing the potential second- and third-order effects of the Department of Defense (DOD) moving to a single-salary system (SSS) for military compensation. We identified more than 25 potential effects in six broad areas: housing and food arrangements, retention and separation pays, changes in the dependency ratio, family and dependent benefits, income support programs, and other effects. The report provides information, for each effect, on the number of people potentially affected, budget costs, and potential risks to readiness, based on an extensive literature and policy review and conversations with subject-matter experts from across DOD and the services. We recommend that DOD undertake additional analysis in the areas of housing and food arrangements and retention and separation pays. We also recommend that DOD consider the potential effects of an SSS on military marriage rates and the dependency ratio. We provide a number of topics for further research that will help DOD think through the implications of moving to an SSS.

This work was performed under Federal Government Contract No. N00014-16-D-5003.

Cover image credit: 190318-N-KK394-0008 Mayport, Florida (March 18, 2019). Homes at Bennett Shores East, an onbase military housing community at Naval Station Mayport. (U.S. Navy photo by Mass Communication Specialist 2nd Class Anderson W. Branch)

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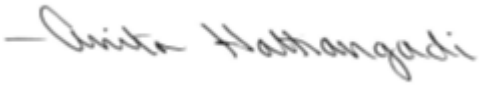

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Executive Summary

The director of the 13th Quadrennial Review of Military Compensation (QRMC) asked CNA to carry out three tasks:

1. Identify potential second- and third-order effects of a move from the current pay and allowances system for regular military compensation to a single-salary system (SSS).
2. Prioritize these potential effects to determine which are most important for further research and analysis.
3. Develop study designs for analyzing the selected second- and third-order effects.

This report presents our findings and recommendations regarding these tasks. We identified more than 25 potential effects in six broad areas: housing and food arrangements, retention and separation pays, changes in the dependency ratio, family and dependent benefits, income support programs, and other effects. For these potential effects, we report information on the number of people potentially affected, budget costs, and potential risks to readiness, based on an extensive literature and policy review and conversations with subject matter experts from across the Department of Defense (DOD) and the services. We also highlight potential research questions that could form the basis for additional empirical work on the effects of a move to an SSS on cost and military readiness, as well as policy changes that may be needed to mitigate these effects.

We recommend that DOD undertake additional analysis in the following areas:

- **Housing and food arrangements**—including onbase and offbase housing, overseas housing, and military meals programs
- **Retention and separation pays**—including Continuation Pay (CP), Selective Reenlistment Bonuses (SRBs), Nondisability (Involuntary) Separation Pay, Voluntary Separation Pay, and Disability Severance Pay

Each of these policies affects a relatively large number of people. Housing and food arrangements affect every servicemember, the retention pays (CP and SRBs) affect 100,000 or more members, and the separation pays affect several thousand each year. Each also has potentially large budgetary impacts—several billion dollars per year for housing and food arrangements, and several hundred million dollars annually in the case of retention and separation pays. Finally, these policies involve potentially substantial risks to member nutrition, family support, and retention, and thus military readiness. Other, lower priority

policies affect fewer people, have smaller budget implications, and/or pose risks to readiness that are more limited.

We also recommend that DOD consider the potential effects of an SSS on military marriage rates and the dependency ratio. Military retention rates are higher for married servicemembers than for single members, which may be at least partially because of the difference in basic allowance for housing (BAH) rates for members with and without dependents. An SSS that eliminates BAH and the with-dependent compensation advantage may have important implications that cut across the other high-priority policy areas of housing, retention, and ultimately military readiness.

In addition, we include a set of research study ideas for analyzing the highest priority effects. These ideas include the following:

- Funding alternatives for privatized housing operations under an SSS
- Estimating how an SSS could affect marriage rates and retention
- Alternative methodologies for incorporating housing costs into an SSS
- Adapting overseas housing benefits to an SSS
- Effects of an SSS on demand for military meals programs
- Efficiencies of moving to lump-sum, flat-amount SRBs

Contents

Introduction

The 13th Quadrennial Review of Military Compensation (QRMC) is considering whether the US military should move from its current regular military compensation (RMC) structure to a single-salary system (SSS). The RMC that most servicemembers receive is a four-part system of pay and allowances:[1]

1. **Basic pay** – a salary that depends on a servicemember's rank and years of service (YOS). Basic pay is about 56 percent of RMC for enlisted members and 70 percent for officers.
2. **Basic allowance for housing (BAH)** – an allowance that depends on rank, location, and dependent status to offset housing costs for members who do not receive government-provided housing. BAH makes up about 30 percent of the typical enlisted member's RMC and about 22 percent for officers.
3. **Basic allowance for subsistence (BAS)** – an allowance that depends on enlisted/ officer status (and is higher for enlisted members) to offset members' meal costs. BAS makes up 7 percent of RMC for enlisted members and 3 percent for officers.
4. **Tax advantage (TA)** – tax savings resulting from the fact that BAH and BAS are not taxable at the state or federal level. The tax advantage makes up about 6 percent of RMC for both enlisted members and officers.[2]

Although this RMC structure has been a central component of US military compensation since the late 1940s, policy-makers are concerned that it may be overly complex, making it difficult for servicemembers to understand the full value of their compensation, and inequitable in some respects, such as the differential treatment of members with and without dependents. There is also some sentiment that the current RMC system does not adequately embody the

[1] Percentages of RMC are from authors' calculations based on information from the Office of the Under Secretary of Defense for Personnel and Readiness, Directorate of Compensation's Selected Military Compensation Tables, January 1, 2018, "Detailed RMC Tables for All Personnel," and "Military Personnel by Pay Cell" [1]. Percentages may not sum to 100 due to rounding error.

[2] We based these calculations on "Detailed RMC Tables for All Personnel" from the Compensation Green Book (dated 1-Jan-2018). For each enlisted paygrade, we multiply the value of the TA by the number of members in that rank, and then sum over paygrades to get the total TA dollar value for enlisted. We do the same for other compensation components to get the total dollar value of RMC for enlisted, and the percentage is then TA divided by RMC. We do a similar, separate calculation for officers. In both cases, TA comprises 6 percent of RMC [1].

principle of "equal pay for equal work" or provide sufficient performance incentives for servicemembers.[3]

As a result, the FY 2017 National Defense Authorization Act (NDAA) mandated that the Department of Defense (DOD) study whether the current RMC system should be converted to an SSS [6]. According to the NDAA, an SSS would involve the following:

- Elimination of BAH and BAS
- Pay table changes specifying the pay levels, by grade and YOS, required to
  - Achieve pay comparability with the civilian sector
  - Effectively recruit and retain a high-quality All-Volunteer Force
- Cost-of-living (CoL) adjustment, using the same adjustment system that DOD currently uses worldwide for civilian employees
- Necessary adjustments to the military retirement system, including the retired pay multiplier, to ensure that servicemembers are situated similarly to where they would otherwise be under the new Blended Retirement System (BRS).

The NDAA also specifies a cost containment objective, so that a new SSS would result in at most "minimal" additional costs to the government compared with the current RMC system.

In addition to basic pay and housing and subsistence allowances, the US military provides a variety of special and incentive pays for service in particular environments and circumstances. These include hazardous duty pay, family separation pay, and special pays for hard-to-staff positions and occupations. Although converting from the current system to an SSS probably would not change the nature of these pays very much, to the extent that the value of some of these pays is tied to RMC components, their costs may change under an SSS.

Moving to an SSS would represent a substantial change to US military compensation policy. The potential benefits of such a change could include reduced complexity and increased transparency of military compensation, and improvements in both compensation equity and incentives. Potential disadvantages of an SSS could include high transition costs to the new system and perhaps higher long-term compensation costs as well. To understand better the implications of moving to an SSS, the director of the 13th QRMC asked CNA to:

1. Identify potential second- and third-order effects of a move from the current pay and allowance RMC system to an SSS.
2. Prioritize these potential effects for further research and analysis.
3. Develop study designs for analyzing the selected second- and third-order effects.

[3] See, for example, discussions on a military SSS in the First (1967), Third (1976), and Seventh (1992) QRMCs, and in the 1976 Defense Manpower Commission Report [2-5].

Defining second- and third-order effects

According to the FY 2017 NDAA, the direct (or first-order) effects of implementing an SSS include changes to the pay table, implementation of a locational CoL adjustment, and modifications to the military retirement system. Beyond these first-order effects, a number of nondirect potential effects must be identified to ensure that appropriate legislation and regulations can be adopted to mitigate them. Such nondirect effects could include potential budgetary cost increases, impacts to servicemembers and their families, or risks to readiness caused by adverse effects on recruiting, retention, or servicemember morale. It is these nondirect potential effects of adopting an SSS that we define as second- and third-order effects.

Approach

Identifying potential effects

Our first task was to identify potential second- and third-order effects of a move to an SSS. We began by conducting brainstorming sessions with CNA staff members who have both military experience and research backgrounds in manpower, personnel, and compensation issues. We also conducted an extensive literature review of policy documents, including the Military Compensation Background Papers and the DOD Financial Management Regulation (FMR). These efforts focused on identifying aspects of compensation policy that could be affected by the first-order changes involving elimination of BAH and BAS, increased basic pay, and changes to the retirement system. We held discussions with a number of subject matter experts (SMEs) in military compensation in the Air Force, Army, Navy, and Marine Corps, and with Defense Finance and Accounting Services (DFAS).[4] From these documents and discussions, we identified over 25 potential second- and third-order effects in six broad areas: housing and food arrangements, retention and separation pays, changes in the dependency ratio, family and dependent benefits, income support programs, and other potential effects. For each policy effect, we conducted an extensive literature review to estimate the number of people affected, budgetary impacts, and risks to readiness.

Prioritizing potential effects

Once we identified the set of potential second- and third-order effects, our second task was to prioritize the set and identify a subset of sufficient significance that require more detailed

[4] Throughout this effort, we coordinated with the Institute for Defense Analysis (IDA), who is conducting a study on the first-order effects of an SSS, to prevent overlap between the two studies.

empirical analysis. In consultation with the project sponsor and SMEs, we developed criteria to establish priorities among our identified effects. The policy-related criteria are as follows:

1. *Number of people affected:* How many servicemembers does the policy or program affect? Is it a "niche" policy applying to a small group? Does it affect many or most servicemembers? Does it affect servicemembers' dependents? Also, will a move to an SSS create large compensation windfalls or losses for some groups?
2. *Budget impacts:* What will be the potential impact of eliminating BAH and BAS, or of increasing basic pay, on the budgetary cost of the program or policy?
3. *Risks to readiness:* What will be the potential impacts on readiness-related manpower outcomes, such as recruiting and retention? Will the impacts, or the policy changes needed to mitigate adverse impacts, have consequences for servicemember incentives or morale?

We consider these first three criteria—number of people affected, budget impacts, and risks to readiness—to be the driving factors in prioritizing the effects. Research studies on policies that affect large numbers of servicemembers and their dependents, that have a high potential increase in budget, and/or for which there are important potential risks to readiness (especially with respect to the availability of personnel and flexibility to deploy or assign them as needed) should have the largest payoff in terms of understanding the potential effects of an SSS and developing policies that can mitigate potential cost increases or adverse readiness effects.

We consider the following two criteria to be somewhat less important than the first three, but we do consider them where appropriate:

- *Feasibility of policy change:* What kind of policy changes may be needed to mitigate any second- or third-order effects? How feasible or difficult will it be to implement such changes? Do changes require modification to service-level or DOD policies? Will congressional action be required?
- *SME inputs:* Which effects do SMEs believe to be the most likely to occur, and to have the largest effects?

Finally, we also consider two research-related criteria, bringing the total number of criteria to seven:

- *Feasibility of measuring impacts:* Will researchers be able to collect the data and information needed for an empirical study on the policy or program in question?
- *Availability of existing research or information:* How much research exists on the policy that can inform what we expect the second- and third-order effects to be? A policy that is well studied may be lower priority for further research, unless there are research

gaps that need to be filled to inform the design of appropriate policy and legislation for an SSS.

Organization of the report

This report summarizes our findings from identifying and prioritizing the second- and third-order effects of moving to an SSS. The first section of this report presents our recommendations for the highest priority effects requiring further analysis. These effects involve housing and food arrangements, and retention and separation pays. For each policy program, we discuss the second- and third-order effects, and we provide information about the number of people affected, potential budgetary impacts, potential risks to readiness, the feasibility of making needed changes to the policy, and the existing research literature on the topic. We also recommend that DOD consider the potential effects of an SSS on military demographics—specifically, marriage rates and the dependency ratio. We suggest a number of questions raised by the potential adoption of an SSS that could form the focus of a future research study or studies. The second section of the report summarizes the study ideas for analyzing the highest priority effects. The third section of the report describes other second- and third-order effects that we consider lower priority for further research and analysis.

Highest Priority Effects

In this section, we present and discuss the highest priority second- and third-order effects identified by our policy and literature reviews and our SME discussions. For each effect, we provide information about the number of people affected and possible budgetary impacts and risks to readiness. Because estimates of the number of people affected, budget impacts, and assessments of potential risks to readiness are based on policy and literature reviews and SME discussions, they should be considered rough estimates only. Harder numbers or more precise risk assessments will require more detailed empirical analysis.

We organize the effects into three broad categories: housing and food arrangements, retention and separation pays, and changes in the dependency ratio.

Housing and food arrangements

The most important effects requiring further study involve housing and meal programs for servicemembers. Current housing and meal programs are predicated on the existence of BAH and BAS, so eliminating these allowances will require a substantial redesign of these arrangements. In terms of number of people affected, housing and meal arrangements in one way or another affect every servicemember, and housing arrangements affect dependents as well. Budgetary effects are potentially large, and the potential risks to readiness, which may include adverse impacts on housing and food availability and quality (perhaps leading to negative effects on morale, nutrition and health, and/or willingness to deploy) are probably the highest of any of the policies we considered.

Onbase family housing

All active component (AC) servicemembers receive some sort of housing provision or subsidy from the military. Members receive either BAH, privatized housing benefits, or an in-kind housing benefit in the form of military-provided housing [7-8].

Number of people affected and budget costs

According to the Selected Military Compensation Tables report published by the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD-P&R), about 480,000 AC servicemembers live in onbase, military-provided housing (not including those in privatized, or PPV, housing). Because of service requirements for junior enlisted without dependents to live on base, about 355,000 of these are living in bachelor housing, leaving roughly 125,000 AC

servicemembers with dependents living in onbase, military-provided housing; these are the servicemembers receiving housing as an in-kind benefit [1].[5]

Provision of onbase family housing to servicemembers living in the United States has undergone substantial change in the last two decades because the military has privatized almost all of its US military family housing. Since 1996, over 200,000 units of such housing have been privatized under the Military Housing Privatization Initiative (MHPI). Under MHPI, housing ownership and management are transferred to private developers, usually for a 50-year period. In exchange, the project owners agree to rent the homes to AC servicemembers at the BAH rate with no additional out-of-pocket cost [9]. MHPI contracts require that the private partners operate the housing with many of the rules of military-owned housing. For example, servicemembers are entitled to rent units sized according to their paygrades and their number of dependents. Servicemembers with dependents can choose whether to reside in MHPI housing or private-sector housing. Either way, they receive monthly BAH payments. In general, choosing to live in MHPI housing is voluntary.

A 1999 RAND report stated that, as of the late 1990s, DOD was paying nearly $10 billion annually for onbase housing, while a 2002 CNA study reported that the Navy's cost of providing family housing was $1.1 billion in FY 2001 [10-11]. However, the FY 2019 budget request for the Family Housing Program was only $60 million [12]. Much of military spending for onbase family housing has been transferred elsewhere in the budget because of the privatization initiative.

Risks to readiness

The importance of housing arrangements to military readiness is widely recognized. According to a 2002 CNA report, for example,

> Military leaders know that ensuring servicemembers a high quality of life (QoL) is central to the cultivation and maintenance of a capable force. Improvements in QoL [including housing quality and affordability] are believed to increase overall satisfaction with the military and to improve recruiting, retention, and readiness. [11]

A 2003 CBO report summarizes some of the benefits of spending on QoL programs (including housing), which include promoting military readiness and cost-effectively attracting and retaining servicemembers. According to the report, QoL programs such as subsidized family housing can promote readiness because

[5] These numbers come from the authors' calculations from the Selected Military Compensation Tables, January 1, 2018, "Detailed RMC Tables for All Personnel" and "Military Personnel by Pay Cell," provided by the Office of the Under Secretary of Defense for Personnel and Readiness, Directorate of Compensation [1].

> deployed service members who feel that their families are taken care of may perform their jobs more effectively. Moreover, quality-of-life programs that encourage experienced people to remain in the military or that attract high-quality recruits could be said to enhance readiness. [7]

Therefore, any changes to military housing policies that affect the level of housing affordability and quality to servicemembers may have effects on overall readiness as well.

It is also possible that changes to military housing arrangements could affect readiness in specific locations by affecting servicemembers' willingness to take assignments in those locations. Some SMEs with whom we spoke expressed concern that, in the absence of BAH, servicemembers might be less willing to relocate to areas with high costs of living unless a locality adjustment to basic pay were introduced as a part of a new SSS.

Housing-related issues in moving to an SSS

Although there is a substantial research literature on military housing, a number of housing-related issues could warrant further study as part of an SSS assessment.

Equity issues. A move to an SSS will create issues with respect to how to deal with individuals in different housing situations. Currently, there is a degree of equity in military housing arrangements in that every servicemember, whether receiving housing directly or BAH, receives some sort of housing benefit.[6] If BAH were eliminated (and no other mitigating policy changes were enacted), an inequity would be introduced because those living in military-provided housing still would be receiving the in-kind benefit, but those living in MHPI housing or off base who are no longer receiving BAH would receive no housing subsidy. Some specific equity-related considerations follow:

- How will single servicemembers who live on base, in barracks, or on ships and do not receive BAH be treated under an SSS? Will such servicemembers receive the same salary as those now receiving BAH (living in MHPI housing or off base)? If so, single members in military-provided housing could receive a large compensation windfall. Under an SSS, will charges be introduced for those living in barracks or on ships?
- How will dual-military couples be treated? There is something of an advantage for such couples living in MHPI housing or off base because both members receive BAH, while those living in onbase, military-provided family housing receive only one house. Moving to an SSS may disadvantage dual-military couples receiving BAH.

[6] It is worth noting that current military housing arrangements also have a degree of inequity. A 1997 CNA study on Navy housing reported that separate administration of onbase family and bachelor housing and offbase allowances resulted in significantly different housing benefits to servicemembers within the same paygrade, depending on where they lived. The 25 percent of Navy families who were living on base received 40 percent of the budgeted Navy housing resources for families at the time [13].

Demand for onbase family housing. Another set of issues concerns how an SSS might affect the demand for onbase housing. Some research suggests that servicemembers in the past (before the widespread availability of MHPI housing) preferred onbase family housing to receiving BAH; the economic benefit of onbase housing was perceived by members to be greater than that provided by BAH payments. Servicemembers at the time did not view the noneconomic benefits of onbase family housing (e.g., acculturation of junior personnel, fostering military values, or support for families of deployed servicemembers) to be nearly as important as the perceived benefit gap between BAH and onbase family housing [10, 14]. It may be worth revisiting these studies to assess the extent to which these preferences still hold. If they do, it may be the case that, under an SSS that eliminates BAH (and includes a cost-of-living adjustment), servicemembers and their families may see little compelling reason to live on base. The result could be decreased demand for onbase family housing. Without a CoL adjustment, however, demand for onbase housing in areas with high living costs might remain at current levels or even increase under an SSS.

There also could be differential geographical effects of an SSS on onbase housing demand. The elimination of BAH (if not accompanied by some sort of location adjustment to basic pay) could, for example, increase the demand for onbase housing in locations with high CoL.

Military housing management. A move to an SSS may require changes to the way military housing is managed. One issue, already mentioned, is the potential need to establish a system of rents or charges for military-provided housing (barracks, ships' quarters, etc.).

There also may be implications for the management of MHPI housing. Currently, MHPI contracts stipulate that the maximum rent that can be charged is based on the BAH rate. The contracts have no stipulations for what would happen if BAH were eliminated. Under an SSS, new procedures for setting maximum MHPI rents would have to be established. If MHPI contracts are renegotiated to allow private partners to charge market rents, the demand for onbase housing (which, as noted, in the past has depended on a perceived "benefit gap" between BAH and in-kind housing) could fall dramatically.[7] Permitting private partners to charge market-level rents also could impose hardships for some servicemembers, especially junior members with large families. Alternatively, a resolution involving continued explicit

[7] The extent to which BAH sets a ceiling on rents in all military housing markets is not clear. In some markets, private partners provide rent discounts to military families living in MHPI housing, with these families effectively paying less than their BAH rate in rent. In these locations, MHPI housing rents already are at market level; the market level of those rents is now below the ceiling established by the BAH rate. This may be because BAH rates have risen relative to local rents or because the quality of privatized housing has fallen over time. In such locations, elimination of BAH may have less effect on MHPI rents than locations where the market rental rate is still above the BAH rate. We do not have firm estimates of the amount of MHPI housing being rented at essentially market rates, although there is some evidence that these discounts may be significant and fairly widespread. In other locations, however, there are long waiting lists for newer and larger MHPI homes, suggesting a shortage of such homes because market rental values are higher than the ceiling established by the BAH rate.

rent subsidies could prove costly for the partnerships or the military. In any case, an SSS would require that every MHPI contract be renegotiated, which could be an administratively difficult and costly task. MHPI partnerships are legal agreements, and the private partners and their bondholders have economic interests that are different from the military's [15].

Although this would be a much more radical military housing policy change, DOD may want to consider whether it should be providing subsidized housing at all. Current policy determines the level of need for onbase housing based on such considerations as the degree to which a presence is needed and the suitability of local community housing (in terms of minimum standards of affordability, location, features, and physical condition). Multiple research studies have found, though, that the cost of providing in-kind family housing may outweigh the benefits. A 1997 CNA study estimated that the cost to the government of providing family housing for soldiers exceeded their valuation of it by 25 to 40 percent [13]. A 2002 CNA study found similar results for the Navy (note that these valuations predate MHPI and might be different under an MHPI framework) [11]. If the cost of providing family housing exceeds the benefits to servicemembers and the military, it may make sense for DOD to stop providing it, at least to the extent that it now does [16]. DOD-provided housing (and/or MHPI ventures) still may be efficient in austere, isolated locations where housing markets are thin [7].

Offbase housing

Offbase housing is currently subsidized at BAH rates for those servicemembers who live in MHPI housing or who rent or own homes in the local community surrounding the installation or duty location. Because housing prices vary substantially across the country, BAH compensation also varies substantially. For example, the 2019 BAH tables for servicemembers with dependents show allowance rates for E-5s ranging from $813 per month at Fort Chaffee/Fort Smith, Arkansas, and at Johnstown, Pennsylvania, to $4,368 per month at San Francisco, California [17]. Because of this range of housing costs, it will probably be necessary to institute some sort of locality pay as part of an SSS to provide servicemembers with the geographic equity currently provided by BAH.

Number of people affected and budget costs

About 770,000 AC servicemembers received BAH in FY 2017 (which includes members living on base in MHPI housing, so not all of these are living off base) [1]. Thus, a large percentage of the military population will be affected by any change to offbase housing policy. Since junior enlisted without dependents are typically required to live on base, mid-career and senior enlisted, and officers, are overrepresented in the offbase military population. The size of the offbase military population also tends to vary geographically, depending on the extent to which an onbase presence is needed, the suitability of local community housing, and whether local

housing can accommodate the base's needs. In terms of budget costs, an estimated $21 billion was expected to be paid out in BAH benefits in FY 2019 [18].

Risks to readiness

The risks to readiness with respect to offbase housing are the same as for onbase housing: housing quality and affordability, and the security that a servicemember's dependents are taken care of, influence overall satisfaction with the military, as well as recruiting, retention, willingness to accept assignments, and, therefore, readiness.

Offbase housing issues

A move to an SSS could affect offbase housing policy in a number of ways.

Demand for offbase housing. The counterpart to any potential decline in onbase housing demand under an SSS could be an increase in demand for offbase housing. DOD may want to consider methods for meeting any increased demand. Policy options might include enhancing programs that help servicemembers to find offbase housing (as recommended in a 1999 RAND report), an expansion of government-leased housing programs, or contracting with private-sector construction and housing companies to build low-cost housing near military installations [10]. As long as such efforts cost less than expected BAH payments ($21 billion in FY 2019), and do not result in a change in QoL-related aspects of housing, they may be cost-effective.

Impacts to local housing markets. An increase in demand for offbase housing also might affect local housing markets in areas with military installations, especially in areas close to the base. The type and size of any potential effects could be a subject for further research. For example, an increase in demand for offbase housing might force servicemembers into (or give them incentives to find) lower quality housing. Members moving to high-cost locations (where local economy rates may be higher than current BAH rates—for example, the DC area, New York City, or San Francisco) might be forced to live farther away from the base to find affordable housing, perhaps in less-desirable (e.g., higher crime, poorer amenities) neighborhoods that involve longer commutes (which could affect readiness). If an increase in demand for offbase housing thus changes the extent to which there is suitable housing in the local community for the increased number of servicemembers who want it, a further effect might be that members and their families reassess the benefits of onbase housing relative to living off base.

Local housing markets also could be affected by the elimination of BAH because, according to some of our SME discussions, BAH rates may help to set a standard for rents in areas around military bases, giving servicemembers a sense of how much they should be paying for rent and giving landlords a sense of how much they can and should be charging. Without BAH, areas near military bases may see a spike in rents if landlords find it easier to raise them. This

potential effect may be especially important in isolated areas where military housing demand is a relatively large share of total housing demand.

Also, it might be worthwhile to investigate potential reactions of local communities to any housing market changes in terms of attitudes to the military or willingness to serve (which could affect readiness).

Location-based pay adjustments. In addition to those already discussed, a number of other considerations may result from the elimination of BAH that could be addressed by implementing some form of location pay, such as the following:

- In some cases, DOD is allowed to pay members a BAH rate that is different from their current duty station (e.g., if their dependents are living in a different location). How would such a policy be implemented in the absence of BAH? Would members be given a choice of locational pay adjustments?
- How would a new SSS handle servicemembers on short-term moves or those who have to make multiple moves in relatively quick succession?

Effects on younger servicemembers. Changes in housing arrangements could have especially important effects on younger servicemembers. For example, would a reduction or even elimination of onbase housing options subject younger servicemembers to being taken advantage of in local housing markets due to financial immaturity?

Overseas housing

Servicemembers stationed in US territories and abroad who are not assigned to military-owned housing currently receive Overseas Housing Allowance (OHA). OHA is a dollar-for-dollar reimbursement for actual housing costs up to a predetermined maximum amount. Servicemembers must document their rental expenditures to obtain compensation. Maximum OHA rates are calculated for each overseas area based on actual servicemember housing expenditures, with the maximum rental rate set at the 80th percentile of servicemember rents. Approximately 52,000 servicemembers receive $1.5 billion annually in OHA benefits [19-20].

An SSS that eliminated BAH but retained OHA could create an inequity between servicemembers living overseas and those living in the US. If all servicemembers are subject to the same basic pay table, those living overseas would essentially be receiving two housing benefits under an SSS—the amount of the old BAH that is incorporated into the new basic pay, and payments under the continued OHA. Resolving this inequity would require elimination or revision of OHA policy, and/or a separate basic pay table for servicemembers living overseas. OHA has been designed specifically to encourage servicemembers living overseas not to skimp on housing quality in locations where much of the housing stock may be significantly below US standards [20]. It is unclear how these features of OHA would be retained under an SSS, but it

will be important to do so to ensure that servicemembers living overseas do not suffer a decline in QoL. QoL declines could have adverse effects on retention and readiness (by, for example, reducing members' willingness to take overseas assignments).

Some servicemembers who live overseas can be assigned to military-owned housing. Again, under an SSS that incorporated BAH into basic pay, these members would essentially be receiving two housing benefits. DOD may have to consider establishing rents for military-owned overseas housing to eliminate this inequity.

Military meal programs

Servicemembers entitled to basic pay also are entitled to government-provided provisions, which take the form of either BAS or subsistence-in-kind (SIK). BAS recipients must pay for any government-provided meals consumed. Historically, SIK was provided using a "meal card"; however, in recent years, servicemembers receiving SIK can record their receipt of the benefit using their Common Access Card (CAC).

Number of people affected and budget costs

All AC servicemembers—1.3 million people—receive either BAS or SIK. Enlisted members are entitled to a daily ration of three meals to meet a prescribed basic daily food allowance, except when entitled to per diem or BAS instead. Although BAS (unlike BAH) is not intended to support family subsistence, the reality is that servicemembers with dependents who receive BAS will use the benefit to supplement family income and food budgets, so the subsistence policy will indirectly affect dependents as well.

In terms of budget costs, DOD spent $4.3 billion in FY 2015 on BAS payments to servicemembers. With respect to SIK, we could find only fragmentary evidence on services' spending. The Navy spent $270 million on ashore galleys (including costs to run and staff the facilities) in FY 2016, while the Air Force in FY 2008 spent $128 million on food service contracts (not including facilities and manpower costs), so the total for all services would appear to be on the order of several hundred million dollars annually [21-22]. Actual SIK costs vary by location and take into account all of the costs of preparing each meal.

Risks to readiness

Risks to readiness with respect to subsistence programs involve servicemember nutrition and health, and family support. A loss of BAS, or significant changes to SIK programs, could affect levels of affordable subsistence for both servicemembers and their dependents.

Subsistence-related issues

Subsistence-in-kind (SIK). Perhaps the biggest question with respect to military meal programs under an SSS is, What happens to SIK? Currently, all members receive some form of

food subsidy, but, if BAS were eliminated, SIK recipients still would be receiving a benefit, which would introduce an inequity into military compensation unless some other policy change was enacted to mitigate it. Would SIK be eliminated? Would a minimal level of SIK be continued for the following groups?

- *Bootcamp:* Servicemembers going through basic training still will require SIK due to their tight schedules, lack of a CAC, and so on.
- *Servicemembers in school/training:* How will members in school be treated? Will they have access to SIK meals?
- *Deployed servicemembers:* Members in the field or at sea still will probably require some form of SIK. If BAS is integrated into basic pay, some form of charges might have to be introduced for meals in the field or at sea (as is done now for naval officers at sea). Alternatively, SIK in the field or at sea could be continued as a nonmonetary benefit of being deployed, which could promote readiness by positively affecting willingness to deploy.[8] For members on field duty, a system of post-duty charges for meals ready-to-eat (MREs) may have to be instituted, and a definition of "field conditions" would have to be developed for the purpose of establishing such charges. Implementing these changes could increase the administrative burden.

Dining facility management. In the absence of BAS (except for the cases described above), it seems that SIK for other servicemembers may have to be eliminated because of equity concerns. This raises a number of questions:

- Will SIK be replaced by something else, perhaps a "pay dining for all" system that institutes charges for meals in military dining facilities?
- How would such a system affect the demand for military meals and dining facility services? Would food demand become less predictable and harder to plan for? Currently, under the meal card/CAC system, members receiving SIK eat at military dining facilities in predictable ways. If charges were established for meals, would member dining patterns change? Would they change differently during the week than on weekends? Would servicemembers skip meals to save money? Would more of them try to buy food and cook at home more often? What effects would these behavioral changes have on the ability to plan and manage dining facility operations? Would there be increased instances of food spoilage or shortages? What effects would these changes have on member nutrition?
- Will there be an effect on the requirement for dining facilities? There is some evidence that military dining facilities currently are underutilized [21-22]. Should DOD think

[8] This approach would benefit primarily servicemembers' dependents because household disposable income would increase while the servicemember is away, and this additional income could be passed on to dependents.

about keeping an onbase meal option for members, perhaps something like dorm-style meal plans, especially for lower ranking enlisted servicemembers living on base or members stationed in remote locations with limited offbase dining options?

Commissaries and the PX system. An SSS that eliminates BAS (and BAH) could have effects on commissaries and the Post Exchange (PX) system as well. Elimination of SIK meal programs could increase commissary and PX use. The nature of post-BAH housing arrangements also could affect demand for commissaries and PXs. For example, how would a decline in demand for, or elimination of, onbase housing affect demand for commissaries and PXs? Would it decline, or would it be maintained by members living off base who continue to use commissaries and PXs as low-cost alternatives to shopping in town?

Effects on younger servicemembers. As with housing, changes in food arrangements could have especially important effects on younger servicemembers. For example, is it more cost-effective to provide meals to younger servicemembers than to rely on them to feed themselves properly? With fewer young people owning and driving cars, will there still be some demand for onbase meal options even if SIK is eliminated, if younger members prefer using close-by dining facilities to going off base for food [23]?

Summary of housing and food arrangements

Table 1 summarizes the second- and third-order effects, number of people affected, budgetary cost, and risks to readiness for housing and meal programs.

Table 1. Housing and meal policies for further analysis

Policy or program	2nd- and 3rd-order effects	Number of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Onbase (Family) Housing	Housing affordability, quality, demand	125,000 SMs plus dependents (not incl. MHPI)	$60M (not incl. MHPI); $10B (incl. MHPI)	Depends on demand change	Recruiting, morale issues, retention
Offbase Housing		Up to 770,000 SMs, plus reservists, dependents	$20B (BAH payments)	Cost of rolling BAH TA into BP ($3B-$4B)	
Overseas Housing		52,000 SMs receiving OHA plus those in military housing	$1.5B (OHA payments)	Depends on policy specifics	

Policy or program	2nd- and 3rd-order effects	Number of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Military Meal Programs	Food affordability, quality, demand	All SMs receive either BAS or SIK	$4.3B (BAS payments) plus SIK cost—several hundred million	Cost of rolling BAS TA into BP ($750M); also depends on what happens to SIK	SM nutrition, health, ability to deploy

Source: CNA.
Note: SM = servicemember; TA = tax advantage; BP = basic pay.
[a] Potential cost change under the assumption that no mitigating policy changes are enacted.

References for housing and food arrangements

The Effect of the BAH Changes on Privatized Family Housing, Volume 1: Theory and Overall Results, by Glenn H. Ackerman and S. Alexander Yellin, 2018, CNA, DRM-2018-U-017673–1Rev. This report examines the effects of planned BAH reductions on Navy privatized housing. The study finds that most Navy public-private venture (PPV) locations did not actually receive a reduction when compared to local rents. Most locations received increases, but a few did receive excessive reductions. BAH changes relative to local rents had a statistically significant effect on occupancy rates for military families in privatized housing.

Ashore Galleys and Alternatives, by Ralph Huntzinger, Maryann Shane, and Ronald Filadelfo, 2017, CNA, DRM-2017-U-015001-1Rev. This study analyzes ashore galley operations at 42 installations using data for FY 2016. The analysis finds that average costs of providing a daily ration to entitled sailors vary widely by installation, with the cost at some locations being substantially higher than the per diem rate. The study also compares the costs of current galley operations with those of alternative arrangements, finding that maintaining current operations would be cost-effective for most ashore galleys.

Evaluating Which Housing Allowance System Is Best for U.S. Territories: A Comparison of OHA and BAH, by Glenn H. Ackerman, Alan J. Marcus, Veronica De Allende, and Dan D. Steeples, 2013, CNA, DRM-2013-U-004233-1REV. This paper analyzes the implications of changing the housing benefit paid to military servicemembers in US territories from the current OHA system to the BAH system used in the 50 states. The study found that switching from OHA to BAH would often result in lowering the housing allowances paid to active duty servicemembers, while raising the allowances paid to activated Guard and Reserve members.

Military Families and Their Housing Choices, by Kristie L. Bissell, Robert L. Crosslin, and James L. Hathaway, 2010, Logistics Management Institute (LMI), HCS80T2. This is an analysis of survey and other data on AC servicemembers, their housing choices, and their satisfaction with their housing arrangements. Findings include the following: most military families are living in their preferred housing choice; the most important factors in housing choice in order

of importance are affordability and building equity, quality and condition of the residence, security and safety, and neighborhood quality; and those who own their residences reported higher levels of satisfaction than servicemembers living in other housing types.

Military Compensation Reform in the Department of the Navy, by Michael L. Hansen and Martha E. Koopman, 2005, CNA, CRM D0012889.A2/Final. This study relies on a literature survey to assess the extent to which major, existing Navy compensation tools align with the Navy's goals and principles. The analysis focuses on basic pay, BAH, military housing, Selective Reenlistment Bonuses (SRBs), Enlistment Bonuses (EBs), sea pay, Assignment Incentive Pay (AIP), retirement pay, the Thrift Savings Plan (TSP) and TSP matching, health care, Voluntary Separation Pay (VSP), and quality-based compensation.

Military Compensation: Balancing Cash and Noncash Benefits, by Carla Tighe Murray, 2004, Congressional Budget Office (CBO). This issue brief provides an overview of the military compensation package, including cash compensation and noncash benefits, such as health care, housing and childcare, and retirement pay. It discusses issues surrounding the current mix of compensation.

Return on Investment of Quality-of-Life Programs, by Michael L. Hansen, Jennie W. Wenger, and Anita U. Hattiangadi, 2002, CNA, CRM D0006807.A2/Final. This study measures the retention benefits of several of the Navy's quality-of-life (QoL) programs—Morale, Welfare, and Recreation (MWR) programs, Navy-provided housing, Navy-provided childcare, and Family Service Centers (FSCs)—and compares these benefits with the costs of providing the programs. The study finds that most QoL programs have a strong, positive impact on satisfaction with the Navy, and several (e.g., use of MWR programs, military family housing, and Child Development Centers) have positive and statistically significant effects on retention.

An Evaluation of Housing Options for Military Families, by Richard Buddin, Carole Roan Gresenz, Susan D. Hosek, Marc Elliott, and Jennifer Hawes-Dawson, 1999, RAND, MR-1020-OSD. This report analyzes survey and Census data to understand how military members select housing and decide where to live, to compare those decisions with those of their civilian counterparts, and to predict how members might respond to changes in housing policies and options. The study found that military members at the time viewed the economic benefit of military housing as greater than that of the various housing allowances. Nonmonetary benefits of military housing, such as acculturation of junior personnel, support for families of deployed members, or fostering military values, were found to be of less value to members.

Housing Benefits: Shifting to Private Sector Provision, by Glenn H. Ackerman, Alan J. Marcus, George Tolley, Peter Bernstein, and Robert Fabian, 1997, CNA, CRM 97-25. This report studies one alternative option for providing housing benefits to military members, privatizing the military housing stock and paying all Navy families an increased housing allowance. This approach would have allowed military families to choose where they wanted to live and would

have provided them the means to afford more options than they had under the existing system (as of 1997). The study recommended using rent differential payments to increase the purchasing power of servicemembers for housing in the private sector, and predicted that privatization would have little effect on local rents.

Housing Benefits: Baseline Analysis, by Glenn H. Ackerman, Alan J. Marcus, and Christine Baxter, 1997, CNA, CRM 97-26. This report examines Navy housing processes (including family housing, bachelor housing, and offbase allowances) and describes the current state (as of 1997) of housing benefits, including costs, conditions, processes, and value to servicemembers. It identifies options and alternatives to the current system, and evaluates these options. The study finds that the separate administration of onbase family housing, onbase bachelor housing, and offbase allowances resulted in inequities, providing substantially different housing benefits to servicemembers within the same paygrade, and that the value of military-provided housing to servicemembers was lower than the government's cost to provide it.

Housing Benefits: Analysis of Public-Private Authorities, by Glenn H. Ackerman, Robert I. Dodge III, and Alan J. Marcus, 1997, CNA, CRM 97-27. This publication analyzes use of public-private authorities to create alternatives to traditional military housing construction and operation. The study suggests that use of differential rent payments combined with the sale and outlease of existing resources would be a highly cost-effective mechanism to improve housing benefits for servicemembers and save money for the military.

Issues for further research—housing and food arrangements

A research study or studies into the second- and third-order effects of a move to an SSS on military housing could address questions, such as the following:

- How are housing quality and affordability related to overall satisfaction with the military, recruiting, and/or retention?
- How might a move to an SSS affect housing quality and affordability under different implementation scenarios?
- In the absence of BAH, with its locality-based adjustments, will servicemembers be less willing to relocate to high cost-of-living areas?
- How will dual-military couples be treated under an SSS?
- Under an SSS that eliminates BAH, will demand for onbase family housing decrease? Will any such effect vary by location (isolated areas versus high-cost, densely populated areas, for example)?
- Under an SSS, will charges have to be introduced for those living in barracks or on a ship? How would such a system be implemented, and what would it cost?

- If BAH is eliminated, how will MHPI rents be set? Will providers be allowed to charge market rents? How will the demand for onbase housing be affected under alternative policies for setting rents?
- Will there be an increase in demand for offbase housing under an SSS? What policy changes should be considered to meet any increased demand: Enhance programs that help servicemembers to find offbase housing? Expand government-leased housing programs? Contract with private-sector construction and housing companies to build low-cost housing near military installations?
- How would an increase in demand for offbase housing affect local housing markets in areas with military installations? Would servicemembers be forced into lower quality housing options? How would local communities react to increased demand for local housing from military members?
- Would elimination of BAH affect housing rents or costs in areas near military bases? If so, does this effect vary by location (e.g., isolated versus more densely populated)?

Possible data sources for conducting a study or studies on military housing include service-level readiness, installations, and facilities commands. Also, information about servicemember perceptions of, or preferences for, different policy alternatives under an SSS could be collected using interviews, focus groups, or surveys.

A research study or studies into the second- and third-order effects of a move to an SSS on military meal programs could address questions that include the following:

- Would SIK be eliminated under an SSS? Would a minimal level of SIK be continued for some groups (e.g., those in bootcamp, deployed, or in school)? Would elimination of SIK result in changes in the proportion of members with dependents?
- Should SIK be replaced by a system of pay dining for all that institutes charges for meals in military dining facilities? Should the military continue to have onbase dining options (dorm-style meal plans) for those who want them? How would such systems be implemented, and what would the costs be?
- What would be the effect of pay dining for all, or alternative food distribution systems, on the demand for military meals and dining facility services? Would food demand become less predictable and harder to plan for? What would be the effect on requirements for dining facilities?
- How would an SSS that eliminates BAS and BAH affect commissaries and PXs?
- Should the military make special provisions under an SSS to ensure that younger servicemembers are not adversely affected by changes to housing and food arrangements? What steps should be taken?

Data sources for conducting a study or studies on military meals programs could include service-level readiness, installations, and facilities commands, perhaps supplemented by servicemember interview, focus group, or survey data.

Retention and separation pays

After housing and meals, the next most important area for further study is retention and separation pays. These programs and policies are important force-shaping tools used to ensure that the military has the right personnel levels across paygrades, experience levels, and occupations. As a result, setting appropriate levels of these pays is an important readiness issue. Also, these pays affect relatively large numbers of servicemembers and have a substantial budgetary cost. Each will be affected by a move to an SSS because levels of these pays under current policy are typically set as a multiple of basic pay. Under current policy, the levels of these pays will increase under an SSS that raises basic pay. It will be important to study further the potential impact on the levels and distributions of these payments, and what policy changes may be needed to address any impacts to cost and readiness.

Continuation Pay (CP)

CP is a mid-career one-time bonus paid to servicemembers who have completed a minimum YOS requirement and agree to serve for an additional four years. CP is a component of the new Blended Retirement System and is intended to maintain current retention profiles by offsetting some of the 20 percent decrease in the value of the defined-benefit portion of retirement pay under BRS. CP is tied to RMC because the amount is a multiple of the servicemember's current basic pay [24-25]. As specified in Title 37 of the United States Code (U.S.C.), Section 356, the services can set CP anywhere from 2.5 times to 13 times basic pay, can vary the minimum YOS needed to qualify for CP from 8 to 12 YOS, and can vary the minimum required additional service obligation from three to four years. Currently, the services are setting these parameters at the minimum, or most restrictive, levels: 2.5 times basic pay at 12 YOS, with four years of obligated service [26].[9]

Number of people affected and budget costs

In 2017, there were approximately 64,000 AC servicemembers with 12 YOS who were eligible for CP under current policy, including about 50,000 enlisted members, and 12,500 officers [1]. Given their average basic pay levels and the current CP multiplier of 2.5, an upper-bound estimate of potential spending on CP is about $700 million. Actual spending on this program,

[9] The exception is Army reservists, for whom the multiplier is currently set at 4 times basic pay, and who can qualify for a CP bonus at 11 YOS rather than 12.

however, will be less because not all eligible members will receive CP. For example, FY 2018 budget estimates projected that the Air Force and Army would spend about $340 million on CP bonuses in that year (the Navy did not include CP payment estimates in its budget request), suggesting a total DOD budget for CP of about $500 million [27-28].

Using the OUSD (P&R) military compensation tables, an SSS that fully rolls BAH, BAS, and the tax advantage into basic pay would result in approximately a 60 percent increase in basic pay, on average, for servicemembers with 12 YOS [1]. This suggests a potential increase in CP payments under an SSS of $300 million per year, if no other policy changes are implemented to mitigate this increase.[10]

Risks to readiness: Retention

Two recent studies have tried to predict the retention effects of CP. Huff et al. (2018) found that the CP policy options available to the Navy should be "more than sufficient" to counteract declines in retention caused by the reduction in defined-benefit retirement pay under BRS [24]. Asch et al. (2017) also found that the BRS policy as a whole, including CP, should be able to support force levels and experience mixes that are close to pre-BRS levels, for each of the services. This study also calculated the CP multipliers that would be needed to maintain pre-BRS force structures. It found that, for enlisted personnel, CP multipliers set at or near the minimum of 2.5 should be sufficient to maintain force levels. For officers, however, they estimated that CP multipliers would have to be set at a much higher level (10 to 12) to maintain pre-BRS retention rates [25]. This would represent an increase in CP payments to officers of more than 300 percent relative to current policy. A move to an SSS would increase eligible officer basic pay, and thus CP bonus payments (assuming no counteracting policy changes), by roughly 40 percent, which might mitigate some, but not all, of this potential officer under-retention. At the same time, a move to an SSS that resulted in increased CP payments to enlisted members could result in retention rates that are higher than needed to maintain current enlisted force structures, even at the minimum multiplier levels. This raises the question of whether a move to an SSS could exacerbate a potential imbalance in retention rates between enlisted members and officers.

Feasibility of a policy change

Because CP bonus parameters are currently set at their lowest, most restrictive levels, it may be relatively difficult to change the policy to mitigate any cost increases or manage retention effects due to a move to an SSS. A change to the law would be needed to reduce the minimums.

[10] See Appendix A for additional details on the estimation of this budget effect.

Selective Reenlistment Bonus (SRB)

Authorized under Title 37, U.S.C., Section 308, SRB is a monetary payment to provide incentives for the reenlistment of enlisted servicemembers in critical skill specialties with high training costs and/or demonstrated retention shortfalls [29]. These payments are linked to RMC because the bonus amount received by an eligible servicemember is a multiple of his or her basic pay in the Air Force and Navy, and for some SRB recipients in the Army. In the Marine Corps, and for other Army SRB recipients, the payment is a flat dollar amount that is not a multiple of basic pay. For servicemembers whose bonus is a multiple of basic pay, the multiplier is set by service policy as a function of military occupation, specific skills and qualifications, and YOS (in the Air Force and Navy, or as a function of rank in the Army). Each of the services establishes maximum bonus amounts that apply to both a single bonus ($100,000 in the Air Force, Navy, and Marine Corps and $90,000 in the Army), and the lifetime total of SRB payments a servicemember can earn ($200,000 in the Air Force, Army, and Marine Corps; in the Navy, a limit of three bonuses, one in each YOS "zone" over the course of a Navy career) [30-36].[11]

Number of people affected and budget costs

SRB is a sizable program in terms of both the number of servicemembers affected and the budgetary cost. According to DOD's Military Compensation Background Papers, on average, about 83,000 members annually received a total of about $653 million in SRB payments in FY 2013 through FY 2015, the three most recent years for which data were available [29]. Budget estimates for FY 2017 and FY 2018 suggest that the program was expected to grow to about 96,000 recipients per year (roughly 9 percent of the AC enlisted force) and over $1 billion in payments [27-28, 37-38].

How much might SRB payments increase under an SSS? OUSD-P&R's Selected Military Compensation Tables report contains a "Detailed RMC Table for All Personnel" that breaks down average RMC by basic pay, BAH, BAS, and the tax advantage, for personnel in each paygrade. The table suggests that fully incorporating BAH, BAS, and the tax advantage into basic pay would require an average 80 percent increase in basic pay for enlisted servicemembers [1]. This figure suggests, in turn, an upper-bound estimate for the increase in

[11] For the purposes of determining SRB payment amounts, each service divides YOS into zones. For example, the Air Force and Marine Corps define Zone A as 17 months to 6 YOS, Zone B as 6 to 10 YOS, Zone C as 10 to 14 YOS, Zone D as 14 to 18 YOS, and Zone E as 18 to 20 YOS. The Navy has three zones, corresponding to the Air Force and Marine Corps Zones A, B, and C. The Army defines four zones corresponding to specific ranks for SRB payments that are a multiple of basic pay, and it defines five zones (corresponding to 1 to 2, 2 to 3, 3 to 4, 4 to 5, and 5+ YOS) for flat-amount SRB payments.

SRB payments on the order of $400 million to $650 million (taking into account that Marine Corps and some Army SRBs will not automatically increase because they are set as flat amounts and not as multiples of basic pay), depending on whether we use the FY 2013 through FY 2015 actuals or the FY 2017 through FY 2018 budget estimates as a baseline SRB cost.[12] Note that this is an upper bound because the annual and lifetime limits on SRB payments would hold down costs and are not accounted for here.

Risks to readiness: Retention

In terms of risks to readiness, the primary effect of changing SRB levels would be effects on retention of military personnel in occupations with personnel shortages. The second- and third-order effects of an SSS on SRB retention effects would probably be low, however. Without further policy changes, the effects would be an increase in SRB payments (to those servicemembers in the Air Force, Army, and Navy whose payments are a multiple of basic pay), which would be expected to increase retention in those occupations and skill sets to which SRBs are targeted [39-40]. Nevertheless, SRBs are an important force-shaping tool for the services, and payments need to be set at the right level to ensure the amount of retention needed in key occupations.

Relatively simple policy changes that could mitigate an increase in SRB payments due to the adoption of an SSS would involve decreasing the SRB multipliers, or fully moving all the services to flat-dollar-amount SRBs as the Marine Corps has done. Flat-amount SRBs could be easier for the services to plan for and easier for servicemembers to understand. If DOD and the services consider such policies, it may be wise to conduct surveys or focus groups of servicemembers to measure the extent to which such policy changes could generate morale declines or unhappiness with the new compensation system.[13]

Nondisability (Involuntary) Separation Pay

Nondisability (Involuntary) Separation Pay (authorized by Title 10, U.S.C., Section 1174) provides a lump-sum payment to eligible active and reserve component servicemembers. Eligible servicemembers are those who are to be involuntarily discharged or denied continuation of service for which they volunteered, and who have completed at least 6, but less than 20 YOS (and are thus ineligible for retirement). This separation pay is linked to RMC because the amount of the payment is a multiple of the servicemember's annual basic pay at discharge (at full rate, it is 10 percent of annual basic pay multiplied by YOS; under some circumstances, separating servicemembers are eligible for separation pay at half of that rate).

[12] See Appendix A for additional details on the estimation of this budget effect.

[13] A 2003 CNA study used Navy survey data to predict that a 1-point increase in the SRB multiplier would produce about the same increase in the reenlistment rate as a 3 percent increase in basic pay [41].

Between FY 2006 and FY 2016, an average of about 17,000 servicemembers per year received payments totaling, on average, $567 million annually [29-30].

A move to an SSS that increases basic pay to fully compensate servicemembers for loss of BAH, BAS, and the tax advantage would result in a 66 percent increase in basic pay for servicemembers with at least 6 but less than 20 YOS. This pay increase suggests potentially a $375-million annual increase in the cost of nondisability separation payments if no offsetting legislative or policy changes are enacted [1].[14] These costs could be mitigated by changing the law to reduce the 10 percent multiplier, or to make the payments a flat-dollar amount rather than a multiple of basic pay, although DOD may want to investigate the potential reaction of servicemembers to such a policy change before implementing it.

Little information is available about the relationship between involuntary separation policy (including pay) and military recruiting and retention [42]. One recent research study by Asch et al. (2016) compared the cost-effectiveness of alternative means of military personnel reductions, including using involuntary separation authorities alone versus using packages of voluntary and involuntary incentives and authorities. It concluded that increased use of voluntary separation authorities could be an important tool in achieving future personnel reductions in a cost-effective manner [43].

Voluntary Separation Pay

Servicemembers who agree voluntarily to separate from the AC who have at least 6 but less than 20 YOS may be offered Voluntary Separation Pay. The services are provided temporary authority to make such payments under Title 10, U.S.C., Section 1175a, as an additional force-shaping tool and to minimize involuntary separations. This authority is currently scheduled to end on December 31, 2025 [29-30]. Some research studies have concluded that Voluntary Separation Pay can be a useful force-shaping tool that may be more efficient than involuntary separations in separating senior personnel from the military before they reach retirement age [42-43].

The link between Voluntary Separation Pay and RMC is more indirect than for some of the other policies we consider because service secretaries have some discretion in setting payment levels. However, the maximum amount a servicemember can receive (four times the full amount of Nondisability (Involuntary) Separation Pay that a member of the same paygrade and YOS would receive) does depend on the member's monthly basic pay rate [29].

According to the DOD's financial report for FY 2018, $70.6 million was spent on voluntary separation payments in FY 2017, and $61.6 million was spent in FY 2018 [44]. Because of the

[14] See Appendix A for additional details on the estimation of this budget effect.

services' discretion in setting voluntary separation pay levels, it is unclear whether or how much these payments would necessarily increase under an SSS.

Disability Severance Pay

Disability Severance Pay (Title 10, U.S.C., Section 1212) is a special lump-sum payment to servicemembers separated from active service because of physical disabilities that are substantial enough to impair their ability to perform military duties, but not severe enough to seriously impair their civilian earning capacity. This payment is intended to assist such personnel in transitioning out of the military and into civilian life [29-30, 45].

Disability Severance Pay is a multiple of the servicemember's monthly basic pay at the time of discharge. The formula is two times monthly basic pay, multiplied by YOS.[15] Between FY 2012 and FY 2015, an average of just under 9,000 servicemembers received nearly $300 million per year in Disability Severance Pay [29]. A move to an SSS could result in an increase in payments of $200 million or more per year (again, depending on whether members are fully compensated for loss of allowances and tax advantages, and assuming that no counteracting policy changes are implemented).[16]

Summary of retention and separation pays

Table 2 summarizes our findings on the potential effects of moving to an SSS on these pays in the areas of personnel numbers, budget cost, and readiness risks.

Table 2. Retention and separation pay policies for further analysis

Policy or program	2nd- and 3rd-order effects	No. of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Continuation Pay	Increase in payments	64,000 SMs	$500M	$300M	Retention imbalance between officers and enlisted
Selective Reenlistment Bonus	Increase in bonuses	96,000 enlisted	$1B	$400M-$650M (upper bound)	Retention imbalance across enlisted occupations
Nondisability (Involuntary) Separation Pay	Increase in payments	17,000 SMs	$570M	$400M	Ability to shape force – achieve appropriate separation levels

[15] Servicemembers with less than 3 YOS are treated as if they had served 3 years; those who incurred the disability in the line of duty while serving in a combat zone, and who have less than 6 YOS, are treated as if they had served 6 years for the purpose of setting Disability Severance Pay.

[16] See Appendix A for additional details.

Policy or program	2nd- and 3rd-order effects	No. of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Voluntary Separation Pay	Unclear – service discretion		$71M		
Disability Severance Pay	Increase in payments	7,500 SMs	$220M	$175M	

Source: CNA.
Note: SM = servicemember.
[a] Potential cost change under the assumption that no mitigating policy changes are enacted.

References on retention and separation pays

Estimating the Retention Effects of Continuation Pay, by Jared Huff, Mikhail Smirnov, Greggory Schell, and James Grefer, 2018, CNA, DRM-2018-U-017177-Final. This study uses a dynamic modeling approach to analyze the retention impacts of the lump-sum CP that sailors can receive in the middle of their careers under the Blended Retirement System. The analysis finds that CP should be able to offset the retention decline that results from some of the other retirement changes, including the 20 percent decrease in retired pay.

The Blended Retirement System: Retention Effects and Continuation Pay Cost Estimates for the Armed Services, by Beth J. Asch, Michael G. Mattock, and James Hosek, 2017, RAND, RR1887. This report studies the effect of the Blended Retirement System on AC military retention and reserve component (RC) participation. It includes findings on CP rates and cost, and it presents BRS retention and cost findings for each of the armed services. The results suggest that the BRS can, in principle, support a steady-state force and experience mix that are quite close to the current forces for enlisted personnel and officers in each service but that current CP multipliers are insufficient to maintain retention levels for officers.

Workforce Downsizing and Restructuring in the Department of Defense: The Voluntary Incentive Separation Payment Program Versus Involuntary Separation, by Beth J. Asch, James Hosek, Michael G. Mattock, David Knapp, and Jennifer Kavanagh, 2016, RAND, RR1540. This study assesses the effectiveness of alternative levels of Voluntary Separation Incentive Pay (VSIP), considers the effects of a change in the formula used to compute VSIP, and quantifies the cost of VSIP relative to the cost of involuntary separation. The authors find that increasing the VSIP cap is a cost-effective means to draw down military personnel levels while avoiding involuntary separations, especially if combined with Voluntary Early Retirement Authority (VERA).

Cash Incentives and Military Enlistment, Attrition, and Reenlistment, by Beth J. Asch, Paul Heaton, James Hosek, Francisco Martorell, Curtis Simon, and John T. Warner, 2010, RAND,

MG950. This study provides an empirical analysis of the enlistment, attrition, and reenlistment effects of bonuses, applying statistical models that control for such other factors as recruiting resources, in the case of enlistment and deployments in the case of reenlistment, and demographics. Results indicate that enlistment and reenlistment bonuses were important contributors to the success of the Army and the Marine Corps in meeting their recruiting and retention objectives during a period of heavy deployment.

The Case for Voluntary Separation Pay, by Michael L. Hansen and Thomas A. Husted, 2005, CNA, CRM D0011959.A2/Final. This study combines data analysis and literature reviews to examine separation pay options that would allow the Navy to selectively separate personnel in a cost-effective manner. The results indicate that targeting incentives, both to those who would not otherwise leave and to the least productive employees, is critical to success. Targeting too aggressively, however, will dramatically reduce the number eligible for separation incentives, which can provide servicemembers with some leverage in setting the amount of compensation they require and reduce the cost-effectiveness of VSP. Also, separation pay needs to be set high enough to provide adequate incentives for personnel to leave active duty. Finally, DOD and the services must ensure that servicemembers not be provided incentives to reduce their productivity in order to become eligible for early separation.

An Analysis of Military Disability Compensation, by Richard Buddin and Kanika Kapur, 2005, RAND, MG-369. This study reviews the goals and effectiveness of current policies for compensating veterans with service-connected disabilities. It identifies trends in veterans' disabilities, compares the military disability system with that used by civilian firms, and describes the effect of military disability on civilian labor market outcomes.

The Navy Survey on Reenlistment and Quality of Service: Using Choice-Based Conjoint To Quantify Relative Preferences for Pay and Nonpay Aspects of Naval Service, by Amanda B. N. Kraus, Diana S. Lien, and Bryan K. Orme, 2003, CNA, CRM D0008416.A2/Final. This study developed and implemented a choice-based conjoint (CBC) survey of sailors' preferences for pay and other quality-of-service (QOS) factors. The survey items considered were increases in basic pay, sea pay, and the selective reenlistment bonus (SRB) multiplier; different payment methods for the SRB; matching payments to thrift savings plan contributions; second-term obligation lengths; second-term assignment guarantees; different amounts of time doing work that uses training and skills; changes in promotion schedules; restrictions on contacting detailers; guaranteed time for voluntary education; changes in shipboard living space; and options for housing during in-port sea duty. The survey results indicate that nonpay factors play a substantial, measurable role in guiding sailors' reenlistment intentions. The two highest impact QOS improvements are location and duty-type assignment guarantees.

Why Do Pay Elasticity Estimates Differ? by Michael L. Hansen and Jennie W. Wenger, 2002, CNA, CRM D0005644.A2/Final. This study examines potential sources of variation in the *pay elasticity of reenlistment*, which measures the percentage change in reenlistment associated with a 1 percent increase in pay. It concludes that most of the variation in the literature results from differences in statistical methods, and not from any changes in the actual behavior of Navy personnel. The authors estimate an elasticity of 1.5 for Navy enlisted personnel.

Issues for further research—retention and separation pays

Research studies into the second- and third-order effects of a move to an SSS on retention or separation pays could address questions that include the following:

- What is the current distribution of these pays, by paygrade, YOS, military occupational specialty (MOS)/rating/designator, skill group, etc.?
- Are current levels of these pays adequate to achieve desired levels of retention and separation? Overall? By such categories as experience level, occupation, etc.?
- How would an SSS affect the amount and distribution of retention and separation payments? How would these amounts and distributions change under various scenarios for implementing an SSS, including integrating allowances into basic pay, implementing a CoL adjustment, and/or fully compensating servicemembers for the loss of tax advantage?
- What would be the effects on retention and separation rates, overall and by group (experience level, occupation) of these retention and separation pay distributions?
- How should policy be reset under an SSS to achieve desired levels of retention and separation? To minimize cost growth? How should basic pay multipliers be revised? Should DOD move to flat-dollar amounts for these pays, as the Marine Corps has done for SRBs?
- Should DOD consider increasing the importance of retention pays in the overall compensation package through increases in SRBs or other incentive pays, rather than through an increase in basic pay alone?
- Should DOD consider permanently instituting a Voluntary Separation Pay under SSS?

Data for conducting a study or studies on retention and separation pays should be available from military personnel data sources, such as the Defense Manpower Data Center (DMDC), and/or the services, again supplemented by servicemember interview, focus group, or survey data to measure perceptions, preferences, and potential reactions to policy changes. An important consideration in determining which studies to prioritize is that, because CP is so new, the availability of data on the program is likely to be limited for a few years, although it still should be possible to conduct a study.

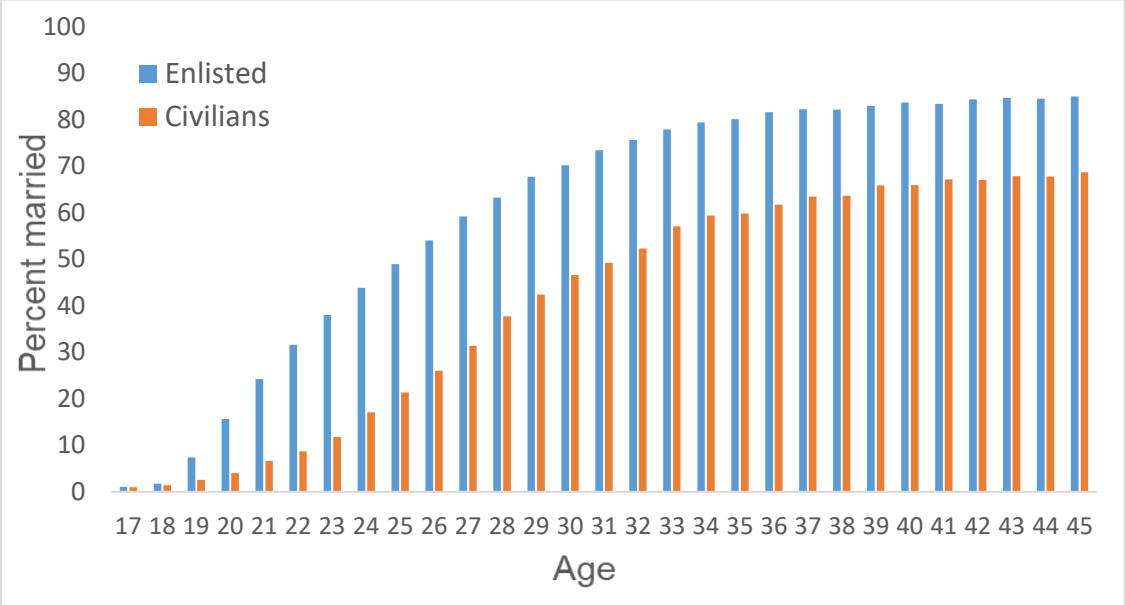
Changes in the dependency ratio

There is a significant social science research literature showing that people's family decisions (especially marriage) are sensitive to their financial situation and compensation level [46-49]. Therefore, another potential effect of an SSS could be to change incentives for servicemembers to marry and/or have children or dependents. Because servicemembers with dependents reenlist at higher rates, a change in the percentage of servicemembers who are married or have dependents could have important effects on retention as well [50].

BAH provides incentives for servicemembers to marry at younger ages than civilians because of the higher with-dependents rate. Currently, the BAH payment differential between single and married members ranges from 4 to 28 percent depending on rank (averaging 17 percent for enlisted and 13 percent for officers). This BAH differential results in an RMC differential of about 5 percent for married enlisted members and 1 percent for married officers [1].

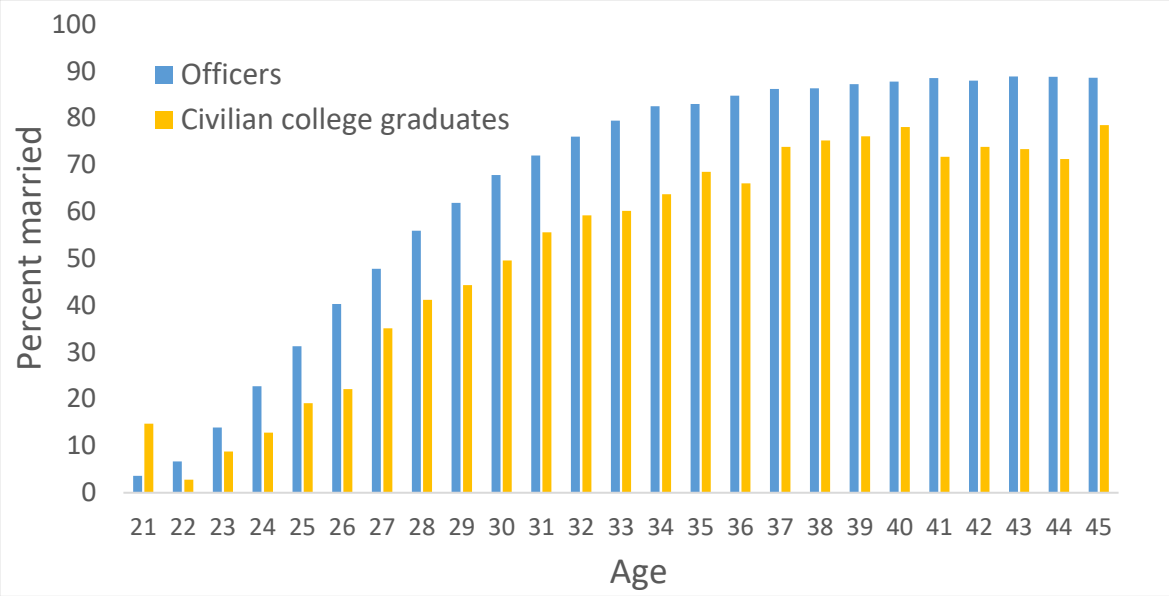
When recruits come into the military, most are single (in 2018, about 93 percent of E-1s were single, as were 74 percent of O-1s) [1]. However, compared to civilians, servicemembers—both enlisted and officers—generally marry at younger ages and at higher rates [51]. To illustrate, Figure 1 and Figure 2, respectively, show the percentages of enlisted members and officers who were married at the end of FY 2017 by age, compared with their civilian counterparts.

Figure 1. Marriage rates for enlisted, compared with civilian counterparts



Source: [51].

Figure 2. Marriage rates for officers, compared with civilian counterparts



Source: [51].

Some of this behavior may be driven by incentives provided by higher BAH and RMC for married servicemembers and by the fact that marriage allows younger servicemembers to move out of bachelor housing and begin receiving BAH. Survey evidence has shown that, at least in the past, very few servicemembers prefer to live in bachelor housing, and a higher percentage of homeowners tend to be satisfied with their housing than those living in military housing [10, 14].

Marriage behavior of servicemembers may matter for military readiness, in part because married servicemembers tend to reenlist at higher rates than do single servicemembers.[17] A CNA study on Marine retention, for example, showed that Marines with dependents were less affected by long deployments than were those without dependents; more deployments and increases in deployment lengths reduced reenlistment rates for first-term Marines without dependents [50]. This raises the possibility that an SSS that eliminates BAH and the with-dependents pay advantage could adversely affect retention rates by lowering the marriage rate and reducing the proportion of servicemembers with dependents. The effect that an SSS would have on retention rates would depend on how it is implemented. Two examples follow:

[17] It may also be that the military attracts people who have a relatively high preference for marriage.

- Would an SSS incorporate BAH into basic pay at the higher with-dependents level? This might have the effect of increasing the retention rate of members without dependents, but at a relatively high budgetary cost.
- If BAH were incorporated into basic pay at the lower without-dependents level, there would be budgetary savings, but potentially at the cost of lower retention rates for married servicemembers.

Demographic shifts also could have implications for some of the other policies and effects we considered. Consider the following questions:

- How would changes in the dependent share affect the demand for onbase or offbase housing? If fewer servicemembers are married, will it become worthwhile for DOD to invest in improving bachelor housing?
- If BAH were incorporated into basic pay at less than the with-dependents level, would retention or other incentive pays, such as SRBs or CP, have to be increased to counteract adverse retention effects? If so, by how much?
- Would shifts in the dependent share affect the attractiveness of voluntary separation pay as a force-shaping tool?

References on changes in the dependency ratio

"The Economic Foundations of Cohabiting Couples' Union Transitions," by P. Ishizuka, 2018, *Demography* 55 (2): 535-557. This study uses survival analysis with monthly data from the Survey of Income and Program Participation from 1996 through 2013 to test alternative theories of how money and work affect whether cohabiting couples marry or separate. Analyses support marriage bar theory: adjusting for couples' absolute earnings, increases in wealth and couples' earnings relative to a standard associated with marriage strongly predict marriage.

"The Effects of the Great Recession on American Families," by Daniel Schneider, 2017, *Sociology Compass* 11 (4). This study reviews recent social scientific research on the effects of the Great Recession on American families. The Great Recession was marked by historic rates of unemployment and foreclosure and caused substantial household economic hardship and widespread economic uncertainty. The research review indicates that the recession had modest effects on marriage and cohabitation, but significant negative effects on fertility.

"Money, Marriage, and Children: Testing the Financial Expectations and Family Formation Theory," by Christina M. Gibson-Davis, 2009, *Journal of Marriage and Family* 71 (1): 146-160. Using data from the Fragile Families and Child Wellbeing Survey, this work examines how gains in earnings and income are associated with marriage and subsequent

childbearing for low-income couples. Using change models, results indicate that positive changes in earnings, controlling for baseline levels of earnings, were associated with greater odds of marriage. Cohabiting couples who became poor were associated with a 37 percent decrease in marriage likelihood. Neither earnings nor income was affiliated with additional fertility. Results are consistent with the Financial Expectations and Family Formation theory, which posits that positive economic circumstances are necessary for marriage but are not associated with subsequent childbearing.

Revisiting Financial Issues and Marriage, by Jeffrey P. Dew, 2008, in *Handbook of Consumer Finance Research*, edited by Jing Jian Xiao, New York: Springer-Verlag, 281-290. This work examines recent research pertaining to the association between financial issues and marriage. These studies show that financial issues relate to marriage formation, marital quality, and marital stability (i.e., divorce). Specifically, financial stability is associated with a greater likelihood of marriage. Further, behaviors that financial practitioners would label "sound financial management" (e.g., higher value of financial assets, or lower consumer debt) are positively associated with marital quality and stability.

Marine Corps Retention in the Post-9/11 Era: The Effects of Deployment Tempo on Marines With and Without Dependents, by Aline O. Quester, Anita U. Hattiangadi, and Robert W. Shuford, 2006, CNA, CRM D0013462.A1/Final. This study focuses on the post-9/11 relationship between deployment tempo and retention, especially on differences in responses for Marines with and without dependents. The authors found that, at least for career Marines and officers, high deployment tempo had little negative effect of reenlistment/continuation decisions. Officer retention actually increased with total days deployed or deployment to Iraq or Afghanistan. We found, however, that increases in deployed days lowered reenlistment rates for first-term Marines—particularly those without dependents.

Study Ideas for Highest Priority Effects

This section of the report presents study designs for analyzing the selected second- and third-order effects in the highest priority areas of housing and food arrangements, changes in the dependency ratio, and retention and separation pays.

Funding alternatives for privatized housing operations under an SSS

Eliminating BAH would create legal, contractual, and rent-setting difficulties for the military's privatized housing projects. This study will assess alternatives to the current operational funding of privatized housing under an SSS that eliminated BAH.

In this study, analysts familiar with MHPI housing issues would develop alternative proposals for pricing MHPI housing rents to keep them affordable to military families. The study team then would meet with SMEs from the military and privatization partner organizations to obtain their assessment of each alternative. The team also would analyze data and conduct economic analyses to assess the feasibility and long-term ramifications of each alternative.

Effects of an SSS on marriage rates and retention

This effort would assess the extent to which, under an SSS, elimination of the pay gap between servicemembers with and without dependents could affect marriage rates and retention. The study would consider questions that include the following: (1) To what extent are higher reenlistment rates for married servicemembers due to the pay gap that results from BAH differences between married and unmarried members (i.e., those without dependents)? (2) How would the pay of married and single members change under various scenarios for implementing an SSS? (3) What effects would these pay changes have on servicemember marriage rates, and how would this affect the proportions of married and single members in the force? (4) What effect would a change in the married and single proportions in the force have on retention rates, and how would such effects vary by servicemember characteristics? (5) How much would retention pays, such as SRBs or CP, have to be increased to counteract any adverse retention effects of moving to an SSS?

The study team would review social science and demography literature to assess the relationship between marriage rates and compensation in the civilian sector. The team also would review military manpower and personnel literature for information about the relationships between marriage rates, compensation, and retention rates in the military. Although there is some evidence that military service may be attractive to those who choose to marry early, other evidence suggests that the military incentives for marriage also play a role. Informed by these reviews, the study team would conduct data analyses using military manpower and personnel data provided by DMDC. The data analysis would estimate the size of pay changes for married and single servicemembers under different scenarios for SSS implementation, and the relationships between pay changes, marriage rates, and retention rates, and between retention pays and retention levels.

Alternative methodologies for incorporating housing costs into an SSS

The current methodology used to calculate BAH is contractually expensive and produces highly variable and sometimes inaccurate results [9]. It also would be very difficult to incorporate it into a locality component of an SSS. This study would develop alternative methodologies that use existing government housing and demographic datasets to create more cost-effective and accurate housing cost estimates. Such a methodology could be easily adapted to support an SSS.

The project would use publicly available data from the US Department of Housing and Urban Development and the US Census Bureau to create algorithms for estimating housing allowances appropriate for military servicemembers at US locations. It would match these estimated allowance levels to BAH rates and to General Schedule (GS) locality pay rates to check for overall consistency. It also would check the statistical accuracy of the estimates by examining occupancy rate changes of military families in privatized family housing. Given aggregate occupancy data, the study would verify its results by analyzing whether servicemembers "vote with their feet" in accordance with the algorithm's cost predictions.

Adapting overseas housing benefits to an SSS

Servicemember families stationed overseas are assigned to military housing or receive OHA. Neither alternative fits easily into an SSS. Currently, families who are assigned to military housing do not receive any housing allowance. However, an SSS must include some component for housing cost. Should these families be forced to pay rent for their military housing, and is this proper if they are assigned to the housing without their consent?

OHA is a variable housing allowance that reimburses servicemembers dollar-for-dollar for their actual rent and utility costs up to a specified maximum amount. This maximum amount is typically reviewed and adjusted every 6 months because of currency fluctuations. These unique characteristics may make it difficult to incorporate into an SSS.

This study would examine the various alternatives and subsequent ramifications of an SSS for in-kind housing and OHA. It would address such questions as the following: What are the alternatives for adapting in-kind housing and OHA to an SSS? What are the costs of these alternatives? How will these alternatives incentivize and affect servicemember choices?

This study would require gathering aggregate manpower and economic data along with economic analysis and discussions with SMEs. It also would include a review of how private companies and other government agencies compensate personnel overseas.[18]

Effects of an SSS on demand for military meals programs

This study would assess the extent to which demand for military meals programs (subsistence in-kind, or SIK) would be affected under an SSS. It would address questions, such as the following: What would be the effect of replacing SIK with a "pay dining for all" system on the demand for military meals and dining facility services? If SIK is largely eliminated under an SSS, should the military continue to have onbase dining options (e.g., dorm-style meal plans) for those servicemembers who want them?

The study would use multiple methods to assess the effects of moving to an SSS on demand for military-provided subsistence. The study team would collect data on current military dining facilities from service-level readiness, installations, and facilities commands. These data would be supplemented by servicemember personnel data and interview, focus group, or survey data that would be collected by the study team. Data analysis and fieldwork would address such issues as servicemember perceptions of the introduction of meals charges, how servicemember dining habits might change under a pay dining system, and the level of demand for retaining onbase dining options if SIK were generally eliminated. The analysis would

[18] This review would build on work done as part of an earlier CNA study, *The Single Salary System for Military Personnel: A Review of Existing Practices and Literature*. Foreign service (FS) officers stationed overseas, for example, are eligible for Overseas Comparability Pay (OCP) that helps ensure compensation parity between overseas and domestic FS officers. Civilians in the Department of State and the DOD also can be eligible for a Living Quarters Allowance (LQA), a nontaxable allowance intended to cover rent, utilities, taxes, and other fees, when stationed at a post abroad where the US government does not provide living quarters. In the private sector, although it is increasingly common for firms with a global presence to convert housing allowances into cash compensation, some sectors (e.g., the petroleum industry) still offer various overseas housing incentives [52].

consider how these variables might vary by servicemember characteristics (such as age, experience, rank, dependent status, and living onbase versus offbase). The study team would talk to personnel who currently oversee dining facility operations, as well as on-the-floor facility managers and people who record installation-level data at a variety of dining facility locations (remote versus densely populated locations, and well-used versus underused locations, for example). These data would serve as inputs to a simulation model that would predict how dining facility utilization would change under different scenarios for implementing an SSS.

Efficiencies of moving to lump-sum, flat-rate SRBs

The current SRB system calculates bonus amounts using a formula that includes basic pay and a bonus multiplier. A move to an SSS potentially would increase basic pay and could substantially increase bonus amounts unless a corresponding change is made to decrease the multiplier, which could lead to decreased interest in reenlistment. DOD may want to consider a simpler system involving lump-sum and/or flat-rate payments. Such a system could help to mitigate negative retention effects and allow more efficient SRB management.

In 2008, the Marine Corps moved to a flat rate SRB that severed the tie between SRB rate and basic pay. In doing so, the Marine Corps was able to offer flat-rate bonuses that increased the efficiency of budgeting with the limited money available and to market SRBs more directly by eliminating the need for eligible Marines to calculate their own bonus amounts. In recent years, the Army has started to offer its soldiers flat-rate SRBs in some occupations while retaining multiples in other specialties. In addition, the Marine Corps decided to pay all SRBs in lump-sum payments, thus eliminating the fiscal year execution "tail" in later fiscal years and improving effectiveness [53].

Regardless of whether DOD moves to an SSS, we believe this is an opportunity to investigate the possibility of moving SRBs to a lump-sum, flat-rate system. This analysis would help determine (1) the feasibility of moving to a lump-sum, flat-rate SRB system, (2) the implications to each service if SRBs moved to such a system, and (3) the benefits and drawbacks of moving to such a system. This analysis would help DOD and the services to better align SRBs to retention requirements to ensure that the services retain the right people.

Building on earlier CNA research, the study would review how the services execute the current SRB multiplier system and would compare and contrast across services to identify benefits and drawbacks of lump-sum versus annuity and flat-rate versus basic pay multiplier approaches [53-54]. The study team would meet with service-level SMEs to obtain their assessment of their respective SRB employment along with the perceived benefits and drawbacks. The team also

would assess the feasibility and long-term ramifications of moving to a lump-sum and/or flat-rate SRB model. This study would involve the following tasks:

- **Literature and policy review**: The study team would review previous literature on the relationship between SRBs and reenlistment rates and examine other research relevant to either the SRB program or the estimation of the effects of pay on retention and reenlistment, and then review policies determining service-level execution of SRBs.
- **Data analysis**: The study would develop prediction models for the effect of SRBs on reenlistments. The study team would create a dataset to estimate the impact of paying SRBs as lump sums versus annuity payments and as flat rates versus multiples of basic pay. The team would then analyze the expected gains from switching to a lump-sum and/or flat-rate payment plan. The study could exploit the "natural experiments" of the Marine Corps' and Army's moves to lump-sum and flat-rate bonuses as part of the estimation strategy.
- **Cost/benefit analysis**: The study team would evaluate the expected costs and benefits from moving to a lump-sum and/or flat-rate payment plan, based on the literature review, data analysis, and consultation with SMEs.

Lower Priority Effects

We consider the other identified effects to be of lower priority for further research than housing and food arrangements or retention and separation pays. These effects are lower priority for one of three reasons:

1. They affect relatively few servicemembers.
2. The budgetary costs are low.
3. We perceive the risks to readiness generated by the effects of an SSS on these programs to be relatively low.

Other retention and separation pays

Combat Zone Tax Exclusion (CZTE)

Servicemembers are eligible for the CZTE when they are either serving in a combat zone or providing direct support to military personnel serving in such an area [55]. CZTE is linked to RMC because the monthly exemption amount for officers is set at the highest rate of enlisted basic pay (that of Senior Enlisted Advisors, or SEAs), plus the value of any hostile fire or imminent danger pay the officer earned in the given month. There is no upper limit to the monthly exemption amount for enlisted members or warrant officers. In 2017, the maximum exclusion for a commissioned officer was $8,390.10 per month ($8,165.10 for SEA monthly basic pay, plus the maximum $225 hostile fire/imminent danger monthly pay) [29-30, 56]. In 2018, these limits would apply only to officers in paygrade O-5 with 16 or more YOS, paygrade O-6 with 14 or more YOS, and paygrade O-7 and above. There were about 38,000 such officers in 2018, making up about 18 percent of all commissioned officers and about 3 percent of all AC military personnel [1].

The probable effect of a move to an SSS on CZTE would appear to be small. For enlisted members and warrant officers, basic pay currently is fully excluded under the CZTE, and BAH and BAS are non-taxable. Under an SSS, enlisted pay would increase the total amount of basic pay to cover the loss of BAH and BAS, but since BAH and BAS were non-taxable already, there would be no "lost revenue" from these portions of pay earned in a combat zone. The effects on the CZTE would therefore likely be zero sum—no loss to the government or to the individual service member—for enlisted members and warrant officers.

For commissioned officers, however, CZTE would potentially decline in value because of the cap on the maximum exclusion amount. As stated previously, the cap on the exclusion amount

for senior officers is based on the highest rate of enlisted pay plus the value of any hostile fire or imminent danger pay. Under an SSS, this exclusion cap would also increase, since the highest rate of enlisted pay would increase. Any senior officers whose monthly pay exceeds that of the exclusion cap would have that excess income subject to tax, but potentially at a lower tax rate since their tax rate would be based on taxable income. Overall, for senior officers, there may be a minimal increase in the excess income taxable due to the elimination of tax-free allowances.

More specifically, in terms of budget effects, exclusion of combat pay for all servicemembers has been estimated to result in average annual tax expenditures of $600 million to $700 million between FY 2018 and FY 2022 [57]. The average value of the CZTE benefit per servicemember in 2009, translated into 2017 dollars, was about $7,000 per year, suggesting that about 80,000 to 100,000 servicemembers annually can be expected to receive CZTE [58]. If the number of affected officers is the same percentage of CZTE recipients as of all AC personnel, then perhaps only 2,500 to 3,000 officers per year are subject to the upper limits, earning a total of $40 million to $50 million from CZTE. In addition, if changes to basic pay under an SSS result in similar treatment of SEAs and officers, there should be little or no change in the percentage of officers subject to the upper limits.

Cadet and midshipman pay

Under Title 37, U.S.C., Section 203(c)(1), as amended by the NDAA for FY 2001, service academy cadets and midshipmen are entitled to monthly pay equal to 35 percent of the basic pay received by a grade O-1 officer with less than 2 YOS [29]. In 2018, that amount was $1,087.70 per month [1]. Budget projections indicate that 12,800 cadets and midshipmen were expected to receive $241 million in pay in FY 2017 [27-28, 37]. Under an SSS that fully integrated BAH, BAS, and the tax advantage into basic pay, O-1 basic pay would rise by 60 percent, on average. This suggests that an SSS in the absence of mitigating policy changes could result in increased budgetary cost of approximately $140 million. Reducing the cadet/midshipman pay multiplier from its current 35 percent to the 20–25 percent range could counteract most or all of this cost increase, while leaving service academy attendees as well-off as they are now. Although there is some research that compares the cost and performance of accessing officers from different sources (the academies, Reserve Officer Training Corps (ROTC), and Officer Candidate School (OCS)), there appears to be no research on the relationship, if any, between cadet/midshipman pay and variables that might affect readiness, such as the number or quality of incoming or graduating academy attendees [59-60].

Accrued leave payment

Accrued leave payment (Title 37, U.S.C., Section 501) provides reimbursement for unused leave for a servicemember whose term of service is expiring. Each day of unused leave is valued at

one day's basic pay (the monthly basic pay rate divided by 30). Between FY 2006 and FY 2015, an annual average of about 160,000 servicemembers were paid an average of $282 million per year in accrued leave payments [29-30]. A move to an SSS could result in increased accrued leave payments of $200 million or more per year if the allowances and the tax advantage were fully incorporated into basic pay. The policy fix to mitigate this cost increase would have to involve valuing each day of unused leave at less than one day of the new, higher level of basic pay. It would be important to assess the feasibility of enacting such a policy and, if feasible, the extent to which such a policy would be resisted by servicemembers through surveys or focus groups.

Active duty Contract Cancellation Pay

Reserve servicemembers released involuntarily before the end of their active duty agreement may be entitled—under Title 10, U.S.C., Section 12312—to a special payment compensating them for the cancellation of the contract. Contract Cancellation Pay is linked to RMC because the amount of the payment is equal to the pay the servicemember would have received had the member completed the active duty contract (one month's basic pay, special pay, and allowances at release, multiplied by the number of months remaining on the contract) [29-30]. Because Contract Cancellation Pay already incorporates BAH and BAS, there should be little or no change to these payments under an SSS that incorporates BAH and BAS into basic pay. There will be a cost increase (of perhaps 10 percent), however, if the tax advantage also is rolled into basic pay.

Other housing policies

Family Separation Housing Allowance (FSHA)

Family Separation Housing Allowance (FSHA) is designed to partially reimburse servicemembers who incur extra expenses because they are involuntarily separated from their dependents. These expenses could include, for example, maintaining a home for dependents or communicating with the family. It addresses an inequity created between the treatment of these servicemembers and those who receive authorization to have their dependents accompany them [29].

There are two types of FSHA. The type that is relevant for understanding the effects of an SSS is Type I, which is intended to reimburse personnel who have to maintain two homes—one for themselves at the duty location, and a second for dependents. The amount of Type I FSHA is equal to the BAH without-dependents rate for that member's paygrade [29]. As a result, under an SSS that eliminates BAH, the amount of Type I payments will have to be reset, if the policy is retained at all.

Type I FSHA affects all members on unaccompanied tours with overseas family members, as well as their dependents. In FY 2015, DOD spent $82 million on Type I payments to 27,400 military personnel [29].

With respect to readiness risks, it is possible that resetting the level of Type I payments (or eliminating the program altogether) could have effects on the willingness of servicemembers to volunteer for unaccompanied tours, or on the retention behavior of those assigned to such tours. There appears to be little current research on the effectiveness of FSHA payments on either willingness to deploy or retention, or on easing the economic burden for servicemembers who serve on unaccompanied tours. The research that does exist on FSHA uses receipt of the allowance as a measure of the burdens of deployment on servicemembers and their dependents [61-62].

Post-9/11 GI Bill housing stipend

Established in 2009, the Post-9/11 GI Bill provides educational benefits to a potentially large population: AC servicemembers, reservists, veterans, and dependents (because some benefits can be transferred). As part of the policy, eligible individuals are entitled to a monthly stipend to cover housing expenses while seeking a degree. We could not find clear information on exactly how many people are receiving the housing benefit, or how much is spent on it. The link between this policy and RMC is that the amount of the housing allowance is based on the BAH rate for E-5s with dependents (which varies by location, but averages $1,650 per month in FY 2018). Under an SSS that eliminates BAH, the amount of housing benefit will have to be reset if the policy is to be retained.

Military readiness could be affected by a change to this policy if it provides incentives for individuals to join or stay in the military. One study reported that the housing allowance appears to be a major draw of the Post-9/11 GI Bill. A substantial number of focus group participants cited it as the most important improvement in the new GI bill relative to the older Montgomery GI Bill, especially increasing the ability of single recipients without children to attend school full time without working [63]. More recent studies, however, have found relatively small effects on recruiting and mixed effects on retention from the Post-9/11 GI Bill, [64-65].[19]

[19] A 2017 CNA study estimated negative reenlistment effects of the Post-9/11 GI Bill at the Navy's Zone A decision point (17 months to 6 YOS), with little overall effect at Zone B (6 to 10 YOS) and Zone C (10 to 14 YOS) decision points. The transferability option appears to have mitigated part of the reenlistment decline. The study also estimated negative retention effects for officers up to 8 YOS, with positive retention effects for officers beyond 8 YOS [65].

Family and dependent benefits

An SSS also may have implications for aspects of military compensation that affect a servicemember's family and dependents. These include required support levels for dependents during marital separation prior to divorce, child and spousal support arrangements, especially those involving pay garnishment or involuntary allotment, and the division of retirement pay between former servicemembers and their former spouses. In addition, such policies as the Survivor Benefit Plan (SBP) and Advance Dependent Evacuation Allowance are linked to RMC and may be affected by a conversion to an SSS.

Support for dependents during separation prior to divorce

Moving to an SSS will have some effect on the guidance and regulations governing the amount of support servicemembers are required to provide dependents in cases of separation prior to divorce. Dependent support is linked to RMC because each of the services uses BAH, in some form, to set base minimum support to dependents prior to a court order or divorce agreement. The Army, for example, sets the interim support amount equal to a share of the BAH, Type II (also known as BAH Reserve Component/Transit, or RC/T) with-dependent rate [66]. BAH RC/T is a nonlocality housing allowance for servicemembers in particular circumstances, such as National Guard or reserve members on active duty for 30 or fewer days, or members in transit from locations where no prior BAH rate exists (such as overseas). BAH RC/T rates are set by the Secretary of Defense and do not vary by geographic location. Rates originally were set based on the old basic allowance for quarters (BAQ) policy, and they are revised annually according to national average housing cost growth [67]. In the Air Force, servicemembers are required to provide a share of the nonlocality BAH with-dependents rate. Those who fail to provide required support will have their BAH with-dependents rate terminated [68]. The Navy's interim support guide specifies support levels as a percentage of "gross pay," where gross pay includes basic pay and BAH but excludes BAS and special/incentive pays (such as hazardous duty pay, sea duty pay, foreign duty pay, or other incentive pays) [69]. The Marine Corps' interim financial support standards *(Marine Corps Manual for Legal Administration,* Chapter 15, "Financial Support of Family Members") base support levels on a share of BAH or Overseas Housing Allowance per requesting family member [70]. As a result, our SMEs told us that each of these policies would have to be modified under an SSS that eliminated BAH. Other than administrative costs of changing the policy, there should be no budgetary cost to DOD because dependent support is paid by the servicemember.

Number of people affected

The annual divorce rate for married, AC servicemembers has remained relatively stable at about 3 percent per year for at least the last decade [71-72]. In 2015, there were 22,598

divorces involving AC servicemembers. With each married servicemember responsible for an average of 2.4 dependents, an estimated additional 50,000 or more military dependents also are involved in military-related divorce cases annually [73]. So, there may be 70,000 servicemembers and their dependents who could be affected by a change in dependent support requirements each year.

Risks to readiness

The potential effects of a change in dependent support policy on readiness-related issues, such as morale or retention, are unclear. If, under an SSS, dependent support policies were modified to keep required support levels about where they are now, there might be little effect on morale or retention. The following questions might be worth considering, however:

- Are current levels of dependent support adequate?
- For servicemembers who are potential recipients of such support, does uncertainty about provision for dependents affect morale, willingness to deploy, or retention?
- Do any such effects differ by gender?
- If dependent support levels were raised under an SSS, would there be adverse morale or retention effects on providers of such support?

Child support and alimony—pay garnishment/involuntary allotment

A related issue with respect to an SSS involves child support and spousal support (alimony) arrangements. In general, our SMEs emphasized that divorce outcomes are controlled by state courts, which generally require a level of child and spousal support based on the total earnings of the divorcing parents (among other factors), where total earnings include all components of military compensation: basic pay, BAH, BAS, and special and incentive pays. As a result, the elimination of BAH and BAS under an SSS is likely to have little or no effect on state-imposed court orders for child and spousal support.

When it comes to involuntary garnishments from a servicemember's pay, however, according to DOD policy, only basic pay is currently subject to garnishment (even if a support order from a court of competent jurisdiction is presented to a military department). BAH and BAS are not subject to garnishment [30]. As a result, converting RMC to an SSS that folds BAH and BAS into basic pay would subject servicemembers to higher pay amounts subject to garnishment or involuntary allotment.

Number of people affected and budget costs

Some fraction of the 20,000 servicemembers per year who go through a divorce are among those who could potentially be affected by higher pay garnishments. Add to that number some

percentage of the number of never-married servicemembers supporting children.[20] It is not clear what percentage of divorced and never-married servicemembers will face pay garnishment or involuntary allotment, but a 1991 study reported that there were 4,575 unmarried Army soldiers who were receiving housing allowance solely for support of children and that 846 of those (18 percent) were subject to involuntary, court-ordered support [74].

Risks to readiness

In terms of risks to readiness, the extent to which there may be adverse morale or retention effects on child or spousal support providers facing larger pay garnishments is unknown and would have to be investigated. There also could be beneficial effects for servicemembers in dual-military couples who are recipients of support and who may be able to receive higher support levels under an SSS.

Retirement pay for former spouses

A third issue related to an SSS that could potentially affect divorced servicemembers and their dependents involves the division of retired pay between former servicemembers and their former spouses. The Uniformed Services Former Spouses' Protection Act (USFSPA), Title 10, U.S.C., Section 1408, authorizes the division of "disposable retired pay" for purposes of child support and/or alimony payments. Disposable retired pay is defined as the amount of retired pay payable to the member for the member's paygrade and YOS at the time of the court order, increased by the cost-of-living amounts granted to military retirees from the time of the divorce to the date the member retires [75]. Under an SSS, according to our SMEs, divorce cases still will involve division of this disposable retired pay. We would not expect either the nature of divorce decrees or the actual mechanics of the administration of justice in such cases to change very much. Some minor changes to USFSPA probably will be required, especially the definition of disposable retired pay, which would have to be updated to reflect the nature of the new SSS, but this would amount to little more than modifying some language in the law. Overall, the second- and third-order effects of an SSS on retirement pay for former spouses should be limited.

Survivor Benefit Plan (SBP)

DOD's SBP provides cash benefits to a surviving spouse (or other eligible recipient) of a former servicemember. SBP allows a military retiree to withhold a portion of his or her monthly retired pay to provide a monthly annuity payment to a designated beneficiary. The cost of this protection is shared among the former servicemember, the government, and (under certain

[20] In 2010, there were about 77,000 single AC servicemembers with children [71]. In 2016, there were 55,360 single AC servicemembers with children [73].

types of coverage) the beneficiary [76-77]. SBP is linked to RMC because the maximum benefit level is a percentage (55 percent) of retired pay, which depends on the former servicemember's basic pay history.

In FY 2017, 279,240 families received $3.7 billion in benefits under SBP, while nearly 1 million former servicemembers made $1.5 billion in contributions toward the program [78]. The degree to which these payments and costs would change under an SSS would depend on how retirement pay is handled. If retirement multipliers are reset to take into account the probable increase in basic pay under an SSS so that former servicemembers receive about the same level of retired pay as they do now, the effects on SBP are likely to be relatively small. If retirement pay under an SSS rises substantially, however, maximum SBP benefit levels and program costs could rise.

Advance Dependent Evacuation Allowance

A servicemember whose dependents are authorized or ordered to evacuate from a threatened area may be provided an advance of up to two months of basic pay (Title 37, U.S.C., Section 1006) and/or allowances, including BAH and BAS (Title 10, U.S.C., Section 1006). The amount of funds spent on these advances appears to have been small in recent years. The effects of moving to an SSS would seem to be rather small with respect to these advances since the services already have the flexibility to advance basic pay, and/or allowances, at their discretion. If RMC increases under an SSS (e.g., due to the incorporation of the tax advantage into basic pay), the amount of pay that could be advanced might increase somewhat.

Income support programs

The federal government and the states provide a number of income supplement programs that servicemembers or former servicemembers may qualify for under certain circumstances. In some cases, a move to an SSS that eliminates BAH and BAS and increases basic pay may affect eligibility for these programs because current program eligibility criteria may or may not include the allowances.

Supplemental Nutrition Assistance Program (SNAP) eligibility

SNAP is a federal nutrition assistance program, funded by the US Department of Agriculture (USDA), that provides assistance to eligible low-income individuals or families that live in the same household. To qualify for SNAP benefits, a household's gross income must be under 130 percent of the poverty line ($1,732 a month for federal FY 2018), net income must be at or below the poverty line, and the value of all the family's assets must be at or below an asset limit ($2,250 for households without an elderly member and $3,500 for households with an elderly

member, as of October 2018) [79].[21] More recently, states have been given a fair amount of flexibility to adopt broad-based categorical eligibility (BBCE), an eligibility criterion that has more generous gross income and/or asset limits than the federal guidelines. As of May 2018, 40 states, DC, Guam, and the Virgin Islands have implemented BBCE [80].[22] In all cases, gross (and net) incomes are calculated *including* BAH and BAS cash payments. Income limits do not, however, include in-kind housing compensation or SIK [82].

Number of people affected and budget costs

A 2015 study using data from FY 2008 to FY 2012 found that just over 2 percent of AC servicemembers used SNAP, as did 9 percent of reservists and National Guard members, 7 percent of recent veterans, and 6.5 percent of long-term veterans [83]. These figures would correspond to about 31,000 AC servicemembers per year. All of these SNAP use rates are lower than the rate of SNAP use in the general population, which has ranged from 10 to 15 percent over the last decade [84].

Because SNAP is funded by the USDA, changes in servicemember eligibility will have little effect on DOD's budget, although it may have some effect on the federal budget. Whatever effect it has, however, is likely to be very small. According to the Government Accountability Office (GAO), in FY 2015, AC servicemembers spent about $21 million in SNAP benefits at commissaries, compared with a total program budget of $60 billion to $70 billion (the actual amount of benefits *received* by servicemembers could have been higher, of course, but is still likely to make up a small amount of overall SNAP spending) [85].

Risks to readiness

For servicemembers who currently receive BAH, the effect on SNAP eligibility of a move to an SSS might be relatively small. If BAH and BAS were fully converted into basic pay and a locational cost-of-living adjustment were established, the monthly gross or net income levels that determine SNAP eligibility would probably change little, on average, even in high-cost locations, such as Alaska or Hawaii. One caveat might be if an SSS also incorporated the current tax advantage into basic pay so that average cash incomes—for both officers and enlisted combined—would be somewhat higher (perhaps 10 percent higher) than they are under the

[21] For Hawaii and Alaska, the restriction is that income be less than 130 percent of *that state's* poverty line. For all other states and territories, the relevant cutoff is 130 percent of the poverty line for the 48 contiguous states and DC (Title 7, Code of Federal Regulations, 273.9).

[22] A recent USDA rule states that "As of March 2019, 43 States have used this flexibility to expand categorical eligibility to households that receive non-cash TANF benefits" [81]. However, it appears that this number likely reflects *40* states plus DC, Guam, and the Virgin Islands, since previous USDA documentation included DC, Guam, and the Virgin Islands in its count of 43 states [80].

current system.[23] In that case, some servicemembers who would currently qualify for SNAP may not qualify under an SSS.

An even more important exception involves servicemembers who currently do not receive BAH but instead receive government-provided housing in kind. Such in-kind benefits are not currently counted as income for determining SNAP eligibility, but, under an SSS that converted these in-kind benefits into cash payments, they would count. As a result, a relatively larger percentage of servicemembers in government-provided housing who currently qualify for SNAP might lose those benefits in an SSS [82]. The effects of restricted access to food assistance on servicemember well-being have not been researched, nor have potential effects on morale or retention. Converting the in-kind benefit into cash under an SSS, however, would remove the inequity in program eligibility that currently favors those living in government-provided housing and disadvantages those living in MPHI housing, which could also affect servicemember morale.

Family Subsistence Supplemental Allowance (FSSA)

FSSA supplements servicemembers' BAS so that they are no longer eligible for SNAP. While originally intended for members living in the continental United States (CONUS), currently members are eligible if they qualify for SNAP, receive BAS, and live *outside* the continental US (OCONUS). Therefore, relatively few servicemembers receive benefits under FSSA—fewer than 200 in 2015 [85]. The allowance is not taxable and cannot exceed $1,100 per month [30]. The overall budget for the program is very small; about $75,000 per year was requested, on average, for FY 2018 through FY 2020 [86]. Under an SSS, eligibility requirements will have to be revised to account for the elimination of BAS and any OHA changes, but there likely will be little change to the overall program cost.

Unemployment Compensation for Ex-Servicemembers (UCX)

Under the UCX program, members who leave the military can receive up to 26 weeks of regular unemployment insurance (UI) benefits if they apply for and meet their state eligibility requirements. Eligibility requirements include having earned a sufficient amount in the base period (one year prior to application for benefits) [87]. UCX is linked to RMC because, according to the Code of Federal Regulations (Title 20, Part 614.2), the "federal military wages" that are counted as earnings for the purpose of determining UCX eligibility include "all pay and

[23] To calculate the increase in cash incomes, we multiply, for each paygrade, the value of the tax advantage by the number of servicemembers in that paygrade, and then sum over paygrades to get the total dollar value of the TA. We then divide the total value of TA by the total value of basic pay (not RMC) since cash income is what is relevant for SNAP program eligibility. These calculations reveal a 10 percent increase in basic pay resulting from incorporating the TA into basic pay. Note that this 10 percent increase is for enlisted and officers combined.

allowances in cash and in kind," a definition that includes BAH, BAS, and the tax advantage based on paygrade at separation [88]. Most veterans who have completed their first active duty term will have earned enough to qualify for UCX [87].

Number of people affected and budget cost

The number of former servicemembers claiming UCX benefits fluctuates with the state of the national economy and changes in the size of the eligible veteran population. The number of claimants increased from 38,000 in 2000 to more than 70,000 in 2004, despite a strong economy, because the number of eligible veterans increased due to large-scale activation of reservists for the wars in Iraq and Afghanistan. The number of claimants climbed higher, to 91,000 in 2010, during the last economic recession. By 2016, the number of claimants had fallen to 34,000 [89]. The percentage of veterans collecting UCX benefits varies by service and component, and by demographic characteristics. Servicemembers who are younger, female, not white, who have earned a GED rather than a traditional high school diploma, and who served fewer years and specialized in occupations with transferable but less technical skills (supply, repair and maintenance, construction) are all more likely to receive UCX benefits after separation [90].

The services reimburse states for UCX (because services do not pay federal and state UI taxes for their servicemembers, as civilian employers do), so the UCX program has a direct impact on the DOD budget. As with the number of claimants, spending on UCX benefits varies with the national economy and the size of the eligible veteran population. UCX payments climbed from $230 million in 2000 to $630 million in 2004, and increased further to $1 billion in 2011, before dropping to $310 million in 2016 [87, 89].

The second- or third-order effects of an SSS on UCX payments are likely to be relatively small, depending on how DOD sets basic pay under a new RMC structure. If basic pay is set to fully compensate servicemembers for the loss of BAH, BAS, and the tax advantage, former servicemembers' federal military wages should differ little under an SSS compared to their level now. As a result, UCX eligibility and DOD reimbursements to states for the program should not change much either. If basic pay increases under an SSS do not fully compensate members for the loss of allowances and tax advantage, however, UCX eligibility could be restricted because fewer former servicemembers would have earned a sufficient amount to qualify. Also, because UCX affects former servicemembers only, it seems unlikely that there would be substantial morale, retention, or other readiness effects on the military from any changes to UCX eligibility.

Supplemental Security Income (SSI) eligibility

SSI is a program that provides additional income to help cover basic needs for low-income individuals who are age 65 or older, blind, or disabled (including disabled children). AC

servicemembers or reservists who have a disabled dependent may be eligible for SSI. SSI eligibility for such servicemembers is linked to RMC because the program treats BAH differently depending on how the allowance is used. If a servicemember owns or rents a privately owned home, BAH is counted as earned income in determining SSI eligibility. If, however, BAH payments are used to pay for privatized (MHPI) housing, or if the servicemember lives on base in government-provided housing, BAH or the in-kind benefit is not counted as income for the purposes of determining SSI eligibility [91].

Number of people affected and budget costs

We could not find information on the number of AC servicemembers who currently receive SSI. Nationally, the families of about 1.7 percent of children in the United States (about 1.2 million children) receive SSI benefits. Families with incomes up to about 100 percent of the poverty level typically qualify for full benefits, and families with incomes between 100 and 200 percent of the poverty level can qualify for partial benefits [92]. If the percentage of military children with AC parents (just over 1 million in 2016) qualifying for SSI is about the same as for the US as a whole, it suggests that perhaps 17,000 military children of AC parents may be eligible for SSI. This number could be lower, however, if (as with SNAP) a lower percentage of military families receive SSI benefits compared with the population as a whole. Servicemembers with disabled spouses or other adult dependents also might qualify for SSI benefits.

SSI benefits average $650 a month per child, so the amount of benefits paid to the families of AC servicemembers per year is likely no higher than $140 million out of a total SSI budget of $59 billion in 2017 (about 0.2 percent of total program spending) [92]. Because payments to AC servicemembers make up such a small part of the total SSI budget, the budgetary effects of an SSS on SSI are likely to be small.

The impact of losing benefits on the families of low-income servicemembers with disabled children could be substantial, however. Moving to an SSS that eliminates BAH could affect eligibility, especially for low-income servicemembers who live on base or in MHPI housing. Their BAH payments or in-kind benefits, which are not currently counted as income in the determination of SSI eligibility, would be converted into cash salary that would be counted as income, thus reducing the number of eligible families. The loss of benefits could adversely affect the ability of such families to care for their special-needs children, for example, if a parent currently providing care was forced to increase work-hours to make up for the income loss [92]. Since the number of servicemembers affected would likely be small (probably a few thousand at most), effects on morale, retention, or readiness to the military as a whole would probably be small, but the effects on affected families could be large.

Other potential effects

Two other effects of a potential move to an SSS include possible increases in monetary punishments under the Uniform Code of Military Justice (UCMJ) and the need to upgrade pay- and personnel-related information technology (IT) systems.

Fines and forfeitures under UCMJ

A move to an SSS could affect the amount of fines and forfeitures to which a servicemember could be subject under the UCMJ. Fines and forfeitures are tied, at least loosely, to a servicemember's basic pay because maximum fines and forfeitures are limited by a servicemember's basic pay in some cases but by total compensation (including BAH and BAS) in others. An SSS that eliminated BAH and BAS and increased basic pay might result in larger monetary punishments for some servicemembers in some cases.

Throughout the military justice system, as emphasized by our SMEs and by previous research, commanders and courts have considerable discretion in determining (1) whether a given infraction results in a nonjudicial punishment (NJP), a court-martial, or neither; (2) whether the maximum level of fine or forfeiture will be assessed as punishment; and (3) the exact amount of any fine or forfeiture if less than the maximum [93]. Forfeitures of pay and allowances are routinely ordered in NJP and court-martial sentences, although total forfeiture of all pay and allowances is only authorized in general courts-martial, and not for special courts-martial, summary courts-martial, or NJP proceedings [30]. In any case, courts have the discretion to specify forfeitures below maximum limits, and this discretion is used frequently. With respect to fines, maximum levels are set at a percentage of basic pay, and allowances (including BAH and BAS) cannot be subject to fine, so the maximum fine level would rise under an SSS that converted allowances into basic pay. Again, courts have the discretion to impose fines below minimums and to impose fines that are flat-dollar amounts rather than percentages of basic pay [94-95].

Because of this level of discretion in setting punishment by courts and commanders, moving to an SSS might not result in any increase in monetary punishments, at least at first. One of our SMEs believes that, over time, as servicemembers, commanders, and courts adjusted to the new, higher level of basic pay under an SSS, the distribution of fines might increase to some extent. The extent of any changes in the distribution of monetary punishments in NJP and courts-martial may be an issue that should be monitored if an SSS is adopted.

The number of servicemembers affected by an increase in maximum fines is likely to be small. Less than 5 percent of servicemembers each year are involved in NJP or court-martial proceedings, and only a fraction of these cases would be subject to any fine or forfeiture at all. Recent research confirms the rarity of NJP/court-martial cases, finding that about 2 percent of

Marines were involved in summary or special courts-martial; the average incidence of NJPs per Marine in the first two YOS is 0.2, and incidences of disciplinary procedures for Navy sailors are even lower [93, 96].

Upgrading personnel IT systems

SMEs indicated to us that implementing an SSS will almost certainly involve major changes to pay- and personnel-related information technology systems. Services with multiple IT systems handling different parts of their personnel systems may find it especially difficult and costly to update under an SSS. There may even be a need for DOD to move to a single, integrated, and standardized personnel IT system to implement an SSS, which could require the updating and integrating of dozens of legacy systems. We emphasize that these were concerns voiced by the Service-level SMEs with whom we spoke. We mention these insights as a consideration, but note that we did not review the Defense Integrated Military Human Resources System (DIMHRS), the Integrated Personnel and Payment System (IPPS), or the Services' individual pay systems, as that was outside the scope of our effort. As such, we did not evaluate the specific changes that would be necessary to integrate the legacy systems and are not making any concrete recommendations whether such changes are necessary or how they would best be achieved.

Summary of lower priority effects

Table 3 summarizes the lower priority effects, along with our findings about the potential effects of moving to an SSS on numbers of personnel, budget, and readiness.

Table 3. Lower priority effects

Policy or program	2nd- and 3rd-order effects	No. of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Pay of Cadets, Midshipmen	Increase in pay	12,800	$241M	$140M	None – number of cadets, mid-shipmen not likely to change
Combat Zone Tax Exclusion (CZTE)	Possible change in exemption limit	2,500 to 3,000 officers	$30M	Little or none of officers, if SEA pay changes are similar	Little or none

Policy or program	2nd- and 3rd-order effects	No. of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Family Separation Housing Allowance (FSHA)	Housing-relevant part (Type I) based on BAH-without	27,400 SMs	$82M	Depends how benefit will be set under SSS (if retained)	Little – program has small impact on family budgets
Post-9/11 GI Bill Housing Stipend	Stipend based on BAH-with for E-5s	Potentially large (several million SMs, dependents, vets are eligible)	Difficult to estimate	Depends how benefit will be set under SSS (if retained)	Little – small recruiting, retention effects
Accrued Leave Payment	Increase in payments	160,000 SMs	$284M	$200M	Little – morale effects of change to pay formula
Active-Duty Contract Cancellation Pay	Increase in payments	Unknown number of reservists		Cost due to integrating TA into basic pay[b]	Little – morale effects of change to formula
Support for Dependents Prior to Divorce	Interim sup-port depends on BAH; depends on how policy is reset	20,000 newly divorced SMs annually, plus dependents	None to DOD	None to DOD	Hard to assess – morale, reten-tion effects from uncertainty about depen-dent provision
Child Support & Alimony Pay Garnishment/ Involuntary Allotment	SMs could be subject to larger garnishments	Difficult to estimate – some % of divorced SMs, unmarried SMs, plus dependents	None to DOD	None to DOD	Some morale effects – some SMs subject to higher garnish-ments; others receiving more support
Retirement Pay-Former Spouses	Small – divorce case outcomes won't change much	20,000 former spouses per year	None to DOD	None to DOD	Little or none

Policy or program	2nd- and 3rd-order effects	No. of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Survivor Benefit Plan (SBP)	Max. payment 55% of retired pay; depends on how retired pay reset	279,240 families receiving Nearly 1 million contributing	$3.7B in payments $1.5B in contributions	Depends on how retired pay set under SSS	Little or none
Advance Dependent Evacuation Allowance	Small – SMs can be advanced basic pay, allowances		$678,000 requested (FY19)	Little or none	Little or none
Supplemental Nutrition Assistance Program (SNAP) Eligibility	Some SMs may lose eligibility; in-kind housing does not count toward income limits	30,000 SMs receiving	None to DOD (USDA program)	None to DOD; some reduced cost to federal government	Effects on SM nutrition – morale, retention effects (uncertainty about dependent provision)
Family Subsistence Supplemental Allowance (FSSA)	Some SMs may lose eligibility	Probably very small	$50,000 to $100,000 (very small)	Small reduction	Small overall Impact on affected families
Unemployment Compensation for Ex-SMs (UCX)	Depends on how basic pay is set under SSS – possibly little or none	34,000 new recipients (FY16)	$310M (FY17)	Small if BAH, BAS, TA fully integrated into basic pay	Little or none
Supplemental Security Income (SSI) Eligibility	Some SMs could lose eligibility	17,000 (perhaps fewer)	None to DOD $140 million in payments to SMs (at most)	None to DOD Small overall – payments to SMs small % of program budget	Little to none overall Larger impact on affected families

Policy or program	2nd- and 3rd-order effects	No. of people affected	Current annual cost	Potential cost change[a]	Risk to readiness
Fines and Forfeitures under UCMJ	Possibly small; courts have discre-tion to set monetary punishments	Fewer than 5% of SMs per year	None	None	Little or none

Source: CNA.
Note: SM = servicemember.
[a] Potential cost change under the assumption that no mitigating policy changes are enacted.
[b] BAH and BAS already are included in contract cancellation pay for reservists.

References for other retention and separation pays

Combat Compensation and Continuation in the Active and Reserve Components, by Diana S. Lien, Molly F. McIntosh, and Darlene E. Stafford, 2011, CNA, CRM D0024937.A5/2REV. This study examines how servicemembers' retention is affected by the receipt of combat compensation, focusing on hostile fire pay (HFP) and combat zone tax exclusion. Results indicate that, for servicemembers with less than 6 years of service, the continuation effect of a hostile deployment is negative for the Army and Marine Corps and positive for the Air Force. For servicemembers with 6 or more years of service, the continuation effect of deploying is unambiguously positive. For all reserve components except the Marine Corps, those who have received any HFP have higher continuation rates than those who have not received the pay.

Risk and Combat Compensation, by Saul Pleeter, Alexander O. Gallo, Brandon R. Gould, Maggie X. Li, Shirley H. Liu, Curtis J. Simon, Carl F. Witschonke, and Stanley A. Horowitz, 2009, Institute for Defense Analyses, IDA Paper P-4747. This study focuses on combat compensation. It documents differences in combat-related compensation by paygrade and marital status, identifies factors that could be used to distinguish the level of risk to which members are exposed, and traces the development of the central features of US policy on provision of combat (or imminent danger) pays. An important finding is that there is considerable variation in the value of the CZTE depending on an individual's circumstances (marital status, filing status, family size, medical deductions) because the tax exclusion lowers the individual's income tax obligations and creates eligibility for various tax credits and deductions. The authors also find no correlation across countries within combat zones between casualty rates and average combat compensation. Therefore, they conclude, DOD's objective that compensation increase with increased danger or risk cannot be achieved within the current structure of CZTE.

Accessing Talent: The Foundation of a U.S. Army Officer Corps Strategy, by Casey Wardynski, David S. Lyle, and Michael J. Colarusso, 2010, Strategic Studies Institute. This

monograph, part of a series on Army officer talent management, focuses on the ways in which changing labor market conditions and generational preferences have shaped willingness to serve among potential officer prospects. The authors develop a theoretical framework for how the labor market for Army officers works, and present ideas for implementing improvements to the officer accession process. The authors discuss alternative sources for commissioning officers, trends in officer accessions, innovative marketing approaches, and ways of building flexibility into the accessions process.

An Evaluation of URL Officer Accession Programs, by Ann D. Parcell, 2008, CNA, CAB D0017610.A2/Final. This study attempts to identify the "best value" accession source among Unrestricted Line Navy officer accession programs. The three biggest officer accession programs are the Naval Academy, the Naval Reserve Officer Training Corps, and Officer Candidate School. The authors evaluate the Navy's current practice of seeking to access officers from these three sources in roughly equal shares. Evaluation criteria include cost, likelihood of officers from different sources achieving certain career milestones, and racial, ethnic, and gender diversity. The evaluation sources show that no single accession source dominates in terms of providing best value with respect to these criteria.

References for other housing policies

Estimating the Retention Effects of the Post-9/11 GI Bill, by Omer Alper and Diana Lien, 2017, CNA, DRM-2016-U-014358-1REV. This study analyzes the relationships between the Post-9/11 GI Bill and sailor retention. The authors find negative reenlistment effects associated with the Post-9/11 GI Bill at the Zone A decision point, with little overall effect at Zone B and C decision points. The transferability option appears to have mitigated part of the reenlistment decline. Results also indicate negative retention effects for officers with up to eight years of service, with positive retention effects for officers beyond eight years of service.

Are Current Military Education Benefits Efficient and Effective for the Services? by Jennie W. Wenger, Trey Miller, Matthew D. Baird, Peter Buryk, Lindsay Daugherty, Marlon Graf, Simon Hollands, Salar Jahedi, and Douglas Yeung, 2017, RAND, RR1766. This study examines the two largest military education benefits, the Post-9/11 GI Bill and Tuition Assistance, with a focus on impacts on recruiting and retention and the potential for interactions between these benefits. Post-9/11 GI Bill benefits appear to play a small positive role in attracting potential recruits, but they have a small negative effect on continuation, which the transfer option appears to mitigate somewhat. Also, Tuition Assistance and Post-9/11 GI Bill benefits complement each other, as passage of the Post-9/11 GI Bill is associated with a small increase in Tuition Assistance use.

Service Members in School: Military Veterans' Experiences Using the Post-9/11 GI Bill and Pursuing Postsecondary Education, by Jennifer L. Steele, Nicholas Salcedo, and James Coley, 2010, RAND, American Council on Education. This study examines students'

experiences using the Post-9/11 GI Bill during its first year of availability. Focus group participants described satisfaction with several aspects of the law. In particular, the monthly living allowance and book stipend, and coverage of tuition and fees at private institutions and public graduate programs. Study participants also described experiencing a number of challenges in using the new GI Bill, including the lack of an online accounting system that showed their total benefit balance, and delays in the arrival of tuition and living allowance payments.

References for family and dependent benefits

Military Benefits for Former Spouses: Legislation and Policy Issues, by Kristy N. Kamarck, 2018, Congressional Research Service, RL31663. This report provides a general discussion of legislative provisions and proposals relating to the military benefits for former spouses. It addresses such questions as the following: What benefits can former spouses of members or retirees of the uniformed services receive under law? What role do the services play in facilitating delivery of those benefits? What practical problems arise in the implementation of and service involvement in claims on those benefits? How does the current system for a divorce-related division of military retired pay work?

Military Survivor Benefit Plan: Background and Issues for Congress, by Kristy N. Kamarck and Barbara Salazar Torreon, 2018, Congressional Research Service, R45325. This report describes the categories of beneficiaries eligible for survivor benefits under the military Survivor Benefit Plan (SBP), the formulas used in computing the income level (including the integration of SBP benefits with other federal benefits), and the costs of SBP participation incurred by the retiree and/or the beneficiary.

An Assessment of the Military Survivor Benefit Plan, by James Hosek, Beth J. Asch, Michael G. Mattock, Italo A. Gutierrez, Patricia K. Tong, and Felix Knutson, 2018, RAND, RR2236. This study assesses the military's Survivor Benefit Pan. It discusses SBP participation and available benefits, how SBP compares with similar plans in public organizations and private companies, and how large a contribution SBP makes to survivors' incomes. The report also considers the feasibility of having SBP provided by commercial sources. The authors conclude that SBP is well structured to provide benefits to survivors of servicemembers who die on duty and military retirees. Using commercial sources to provide survivor benefits appears feasible, and the advisability of doing do would depend on a cost-benefit analysis of military versus private provision.

"The Demographics of Military Children and Families," by Molly Clever and David R. Segal, 2013, *The Future of Children* 23 (2): 13-39. This study reviews government data sources and academic and nonacademic research to identify demographic trends that distinguish today's military families. The authors report that, compared with civilians, servicemembers marry younger and start families earlier. Military families also move much more frequently

than civilians do, and they are often separated from their families for months at a time. Despite steady increases since the 1970s in the percentage of women who serve, the armed forces are still overwhelmingly male, meaning that most military parents are fathers. Overall, military families are a strikingly diverse population with diverse needs, and the authors conclude that the best policies and programs to help military families and children must be flexible and adaptable.

Families Under Stress: An Assessment of Data, Theory, and Research on Marriage and Divorce in the Military, by Benjamin R. Karney and John S. Crown, 2007, RAND, MG-599-OSD. This report provides an empirical and theoretical foundation for discussions of the effects of military service on military marriages and about the most effective ways of addressing the needs of military families. The study looks at the accumulated research and theory on military marriages to understand better how and why military marriages succeed or fail. The authors also use service personnel records to assess how rates of transition into and out of marriage within the military have changed since the onset of the global war on terror, and how the length of time deployed affects the likelihood that a married servicemember will subsequently end his or her marriage. The authors find that, over a period when demands on the military have increased markedly, rates of marital dissolution have increased only gradually. They also find that marriages of female servicemembers are at several times higher risk of dissolving than are the marriages of male servicemembers, and the marriages of enlisted members are at higher risk than are the marriages of officers.

References for income support programs

The Supplemental Nutrition Assistance Program (SNAP) and Military Families: Who Qualifies and Where? by Peggy Golfin, Danielle Angers, and Chris Gonzales, 2018, CNA, DRM-2018-U-018862-Final. This study determines state and District of Columbia eligibility requirements for Supplemental Nutrition Assistance Program benefits in order to identify which military allowances and in-kind benefits count toward eligibility. It provides estimates of the number of AC servicemembers who would be eligible for SNAP, and the number of servicemembers serving in the United States who would be eligible for the Family Subsistence Supplemental Allowance (FSSA) if it were reinstated. The study found that no single servicemember would qualify for SNAP in any Military Housing Area or paygrade and that no servicemember above the paygrade of E-7 would qualify. While fewer in numbers, members who live on base and receive quarters-in-kind (that is, they do not receive BAH) are far more likely to be eligible for SNAP than their peers who have dependents and do not live on base because the in-kind benefit is not considered income for SNAP purposes. The authors estimate that far fewer servicemembers would be eligible for FSSA than SNAP.

Policy Basics: The Supplemental Nutrition Assistance Program (SNAP), Center on Budget and Policy Priorities, 2018. This brief report provides a summary of SNAP eligibility

requirements, the application process, amounts received by beneficiaries (according to household size), program costs, changes in the size of caseloads over time, and information about special features of the program.

A Quick Guide to SNAP Eligibility and Benefits, Center on Budget and Policy Priorities, 2018. This brief report provides a summary of SNAP eligibility and benefit calculation rules.

DOD Needs More Complete Data on Active-Duty Servicemembers' Use of Food Assistance Programs, by Brenda S. Farrell, 2016, Government Accountability Office, GAO-16-561. This report assesses the extent to which active-duty servicemembers and their families have access to food assistance programs and any variations in eligibility for these programs. It also assesses the extent to which DOD has identified the servicemembers' use of these programs. The report recommends that DOD revise surveys of servicemembers to (1) collect and analyze more complete data and, if warranted, implement such actions as assigning department-level responsibilities for monitoring food assistance and (2) coordinate with USDA to access its usage information.

"Supplemental Nutrition Assistance Program (SNAP) Use Among Active-Duty Military Personnel, Veterans, and Reservists," by Andrew S. London and Colleen M. Heflin, 2015, *Population Research and Policy* Review 34: 805-826. This article uses American Community Survey public-use data to examine current Supplemental Nutrition Assistance Program use by military service status: active-duty personnel, recent veterans, long-term veterans, and reserve/guard members. The authors document low but nontrivial levels of participation among active-duty personnel (2.2 percent), higher but still moderate levels of SNAP use among veterans (7.1 percent for recent veterans and 6.5 percent for long-term veterans), and the highest level of use among members of the reserve/guard (9.0 percent). Levels of SNAP use among active-duty personnel, veterans, and reservists are lower than those observed in the national population. Findings also suggest that leaving active-duty military service results in a substantial and relatively immediate reduction in food-related resources for many recent veterans and their families.

Transitioning From the Military to the Civilian Workforce: The Role of Unemployment Compensation for Ex-Servicemembers, by Elizabeth Bass and Heidi Golding, 2017, Congressional Budget Office. This report describes the use of unemployment benefits among servicemembers who have recently transitioned to the civilian workforce. It provides information on how program costs and numbers of beneficiaries have changed since 2000.

Demographic Profiles of Those At-Risk of Collecting Unemployment Compensation for Ex-Servicemembers, by Shannon P. Desrosiers, Elizabeth S. Bradley, and Lauren R. Malone, 2014, CNA, DRM-2014-U-007559-6Rev. This report examines the characteristics of recently transitioned servicemembers who are most at risk of collecting Unemployment

Compensation for Ex-servicemembers (UCX) after separation. The authors find that, across the services, members more likely to be at risk of collecting/applying for UCX are those who served fewer years or are younger, female, nonwhite, or Hispanic as well as those without either a formal high school diploma or an AFQT score above 50. We also find that servicemembers with transferable, but not technical, skills have the hardest time finding work (e.g., service/supply soldiers or repair/maintenance, operator, service, or construction sailors).

Prior Research on Veteran Unemployment and Unemployment Insurance Benefits, by Shannon Phillips, Laura Kelley, and Diana Lien, 2012, CNA, DRM-2012-U-001291-Final. This report reviews veteran unemployment patterns and durations, and discusses how unemployment insurance benefits affect job match quality and unemployment duration. It also summarizes differences by state in the provision of unemployment insurance benefits.

SSI: A Lifeline for Children with Disabilities, by Kathleen Romig, 2017, Center on Budget and Policy Priorities. This report provides basic information about the Supplemental Security Income (SSI) program as it relates to families caring for children with disabilities. It includes information on eligibility requirements, participation, eligibility reviews, and effects on poverty levels and adult outcomes of recipients.

References for fines and forfeitures under UCMJ

Waivered Recruits: An Evaluation of Their Performance and Attrition Risk, by Lauren Malone, Neil Carey, Yevgeniya Pinelis, and Dave Gregory, 2011, CNA, CRM D0023955.A4/Final. This study examines ways in which the services can minimize the risk of misconduct separation and early attrition among waivered recruits by identifying recruit characteristics associated with negative outcomes that can be used as an additional screen. The study found that waivered recruits are not inherently risky and often perform better than Tier II/III recruits. The authors argue that the services could still minimize the "riskiness" of the waivered population by targeting additional screening or mentoring to recruits with waiver combinations associated with early attrition.

An Analysis of Navy JAG Corps Future Manpower Requirements, Part 2: Office of the Judge Advocate General (OJAG), Embedded Supervisory Judge Advocates (SJAs), Naval Justice School (NJS), and Reservists, by Neil Carey, Don Birchler, Veronica De Allende, and Jim Gasch, 2008, CNA, CRM D0017792.A2/Final. This study investigates whether the JAG Corps—including officers, enlisted, civilians, and reservists—has enough personnel, and the right kind of personnel, to fulfill its essential missions, both currently and going forward. The study team documented work performed by JAG Corps personnel and used this information to calculate the JAG Corps' future personnel requirements.

Conclusion

This report presents our findings with respect to identifying and prioritizing potential second- and third-order effects of moving to an SSS, and provides some ideas for study designs that could be used to analyze the highest priority effects. We identified more than 25 potential effects in six broad areas:

1. Housing and food arrangements
2. Retention and separation pays
3. Changes to the dependency ratio
4. Family and dependent benefits
5. Income support programs
6. Other effects

After conducting an extensive literature and policy review and holding discussions with SMEs across the services and DOD, we recommend that DOD consider additional analysis in the following three areas: housing and food arrangements, retention and separation pays, and potential changes to the dependency ratio. Housing and food programs affect every servicemember and their dependents, have large potential budget impacts, and affect readiness by their influence on servicemember QoL, family support, and nutrition. Although retention and separation pays directly affect smaller numbers of servicemembers, they have a substantial budgetary impact and a large potential effect on readiness because they are important force-shaping tools influencing rates of retention and separation. Changes to military marriage rates may have important implications for retention rates, and for some of the other high-priority policies, especially housing and retention and separation pays. In this report, we have posed several questions related to these programs that deserve further inquiry, thought, and analysis. We suggest several study ideas related to these three broad areas, such as the following:

- Funding alternatives for privatized housing operations under an SSS
- Estimating how a move to an SSS could affect marriage rates and retention
- Alternative methodologies for incorporating housing costs into an SSS
- Adapting overseas housing benefits to an SSS
- Effects of an SSS on demand for military meals programs
- Efficiencies of moving to lump-sum, flat-amount SRBs

Appendix A: Budget Effects

This appendix provides additional detail about the budget change estimates for compensation policies that are tied to basic pay. Under an SSS, basic pay is expected to increase to compensate for the loss of BAH, BAS, and possibly the tax advantage, depending on specifics of implementation. We estimate differences in budget effects based on three potential SSS implementation scenarios:[24]

- Scenario 1 – Increase basic pay by an amount equal to the current allowance level, on average.
- Scenario 2 – Fully compensate servicemembers for loss of tax advantage, on average.
- Scenario 3 – Incorporate geographic cost-of-living adjustment. Assume that, on average, 20 percent of basic pay is converted into a location adjustment that is not included in determining retention or separation.

Continuation Pay (CP)

We suggested that, under an SSS, a potential increase in CP payments of $300 million per year could be expected if no other policy changes are implemented. This estimate was based on an estimated current spending level of $500 million per year, combined with a calculation that an SSS that fully rolls BAH, BAS, and the tax advantage into basic pay would result in approximately a 60-percent increase in basic pay, on average, for eligible servicemembers (those with 12 YOS). In this subsection, we detail how we calculated this estimated increase in basic pay.

Table 4 presents RMC levels for servicemembers with 12 YOS, by paygrade, based on OUSD P&R's 2018 Selected Military Compensation Tables report [1]. The table also provides an estimate of the percentage basic pay increases under each of the three scenarios. For example, for E-4s with 12 YOS, under scenario 1, yearly basic pay would increase from the current level of $31,164 to $51,695 (adding in the $16,098 BAH payment and $4,433 BAS payment), a 66-percent increase. Under scenario 2, the $3,452 tax advantage also would be added into basic pay, for a total of $55,147, a 77-percent increase. Under scenario 3, 20 percent of basic pay would instead be allocated as a geographic cost-of-living adjustment, so the new, higher basic pay level would be $44,118, a 42-percent increase over the original $31,164.

[24] These scenarios have been developed by the Institute for Defense Analyses (IDA) as summarized in its memo, "Key Elements in Analysis of Potential Salary Systems," Mar. 6, 2019.

Table 4. RMC and basic pay increases under the three scenarios for members with 12 YOS

Grade	Basic pay (12 YOS)	BAH	BAS	Tax advantage	Increase in basic pay		
					Scenario 1	Scenario 2	Scenario 3
E-4	$31,164	$16,098	$4,433	$3,452	66%	77%	42%
E-5	$39,732	$19,019	$4,433	$4,802	59%	71%	37%
E-6	$45,324	$21,474	$4,433	$5,026	57%	68%	35%
E-7	$50,244	$22,417	$4,433	$4,170	53%	62%	29%
E-8	$54,468	$23,580	$4,433	$4,136	51%	59%	27%
W-1	$54,528	$18,543	$3,053	$3,643	40%	46%	17%
W-2	$58,488	$22,476	$3,053	$3,895	44%	50%	20%
W-3	$64,116	$23,953	$3,053	$4,409	42%	49%	19%
W-4	$70,512	$25,084	$3,053	$6,282	40%	49%	19%
O-1	$46,920	$17,563	$3,053	$4,105	44%	53%	22%
O-2	$59,460	$19,559	$3,053	$4,977	38%	46%	17%
O-3	$78,960	$23,456	$3,053	$5,150	34%	40%	12%
O-4	$88,848	$27,691	$3,053	$7,526	35%	43%	14%
O-5	$92,292	$30,523	$3,053	$9,499	36%	47%	17%
O-6	$96,888	$32,039	$3,053	$10,012	36%	47%	17%

Source: OUSD P&R, Selected Military Compensation Tables, 2018.

Table 5 applies the percentage increases under each scenario to CP for each rank. Because CP is a multiple of basic pay, CP levels will rise by the same percentage as basic pay.

Table 5. Continuation pay levels under the three scenarios

Grade	No. (12 YOS)	Continuation Pay (CP) level			
		Current	Scenario 1	Scenario 2	Scenario 3
E-4	414	$6,491	$10,767	$11,486	$9,189
E-5	9,712	$8,276	$13,161	$14,161	$11,329
E-6	28,897	$9,442	$14,839	$15,886	$12,709
E-7	10,523	$10,467	$16,061	$16,929	$13,543
E-8	236	$11,347	$17,183	$18,044	$14,435
W-1	647	$11,360	$15,859	$16,618	$13,295
W-2	1,056	$12,185	$17,503	$18,315	$14,652
W-3	286	$13,358	$18,984	$19,903	$15,922

Grade	No. (12 YOS)	Continuation Pay (CP) level			
		Current	Scenario 1	Scenario 2	Scenario 3
W-4	25	$14,691	$20,553	$21,862	$17,490
O-1	274	$9,776	$14,071	$14,927	$11,941
O-2	408	$12,388	$17,099	$18,136	$14,509
O-3	2,411	$16,451	$21,974	$23,047	$18,437
O-4	8,843	$18,509	$24,913	$26,481	$21,185
O-5	622	$19,227	$26,222	$28,201	$22,560
O-6	16	$20,185	$27,496	$29,582	$23,665

Source: OUSD P&R, Selected Military Compensation Tables, 2018.

Table 6 aggregates the CP levels from Table 5 to estimate the percentage increase in CP payments under each of the three scenarios.

Table 6. CP payments (millions of dollars)

	Upper bound	Better estimate	Percentage increase
Current	$716	$500	
Scenario 1	$1,070	$746	49%
Scenario 2	$1,139	$795	59%
Scenario 3	$911	$636	27%

Source: CNA (authors' calculations).

The "upper bound" estimate of $716 million in current CP payments is based on all eligible servicemembers from column 1 in Table 5. This estimate represents an upper bound because not all eligible servicemembers actually actually receive a CP payment. The "better estimate" uses the $500 million figure based on 2018 DOD budget estimates as the current level of spending on CP payments. Table 6 suggests that CP payments could increase from 27 percent ($136 million under the better estimate) to 59 percent (nearly $300 million under the better estimate) depending on how an SSS is implemented.

Selective Reenlistment Bonuses (SRBs)

As enlisted members are eligible for SRBs, Table 7 shows RMC levels for enlisted servicemembers. The table also provides, for each enlisted rank, estimates of the percentage basic pay increases under each of the three scenarios.

Table 7. RMC and basic pay increases under the three scenarios for enlisted members

Grade	No.	Basic pay	BAH	BAS	Tax advantage	Increase in basic pay		
						Scenario 1	Scenario 2	Scenario 3
E-1	21,846	$19,660	$14,321	$4,433	$2,597	95%	109%	67%
E-2	73,748	$22,036	$16,518	$4,433	$2,975	95%	109%	67%
E-3	186,019	$23,749	$16,184	$4,433	$3,039	87%	100%	60%
E-4	247,533	$28,423	$16,098	$4,433	$3,452	72%	84%	48%
E-5	222,859	$35,169	$19,019	$4,433	$4,802	67%	80%	44%
E-6	158,192	$43,899	$21,474	$4,433	$5,026	59%	70%	36%
E-7	90,793	$53,884	$22,417	$4,433	$4,170	50%	58%	26%
E-8	26,939	$63,095	$23,580	$4,433	$4,136	44%	51%	21%
E-9	10,125	$80,043	$25,202	$4,433	$5,873	37%	44%	15%
Total	**1,038,054**					**71%**	**83%**	**46%**

Source: OUSD P&R, Selected Military Compensation Tables, 2018.

According to Table 7, under scenario 1 (BAH and BAS incorporated into basic pay), enlisted basic pay would be expected to increase by an average of about 71 percent. Under scenario 2 (tax advantage also incorporated into basic pay), the expected overall increase would be about 83 percent, while under scenario 3 (reducing basic pay by 20 percent and allocating it to location pay), the expected increase would be about 46 percent.

Because all SRB payments in the Navy and Air Force (and some in the Army) are multiples of basic pay, we can use these expected overall basic pay increases to calculate estimates of the expected increase in SRB payments under the three SSS implementation scenarios. Table 8 presents these calculations, using the 2017 DOD budget estimates as the current spending level.

Table 8. SRB payments (millions of dollars)

	AF	Navy	Army	Marine Corps	Total	Percentage increase
Current	$245	$259	$403	$79	**$986**	
Scenario 1	$419	$442	$594	$79	**$1,534**	56%
Scenario 2	$448	$473	$627	$79	**$1,627**	65%
Scenario 3	$358	$377	$527	$79	**$1,341**	36%

Source: CNA (authors' calculations).

Note that the different SRB policies across the services will affect cost differences by scenario. Because the Marine Corps pays SRBs in flat amounts rather than as a multiple of basic pay, increases in basic pay will have no direct effect on SRB payouts. In the Army, a fraction of SRB payouts are flat amounts, so Army SRBs will not face the full percentage increase in payments. Here, we assume that Army SRBs will grow at two-thirds the rate of basic pay increase indicated in the last column of Table 8. In the Air Force and Navy, because SRB payments are a multiple of basic pay, those payments will increase at the same rate as basic pay. The "total" column of Table 8 provides overall estimates of SRB payments, currently (using the FY 2017 and FY 2018 budget estimates as the baseline SRB cost) and under each of the three scenarios. These SRB payment increases range from an estimated $355 million under scenario 3 to $641 million under scenario 2. Again, this estimated cost increase represents an upper bound because it does not incorporate the effects of lifetime or annual limits on SRB payouts.

Non-Disability Severance Pay

Servicemembers with between 6 and 20 YOS are eligible for Non-Disability Severance Pay. Table 9 summarizes the value of RMC components for those servicemembers, by rank, and includes the basic pay increase for each rank under each SSS implementation scenario.

Table 9. RMC and basic pay increases under the three scenarios for members with 6-20 YOS

Rank	No. (6 to 20 YOS)	Basic pay	BAH	BAS	Tax advantage	Change in basic pay		
						Scenario 1	Scenario 2	Scenario 3
E-1	143	$19,660	$14,321	$4,433	$2,597	95%	109%	67%
E-2	66	$22,036	$16,518	$4,433	$2,975	95%	109%	67%
E-3	593	$23,749	$16,184	$4,433	$3,039	87%	100%	60%
E-4	17,797	$28,423	$16,098	$4,433	$3,452	72%	84%	48%

Rank	No. (6 to 20 YOS)	Basic pay	BAH	BAS	Tax advantage	Change in basic pay		
						Scenario 1	Scenario 2	Scenario 3
E-5	134,349	$35,169	$19,019	$4,433	$4,802	67%	80%	44%
E-6	149,716	$43,899	$21,474	$4,433	$5,026	59%	70%	36%
E-7	70,863	$53,884	$22,417	$4,433	$4,170	50%	58%	26%
E-8	10,890	$63,095	$23,580	$4,433	$4,136	44%	51%	21%
E-9	453	$80,043	$25,202	$4,433	$5,873	37%	44%	15%
W-1	2,273	$52,620	$18,543	$3,053	$3,643	41%	48%	18%
W-2	5,740	$60,612	$22,476	$3,053	$3,895	42%	49%	19%
W-3	3,128	$73,174	$23,953	$3,053	$4,409	37%	43%	14%
W-4	548	$87,227	$25,084	$3,053	$6,282	32%	39%	12%
O-1	1,577	$38,890	$17,563	$3,053	$4,105	53%	64%	31%
O-2	4,001	$54,383	$19,559	$3,053	$4,977	42%	51%	21%
O-3	40,778	$70,283	$23,456	$3,053	$5,150	38%	45%	16%
O-4	34,236	$89,866	$27,691	$3,053	$7,526	34%	43%	14%
O-5	13,081	$106,597	$30,523	$3,053	$9,499	31%	40%	12%
O-6	449	$131,887	$32,039	$3,053	$10,012	27%	34%	7%
Total	**490,681**					**55%**	**66%**	**33%**

Source: OUSD P&R, Selected Military Compensation Tables, 2018.

According to Table 9, basic pay for servicemembers who are eligible for Non-Disability Severance Pay would be expected to increase by 55 percent under scenario 1, by 66 percent under scenario 2, and by 33 percent under scenario 3. Table 10 provides estimates of the effects of these basic pay increases on Non-Disability Severance Pay payouts.

Table 10. Non-Disability Severance Pay payments (millions of dollars)

	Payments	Percentage increase
Current	$567	
Scenario 1	$879	55%
Scenario 2	$940	66%
Scenario 3	$752	33%

Source: CNA (authors' calculations).

According to Table 10, Non-Disability Severance Pay would increase from the baseline of $567 million (based on average payments from FY 2006 to FY 2016) by $312 million under scenario 1, by $373 million under scenario 2, and by $185 million under scenario 3.

Disability Severance Pay

All servicemembers are potentially eligible for Disability Severance Pay. Table 11 shows estimates of basic pay increases for all servicemembers under each of the three scenarios.

Table 11. RMC and basic pay increases under the three scenarios for all servicemembers

Rank	No.	Basic pay	BAH	BAS	Tax advantage	Change in basic pay		
						Scenario 1	Scenario 2	Scenario 3
E-1	21,846	$19,660	$14,321	$4,433	$2,597	95%	109%	67%
E-2	73,748	$22,036	$16,518	$4,433	$2,975	95%	109%	67%
E-3	186,019	$23,749	$16,184	$4,433	$3,039	87%	100%	60%
E-4	247,533	$28,423	$16,098	$4,433	$3,452	72%	84%	48%
E-5	222,859	$35,169	$19,019	$4,433	$4,802	67%	80%	44%
E-6	158,192	$43,899	$21,474	$4,433	$5,026	59%	70%	36%
E-7	90,793	$53,884	$22,417	$4,433	$4,170	50%	58%	26%
E-8	26,939	$63,095	$23,580	$4,433	$4,136	44%	51%	21%
E-9	10,125	$80,043	$25,202	$4,433	$5,873	37%	44%	15%
SEA	1	$100,332	$25,500	$4,433	$8,306	30%	38%	10%
W-1	2,540	$52,620	$18,543	$3,053	$3,643	41%	48%	18%
W-2	6,790	$60,612	$22,476	$3,053	$3,895	42%	49%	19%
W-3	5,487	$73,174	$23,953	$3,053	$4,409	37%	43%	14%
W-4	2,787	$87,227	$25,084	$3,053	$6,282	32%	39%	12%
W-5	777	$104,791	$24,888	$3,053	$7,854	27%	34%	7%
O-1	21,774	$38,890	$17,563	$3,053	$4,105	53%	64%	31%
O-2	25,929	$54,383	$19,559	$3,053	$4,977	42%	51%	21%
O-3	62,926	$70,283	$23,456	$3,053	$5,150	38%	45%	16%
O-4	43,567	$89,866	$27,691	$3,053	$7,526	34%	43%	14%
O-5	27,907	$106,597	$30,523	$3,053	$9,499	31%	40%	12%
O-6	11,464	$131,887	$32,039	$3,053	$10,012	27%	34%	7%
O-7	424	$153,069	$33,494	$3,053	$10,689	24%	31%	5%
O-8	429	$175,898	$33,326	$3,053	$11,399	21%	27%	2%
O-9	139	$189,592	$33,188	$3,053	$11,820	19%	25%	0%
O-10	40	$189,601	$33,487	$3,053	$11,688	19%	25%	0%
Total	**1,251,035**					**65%**	**76%**	**41%**

Source: OUSD P&R, Selected Military Compensation Tables, 2018.

Table 11 suggests that the level of basic pay increase for all servicemembers, on average, ranges from 41 percent under scenario 3 to 76 percent under scenario 2. Table 12 translates these basic pay increases into estimates of the increase in Disability Severance pay, using the estimated cost of $302 million from FY 2016 as a baseline.

Table 12. Disability Severance Pay payments (millions of dollars)

	Payments	Percentage increase
Current	$302	
Scenario 1	$499	65%
Scenario 2	$533	76%
Scenario 3	$426	41%

Source: CNA (authors' calculations).

According to Table 12, Disability Severance Pay would increase by $197 million under scenario 1, by $231 million under scenario 2, and by $124 million under scenario 3.

Appendix B: Focus Group Topics

As part of the study design task, the Director of the 13th Quadrennial Review of Military Compensation asked CNA for guidance in identifying information that may be needed to supplement existing data sources. This appendix summarizes potential question topics for surveys, focus groups, or interviews.

Housing

- Servicemember reaction to the following:
    - Introduction of charges/rent for those living in barracks (including overseas) or on a ship
    - Different options for treating dual-military couples under a single-salary system (SSS)
    - New procedures for setting maximum MHPI (privatized housing) rents under an SSS
    - Different options for reimplementing policies that currently allow members to receive a BAH rate that is different from their current duty station (for example, if dependents are living elsewhere)
- Servicemember/dependent preferences for, or valuation of, different housing options (onbase family, Military Housing Privatization Initiative, and offbase housing):
    - Currently
    - Under different SSS implementation scenarios (e.g., location pay versus no location pay)
    - By location (for example, low-cost versus high-cost areas)
    - Potential local community reactions to housing market changes brought about by elimination of BAH and associated changes to military housing policy
    - In terms of attitudes to the military, or willingness to serve

Food/subsistence

- Servicemember reaction to
    - Introduction of charges for meals in the field or at sea
    - Introduction of charges for meals in military dining facilities
- Changes in servicemember dining habits under a "pay dining for all" system (e.g., cook at home more often? Skip meals more often?).
- Servicemember preferences for a onbase ("dorm style") meal plan option under an SSS that eliminated most subsistence in-kind (SIK) benefits
- Demand for PX and commissary services
    - If most SIK eliminated
    - If fewer members living onbase (e.g., to what extent would those living offbase still plan to use PXs and commissaries for shopping?)
- Preferences of younger servicemembers for onbase dining options
    - By characteristic (for example, transportation options – whether the member owns a car? Availability of public transit?)

Retention and separation pays

- Servicemember reaction to options for reducing pays tied to the level of basic pay (Continuation Pay (CP), Selective Reenlistment Bonuses (SRBs), (Non-Disability) Involuntary Separation Pay, and/or Disability Severance Pay (DSP))
    - Reducing the basic pay multipliers
    - For CP, ISP, and/or DSP, introducing caps (as with SRBs)
    - Moving to flat-dollar amounts (as the Marine Corps does with SRBs)

Other pays

- Officer reaction to more restrictive Combat Zone Tax Exclusion (CTZE) limits
- Cadet and midshipman reaction to reducing the basic pay multiplier that determines their stipends
- Servicemembers' reactions to options for limiting increases in Accrued Leave Payment

- Reducing the current 1 day's pay per day of leave ratio
- More restrictive caps on the number of days that can be sold back

- Servicemembers' reactions to different options for resetting Family Separation Housing Allowance (FSHA) Type I payment levels if BAH is eliminated

Family and dependent benefits

- Servicemembers' reactions to
  - Options for resetting base minimum support levels (currently based on BAH) during separation prior to divorce. Reactions of support donors? Of support recipients?
  - Potentially higher amounts of pay subject to garnishment for child support and/or alimony

Income support programs

- Estimate of how many servicemembers receive SNAP, UCX, and SSI
- Servicemembers' reactions to, or effects on, family budgets if transfer of compensation from allowances to salary reduced eligibility for these programs
- Effects on/reactions of servicemembers receiving in-kind housing benefits or living in privatized housing (currently not counted as income in determining SNAP or SSI eligibility).

Other effects

- Servicemembers' reactions to potentially higher monetary penalties under UCMJ
- Reaction of judges or courts who set penalties to new, higher monetary penalty limits.

Tables

Abbreviations

AC	active component
AIP	Assignment Incentive Pay
BAH	basic allowance for housing
BAQ	basic allowance for quarters
BAS	basic allowance for subsistence
BBCE	broad-based categorical eligibility
BRS	Blended Retirement System
CAC	Common Access Card
CBC	Choice-Based Conjoint
CoL	cost of living
CONUS	continental United States
CP	Continuation Pay
CZTE	Combat Zone Tax Exclusion
DFAS	Defense Finance and Accounting Services
DMDC	Defense Manpower Data Center
DOD	Department of Defense
EB	Enlistment Bonus
FMR	Financial Management Regulation
FSHA	Family Separation Housing Allowance
FS	foreign service
FSC	Family Service Center
FSSA	Family Subsistence Supplemental Allowance
GAO	Government Accountability Office
GED	Tests of General Educational Development
GS	General Schedule
HFP	hostile fire pay
IT	information technology
LQA	Living Quarters Allowance
MHPI	Military Housing Privatization Initiative
MOS	military occupational specialty
MRE	meal ready-to-eat
MWR	Morale, Welfare, and Recreation
NDAA	National Defense Authorization Act
NJP	nonjudicial punishment
OCONUS	outside the continental United States

OCP	Overseas Comparability Pay
OCS	Officer Candidate School
OHA	Overseas Housing Allowance
OUSD-P&R	Office of the Under Secretary of Defense for Personnel and Readiness
PPV	public-private venture
PX	post exchange
QoL	quality of life
QOS	quality of service
QRMC	Quadrennial Review of Military Compensation
RC	reserve component
RC/T	Reserve Component/Transit
RMC	regular military compensation
ROTC	Reserve Officer Training Corps
SBP	Survivor Benefit Plan
SEA	Senior Enlisted Advisor
SIK	subsistence-in-kind
SME	subject matter expert
SNAP	Supplemental Nutrition Assistance Program
SRB	Selective Reenlistment Bonus
SSI	Supplemental Security Income
SSS	single-salary system
TA	tax advantage
TSP	Thrift Savings Plan
UCMJ	Uniform Code of Military Justice
UCX	Unemployment Compensation for Ex-Servicemembers
UI	unemployment insurance
URL	Unrestricted Line
U.S.C.	United States Code
USFSPA	Uniformed Services Former Spouses' Protection Act
VERA	Voluntary Early Retirement Authority
VSIP	Voluntary Separation Incentive Pay
VSP	Voluntary Separation Pay
YOS	years of service

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Estimating the Effect of a Single-Salary System on Marriage Rates and Retention

Thomas M. Geraghty, Gerald E. Cox, Jared M. Huff, Rachel Townsley, Lauren Malone, and Jacklyn Kambic

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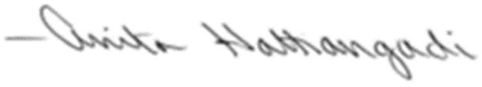
Abstract

This report considers one of the potential effects of a DOD move to a single-salary system (SSS): changes in servicemember retention driven by changes in marriage behavior. It analyzes the effects that a move to an SSS is likely to have on the percentage of servicemembers who are married and studies the changes in retention rates and force size that may be induced by any changes in marriage behavior. Our approach includes a review of the literature on the relationships between compensation, marital status, and retention; computation of pay changes under different SSS implementation scenarios; estimation of the effect of marital status on retention using personnel data; and development of a model that can forecast marriage rates and force size over time. Overall, we find that these effects are likely to be small, so there is little need for policy-makers to be concerned about these effects when considering a change to an SSS.

This work was performed under Federal Government Contract No. N00014-16-D-5003.

Cover image credit: 191107-N-ND356-1205 Pearl Harbor (Nov. 7, 2019). Boatswain's Mate 2nd Class Kyle Woody, assigned to the Arleigh-Burke-class guided-missile destroyer, USS *William P. Lawrence* (DDG 110), is welcomed by his family during a homecoming celebration. *William P. Lawrence* returned to its homeport of Pearl Harbor following a successful deployment to the 3rd and 7th Fleet areas of operations. (US Navy photo by Mass Communication Specialist 2nd Class Jessica O. Blackwell/Released)

Approved by: **April 2020**



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Resources and Force Readiness Division

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Executive Summary

The Department of Defense (DOD) is considering moving to a single salary system (SSS) that would eliminate the basic allowances for housing (BAH) and subsistence (BAS) and increase basic pay to compensate servicemembers. The 13th Quadrennial Review of Military Compensation (QRMC) is studying this issue, and the QRMC's director asked CNA in 2018 to identify and prioritize potential second- and third-order effects of moving to an SSS. This report considers one of the potential effects identified in that work: changes in servicemembers' retention driven by changes in their marriage behavior. It analyzes the effects that a move to an SSS is likely to have on the percentage of servicemembers who are married, and it examines the changes in retention rates and force size that may be induced by any changes in marriage behavior. Overall, we find that these effects are likely to be small.

Our approach includes a review of the literature on the relationships between compensation, marital status, and retention; computation of pay changes under different SSS implementation scenarios; estimation of the effect of marital status on retention using personnel data; and development of a model that can forecast marriage rates and force size over time.

We consider three SSS implementation scenarios: (1) a "full compensation" scenario in which basic pay is increased to fully offset the loss of BAH, BAS, and the associated tax advantage (to members without dependents); (2) a "partial compensation" scenario in which the increase in basic pay is reduced so as to maintain cost neutrality to the federal government; and (3) a "partial compensation with housing rents" scenario, in which servicemembers living in military-provided housing are assessed rents to counteract the large pay increases going to servicemembers not currently receiving BAH under the first two SSS implementation scenarios. Under the full and partial compensation scenarios, non-BAH recipients receive regular military compensation (RMC) increases, while married BAH recipients see their pay reduced, with the largest pay reductions for married junior enlisted. Scenario 3, partial compensation with housing rents, eliminates much of this differential treatment between servicemembers who do and do not receive BAH. In general, among BAH recipients, married servicemembers receive somewhat larger pay reductions than single members, although the difference tends to be small.

Our literature review shows that servicemembers in the current environment, both enlisted and officers, are more likely to marry, and tend to marry earlier, than comparable civilians. With respect to the relationship between compensation and marriage, the literature supports a "marriage bar" hypothesis, in which higher levels of income are linked to higher marriage

rates, but only for incomes up to a certain level (usually defined as a local community median level of income). The literature also provides evidence that marriage positively affects military retention, with the strongest such effects for men who are early in their military careers.

Our statistical analysis of Defense Manpower Data Center data confirms the literature's findings on marriage and military retention, with the largest positive effects for male enlisted, somewhat smaller effects for male officers, and no effect for most female enlisted (with the exception of those in the Army). For female officers, our analysis finds that being married has a negative effect on retention, which is consistent with findings in previous CNA studies.

Our force inventory modeling analysis, however, suggests that SSS implementation is likely to have only small effects on the percentage of the force that is married and on retention and force size. Reasons include the following:

- The nature of pay changes under an SSS means that some servicemembers may receive pay increases that offset the effect of pay reductions received by others.
- The effects of compensation on marriage behavior, and of marriage behavior on retention, do not affect all servicemembers equally strongly (male, junior enlisted are the most affected).
- The effects of compensation on marriage behavior and of marriage behavior on retention, when combined, result in a smaller overall effect on retention than might be anticipated by considering the magnitude of either of the individual effects in isolation.

We note, however, that our work is not a comprehensive analysis of the potential effects of an SSS on military retention. We focus here on retention effects induced by changes in marriage behavior. There may be additional important retention effects that are beyond the scope of this analysis. Overall, however, our study suggests that the effects of an SSS on military marriage rates, and the effect of changes in marriage behavior on military retention, are likely to be small. Therefore, there is little need for policy-makers to be concerned about these effects when considering a change to an SSS.

Contents

Introduction

The 13th Quadrennial Review of Military Compensation (QRMC) is considering whether the US military should move from its current regular military compensation (RMC) structure to a single-salary system (SSS). The RMC that most servicemembers currently receive consists of four components:[1]

- **Basic pay**—A salary that depends on a servicemember's rank and years of service (YOS)
- **Basic allowance for housing (BAH)**—A nontaxable allowance that offsets housing costs for servicemembers who do not receive government-provided housing and that varies depending on a servicemember's rank, location, and dependent status (those with dependents receive a larger allowance)
- **Basic allowance for subsistence (BAS)**—A nontaxable allowance that offsets a servicemember's meal costs and depends on officer/enlisted status (enlisted receive a larger allowance)
- **Tax advantage**—The tax savings resulting from the nontaxability (at both the federal and state levels) of BAH and BAS

Although this RMC structure has been in place since the late 1940s, policy-makers are concerned that it may be (1) overly complex, making it difficult for servicemembers to understand the full value of their compensation, and (2) inequitable in some ways, such as the preferential treatment of servicemembers with dependents and the failure to embody the principle of "equal pay for equal work" [1-4].

As a result, the FY 2017 National Defense Authorization Act (NDAA) mandated that the Department of Defense (DOD) study whether the current RMC system should be converted to an SSS. According to the NDAA, an SSS would involve the following:

- Elimination of BAH and BAS
- Pay table changes specifying the pay levels, by paygrade and YOS, required to
  - Achieve pay comparability with the civilian sector
  - Effectively recruit and retain a high-quality all-volunteer force

[1] In addition to basic pay and housing and subsistence allowances, the US military provides a variety of special and incentive pays for service in particular environments and circumstances. These include hazardous duty pay, family separation pay, and special pays for hard-to-staff positions and occupations.

- Cost-of-living (CoL) adjustment, using the same adjustment system that DOD currently uses worldwide for civilian employees
- Necessary adjustments to the military retirement system, including the retired pay multiplier, to ensure that servicemembers' financial situations are similar to what they would be under the new Blended Retirement System (BRS)

The NDAA also specifies a cost containment objective so that a new SSS would result in "minimal" additional costs (at most) to the government compared with the current RMC system [5].

As part of the effort to understand the implications of such a change, the director of the 13th QRMC asked CNA in 2018 to identify and prioritize potential nondirect (second- and third-order) effects of moving from the current RMC system to an SSS and to develop study designs for analyzing the potentially highest priority effects.[2] One of the effects identified by that study was potential changes in servicemember retention induced by changes in marriage behavior [6].[3] This study explores this potential effect of SSS adoption.

Compensation, marriage, and military retention

A significant body of social science research literature shows that marriage decisions are sensitive to a couple's financial situation and compensation level [7-10]. This research suggests that moving to an SSS could change servicemembers' decisions to marry and/or have children or take on other dependent relatives. Because servicemembers with dependents reenlist at higher rates, if adopting an SSS were to change the percentage of servicemembers who are married or have dependents, it could have important effects on retention as well [11]. When recruits come into the military, most are single (in 2018, about 93 percent of E-1s had no dependents, as did 74 percent of O-1s, as reported by the Office of the Undersecretary of Defense for Personnel and Readiness) [12]. Yet, compared with civilians, servicemembers—both enlisted and officers—tend to marry at younger ages and at higher rates [13].

[2] Second- and third-order effects are nondirect potential effects of adopting an SSS, such as budgetary cost increases, impacts to servicemembers and their families, or risks to readiness caused by adverse effects on recruiting, retention, or servicemember morale. They differ from the direct (i.e., first-order) effects of implementing an SSS, which include changes to the pay table, implementation of a locational CoL adjustment, and modifications to the military retirement system.

[3] We emphasize that SSS-related pay changes could have larger retention effects than just those induced by changes in marriage behavior. Our study, though, focuses only on marriage-induced retention changes.

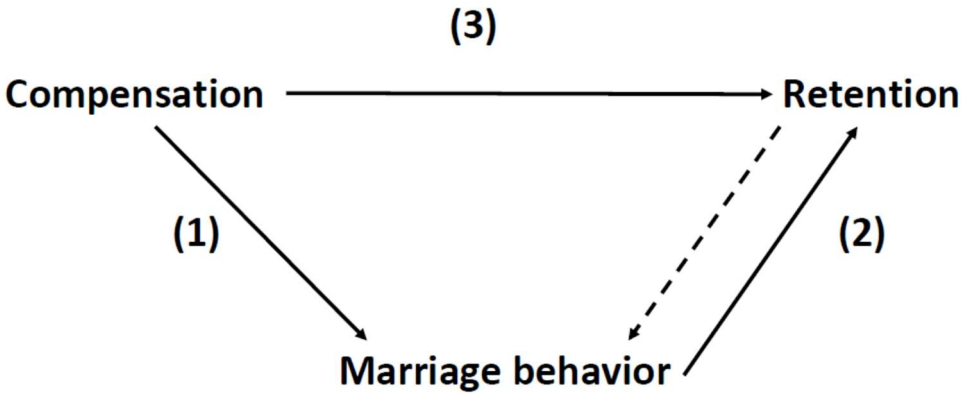
The current RMC structure provides two incentives for junior servicemembers to marry at younger ages than civilians. First, BAH payments are higher for members with dependents. Currently, the BAH payment differential between single and married members ranges from 10 to 31 percent, depending on rank (see Table 11 in Appendix A). The largest differentials go to junior enlisted in paygrades E-1, E-3, and E-4 and to warrant officers in paygrade W-1 [12]. Overall, these BAH differentials result in RMC differentials of about 5 percent for married enlisted members and 1 percent for married officers (see Table 12 in Appendix A). The largest marriage differential is received by married junior enlisted in paygrades E-1 to E-4 [12].[4, 5]

The second, related incentive for early marriage is that marriage allows junior servicemembers to move out of bachelor housing and begin receiving BAH. Survey evidence shows that few servicemembers prefer to live in bachelor housing, and a higher percentage of homeowners tend to be satisfied with their housing than those living in military housing [14].

The marriage behavior of servicemembers may matter for military readiness, in part because married servicemembers tend to reenlist at higher rates than their single counterparts. This raises the possibility that an SSS that eliminates BAH and the with-dependents pay advantage could adversely affect retention rates by lowering the marriage rate and reducing the proportion of servicemembers with dependents.

To illustrate some of the empirical challenges of studying relationships between compensation, marriage behavior, and military retention, Figure 1 displays a set of hypothesized relationships among these three factors.

Figure 1. Theory of the relationships between compensation, marriage behavior, and retention



[4] These differentials represent cross-location averages and do not incorporate BAH's location-specific component.

[5] Appendix A provides additional information about BAH and RMC.

Compensation changes affect marriage behavior (shown by line (1) in Figure 1), as higher incomes are associated with higher marriage rates (perhaps because higher incomes are associated with lower levels of family stress). Marriage rates, in turn, have a positive effect on military retention (line (2) in Figure 1). Changes in compensation, however, also affect retention directly, by changing the attractiveness of staying in the military rather than leaving and accepting alternative civilian-sector employment (line (3) in Figure 1). In this study, we focus on effects (1) between compensation and marriage behavior and (2) between marriage behavior and military retention. In other words, we consider the effects on retention brought about by potential changes in marriage behavior that could result from an SSS.

The connections between compensation, marriage behavior, and retention can be two-way relationships. For example, while marriage behavior has been found to affect retention, retention also could influence (or be correlated with) marriage behavior if, for example, those who marry have a preference for stability with respect to both family life and career. This potential relationship is indicated by the dashed arrow linking retention to marriage behavior in Figure 1. These potential reverse causality and omitted variable problems complicate our ability to empirically disentangle the effects of marriage behavior on retention, and we take steps to deal with them in our empirical analysis.

Report overview

This study's purpose is to assess the extent to which, under an SSS, changes in servicemember pay could affect retention and force size by reducing military marriage rates (the combination of effects 1 and 2 in Figure 1). We consider the following questions:

- How would the pay of married and single members change under various SSS implementation scenarios?
- What effects would these pay changes have on servicemember marriage rates, and how would these affect the proportions of married and single members in the force?
- What effect would a change in the married and single proportions in the force have on retention rates?

The report is organized as follows. The first section reviews the literature on compensation, marriage, and retention in the military. We examine long-term trends in military marriage rates, the relationships between compensation and marriage rates, marriage rates and military retention, and compensation and military retention. Important findings include the following:

- The effect of income on marriage rates is positive, but it tends to diminish at higher income levels.

- Married servicemembers retain at higher levels than single members; the effect is larger for men than for women, and larger early in a servicemember's career.
- There is a positive association between pay and retention, and, again, the effect appears to be strongest early in a servicemember's career.

The next section considers pay changes under an SSS. The distribution of pay changes by paygrade will, of course, depend on the details of SSS implementation, so we illustrate the implications of three alternative implementation scenarios. With the possible exception of junior enlisted personnel, there do not appear to be major differences in the pay changes (relative to current RMC) received by married and single servicemembers under the SSS scenarios we consider.

The third section covers our empirical analysis of the relationship between marriage and retention. We find that, for male enlisted and officers, there is a positive effect of marriage on military retention. For female servicemembers, however, the effect tends to be small to nonexistent for enlisted and negative for officers (that is, being married is associated with lower retention rates).

The fourth section looks at the implications of our compensation, marriage, and retention findings for force inventory, under different SSS implementation scenarios. Specifically, we consider what may happen to the percentages of married and single servicemembers in the force, and the implications for force size that may affect readiness. Overall, we find that the SSS implementation scenarios considered probably will have relatively small effects on servicemembers' marriage behavior and that changes in force inventory resulting from these changes in marriage patterns also will be relatively small.

Literature Review

In this section, we review how the existing literature might inform the expected effects of SSS implementation on servicemember marriage behavior and, ultimately, retention. With the objective of relying on previous work to establish a baseline of currently understood relationships and to inform our analytical approach, we review and summarize two distinct literatures. First, we review existing literature on the relationship between compensation and marriage decisions, since an SSS will alter servicemembers' overall compensation. Second, we summarize previous findings on how marital status affects retention.[6]

Military and civilian marriage behavior

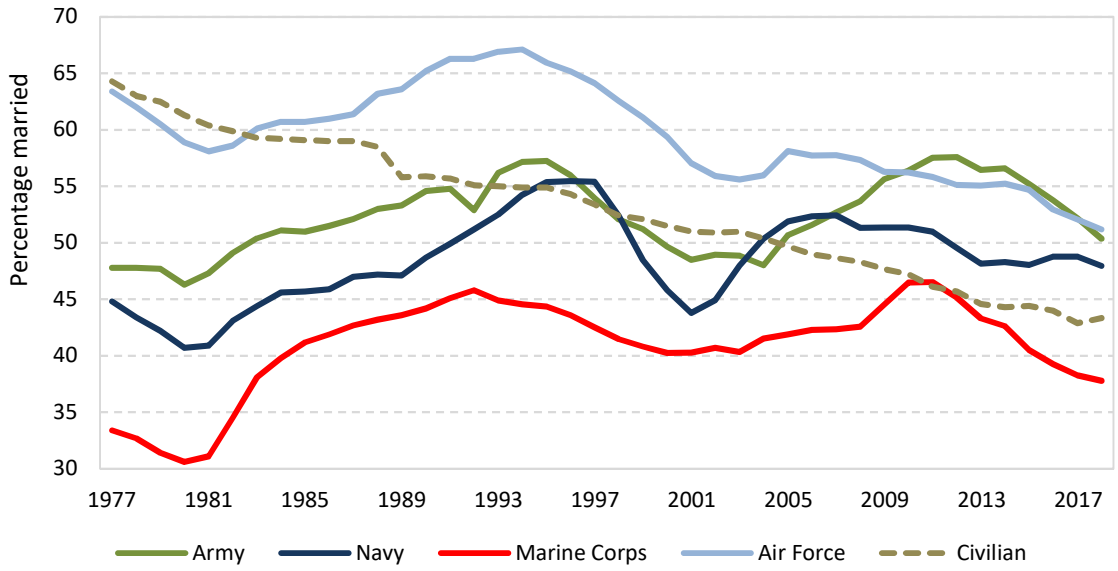
There have been profound changes in marriage behavior in the United States over the last several decades, and we must be aware of these changes when considering the findings of existing analyses of the relationships between compensation, marriage, and retention. It also should be recognized that most existing studies of the relationship between income and marriage behavior are based on civilians' marriage decisions; it is therefore important to understand how servicemembers' marriage decisions might differ.

The United States has witnessed substantial changes in family formation over the last half century. The median age at first marriage, which declined markedly through the first half of the 20th century, has risen sharply since the 1970s, and the percentage of people 15 and older who have never married has increased significantly. As marriage has become less common and has occurred later in life, sharp increases have taken place in both nonmarital childbearing and cohabitation [15].

Marriage behavior in the military has seen much less change in recent decades compared with the civilian sector. When the military was transitioning to an all-volunteer force in the 1970s, marriage rates among civilians were substantially higher than those in the Army, Navy, and the Marine Corps, and were marginally higher than those in the Air Force. While marriage rates among civilians have declined sharply since that time, they have been much more stable in the services; at present, marriage rates in the Air Force, Army, and Navy are higher than among civilians (see Figure 2).

[6] Additional information about military marriage behavior is provided in Appendix B, and Appendix C has more information about specific studies on the relationships between compensation, marriage behavior, and retention.

Figure 2. Percentage married by service with a comparison group of civilians (ages 18 to 44)



Source: Population Representation in the Military Services - Fiscal Year 2017 [13].

Several factors affect these military marriage trends. One important influence is the service's requirement profile. The Marine Corps, for example, has a younger population than the other armed forces and this may account, at least in part, for the service's lower marriage rate. Service-level accession policies also affect the frequency of marriage in the military—the Marine Corps has more stringent limits than the other services on the number of dependents that recruits can have when they access.[7] Marriage rates also may be driven by self-selection among military branches. The Air Force, for example, has relatively low rates of overseas deployment, which may be especially attractive to personnel who enter service with dependents or who wish to start families. A final point to note is that all the services have seen declines in marriage rates since the Great Recession.

Two other significant differences in military and civilian marriage behavior follow [13, 16]:

- Racial differences—a much smaller marital racial gap in the armed forces
- Earlier marriages, on average, for servicemembers compared with civilians

[7] At present, the Marine Corps requires a waiver if an applicant has any dependents under the age of 18, while the Army requires a waiver only if the applicant has two or more such dependents. As a consequence, the Army is now accessing significantly more married personnel than the Marine Corps.

The higher prevalence of young marriage in the military is probably due in part to stressors unique to the military (e.g., deployments and resulting financial burdens) [17-18]. Also, the military offers married members financial stability in terms of "the ability to live off-base, meals subsidized by the Basic Allowance for Subsistence (BAS), a higher housing allowance through the Basic Allowance for Quarters (BAQ), and health care for the spouse" [18].

These military-civilian differences in marriage behaviors provide a framework for the remaining literature review. They suggest that any relationship between compensation and marriage behavior may differ for civilians and servicemembers. That said, though much of the existing literature—especially as it relates to the marriage-compensation link—focuses on civilians, these studies can be informative of possible compensation effects for servicemembers as well. Of course, when the available studies exclusively analyze the civilian context, we will be unable to distinguish which findings also are likely to hold in the military context. These limitations highlight the significant value-added from our empirical research, summarized in subsequent sections.

Compensation and marriage

A significant body of social science research literature shows that marriage decisions are sensitive to a couple's financial situation and compensation level. These studies date back to Becker (1973) and McCubbin and Patterson (1983), but a number of more recent studies have estimated this relationship as well [7-8, 10, 19-21]. These studies employ a wide variety of data on family formation and use disparate empirical approaches. There is a subset of empirical approaches most relevant to our analysis; these include those implementing total income models, marriage-bar models, and specialization models.

Total income models posit that total household income increases raise the likelihood of marriage. Specifically, Smock et al. (2015) found that cohabitating couples with fewer monetary resources were more likely to experience stress and marital conflict, while Schneider (2011) found that certain wealth types (car ownership and financial assets) are positively related to the likelihood of marriage [21-22]. Marriage-bar models suggest that, for couples with average incomes below a perceived marriage "bar," or threshold (often defined as the median income in their community), any income increase (decrease) can produce a substantial rise (decline) in the likelihood of marriage. This finding is relevant to our analysis because it seems likely that a substantial portion of the services' enlisted forces have incomes close to or below the marriage bar. Ishizuka (2018) found that, for couples whose combined earnings were less than the median, there was a positive and significant effect of income on the marriage decision [7]. Finally, specialization models posit that the decision to marry can be characterized as people with complementary skills forming a household in which each person focuses on the activities in which they have a comparative advantage. This is supported by Brines and Joyner's

(1999) finding that "married couples who adopt a more specialized division of labor are less likely to divorce, but the effect is modest" [23]. These models may be relevant to SSS considerations since there is evidence of greater wage-employment specialization among military families than among civilians. The Council of Economic Advisers (2018) reports that "military spouses are far less likely to participate in the labor market than the general working age population" [24].[8]

Overall, the literature supports the marriage-bar hypothesis that income matters for marriage behavior only up to a certain level. Also, income effects on marriage may be stronger for couples who already are cohabitating. If the marriage-bar model is a good representation of how military members make marriage decisions, it is possible that the introduction of an SSS could result in substantial reductions in the propensity to marry among service personnel. As mentioned earlier, current BAH policy increases servicemembers' effective income when they marry. If the increase is sufficient to push a member from under the marriage bar to over it, eliminating it might substantially reduce military marriage rates. Since servicemembers with dependents reenlist at higher rates, if adopting an SSS changed the percentage of members who are married or have dependents, it could have important effects on retention as well (via the relationship between marital status and retention, discussed next) [11].

Marriage and retention/continuation

In this subsection, we review existing literature on how attrition and retention behaviors differ for single and married personnel. An important caveat is that marital status has not been the focus of a major military attrition or retention study. Although there are consistent results across a variety of studies using different methodologies that single and married personnel are retained at higher rates, we emphasize that these are not causal estimates of marriage behavior effects on attrition and retention; we therefore cannot be certain that they represent what would happen if marriage rates were to change. Overall, the literature suggests the following:

- Married servicemembers are more likely to attrite early during their first contracts, although the literature is mixed on whether the attrition differences persist after the first six months [27-28].

[8] It's not clear the extent to which the specialization effect depends on spousal labor force participation being a voluntary choice, as opposed to one forced on couples by the realities of military life or for other reasons. It seems plausible that (for example) a servicemember with an un- or underemployed spouse who would prefer to work (or work more) might suffer relationship strains, or seek to leave the service, either of which might counteract any positive effect of specialization on military marriage or retention rates. There is some research evidence that spousal careers increase employee turnover, particularly when relocation is an issue. This literature includes one study showing that, among married Army officers, having an employed spouse is associated with lower retention four years later [25-26].

- Married men are more likely to reenlist or continue, but this relationship seems to dissipate as they progress through their careers [29-34].
- Married women are no more likely (and may be less likely) than single women to reenlist or continue [30-33].
- The aggregate finding of higher retention for married personnel is consistent across services, across time, and for both officers and enlisted servicemembers [35-36].

Pay Changes Under a Single-Salary System

This section examines the size of servicemember pay changes under an SSS and how these changes could differ by marital status. Pay changes for different servicemember groups will depend on how the SSS is implemented. To better understand the nature of SSS-related pay changes, therefore, we consider three implementation scenarios:[9]

1. **Full compensation**. Increase basic pay to fully compensate servicemembers for the loss of BAH (at the without-dependents level), BAS, and the tax advantage.
2. **Partial compensation**. Increase basic pay to partially compensate servicemembers for the loss of BAH, BAS, and the tax advantage, subject to the constraint that costs to the federal government are approximately the same before and after the change.
3. **Partial compensation with charges for military-provided housing.** Increase basic pay to partially compensate servicemembers for the loss of BAH, BAS, and the tax advantage, subject to the constraint that costs to the federal government are approximately the same before and after the change. In addition, institute rental charges to servicemembers living in military-provided housing.

The data used to calculate these pay changes come from the Office of the Under Secretary of Defense for Personnel and Readiness's Selected Military Compensation Tables report for FY 2019. These tables report average pay levels across regions and do not incorporate location-based pay differences.

Scenario 1: Full compensation

Table 1 shows, by paygrade, the after-tax income changes resulting from adoption of scenario 1 (the full-compensation scenario).

[9] These scenarios have been developed by the Institute for Defense Analyses (IDA) as summarized in the memorandum, "Key Elements in Analysis of Potential Salary Systems," Mar. 6, 2019. These scenarios are illustrative, intended to convey a sense of the potential pay changes that might result from adoption of an SSS, and do not necessarily exhaust the variety of options that DOD might have in implementing an SSS.

Table 1. Pay changes under a full compensation SSS scenario

Paygrade	BAH recipients				Non-BAH recipients			
	Single		Married		Single		Married	
	Dollars	Pct.	Dollars	Pct.	Dollars	Pct.	Dollars	Pct.
Commissioned officers								
O-10	$-	-%	-$1,919	-1%	$28,644	21%	$32,053	22%
O-9	$-	-%	-$2,915	-2%	$28,452	21%	$30,829	21%
O-8	$-	-%	-$3,040	-2%	$28,644	22%	$30,932	22%
O-7	$-	-%	-$3,011	-2%	$28,644	25%	$30,961	26%
O-6	$-	-%	-$1,729	-1%	$28,428	29%	$30,959	29%
O-5	$-	-%	-$2,141	-2%	$26,436	33%	$29,119	33%
O-4	$-	-%	-$926	-1%	$25,224	36%	$27,622	37%
O-3	$-	-%	-$737	-1%	$22,260	40%	$23,959	40%
O-2	$-	-%	-$1,033	-1%	$19,308	42%	$20,339	43%
O-1	$-	-%	-$1,431	-3%	$17,208	50%	$18,225	51%
O-3E	$-	-%	-$1,320	-1%	$23,340	35%	$25,464	36%
O-2E	$-	-%	-$2,000	-2%	$21,552	40%	$23,104	41%
O-1E	$-	-%	-$2,332	-3%	$20,364	45%	$21,440	45%
Warrant officers								
W-5	$-	-%	$2,503	2%	$24,059	30%	$26,561	31%
W-4	$-	-%	-$1,177	-1%	$22,476	33%	$24,599	33%
W-3	$-	-%	-$1,382	-2%	$21,480	37%	$23,218	37%
W-2	$-	-%	-$1,937	-3%	$20,184	41%	$21,451	41%
W-1	$-	-%	-$3,529	-5%	$15,360	34%	$16,175	35%
Enlisted								
E-9	$-	-%	-$1,855	-2%	$22,080	34%	$24,125	35%
E-8	$-	-%	-$1,608	-2%	$21,178	40%	$22,702	41%
E-7	$-	-%	-$2,484	-3%	$19,656	42%	$20,784	42%
E-6	$-	-%	-$2,420	-4%	$19,212	48%	$20,320	49%
E-5	$-	-%	-$1,012	-2%	$18,192	55%	$19,376	56%
E-4	$-	-%	-$2,384	-5%	$15,108	54%	$16,240	55%
E-3	$-	-%	-$2,586	-6%	$15,288	63%	$16,530	64%
E-2	$-	-%	-$806	-2%	$15,732	68%	$16,870	70%
E-1	$-	-%	-$3,510	-9%	$13,716	67%	$14,514	68%
Averages								
COs	**$-**	**-%**	**-$1,229**	**-1%**	**$21,952**	**40%**	**$20,981**	**46%**
WOs	**$-**	**-%**	**-$1,646**	**-2%**	**$20,142**	**37%**	**$19,109**	**37%**
Enlisted	**$-**	**-%**	**-$1,997**	**-3%**	**$15,557**	**61%**	**$16,806**	**61%**

Source: Authors' calculations using pay tables from Selected Military Compensation Tables, 2019 [12].

BAH recipients

By design, single servicemembers currently receiving BAH see no change in after-tax income under this scenario; they are fully compensated for the loss of BAH at the without-dependents level. Married servicemembers currently receiving BAH experience, on average, a small decline in after-tax income because they are not fully compensated for the loss of the with-dependents level of BAH. This pay decline ranges from 1 to 3 percent for commissioned officers (COs), 1 to 5 percent for warrant officers (WOs), and 2 to 9 percent for enlisted servicemembers. In general, married servicemembers at lower paygrades who currently receive BAH would suffer the largest declines in after-tax income under this scenario. Except for junior enlisted and some warrant officers, however, the treatment of married and single BAH recipients, on average, differs by only a few percentage points (equivalent to at most $2,500).

Nonrecipients

Table 1 also shows that, in the absence of other policy changes, servicemembers who currently do not receive BAH would enjoy large pay increases under this SSS implementation scenario. These pay increases range in size from an average of about 40 percent for COs and WOs to about 60 percent for enlisted members. There is little difference in the size of the pay increase for married and single nonrecipients, except for COs: married COs earn a bit higher (46 percent) average pay increase than single COs.

Scenario 2: Partial compensation

Table 2 shows after-tax pay changes resulting from adoption of scenario 2, in which basic pay increases are limited to meet the criterion that an SSS generate, at most, minimal additional costs to the federal government.[10]

[10] The pay changes shown in Table 2 represent one specific set of pay changes meeting the criterion that military compensation costs to the federal government remain about the same after SSS adoption. IDA analysts constructed this particular scenario by increasing basic pay by a percentage that varies according to paygrade. The specific percentage changes applied to each paygrade were determined using a linear programming model designed to choose the set of percentages that minimizes the variation across paygrades in losses among married BAH recipients. These percentages ranged from 34 to 95 percent for enlisted, 20 to 38 percent for WOs, and 4 to 47 percent for COs, with lower paygrades receiving higher percentage increases.

Table 2. Pay changes under a partial compensation SSS scenario

	BAH recipients				Non-BAH recipients			
	Single		Married		Single		Married	
Paygrade	Dollars	Pct.	Dollars	Pct.	Dollars	Pct.	Dollars	Pct.
Commissioned officers								
O-10	-$30,059	-17%	-$33,912	-18%	-$1,415	-1%	$60	0%
O-9	-$29,890	-17%	-$33,692	-18%	-$1,438	-1%	$52	0%
O-8	-$29,017	-17%	-$32,610	-18%	-$373	0%	$1,362	1%
O-7	-$24,808	-17%	-$29,299	-18%	$3,836	3%	$4,673	4%
O-6	-$22,222	-17%	-$26,031	-18%	$6,206	6%	$6,657	6%
O-5	-$18,136	-16%	-$22,435	-18%	$8,300	10%	$8,825	9%
O-4	-$17,586	-18%	-$19,361	-18%	$7,638	10%	$9,187	11%
O-3	-$8,185	-10%	-$7,320	-8%	$14,075	24%	$17,376	28%
O-2	-$6,770	-10%	-$6,029	-8%	$12,538	26%	$15,343	30%
O-1	-$5,342	-10%	-$6,553	-11%	$11,866	33%	$13,103	35%
O-3E	-$9,346	-10%	-$8,824	-9%	$13,994	20%	$16,218	22%
O-2E	-$7,859	-10%	-$4,859	-6%	$13,693	24%	$16,802	28%
O-1E	-$6,868	-10%	-$3,547	-5%	$13,496	28%	$16,446	33%
Warrant officers								
W-5	-$14,864	-14%	-$14,312	-12%	$9,195	11%	$9,747	11%
W-4	-$12,169	-13%	-$13,650	-13%	$10,307	14%	$12,126	16%
W-3	-$10,616	-13%	-$10,921	-12%	$10,864	17%	$13,679	21%
W-2	-$9,798	-14%	-$10,484	-13%	$10,386	20%	$12,904	24%
W-1	-$5,355	-9%	-$7,291	-11%	$10,005	21%	$12,413	25%
Enlisted								
E-9	-$9,060	-10%	-$10,396	-10%	-$4,291	-5%	$15,584	21%
E-8	-$7,750	-10%	-$7,658	-9%	$13,428	24%	$16,652	28%
E-7	-$6,972	-10%	-$7,543	-10%	$12,684	25%	$15,725	30%
E-6	-$6,125	-10%	-$7,430	-11%	$13,087	31%	$15,310	35%
E-5	-$5,304	-10%	-$6,247	-11%	$12,888	37%	$14,141	39%
E-4	-$4,452	-10%	-$7,673	-16%	$10,656	36%	$10,951	36%
E-3	-$4,850	-12%	-$8,278	-18%	$10,438	41%	$10,838	40%
E-2	-$6,369	-16%	-$7,738	-18%	$9,363	39%	$9,938	39%
E-1	-$3,806	-11%	-$7,251	-18%	$9,910	46%	$10,773	48%
Averages								
COs	**-$8,084**	**-11%**	**-$14,902**	**-14%**	**$11,580**	**22%**	**$13,284**	**29%**
WOs	**-$9,051**	**-12%**	**-$10,887**	**-13%**	**$10,396**	**18%**	**$12,709**	**23%**
Enlisted	**-$5,130**	**-11%**	**-$7,282**	**-12%**	**$10,560**	**39%**	**$11,342**	**39%**

Source: Calculations provided to CNA by the Institute for Defense Analyses (IDA).

BAH recipients

Under scenario 2, both single and married BAH recipients would see declines in after-tax pay. Pay decreases would range from 10 to 17 percent for single COs currently receiving BAH and from 5 to 18 percent for married members. On average, married COs would do a bit worse than singles, though, at lower paygrades, married COs would see smaller percentage decreases than singles. Pay decreases would range from 9 to 14 percent for single WOs and from 11 to 14 percent for married WOs, with married WOs taking, on average, slightly larger pay decreases. For enlisted, pay decreases for single servicemembers would range from 10 to 16 percent; for married members, decreases would range from 9 to 18 percent. Again, on average, married enlisted would receive somewhat larger pay cuts than singles. Also, and unlike COs, for enlisted members, pay cuts would be concentrated in the lower ranks. With the exception of junior enlisted, the differences in pay changes between married and single servicemembers appears to be small.

Nonrecipients

Under scenario 2, both single and married servicemembers who do not currently receive BAH would receive substantial pay increases (with the exception of higher ranking COs in paygrades O-6 and above). Lower ranking COs would receive pay increases in the range of 20 to 30 percent, WOs would receive increases in the range of 10 to 25 percent, and enlisted members would receive about a 40 percent pay increase, on average.

Scenario 3: Partial compensation with charges for military-provided housing

Under the first two SSS implementation scenarios, both single and married servicemembers not currently receiving BAH (that is, living in military-provided quarters) would receive large pay increases. This is the case because all servicemembers would be paid according to the same basic pay table, and BAH would be incorporated into a servicemember's basic pay regardless of whether he or she previously was paid BAH.

Charging rent to servicemembers living in military-provided housing would prevent current non-BAH recipients from receiving this windfall pay increase. The third SSS implementation scenario considered here involves instituting such housing rents. Following IDA analyses, we assume that the level of rent charged is determined by a servicemember's valuation for military housing. This valuation is assumed to be a function of BAH payments and to vary with the servicemember's paygrade, according to Table 3.

Table 3. Estimate of the value of government-provided housing as a percentage of BAH

Officer			Enlisted		
Paygrade	Single	Married	**Paygrade**	Single	Married
O-4 and above	100%	100%	**E-6 and above[a]**	100%	100%
O-3	80%	100%	**E-5**	80%	80%
O-2	60%	60%	**E-4**	60%	60%
O-1	40%	60%	**E-3**	40%	60%
			E-2	0%	60%
			E-1	0%	60%

Source: Calculations provided by the Institute for Defense Analyses (IDA).
[a] Includes Warrant Officers.

Under scenario 3, current non-BAH recipients living in military-provided housing are charged housing rents according to Table 3. It is assumed that single junior enlisted (E-1s and E-2s) who must live in barracks by policy will not be charged rent. Table 4 summarizes the implications of this policy for a servicemember's take-home pay.

Table 4. Pay changes under partial compensation with housing charges SSS scenario

	BAH recipients				Non-BAH recipients			
	Single		Married		Single		Married	
Paygrade	**Dollars**	**Pct.**	**Dollars**	**Pct.**	**Dollars**	**Pct.**	**Dollars**	**Pct.**
Commissioned officers								
O-10	-$30,059	-17%	-$33,912	-18%	-$30,059	-21%	-$33,912	-22%
O-9	-$29,890	-17%	-$33,692	-18%	-$29,890	-21%	-$33,692	-22%
O-8	-$29,017	-17%	-$32,610	-18%	-$29,017	-21%	-$32,610	-22%
O-7	-$24,808	-17%	-$29,299	-18%	-$24,808	-21%	-$29,299	-23%
O-6	-$22,222	-17%	-$26,031	-18%	-$22,222	-21%	-$26,031	-23%
O-5	-$18,136	-16%	-$22,435	-18%	-$18,136	-21%	-$22,435	-24%
O-4	-$17,586	-18%	-$19,361	-18%	-$17,586	-24%	-$19,361	-24%
O-3	-$8,185	-10%	-$7,320	-8%	-$3,733	-6%	-$7,320	-12%
O-2	-$6,770	-10%	-$6,029	-8%	$954	2%	$2,520	5%
O-1	-$5,342	-10%	-$6,553	-11%	$4,982	14%	$1,309	3%
O-3E	-$9,346	-10%	-$8,824	-9%	-$4,678	-7%	-$10,566	-14%
O-2E	-$7,859	-10%	-$4,859	-6%	$762	1%	$1,739	3%
O-1E	-$6,868	-10%	-$3,547	-5%	$5,350	11%	$2,183	4%
Warrant officers								
W-5	-$14,864	-14%	-$14,312	-12%	-$14,864	-18%	$14,311	-16%
W-4	-$12,169	-13%	-$13,650	-13%	-$12,169	-17%	-$13,650	-17%
W-3	-$10,616	-13%	-$10,921	-12%	-$10,616	-17%	-$10,921	-17%

Paygrade	BAH recipients				Non-BAH recipients			
	Single		Married		Single		Married	
	Dollars	Pct.	Dollars	Pct.	Dollars	Pct.	Dollars	Pct.
W-2	-$9,798	-14%	-$10,484	-13%	-$9,798	-19%	-$10,484	-19%
W-1	-$5,355	-9%	-$7,291	-11%	-$5,355	-11%	-$7,291	-15%
Enlisted								
E-9	-$9,060	-10%	-$10,396	-10%	-$26,371	-31%	-$10,396	-14%
E-8	-$7,750	-10%	-$7,658	-9%	-$7,750	-14%	-$7,658	-13%
E-7	-$6,972	-10%	-$7,543	-10%	-$6,972	-14%	-$7,543	-14%
E-6	-$6,125	-10%	-$7,430	-11%	-$6,125	-15%	-$7,430	-17%
E-5	-$5,304	-10%	-$6,247	-11%	-$1,665	-5%	-$2,170	-6%
E-4	-$4,452	-10%	-$7,673	-16%	$1,591	5%	-$223	-1%
E-3	-$4,850	-12%	-$8,278	-18%	$4,323	17%	-$632	-2%
E-2	-$6,369	-16%	-$7,738	-18%	$9,363	39%	-$667	-3%
E-1	-$3,806	-11%	-$7,251	-18%	$9,910	46%	-$41	0%
Averages								
COs	**-$8,084**	**-11%**	**-$14,902**	**-14%**	**-$5,438**	**-6%**	**-$3,043**	**-2%**
WOs	**-$9,051**	**-12%**	**-$10,887**	**-13%**	**-$9,746**	**-17%**	**-$9,020**	**-16%**
Enlisted	**-$5,130**	**-11%**	**-$7,282**	**-12%**	**$4,227**	**18%**	**-$788**	**-2%**

Source: Calculations provided to CNA by the Institute for Defense Analyses (IDA).

BAH recipients

Under scenario 3, pay changes to servicemembers currently receiving BAH are identical to those in scenario 2. Current BAH recipients are not affected by this policy.

Nonrecipients

Under scenario 3, most servicemembers who live in military-provided housing and do not currently receive BAH will be charged housing rents that will counteract the increase in basic pay under an SSS. The exception (under the policy considered here) will be single junior enlisted E-1s and E-2s who must live in barracks. As a result, single junior enlisted servicemembers still would receive large pay increases under an SSS. Married junior enlisted and more senior enlisted members and officers would not receive large pay increases under scenario 3, however. In general, higher ranking enlisted (E-6 and above), WOs, and higher ranking officers (O-4 and above) would receive the largest pay cuts under scenario 3.

Marriage and Retention: Data Analysis

Our original objective was to separately identify and estimate the relationship between (1) compensation and marriage and (2) marriage and retention. Our approach uses quarterly snapshots of Defense Manpower Data Center's (DMDC's) active component files for each of the four services, a single data source for enlisted and officer personnel in all four services that allows us to observe changes in compensation, marital status, and retention over time.[11] However, the deficiencies in data related to servicemembers' compensation are so great that we are unable to assess the effects of income on the marriage decision.[12] As a result, in this analysis, we will (1) rely on estimates of the effect of income on marriage taken from the literature on the civilian population and (2) use the DMDC data to estimate the relationship between marital status and retention. This section provides the details of our estimates of the latter effect: the relationship between marital status and military retention.

Empirical strategy

Our choice of empirical methodology for estimating the relationship between marital status and retention is driven by three factors:[13]

- **Reverse causality**: the need to isolate the effects of marriage on reenlistment separate from any effect that reenlistment may have on marriage
- **Omitted variables**: the need to mitigate possible omitted variables bias
- **Additional data limitations**: especially the difficulty in observing contract or obligated service lengths

[11] These data are available for all personnel (officer and enlisted) who were in the service since 2000, and include time-invariant characteristics specific to the servicemember (race, gender, date of accession, number of dependents at accession, etc.) and characteristics of the member's service during each quarter (DOD occupation code, paygrade, unit identification code (UIC) location, home of record, etc.).

[12] The DMDC pay files have fields that are both important and problematic. The basic pay and allowances fields are consistently filled in with values that match stated policy, but many of the incentive pays are not. For instance, Hazardous Duty Incentive Pay, which is hundreds of dollars per month, is often reported in tens of thousands of dollars. Likewise, we see persistent large negative values in other incentive pays. While an isolated instance may represent a "correction" of an earlier too-large amount, these large negative amounts frequently are persistent.

[13] Two approaches that would be most effective in dealing with direction-of-causality and omitted variable issues are an *instrumental variables technique* and a *two-way fixed-effect estimation* applied to panel data of cohorts working in the DOD occupational codes. We attempted both of these approaches in our analyses of officers and enlisted personnel. Neither of these approaches proved useful in the particular circumstances of our analysis.

First, for changes in marital status that happen near the retention decision, it is unclear in which order the marriage and retention decisions actually happened (as opposed to when they were recorded). There are lags between when servicemembers decide to marry and actually marry, as well as when they decide to (or not to) retain and when they are eligible to actually do so (and, thus, the decision is recorded). Accurate estimates of the impact of marital status on retention depend on identifying situations in which the marriage and retention decisions were made sequentially (and in that order). In reality, especially for changes in marital status made near the retention decision, it is possible that the marriage and retention decisions were made jointly or that the retention decision was made first.

The second major concern for our analysis is the possibility of some unobserved omitted factor influencing both marriage and retention. This can manifest in several ways. For instance, policies aimed at improving the employment outcomes of military spouses might increase both the likelihood that servicemembers get married and the likelihood that they retain. It also is possible that differences in cultural norms among the general population mean that servicemembers who tend to get married when they are young also are the kind of people who tend to retain in the military. In this case, marriage would not be a cause of retention, it would be a signal that the servicemember is more likely to naturally retain (or vice versa). Likewise, contrasting retention rates across years where more (or fewer) servicemembers are married may simply signal years where there are more (or fewer) servicemembers of this type. In this scenario, marriage rates would serve as a potential signal in future retention forecasts but would not have a causal effect on retention.

A third challenge has been the nature of the DMDC data that are available to support this study. In addition to the problems with the compensation data already mentioned, other measures that would have been useful in our analysis, such as the lengths of enlisted contracts and officers' current obligated service, either are not gathered by DMDC or are of poor quality.

We use quarterly snapshots of DMDC's active component enlisted and officer files for each of the services. The data allow us to identify changes in servicemembers' personal and military characteristics across time, including their marital status, their paygrades, their occupations/communities, and so on. Our analysis requires that we examine the complete service histories of everyone in our sample (to assess, for example, their marital status since entering the military), and, for this reason, we have excluded those who were in the military in 2000 but who accessed at an earlier date. We also have excluded those who entered the military in recent years and whose reenlistment decisions are not yet evident. Finally, we have excluded the small portion of personnel who are married at the time of accession.

Our explanatory variable of interest is an indicator of whether a servicemember marries after accession but before the end of his or her eighth quarter of service (2 YOS). On one hand, we assume that this is early enough in the careers of service personnel to be unlikely that their

later reenlistment decisions will have a substantial influence on their marriage decisions, thus helping us to deal with the reverse causality issue. On the other hand, 2 YOS should be late enough in a servicemember's career that a sufficiently large proportion have married and we can derive statistically significant and economically meaningful results about the effects of marriage on reenlistment.

Because there are sharp differences between officers and enlisted servicemembers and the laws and policies that regulate their careers, we have conducted separate analyses for these two groups. For similar reasons, within our analyses of officers and enlisted personnel, we have undertaken separate estimations for each of the four armed forces.

Findings

Enlisted

In this subsection, we show our results for enlisted personnel. We summarize the results as follows. For enlisted men, being married by the eighth quarter of service is associated with higher retention. For enlisted women, the effect is smaller: marriage is associated with higher retention only in the Army, and we do not observe any statistically significant relationship between marriage and retention for enlisted women in the Air Force, Navy, or Marine Corps.

Empirical methodology for enlisted analysis

Using individual-level data for each service, we use a linear probability approach—an ordinary least squares (OLS) regression of a binary retention variable on servicemembers' marital status early in their service careers (generally, their status at the end of eight quarters of service).

For our analysis of enlisted personnel, we define retention in the early years of service to be YOS 4 to YOS 6.5—remaining in the military for at least 26 quarters (6.5 YOS) conditional on having served 16 quarters (4 YOS). This definition captures reenlistment among those with the longest enlistment contracts, and it also is a good proxy for those who sign shorter contracts.

We have included in our regressions control variables for occupation, time of accession, and other servicemember-specific independent variables, including race/ethnicity, gender, age at accession, Armed Forces Qualification Test (AFQT) score, accession quarter or year, and DOD occupation code. Inclusion of these latter two variables helps us to control for unobserved factors that can vary over time and that might bias our estimates of the relationship between marriage and retention (e.g., changes in civilian labor market conditions, or changes in preferences for military service over time; or differences in promotion potential or working conditions across occupations).

Summary of results for enlisted personnel

Table 5 shows, for the enlisted personnel in our dataset who accessed between 2000 and 2006, the incidence of marriage by the end of the eighth quarter (2 YOS), and Table 6 shows our regression results.

Table 5. Share of enlisted (enlisted at age 18) who have ever been married, by service and timing

	Army	Navy	Air Force	USMC
First observation	0.02	0.01	0.02	0.00
End of YOS 1	0.08	0.10	0.12	0.09
End of YOS 2	0.20	0.20	0.22	0.20
End of YOS 3	0.33	0.29	0.30	0.32
End of YOS 4	0.49	0.36	0.39	0.44

Source: CNA tabulations of DMDC data (for enlisted personnel who accessed 2000 to 2006).

Table 6. Retention differences (YOS 4 to YOS 6.5) for married versus unmarried enlisted, by gender and service

	Navy		Army		Air Force		USMC	
	Men	Women	Men	Women	Men	Women	Men	Women
Retention difference	7.7	-0.9	8.5	3.5	5.3	1.1	11.2	1.7
	(0.3)	(0.9)	(0.2)	(0.6)	(0.3)	(0.7)	(0.4)	(1.9)
Average retention	60.3	55.4	61.8	58.6	69.3	67.9	54.4	56.5

Source: CNA estimates from DMDC data.
Note: Coefficients represent percentage points. Standard errors are in parentheses.

One empirical result that is consistent for all the services is that, for enlisted men, being married by the eighth quarter of service is associated with higher retention. This effect is largest in the Marine Corps where the likelihood of retention past 6.5 years is 11.2 percentage points (pp) higher among married men than among single men. The effect of marriage for men is smallest in the Air Force, where marriage is associated with a 5.4 pp greater retention likelihood. Among enlisted women, marriage is associated with higher retention only in the Army, where married women are 3.5 pp more likely to retain to 6.5 years than those who are unmarried. We do not observe any statistically significant relationship between marriage and retention for women in the Air Force, Navy, or Marine Corps.

Our estimation results are consistent with other studies that have looked at the effects of marriage on retention among samples of enlisted military personnel. These studies have typically found that married servicemembers reenlist at a rate that is 8 to 16 pp higher than for unmarried members [37-39].

Officers

In this subsection, we show results for officers, which can be summarized as follows. We find that male officers who are married at the end of their second year of service historically have had higher rates of retention at three to nine years of commissioned service (YCS)—that is, retention to 9 YCS conditional on having reached 3 YCS. The opposite holds for women; female officers who are married at the end of their second year of service historically have had lower rates of retention at YCS 3 to YCS 9. These historical relationships are consistent across services, across time, and across alternative measures of early-career retention.

As discussed, when trying to estimate the effect of income changes on marriage rates (and the downstream effects of these changes in marriage rates on retention), our choice of methodology is dominated by three concerns: marriage and retention decision order, unobserved variable effects, and data limitations.

The limited accurate information available in DMDC data, especially inaccurate pay information, greatly constrains the statistical models that are feasible for this analysis.

Data limitations for officers

There are additional limitations to the DMDC data (beyond the inaccurate pay information) that affect our analysis for officers.

First, there is no identification of the end of officers' current obligated service, including the Minimum Service Requirement (MSR) signaling the end of their first contracts. In general, MSR can be identified using the source through which officers entered service (one of the service academies, officer candidate school, etc.), but there are community-by-community exceptions (aviators have later MSRs). After MSR, there is no way to identify whether officers are serving on a year-to-year basis or have incurred additional obligation through different means. As a result, our ability to examine the historical relationship between marital status and later retention is hampered by our inability to identify who was and was not eligible to leave at a particular YCS.

Second, our information about the loss decision is limited. The data include both a loss date and a loss reason, but the data include examples of officers with an early loss date and loss reason recorded each quarter who nonetheless continued in the service (and received promotions, etc.) for years. For that reason, we use officers' final observation in the dataset as their final quarter in the service; however, the lack of consistent loss code data prevents us

from categorizing the type of loss (or trying to identify in-contract versus end-of-contract losses later in officers' careers for those who incur additional obligation).

Empirical methodology for officer analysis

Recall that we have two principal concerns about estimating the effect of marital status on retention: reverse causality and omitted variables.[14]

Our empirical strategy focuses on carefully identifying how the retention of married and single officers has differed over the past two decades. We expect marital status to vary by observable officer characteristics (notably, age) that also may be correlated with retention, so we include controls for several variables.[15] Following the implied suggestions from previous literature, we estimate the historical relationship separately for men and women. As we show below, this has a notable effect on our results.

Since, as we discussed earlier, we cannot observe an accurate MSR for all officers, we estimate differences in retention at YCS 3 to YCS 9; that is, the share of officers (who still were in service at YCS 3) who retained to YCS 9. YCS 3 is at least one year before MSR for all officers, and YCS 9 is several years past MSR for most officers (with aviators being a notable exception). Furthermore, since the earliest MSR in our data is four years of service, we measure marital status at the end of YCS 2 to reduce the likelihood that the (actual, not recorded) retention decision preceded the marriage decision. Finally, as our marital status variable of interest, we use whether an officer has ever been married.[16] We do so to avoid the complications arising from separations, divorces, and remarriages that are outside the scope of our study.

Our final model is a linear probability model that estimates the historical pp difference in retention for those who had, at some point, been married (compared to those who had not) with controls for the variables listed previously.

[14] There is a statistical strategy—instrumental variables—to deal with both of these concerns at the same time, but that strategy involves making assumptions that, for our data, were dubious and require validity tests that our proposed implementation did not pass. Another potential solution is aggregating observations to the community level and relying on "fixed effects" to account for any unobserved third factors. The estimates from this "aggregation" strategy were very sensitive to small changes in the length of service at which we measured whether officers were married. This lack of stability combined with no convincing argument about which "marital timing" choice is correct suggests that the aggregation strategy is a poor one in this circumstance.

[15] In particular, we included indicator variables for racial/ethnic groups, commissioning source, initial (non-student) occupational group, the fiscal year of accession, and the age at accession. We excluded officers who were married when we first observed them in the data, as well as officers we did not observe in the first year of service.

[16] Formally, the variable is defined as whether an officer does not have a marital status value of being single, never married.

Summary of results for officers

We begin our discussion of results by noting the share of officers who have been married by different years of commissioned service. Since this will vary based on the average age at commissioning (which can vary across time and across services), we show marriage rates for officers who commissioned at age 22 (this is strictly illustrative; we do not include the same restriction in our analysis). As Table 7 shows, being married (or divorced/separated) at commissioning is uncommon in all of the services, though it is notably more common in the Air Force. By the end of YCS 2 (our preferred measure of marital timing), around a quarter of officers in our dataset are married or have previously been married.

Table 7. Share of officers (commissioned at age 22) who have ever been married, by service and timing

	Army	Navy	Air Force	USMC
First observation	0.04	0.03	0.12	0.06
End of YCS 1	0.17	0.11	0.20	0.17
End of YCS 2	0.27	0.20	0.31	0.26
End of YCS 3	0.37	0.29	0.40	0.35
End of YCS 4	0.45	0.37	0.49	0.45

Source: CNA tabulations from DMDC data.

As Table 8 shows, officers who were married at the end of their second YCS have historically retained differently than those who were single. The differences vary substantially by gender: married women have been less likely to retain than single women in all of the services. The effect is quite large for the Marine Corps in particular, where married women are approximately 12 pp less likely to retain than single women. In contrast, married men are more likely to retain than single men in all of the services, with the largest difference for the Army.

Table 8. Retention differences (YCS 3 to YCS 9) for married versus unmarried officers, by gender and service

	Navy		Army		Air Force		USMC	
	Men	Women	Men	Women	Men	Women	Men	Women
Retention difference	2.9	-4.5	7.6	-3.5	2.8	-5.0	5.1	-11.7
	(0.9)	(1.7)	(0.6)	(1.3)	(0.7)	(1.4)	(1.1)	(4.1)
Average retention	58.4	41.2	47.2	39.2	67.4	43.6	48.2	39.6

Source: CNA estimates from DMDC data.
Note: Coefficients represent percentage points. Standard errors are in parentheses.

The main takeaway for officers—that married men are more likely to retain than single men, while the reverse holds for women—is not overly dependent on our choice of marital timing. Our results are substantively similar regardless of whether we use marital status at the end of the first, second, or third year (results not shown). In all cases, the estimated direction of the relationship is similar as are the main takeaways (the gap between married and single men is always largest in the Army, while the gap between married and single women is largest in the Marine Corps). Likewise, the results are similar to retention gaps from the year before MSR to the year after MSR.[17] Our estimates also largely align with previous research, which has found retention rates for married male officers on the order of 3 to 9 pp higher than those for unmarried male officers but has found little or no (or in some cases, a negative) effect for women [5, 36, 40-41].[18]

[17] This result excludes those in the aviation and medical communities.

[18] Kraus et al. (2013), for example, also found a negative effect of marriage on retention for female Navy officers. Parcell, Smirnov, and Kraus (2018) found that female Navy officers with military spouses are more likely to leave the Navy than single female officers [40-41].

Income Changes and Marriage Behavior: Implications for Retention

In this section, we examine the implications of our data analysis and the literature for the relationship between income changes, changes in marriage behavior, and changes in retention. Because of the data limitations described in previous sections, we were unable to include compensation variables in our own statistical analyses. As a result, we combine our statistical results on marriage and retention with the literature's findings on both (a) marriage and retention and (b) compensation and marriage to bound the size of retention changes that might be expected from a move to an SSS.

Assumptions

We consider the effects of a $10,000 reduction in income for a servicemember.[19] This reduction is similar in magnitude to the typical reduction some servicemembers would face under the three SSS implementation scenarios we considered. (Under the partial compensation scenarios summarized in Table 2 and Table 4, for example, married junior enlisted BAH recipients would see pay cuts on the order of $7,000 or $8,000, while married junior officers would see reductions of $6,000 or $7,000.) Two key sets of assumptions follow.

Income and marriage

Schneider (2011) found that every $10,000 of additional income increases the likelihood of marriage by 1 percent in a total income model, while Watson and McLanahan (2011) found that, for income below the marriage bar, 10 pp higher income (that is, closer to the marriage bar) increases the probability of marriage by 2.4 pp [21, 42].[20] We assume that the marriage bar for enlisted servicemembers is the RMC of the median enlisted member, and that the marriage bar for officers is the RMC of the median officer.[21] RMC for the median enlisted

[19] This is the size of the income change considered by Schneider (2011), although his analysis reported effects for an income increase rather than a reduction.

[20] Note that we are assuming that income reductions of a given size have the same magnitude effect (but opposite in sign) on marriage rates as do income increases of the same size.

[21] This definition assumes that enlisted servicemembers compare their incomes to those of other enlisted members, and that officers compare their incomes to those of other officers, If servicemembers also compare their

servicemember (who would have rank E-4) is about $50,000, so a 10 pp income increase would be equivalent to about $5,000 (see Table 12 in Appendix A). For the median officer (rank O-3), RMC is around $100,000, so a 10 pp increase below the marriage bar is equivalent to about $10,000.[22] For people in the 25-to-34-year-old age group that Watson and McLanahan studied, a 2.4 pp increase in the marriage rate would be equivalent to a 3–5 percent increase for military (enlisted) and a 4–11 percent increase for civilians [13]. We will, therefore, consider a range of effects of income on marriage from 1 to 15 percent. We will consider the cases of (1) 25-year-old enlisted members with 6 YOS, of whom about 50 percent are married, and (2) 28-year-old officers with 6 YOS, of whom about 56 percent are married [13].

Marriage and retention

The literature and our own statistical estimates have found marriage effects on retention on the order of 5 to 16 pp for male enlisted and from 3 to 9 pp for male officers [36-39, 45]. We will use these estimates as our range of effects for marriage on retention in this analysis.

Enlisted results

Table 9 shows the potential range of effects on marriage and retention of a $10,000 decrease in income for a 25-year-old enlisted member with 6 YOS, using the foregoing set of assumptions.[23]

incomes to those outside the military, then results showing that RMC for servicemembers is above the median level for civilians with similar characteristics (see, for example, Grefer et al. 2011 or Hosek et al. 2018) imply that a higher percentage of servicemembers will be above the marriage bar than we assume in our analysis [43-44]. This, in turn, implies that the marriage and retention effects of any SSS pay changes would be even smaller than those we report, which would reinforce our conclusion of small effects. We also do not consider nonmonetary forms of compensation in our analysis. To the extent that servicemembers have better health care and other nonmonetary benefits than do those outside the military, the implications of taking nonmonetary benefits into account are also likely to be fewer servicemembers below the marriage bar, and smaller effects on marriage and retention behavior from SSS-related pay changes.

[22] We note that our assumptions about the marriage bar for servicemembers are consistent with our data on the percentage of servicemembers who are married (see Table 5 and Table 7), which shows a large increase in the marriage rate for both enlisted and officers over the first four years of service.

[23] Table 9 does not take into account the gender differences in the effect of marriage on retention discussed in the last section. We focus here on the results for men because those represent the strongest potential adverse effects on retention from changes in marriage behavior. Differences across services are accounted for in the range of effects across columns in Table 9.

Table 9. Range of effects of a $10,000 income reduction on enlisted retention

Effect of income on marriage rate (%)	Marriage rate	Effect of marriage on retention (pp)			
		5	8	12	16
Baseline	50.0%	34.0%	34.0%	34.0%	34.0%
-1	49.5%	34.0%	34.0%	33.9%	33.9%
-5	47.5%	33.9%	33.8%	33.7%	33.6%
-10	45.0%	33.8%	33.6%	33.4%	33.2%
-15	42.5%	33.6%	33.4%	33.1%	32.8%

Note: Calculations for a 25-year-old enlisted member with 6 YOS.
Source: CNA calculations.

For 25-year-old enlisted members with 6 YOS, about 50 percent are married, and the continuation rate to 7 YOS is about 34 percent [13]. The "Marriage rate" column shows the effects of the $10,000 income reduction on the percentage married, under different assumptions about the size of the effect (ranging from a 1 percent to a 15 percent reduction in the marriage rate). For the largest effect, 15 percent, the percentage married would fall to 42.5 percent. The columns below "Effect of marriage on retention" show calculations for what would happen to the retention rate under a range of assumptions about the size of the effect of the change in the marriage rate on retention. For example, the "5" column calculates the effect on the retention rate under the assumption that the difference between the retention rate for married and single enlisted is 5 pp. At baseline, with half of 25-year-old enlisted members married and half single, the implication is that the continuation rate for married enlisted 25-year-olds is about 36.5 percent, while the rate for singles is 31.5 percent (producing the average effect of 34 percent).

The table cells show what happens to the baseline continuation rate under the different assumptions about the size of the income effect on marriage and about the size of the effect of marital status on retention. For example, the cell corresponding to row "-15" and column "16" shows what happens to the baseline retention rate under the assumption that a $10,000 income reduction will decrease the marriage rate by 15 percent, and that married enlisted servicemembers are 16 pp more likely to continue than single enlisted servicemembers. The 16 pp difference in retention implies that, at baseline, the retention rate for married enlisted 25-year-olds is about 42 percent, while the retention rate for singles is about 26 percent. If the percentage married falls to 42.5 percent, the retention rate might be expected to fall to (42.5 x 42) + (57.5 x 26) = 32.8 percent.

Table 9 shows that, at the high end of the range of assumptions, a $10,000 income reduction might be expected to reduce the retention probability of a 25-year-old enlisted servicemember

with 6 YOS from 34 percent to about 32.8 percent. This represents a 1.2 pp decrease, or about 3.5 percent. This represents an upper bound on the range of potential effects; any actual effect is likely to be smaller than this.

Officer results

Table 10 shows the results of performing the same analysis, but this time for a 28-year-old officer with 6 YOS.

Table 10. Range of effects of a $10,000 income reduction on officer retention

Effect of income on marriage rate (%)	Marriage rate	Effect of marriage on retention (pp)		
		3	5	9
Baseline	56.0%	55.0%	55.0%	55.0%
-1	55.4%	55.0%	55.0%	55.0%
-5	53.2%	54.9%	54.9%	54.8%
-10	50.4%	54.8%	54.7%	54.5%
-15	47.6%	54.8%	54.6%	54.3%

Note: Calculations for a 28-year-old officer with 6 YOS.
Source: CNA calculations.

At the high end of the range of assumptions for officers (a 15 percent reduction in marriage percentage and a 9 pp difference in retention probability between married and single officers), a $10,000 income reduction would be expected to reduce the retention probability of a 28-year-old officer with 6 YOS from 55 percent to about 54.3 percent—a decrease of 0.7 pp, or 1.3 percent.

Summary

These calculations imply that the effect of income changes on retention through changes in marriage behavior are likely to be small, for both enlisted and officers. A $10,000 pay cut would be expected to reduce enlisted retention by at most 3 to 4 percent, and for officers by at most a little more than 1 percent. Again, because these are upper bounds, the actual effects are likely to be smaller.[24]

[24] Note that a pay cut of $10,000 may well have larger total retention effects than just those induced by changes in marriage behavior. Our analysis, though, focuses only on marriage-induced retention changes. The larger potential retention effects are beyond the scope of our study.

Implications for Force Inventory

In this section, we present our force inventory modeling analysis results. The objective of this part of the analysis is to take our findings on the effect of compensation on marriage behavior, and of marriage behavior on retention, and examine the likely implications for (1) the proportion of married and single servicemembers in the force and (2) how much force size might change, under different scenarios for implementing an SSS. The implications for force size are important for assessing the effect of an SSS on military readiness because an SSS that generates significantly decreased retention and force size will have further implications for recruiting and accession policy, and the experience level, quality, and cost of the force.[25]

Methodology

First, we created a baseline model of the current force structure. To produce a model of the current cohort of servicemembers, we generated a representative cohort in which paygrades are assigned based on the observed paygrade distribution. Within paygrades, we assigned ages proportionally based on the observed age distribution. We also assigned time-in-grade and months of service by sampling an empirical triangular distribution within each paygrade. We assigned marital status according to gender and age. To model accessions, we then generated a representative annual accession cohort (using a similar method), based on the characteristics of those who accessed in FY 2018 and FY 2019. Continuation rates by YOS were based on observed continuation rates between FY 2015 and FY 2019, stratified by gender and marital status (thus capturing the effect of marital status on retention). Baseline annual marriage probabilities (by age and gender) are based on DMDC marital status changes over the last 5

[25] In reality, it is force composition rather than force size that is of primary concern. Most of the services would adjust endstrength by increasing retention or recruiting efforts in response to a potential force size reduction, depending on the service's needs. On one hand, increased recruiting effort would result in a younger, less experienced force that might be cheaper from a cost perspective, but also might raise readiness concerns (especially for the Air Force, Army, and Navy, whose servicemember profiles generally are older and more experienced than those of the Marine Corps). Meeting endstrength needs through increased retention, on the other hand, could result in an older, more experienced force that would be more expensive, and with different personnel readiness concerns (e.g., potentially higher operational tempos for junior servicemembers, of which there will be fewer, which could, in turn, have downstream retention effects). Although our model is not designed to consider this broader set of outcomes, it can provide insight into the potential need for future increases in recruiting or retention efforts as a result of changes in marriage behavior due to an SSS.

years. This baseline model shows what we would expect the force size to look like in the future (out to 10 years), under the current RMC structure.

We then modified the baseline model to examine the implications for percentage married and force size of the three different SSS implementation scenarios: full compensation, partial compensation, and partial compensation with housing rents. The pay changes under each of the three scenarios are those in Table 1, Table 2, and Table 4. We assumed that a marriage bar eliminates the effect of income on marriage for enlisted servicemembers in paygrades E-5 and above and officers in paygrades O-4 and above. For servicemembers below these marriage bars, we assumed that a $10,000 change in income changes the probability of getting married by 2 percent (twice the size of the effect for civilians identified by Schneider (2011) [21].[26]

Enlisted

Here we present the results of our force inventory model for enlisted servicemembers. Overall, the model predicts small effects on both the marriage rate and force size from each of the three SSS implementation scenarios identified in the above paragraph. To investigate what might happen if an SSS produces substantially larger effects on marriage behavior than our analysis (to this point) indicates is likely, we also present results for two additional scenarios:

- One in which a SSS drives military marriage rates down to civilian levels
- Another in which military marriage rates are driven down to a level that is an average of current military and civilian marriage rates

Navy

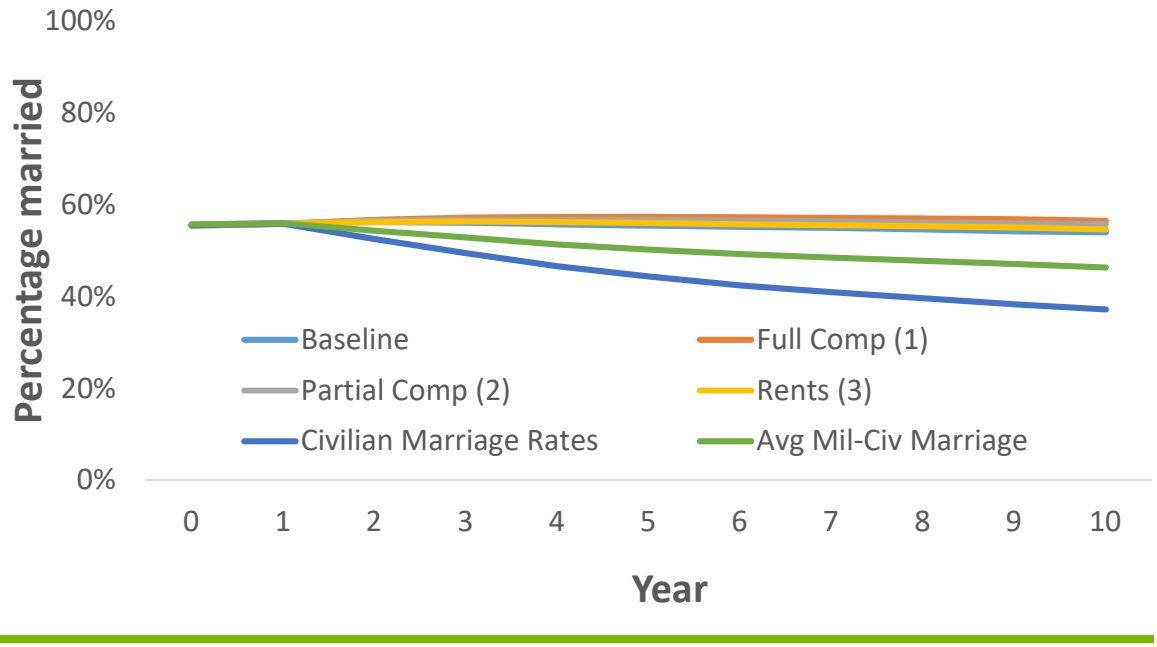
Figure 3 shows the predictions of our model for marriage rates of Navy enlisted Sailors under the three SSS implementation scenarios.

Our force inventory model predicts little change in the overall enlisted marriage rate in any of the three SSS implementation scenarios. In fact, for the first two scenarios (full compensation and partial compensation), our model predicts small increases over the next five years in the proportion of enlisted Sailors who are married. At the five-year point, for example, the baseline projection is for about 55 percent of enlisted Sailors to be married (about the same as now), while under the full compensation and partial compensation SSS implementation scenarios the percentage of enlisted Sailors who are married is projected to increase to about 57 percent. The intuition behind these projections is that, under these two SSS implementation scenarios,

[26] Note that this 2 percent effect is at the low end of the range of marriage effects analyzed in Table 9 and Table 10 (1 to 15 percent). This reflects our best assessment of the likely size of the effect of pay changes on marriage rates.

some Sailors (those currently not receiving BAH) will see relatively large pay increases, which will drive up marriage rates faster than the marriage rate reductions due to the pay reductions to other servicemembers. Even under the third scenario, partial compensation with housing rents charged to those currently not receiving BAH (which would reduce much of those pay increases), our model predicts that the percentage of enlisted Sailors who are married will remain about the same as under the current pay structure. The reason for this is that pay reductions under this scenario, especially for those not currently receiving BAH, are concentrated at the middle and senior levels, where the effects of income and marriage are assumed to be smaller.

Figure 3. Navy enlisted marriage rates under SSS scenarios



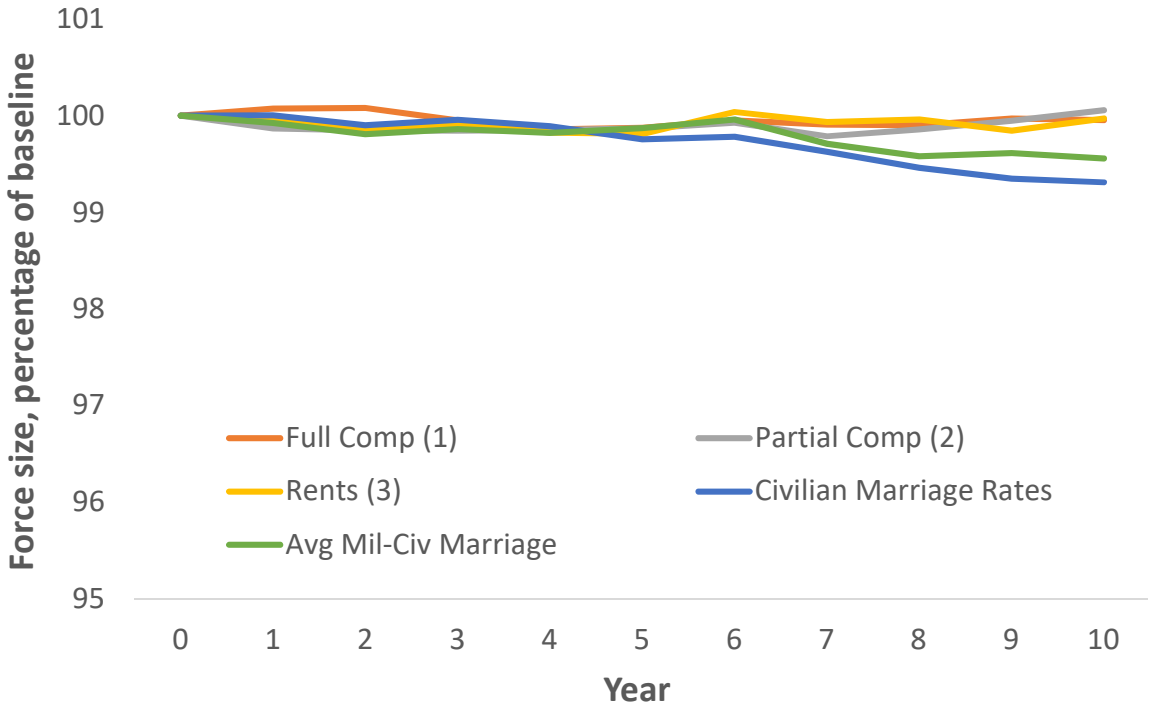
Source: CNA.

It's possible that we are underestimating the effects of moving to an SSS on enlisted marriage behavior. To account for this possibility, we also consider the two additional scenarios in which an SSS drives military marriage rates down either to civilian levels (labeled "civilian marriage rates" in Figure 3) or to an average of current civilian and military marriage rates ("average military-civilian marriage rates" in Figure 3). Under the "civilian marriage rates" scenario, the model projects the percentage of enlisted Sailors who are married to fall from 55 percent to 44 percent over five years. Under the "average military-civilian marriage rates" scenario, the percentage of enlisted Sailors who are married would fall to 50 percent over the five-year forecast. We can use these latter two scenarios to analyze the effects on force size for

potentially larger changes in marriage behavior than predicted under the three SSS implementation scenarios.

Figure 4 shows deviations from baseline force size for Navy enlisted Sailors, under the three SSS implementation scenarios and the two alternative scenarios (civilian marriage rate and average-civilian-military marriage rate).

Figure 4. Navy enlisted force size, deviations from baseline under SSS scenarios



Source: CNA.

Our force inventory model projects relatively small changes in Navy enlisted force size due to changes in marriage behavior under the SSS implementation scenarios. For the full and partial compensation scenarios, over a five-year forecast, the model projects that the number of Navy enlisted would be less than 400 fewer than under the baseline scenario (compared to a baseline inventory of about 277,000 Navy enlisted Sailors). For the partial compensation scenario with rents, the number of Navy enlisted is projected to be only about 500 fewer than under the baseline scenario. Even under the civilian marriage rate scenario, which assumes the largest effects of an SSS on marriage behavior, at the five-year point the number of Navy enlisted Sailors is projected to be only about 700 fewer than baseline, and only about 2,000

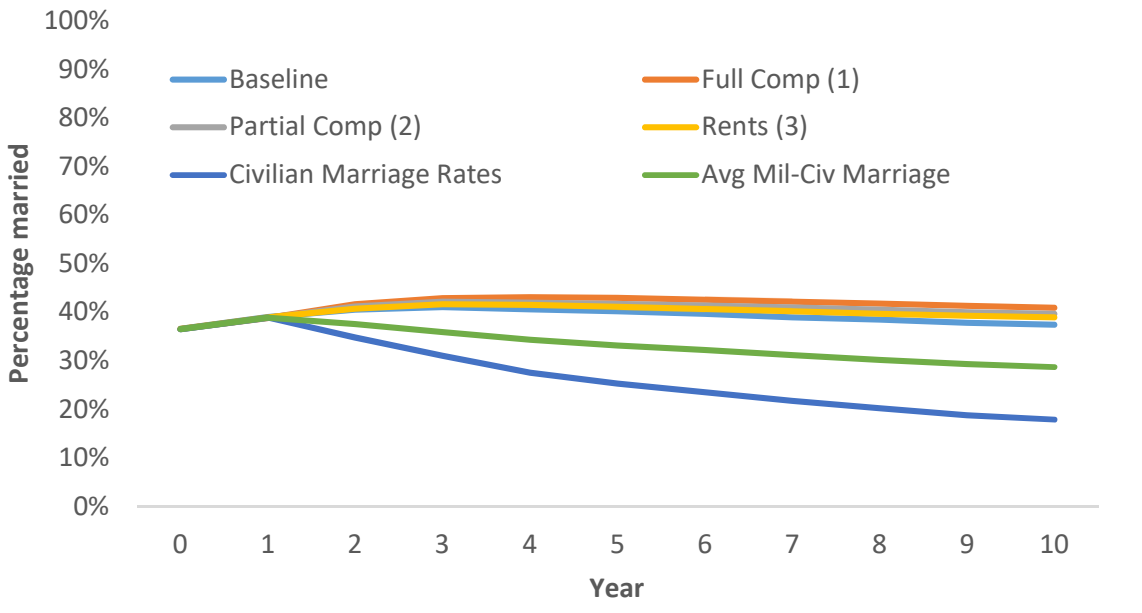
fewer at the 10-year point (less than a 1 percent deviation from baseline). Overall, then, the effects of changes in marriage behavior on the number of Navy enlisted Sailors appear to be small, even under the most extreme assumptions.

The intuition for this result is, first, that the effect of even relatively large changes in marriage behavior appear to have only small effects on retention. The calculations presented in Table 9, for example, suggest that even relatively large assumptions about the effects of income on marriage behavior result in reductions in retention probability on the order of 3 to 4 percent for enlisted (and this is probably an upper bound on the effect's size). In addition, the size of the effects of income on marriage behavior, and of marriage behavior on retention, are not uniform, but rather vary by servicemember characteristics. Changes in income tend to have the strongest effects for younger and more junior enlisted; mid-grade senior enlisted are likely to be affected less by SSS-related pay changes, which mutes any effect for the force as a whole.

Marine Corps

Figure 5 shows model results for the marriage rates of enlisted Marines under the three SSS implementation scenarios.

Figure 5. Marine Corps enlisted marriage rates under SSS scenarios

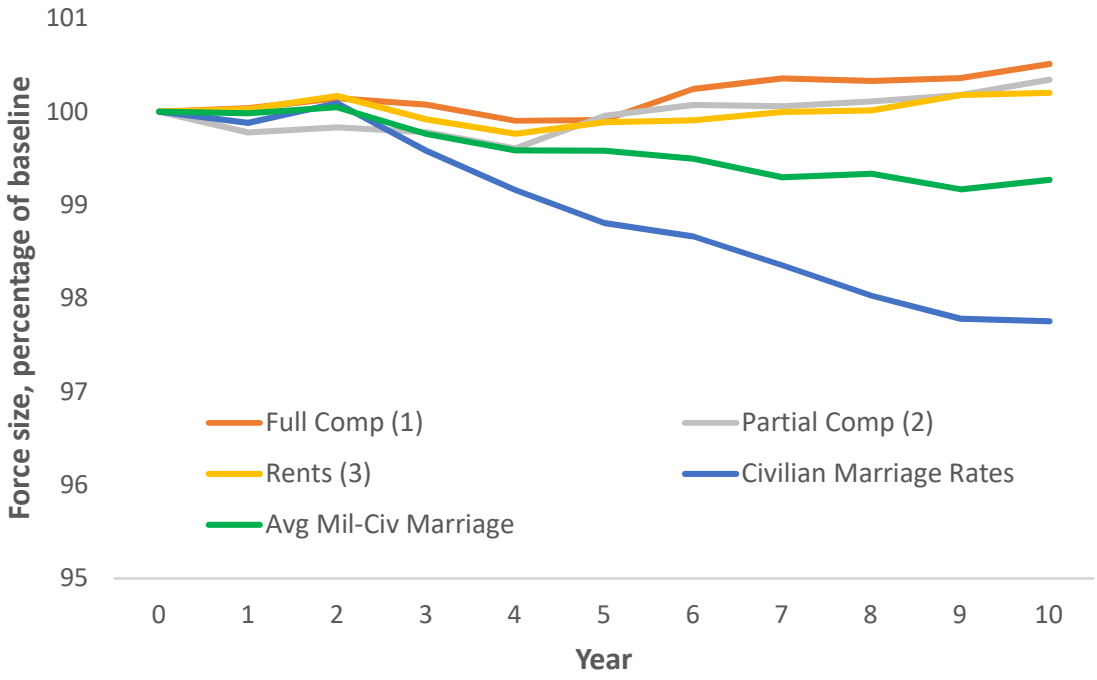


Source: CNA.

As with Navy enlisted, our model predicts only small changes in the overall Marine Corps enlisted marriage rate resulting from any of the three SSS implementation scenarios. The forecast percentage of Marines married after 10 years ranges from 39 percent under the partial compensation with rents scenario to 41 percent under the full compensation scenario (compared with a baseline of 37.5 percent).

Figure 6 shows deviations from baseline force size for enlisted Marines, under the three SSS implementation scenarios and the two alternative scenarios of civilian marriage rate and average-civilian-military marriage rate.

Figure 6. Marine Corps enlisted force size, deviations from baseline under SSS scenarios



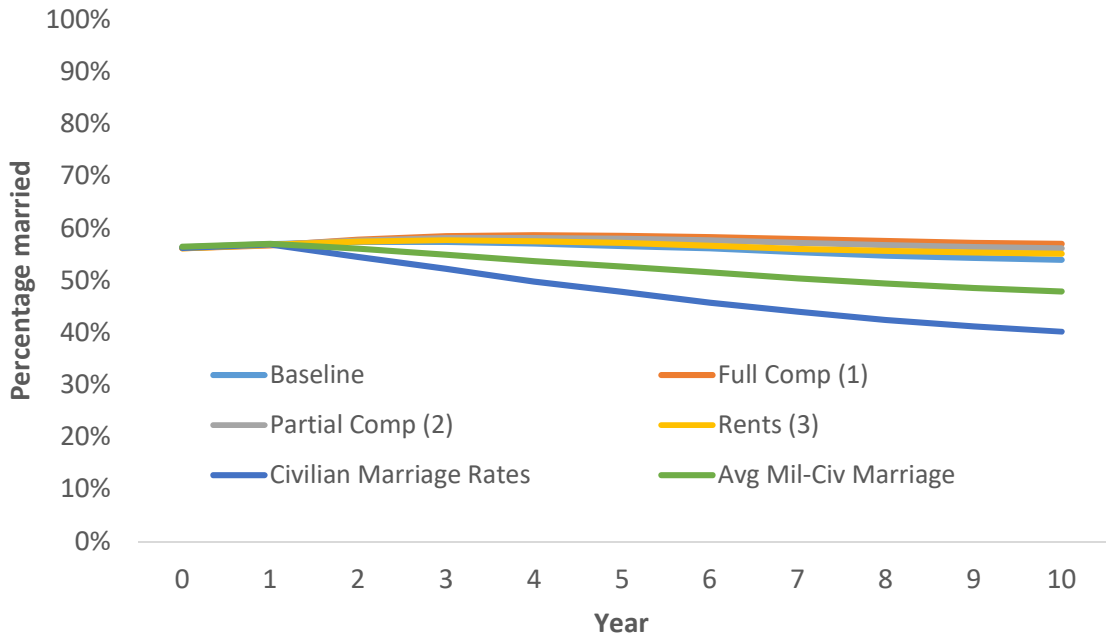
Source: CNA.

Again, our model projects relatively small changes in Marine Corps enlisted force size due to changes in marriage behavior under the SSS implementation scenarios. Under each of the three scenarios, the deviation of force inventory from baseline at the 10-year mark is one-half of 1 percent—a few hundred Marines relative to a baseline of about 160,000. The upper-bound civilian marriage rates scenario forecasts a deficit of about 2 percent (roughly 3,000 Marines) at the 10-year point relative to baseline, although it is unlikely that any of the SSS implementation scenarios would have this large an effect on marriage rates.

Air Force

Figure 7 shows model results for the marriage rates of Air Force enlisted under the three SSS implementation scenarios.

Figure 7. Air Force enlisted marriage rates under SSS scenarios

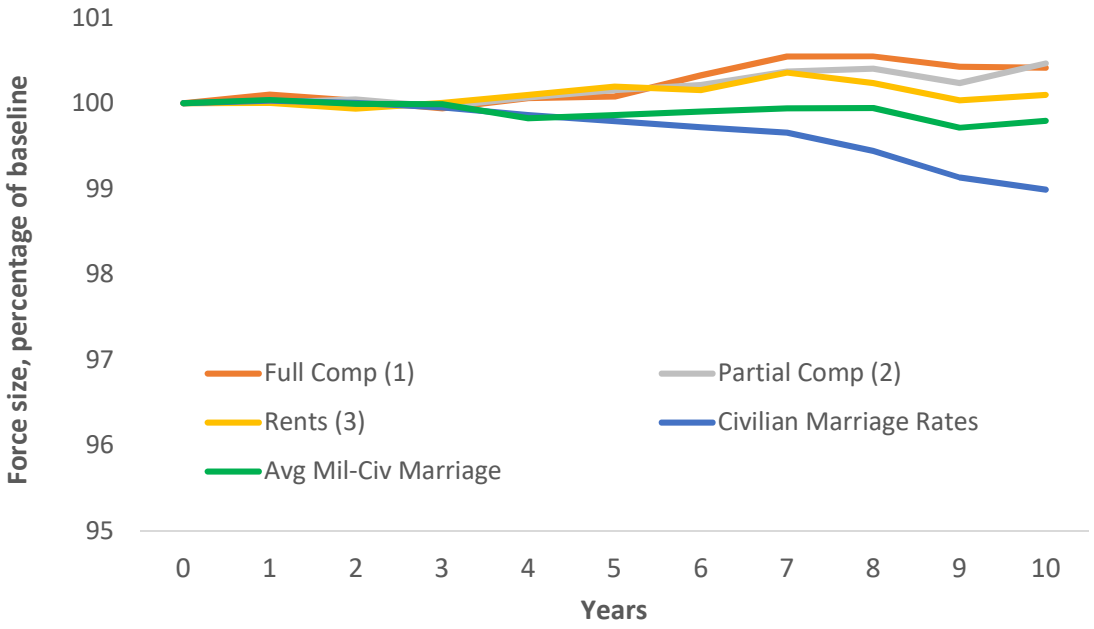


Source: CNA.

As before, our model suggests that none of the three SSS implementation scenarios results in enlisted Airmen marriage rates that are very different from baseline (about 54 percent at the 10-year point). The three SSS scenarios result in marriage rates ranging from 55 to 57 percent.

Figure 8 shows projected deviations from baseline force size for Air Force enlisted, under the three SSS implementation scenarios and the two alternative civilian marriage rate and average-civilian-military marriage rate scenarios.

Figure 8. Air Force enlisted force size, deviations from baseline under SSS scenarios



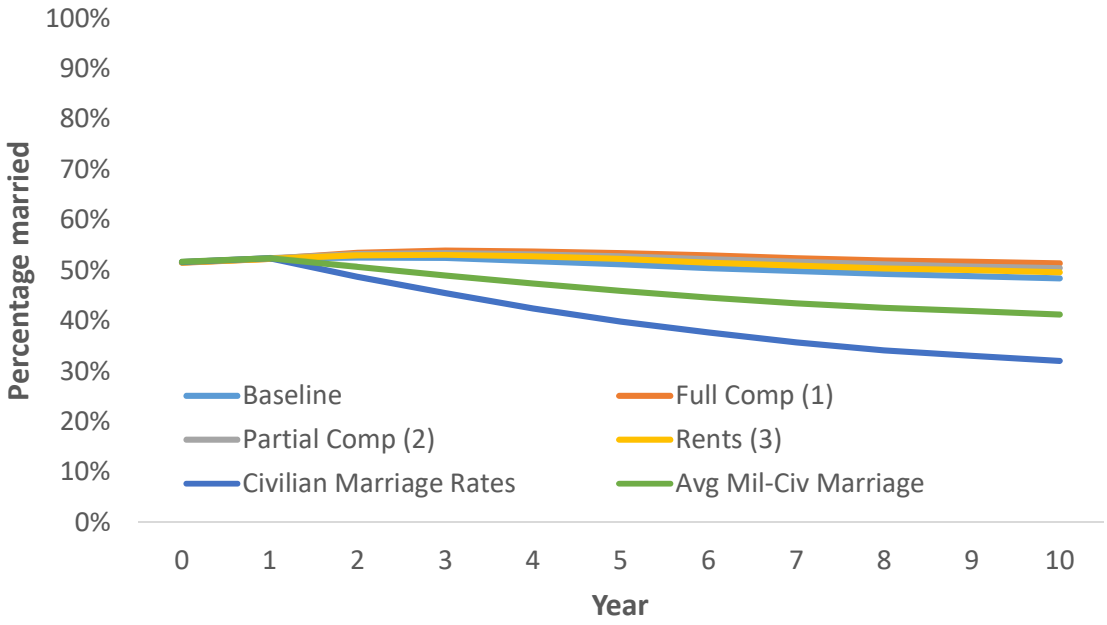
Source: CNA.

Under each of the three SSS scenarios, the deviation of force inventory from baseline at the 10-year mark is actually positive, but small (one-half of 1 percent or less—less than 1,000 Airmen relative to a baseline of about 260,000). The upper-bound civilian marriage rate scenario forecasts a potential deficit of about 1 percent (roughly 2,000 Airmen) at the 10-year point relative to baseline, although the effects from SSS implementation would likely be smaller than this.

Army

Figure 9 shows model results for the marriage rates of Army enlisted under the three SSS implementation scenarios.

Figure 9. Army enlisted marriage rates under SSS scenarios

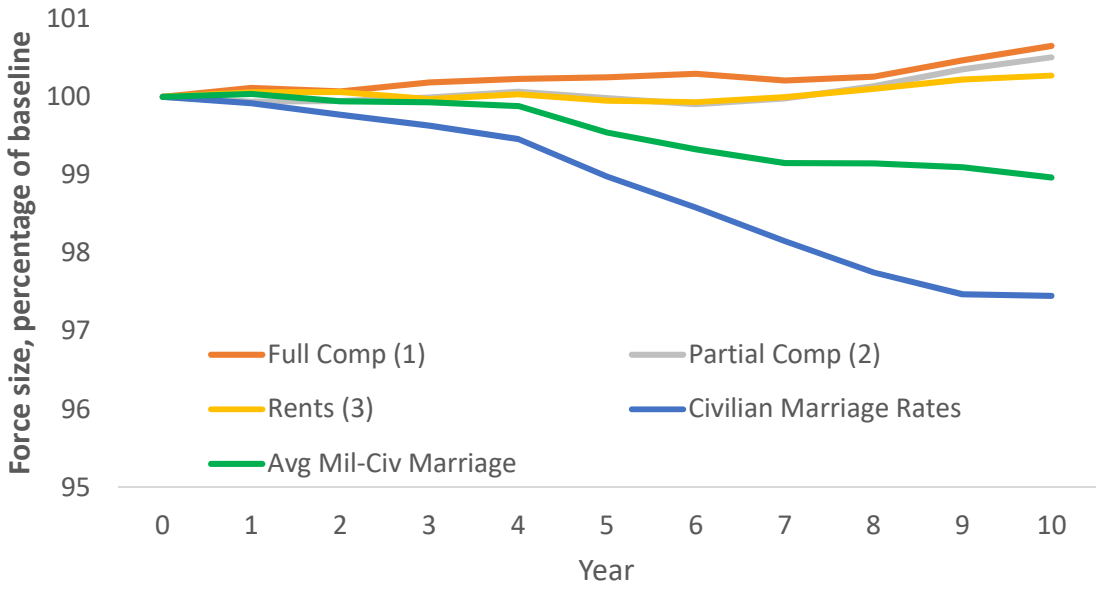


Source: CNA.

The model's results here are similar to those for the Navy, Marine Corps, and Air Force—a relatively small effect of any of the three SSS implementation scenarios on Army enlisted Soldier marriage rates. The marriage rate at the 10-year mark under each of the three SSS implementation scenarios ranges from 50 to 51 percent, which deviates little from the baseline of 48.5 percent.

Figure 10 shows the potential effects of these changes in marriage behavior on the projected deviations from baseline force size for Army enlisted, under the three SSS implementation scenarios and the two alternative civilian marriage rate and average-civilian-military marriage rate scenarios.

Figure 10. Army enlisted force size, deviations from baseline under SSS scenarios



Source: CNA.

Again, the results are similar to those for Navy, Marine Corps, and Air Force enlisted—relatively small (and positive) deviations from baseline (ranging from 0.3 to 0.7 percent, or about 1,000 to 2,000 Soldiers at the 10-year mark) resulting from changes to marriage behavior under each of the three SSS implementation scenarios. The upper-bound civilian marriage rates scenario does result in a force size forecast of 2.5 percent below baseline (about 8,000 Soldiers) at the 10-year mark, although (to repeat) this is probably a larger effect than would actually be realized.

Officers

Overall, as with enlisted, the effects of the SSS scenarios on the percentage of officers married and the number of officers in the force appear to be small, even smaller than the effects for enlisted. Because the effects are small, we discuss the results for officers in Appendix D.

Summary

Overall, our model's implications are consistent for both enlisted and officers, and across all four services. Under any of the three SSS implementation scenarios we consider, the effects on marriage behavior and retention, and therefore projected force size, appear to be small.[27]

One reason for these results is the pattern of pay changes under an SSS. Under two scenarios (the full and partial compensation scenarios), servicemembers not currently receiving BAH will see relatively large pay increases, which will drive up marriage rates faster than the marriage rate reductions due to the pay reductions to other members. Under the third partial compensation with housing rents scenario, pay reductions are concentrated at the middle and senior levels, where the effects of income and marriage are assumed to be smaller.

Further, the effect of even relatively large changes in marriage behavior appear to have only small effects on retention, whereas the size of the effects of income on marriage behavior, and of marriage behavior on retention, vary by servicemember characteristics. Changes in income tend to have the strongest effects for younger and more junior enlisted. Mid-grade senior enlisted are likely to be affected less by SSS-related pay changes, which mutes any effect for the force as a whole. For all of these reasons, the effect of the SSS scenarios on marriage behavior and retention are small.

[27] These results may appear to conflict with our earlier estimate of a potential 3 to 4 percent reduction in enlisted retention resulting from the effects of SSS-related pay changes on marriage behavior (see Table 9, Table 10, and the associated discussion). We emphasize that the 3 to 4 percent figure is an *upper bound* on the potential effect; our best guess is that any actual effects would be a fraction of this upper bound.

Conclusion

This report presents our findings on the extent to which, under an SSS, changes in servicemember pay could affect retention and force size because of changes in military marriage behavior. Overall, we find that the effects of an SSS on servicemembers' marriage behavior probably will be small and that any changes to military retention and force inventories as a result of these changes in marriage patterns also will be small.

In our study, we calculated pay changes by paygrade for married and single servicemembers under three different SSS implementation scenarios:

1. **Full compensation**—a scenario in which basic pay is increased to fully compensate for the loss of BAH (at the without-dependents level), BAS, and the tax advantage
2. **Partial compensation**—a scenario in which the increases in basic pay associated with the first scenario are reduced to achieve cost neutrality for the federal government
3. **Partial compensation with housing rents**—a scenario in which the military would establish charges for military-provided housing to reduce the large pay gains that servicemembers not currently receiving BAH (e.g., those living on base) would receive under the first two scenarios

These calculations show that, under scenarios 1 and 2—full compensation and partial compensation—servicemembers not currently receiving BAH will receive large pay increases (both married and single). Of those who do receive pay decreases, married junior enlisted servicemembers would receive the largest percentage reductions. Under scenario 3—partial compensation-housing rents—the large gains for most non-BAH recipients would be eliminated. Notably, even though an SSS would eliminate the increase in pay that servicemembers with dependents currently receive under BAH, married and single servicemembers tend to be treated similarly in each of the three scenarios.[28]

Our literature review and data analysis do find links between the level of compensation and marital status (for civilians), and between marital status and military retention. The literature supports a marriage-bar hypothesis that income increases are associated with increases in marriage rates, but only up to a certain level (usually associated with a local community median income level). Both the literature and our own data analysis support the idea that

[28] The largest differences are between those who currently receive BAH (who tend to receive pay decreases on the order of 10 to 15 percent under the two partial compensation scenarios) and those who do not (who stand to receive compensation increases of 20 to 40 percent under the partial compensation scenario).

marital status has a positive effect on retention, in which the effects are strongest for men and strongest early in a servicemember's career. Our force inventory modeling analysis, however, suggests that the effects of the pay changes under any of the three SSS implementation scenarios on the percentage of military servicemembers who are married, and the resulting changes in force size, will be relatively small (probably less than 1 percent of baseline force inventories).

There are a number of reasons why the effects of an SSS on force inventories due to changes in marriage behavior might be limited. One reason is the pattern of pay changes under an SSS. The largest differences in how servicemembers are treated under an SSS are not between married and single members, but rather between those who currently receive BAH and those who do not. Under the first two scenarios (full compensation and partial compensation), servicemembers who do not currently receive BAH will receive large pay increases under an SSS. These pay increases actually could increase incentives for these members to marry, thus counteracting any reduction in marriage rates among those receiving pay reductions. With the possible exception of junior enlisted, it is not clear that married servicemembers will be at a significant pay disadvantage relative to single under an SSS.

A second reason why the effects of an SSS on marriage rates (and through marriage rates, on retention and force size) might be relatively limited is that not all servicemembers respond to pay changes in the same way. The effect of pay on marital status, and of marital status on retention, are largest for men and for servicemembers early in their careers. For mid-career or senior servicemembers, and for women, the effects are small to nonexistent (and in the case of female officers, may actually work in the opposite direction with respect to the effect of marital status on retention).

Finally, we considered a combined effect—the combination of the effect of compensation on marriage behavior and the effect of marriage behavior on retention. As we showed in Table 9 and Table 10, combining the two effects can result in an overall effect that is relatively small, even when the individual effects appear to be large.

Note that this study is not a comprehensive analysis of the potential effects of an SSS on military retention. We are focusing on retention changes induced by changes in marriage behavior. There may be additional retention effects of an SSS that we do not consider here. Our findings, however, indicate that marriage-induced effects on retention from an SSS are likely to be small, which means that the need for changes to recruiting and retention policies intended to counteract such effects should be limited.

Appendix A: Regular Military Compensation

This appendix provides information about how current regular military compensation (RMC) varies according to a servicemember's marital status.

Table 11 shows, by paygrade, average monthly BAH rates for servicemembers with and without dependents for FY 2019. Note that these rates represent averages across locations and do not include the location-specific component of BAH payments. Currently, the BAH payment differential between single and married servicemembers ranges from 10 to 31 percent, depending on rank. The largest differentials go to junior enlisted in paygrades E-1, E-3, and E-4 and to warrant officers in paygrade W-1.

Table 11. Monthly BAH rates, FY 2019

Paygrade	Monthly BAH rates		Difference ($/month)	Pct. difference
	Without dependents	With dependents		
Commissioned officers				
JCS/CC	$2,387	$2,831	$444	19%
O-10	$2,387	$2,831	$444	19%
O-9	$2,387	$2,831	$444	19%
O-8	$2,387	$2,831	$444	19%
O-7	$2,387	$2,831	$444	19%
O-6	$2,369	$2,724	$355	15%
O-5	$2,203	$2,605	$402	18%
O-4	$2,102	$2,379	$277	13%
O-3	$1,855	$2,058	$203	11%
O-2	$1,609	$1,781	$172	11%
O-1	$1,434	$1,638	$204	14%
O-3E	$1,945	$2,232	$287	15%
O-2E	$1,796	$2,092	$296	16%
O-1E	$1,697	$1,981	$284	17%
Warrant officers				
W-5	$2,020	$2,221	$201	10%
W-4	$1,873	$2,148	$275	15%
W-3	$1,790	$2,050	$260	15%
W-2	$1,682	$1,949	$267	16%

Paygrade	Monthly BAH rates		Difference ($/month)	Pct. difference
	Without dependents	With dependents		
W-1	$1,280	$1,642	$362	28%
Enlisted				
SEA	$1,840	$2,165	$325	18%
E-9	$1,840	$2,165	$325	18%
E-8	$1,765	$2,026	$261	15%
E-7	$1,638	$1,939	$301	18%
E-6	$1,601	$1,895	$294	18%
E-5	$1,516	$1,699	$183	12%
E-4	$1,259	$1,552	$293	23%
E-3	$1,274	$1,593	$319	25%
E-2	$1,311	$1,473	$162	12%
E-1 >4	$1,143	$1,502	$359	31%
E-1 <4	$1,143	$1,502	$359	31%

Source: Selected Military Compensation Tables, 2019.
Note: These rates represent averages across locations and do not include the location-specific component of BAH payments.

Overall, these cross-location BAH differentials result in RMC differentials of about 5 percent for married enlisted servicemembers and 1 percent for married officers. Table 12 displays these cross-location RMC differences by paygrade. The largest marriage differential is received by married junior enlisted in paygrades E-1 to E-4. As before, these figures represent cross-location averages and do not incorporate the location-specific component of BAH.

Table 12. Annual difference in RMC, married versus single servicemembers, FY 2019

Pay-grade	Common components		Single			Married			RMC difference	
	Basic pay	BAS	BAH	Tax ad-vantage	RMC	BAH	Tax ad-vantage	RMC	Total/ year	Pct.
Commissioned officers										
O-10	$189,601	$3,053	$28,644	$15,835	$237,133	$33,972	$11,608	$237,234	$101	0%
O-9	$188,329	$3,032	$28,452	$15,729	$235,542	$33,744	$11,530	$236,635	$1,093	0%
O-8	$180,331	$3,053	$28,644	$15,388	$227,415	$33,972	$11,367	$228,722	$1,307	1%
O-7	$156,746	$3,053	$28,644	$13,019	$201,462	$33,972	$10,746	$204,516	$3,054	2%
O-6	$135,118	$3,053	$28,428	$10,512	$177,111	$32,688	$10,079	$180,938	$3,827	2%
O-5	$108,992	$3,053	$26,436	$9,309	$147,790	$31,260	$9,596	$152,901	$5,111	3%
O-4	$91,706	$3,053	$25,224	$8,803	$128,786	$28,548	$7,422	$130,729	$1,943	2%
O-3	$70,669	$3,053	$22,260	$7,335	$103,317	$24,696	$4,010	$102,428	($889)	-1%
O-2	$54,740	$3,053	$19,308	$6,169	$83,269	$21,372	$3,450	$82,615	($654)	-1%
O-1	$39,210	$3,053	$17,208	$4,116	$63,587	$19,656	$4,093	$66,012	$2,425	4%
O-3E	$85,628	$3,053	$23,340	$8,052	$120,072	$26,784	$6,143	$121,608	$1,536	1%
O-2E	$67,034	$3,053	$21,552	$7,017	$98,656	$25,104	$3,840	$99,031	$374	0%
O-1E	$54,637	$3,053	$20,364	$6,554	$84,608	$23,772	$3,831	$85,293	$686	1%
Warrant officers										
W-5	$106,178	$3,030	$24,059	$8,552	$141,818	$24,058	$7,536	$140,802	($1,017)	-1%
W-4	$89,331	$3,053	$22,476	$7,874	$122,734	$25,776	$6,334	$124,494	$1,759	1%
W-3	$74,356	$3,053	$21,480	$7,179	$106,068	$24,600	$4,307	$106,315	$248	0%
W-2	$60,307	$3,053	$20,184	$6,459	$90,002	$23,388	$3,800	$90,547	$545	1%
W-1	$53,641	$3,053	$15,360	$5,001	$77,055	$19,704	$3,473	$79,871	$2,816	4%
Enlisted										
E-9	$81,402	$4,433	$22,080	$7,978	$115,893	$25,980	$5,764	$117,579	$1,686	1%
E-8	$64,055	$4,432	$21,178	$7,270	$96,936	$24,310	$3,932	$96,730	($206)	0%
E-7	$55,165	$4,433	$19,656	$6,767	$86,020	$23,268	$3,917	$86,782	$762	1%
E-6	$44,737	$4,433	$19,212	$5,780	$74,162	$22,740	$4,976	$76,886	$2,725	4%
E-5	$35,785	$4,433	$18,192	$4,344	$62,754	$20,388	$5,147	$65,753	$2,999	5%
E-4	$29,027	$4,433	$15,108	$2,724	$51,291	$18,624	$4,615	$56,698	$5,407	11%
E-3	$24,300	$4,433	$15,288	$2,689	$46,710	$19,116	$4,255	$52,104	$5,394	12%
E-2	$22,608	$4,433	$15,732	$2,750	$45,522	$17,676	$4,092	$48,809	$3,286	7%
E-1 >4	$20,171	$4,433	$13,716	$2,436	$40,755	$18,024	$4,121	$46,749	$5,994	15%
E-1 <4	$18,648	$4,433	$13,716	$2,401	$39,198	$18,024	$3,910	$45,015	$5,817	15%

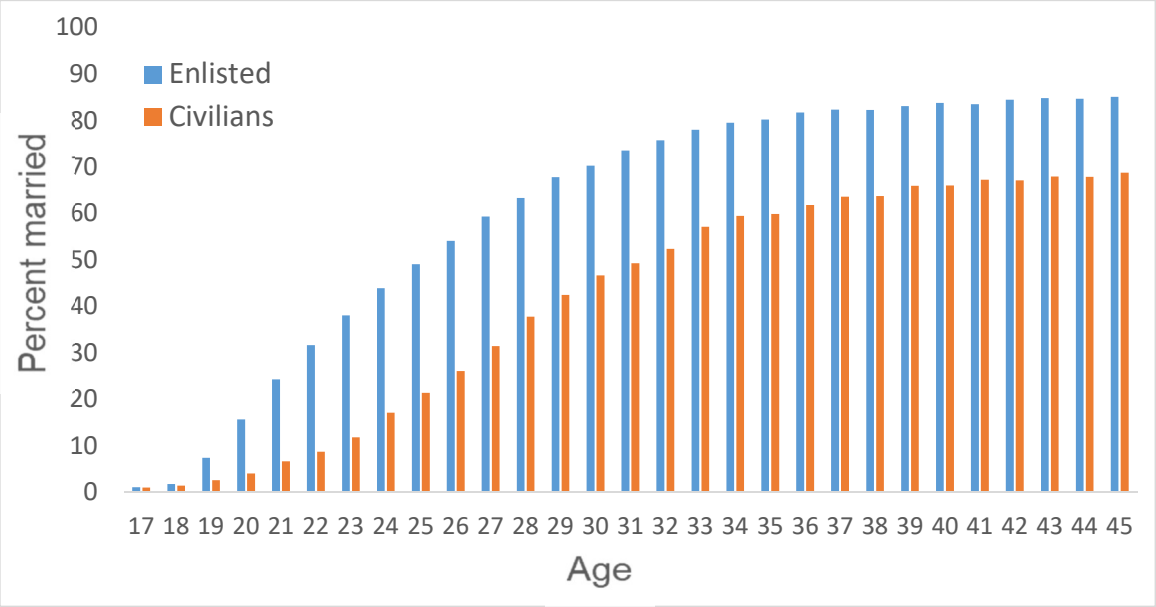
Source: Selected Military Compensation Tables, 2019.

Note: These rates represent averages across locations and do not include the location-specific component of BAH payments.

Appendix B: Civilian and Military Marriage Rates

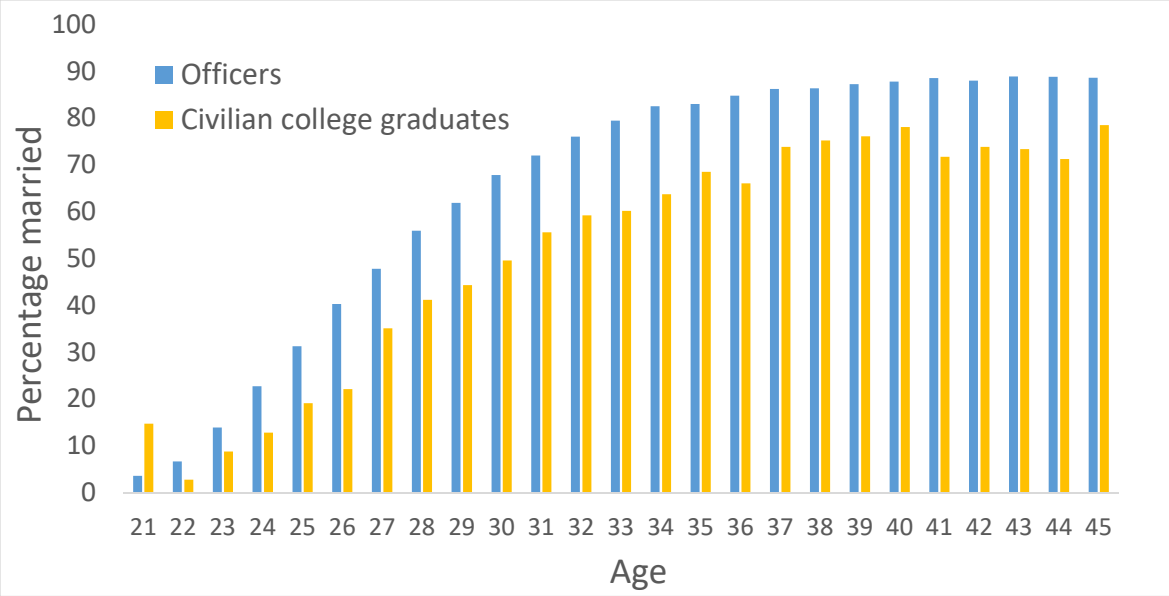
In this appendix, we provide additional information on differences in military and civilian marriage behavior. Figure 11 and Figure 12, respectively, show the percentages of enlisted members and officers who were married at the end of FY 2017 by age, compared with their civilian counterparts. Compared with civilians, servicemembers—both enlisted and officers—generally marry at younger ages and at higher rates. For example, among 23-year-old male enlisted servicemembers, more than one-third are married, compared with less than one-sixth for civilian men of this age. What drives this phenomenon? It may be that the services attract personnel who have a higher-than-average propensity to marry. Alternatively, the culture of the military or the compensation offered to servicemembers may encourage marriage.

Figure 11. Marriage rates for enlisted, compared with civilian counterparts



Source: Population Representation in the Military Services - Fiscal Year 2017.

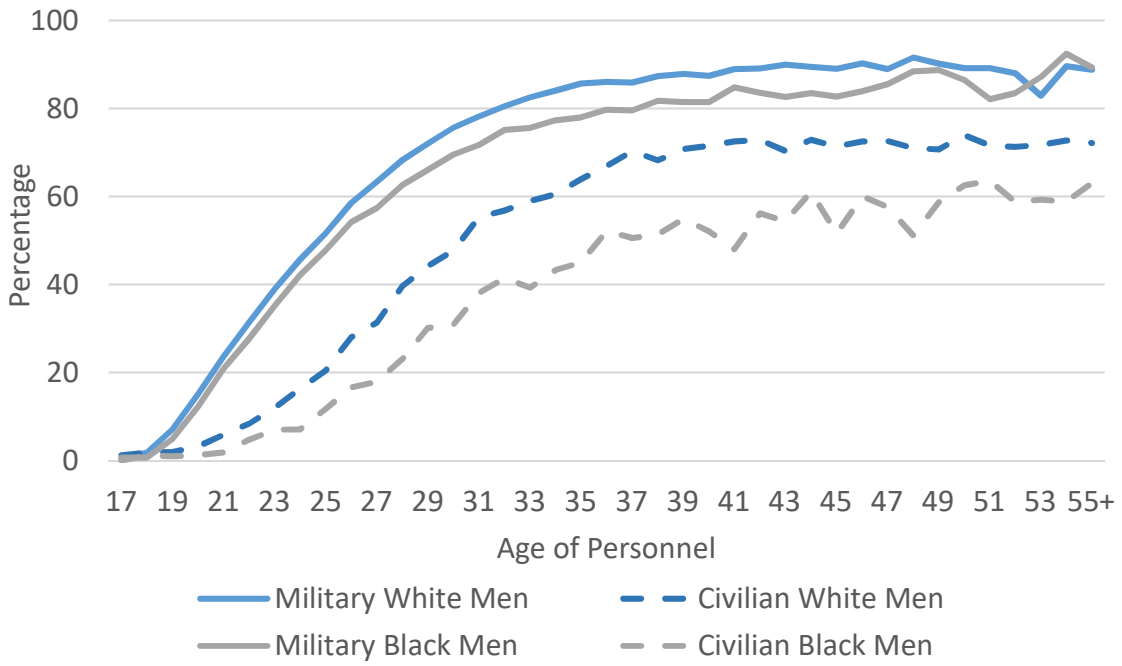
Figure 12. Marriage rates for officers, compared with civilian counterparts



Source: Population Representation in the Military Services - Fiscal Year 2017.

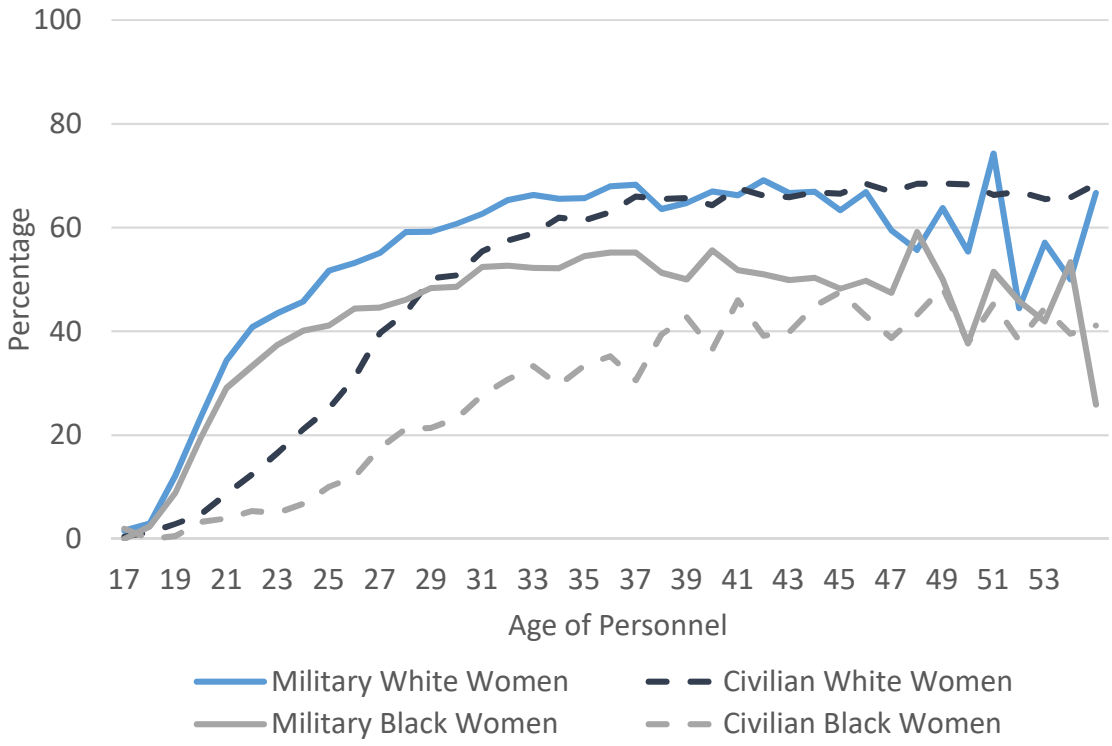
Another difference between military and civilian marriage patterns is a much smaller racial gap in the armed forces, as shown in Figure 13 and Figure 14. As Figure 13 illustrates, there is little difference between white male and black male servicemembers in the likelihood of being married. In the civilian sector, however, white men are much more likely to be married than black men. There continues to be a racial gap among women in the services, but this difference is substantially smaller than among civilians (see Figure 14).

Figure 13. Marriage rates for men by age and race, military and civilian, FY 2016



Source: Population Representation in the Military Services - Fiscal Year 2017.

Figure 14. Marriage rates for women by age and race, military and civilian, FY 2016



Source: Population Representation in the Military Services - Fiscal Year 2017.

Appendix C: Summary of Literature on Compensation, Marriage, and Retention

This appendix provides brief summaries of the quantitative findings of several important studies of the relationships between compensation, marriage, and retention in the military.

Table 13 summarizes the results of studies linking income and marriage behavior. Overall, the literature supports the marriage-bar hypothesis that income matters for marriage behavior only up to a certain income level. Also, income effects on marriage may be stronger for couples who already are cohabitating.

Table 13. Summary of income and marriage studies

Authors	Group studied	Findings
Schneider (2011)	Sample of dual household and cohabitating couples	Total income model: For every $10,000 of additional income, marriage likelihood increases by 1 percent in any given year (logit specification) [21].
Sassler and McNally (2003)	Sample of cohabitating couples from National Survey of Families and Households	Total income model: There is no correlation between cohabitating couples' earnings, their propensity to marry, or their likelihood of divorce [46].
Watson and McLanahan (2011)	Sample of native-US-born non-Hispanic white men ages 25 to 34	Marriage-bar model: For income below marriage bar (local reference group median income), 10 pp higher income is associated with 2.4 pp greater marriage probability. For incomes above group median, there is no effect of income on marriage (linear probability specification) [42].
Ishizuka (2018)	Sample of cohabitating couples	Marriage-bar model: For income below marriage bar, 10 pp higher income is associated with an 8.4 pp greater probability of marriage. For income over the marriage bar, no significant effect (proportional hazards specification) [7].

Table 14 summarizes the literature on the relationship between marriage and retention. It shows a positive effect of marriage on retention that is strongest for men, strongest early in a servicemember's career, and tends to fade over time.

Table 14. Summary of marriage and retention studies

Authors	Service	Findings
Asch et al. (2010)	Army (enlisted)	Zone A reenlistment is 15 pp higher for Soldiers with a dependent [37].
Buddin (2005)	Army (enlisted)	Zone A reenlistment rate for married Soldiers is 7.8–16 pp higher than for unmarried Soldiers [38].
Hattiangadi et al. (2004)	Marine Corps (enlisted)	For Marines, Zone A reenlistment rate is 13.4 pp higher for married or those with dependents, Zone B is 11.8 pp higher, and Zone C is 5.1 pp higher [39].
Huff and Parcell (2015)	Navy (officers)	Conventional SWOs: Married men's retention rate is 3 pp higher. Nuclear field SWOs: Married men's retention rate is 9.5 pp higher than that of unmarried men [45].
Asch et al. (2012)	All (officers)	Married officers' retention rate is 5.3 pp higher at O-3 and 1.4 pp lower at O-5 than that of unmarried officers [36].

Table 15 summarizes the results of the literature on compensation and military retention.

Table 15. Summary of compensation and retention studies

Authors	Service	Findings
Basic pay		
Asch, Hosek, and Mattock (2013)	Army (enlisted)	For enlisted Soldiers at 4 YOS, 1 percent basic pay increase associated with 2.9 percent force size increase [47].
Hansen and Wenger (2002)	Navy (enlisted)	For Navy enlisted, a 1 percent basic pay increase associated with a 1.5 percent retention rate increase [48].
Hansen and Moskowitz (2006)	Navy (officers)	For Navy aviators, a 1 percent basic pay increase associated with a 0.55 percent retention rate increase [49].
Koopman (2010)	Navy (officers)	For Navy officers, a 1 percent basic pay increase associated with a 0.5 percent retention rate increase [50].
Retention pays		
Asch et al. (2010)	Air Force (enlisted)	1-level increase in SRB multiplier associated with: • 1.3 pp retention increase at Zone A • 1.4 pp retention increase at Zone B [37].
Asch et al. (2010)	Army (enlisted)	1-level increase in SRB multiplier associated with: • 8.9 pp retention increase at Zone A • 5.1 pp retention increase at Zone B [37].
Asch et al. (2010)	Navy (enlisted)	1-level increase in SRB multiplier associated with: • 2.5 pp retention increase at Zone A

Authors	Service	Findings
		• 0.9 pp retention increase at Zone B [37].
Huff et al. (2019)	Navy (enlisted)	1-level increase in SRB multiplier associated with 2.2 pp retention increase at Zone A [51].
Asch et al. (2010)	Marine Corps (enlisted)	1-level increase in SRB multiplier associated with: • 3.5 pp retention increase at Zone A • No retention increase at Zone B [37].
Quester et al. (2006)	Marine Corps (enlisted)	1-level increase in SRB multiplier associated with: • 2–3 pp retention increase at Zone A • 3.8–7.8 pp retention increase at Zone B [11].
Hattiangadi et al. (2004)	Marine Corps (enlisted)	1-level increase in SRB multiplier associated with: • 6.6 pp retention increase at Zone A • 7.2 pp retention increase at Zone B • 3.5 pp retention increase at Zone C [39].
Asch et al. (2013)	Navy (officers)	For SOF officers at 15–18 and 20–23 YOS, 25 percent increase in retention bonus associated with 3.7 percent force size increase [47].

Although the studies discussed here are only a small selection of the extensive literature on this topic, they confirm the following:

- Military and civilian pay levels significantly influence the retention decisions of both enlisted and commissioned officer servicemembers.
- Early-career servicemembers are more responsive to pay changes than are later career servicemembers.
- Pay decreases should be expected to cause a drop in retention in all services and among servicemembers of all levels. Though the studies covered here report their findings as the effect of a pay increase on retention, they also provide evidence that a reduction in pay would result in decreased retention. The size of the effect may change slightly when the policy change involves a reduction in pay since the marginal effect of pay on retention may vary across the range of pay.

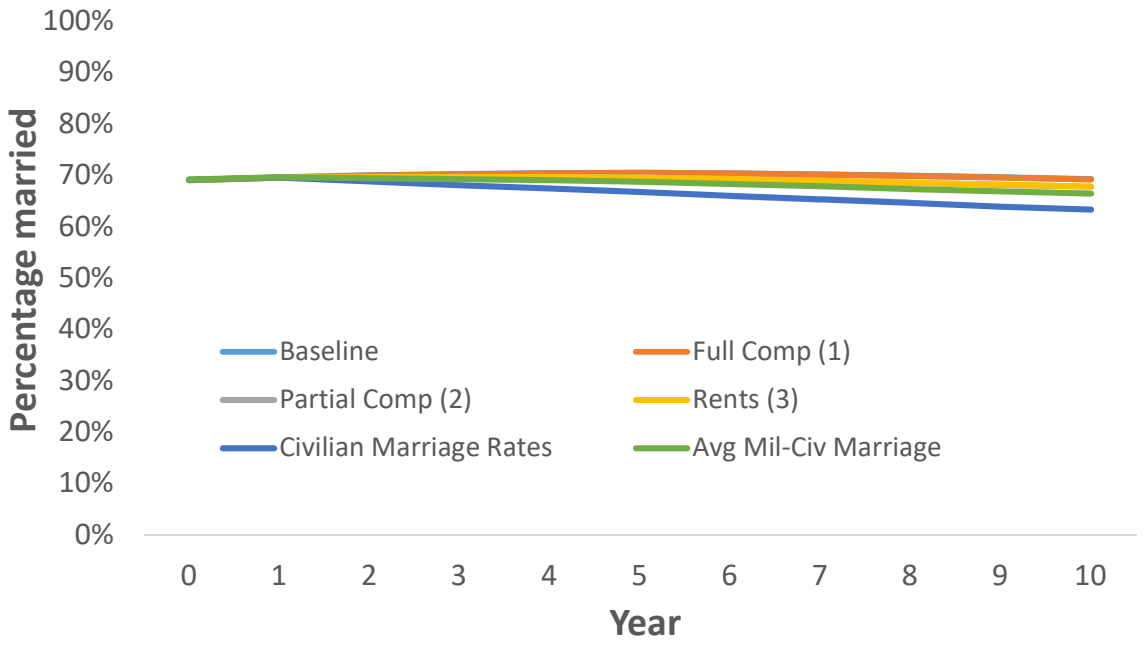
Appendix D: Force Inventory Model Results for Officers

In this appendix, we present model results for officers. Overall, as with enlisted, the effects of the SSS scenarios on the percentage of officers married and number of officers in the force appear to be small.

Navy

Figure 15 shows model results for marriage rates of Navy officers. The model predicts only small changes in officer marriage rates under any of the three SSS implementation scenarios.

Figure 15. Navy officer marriage rates under SSS scenarios

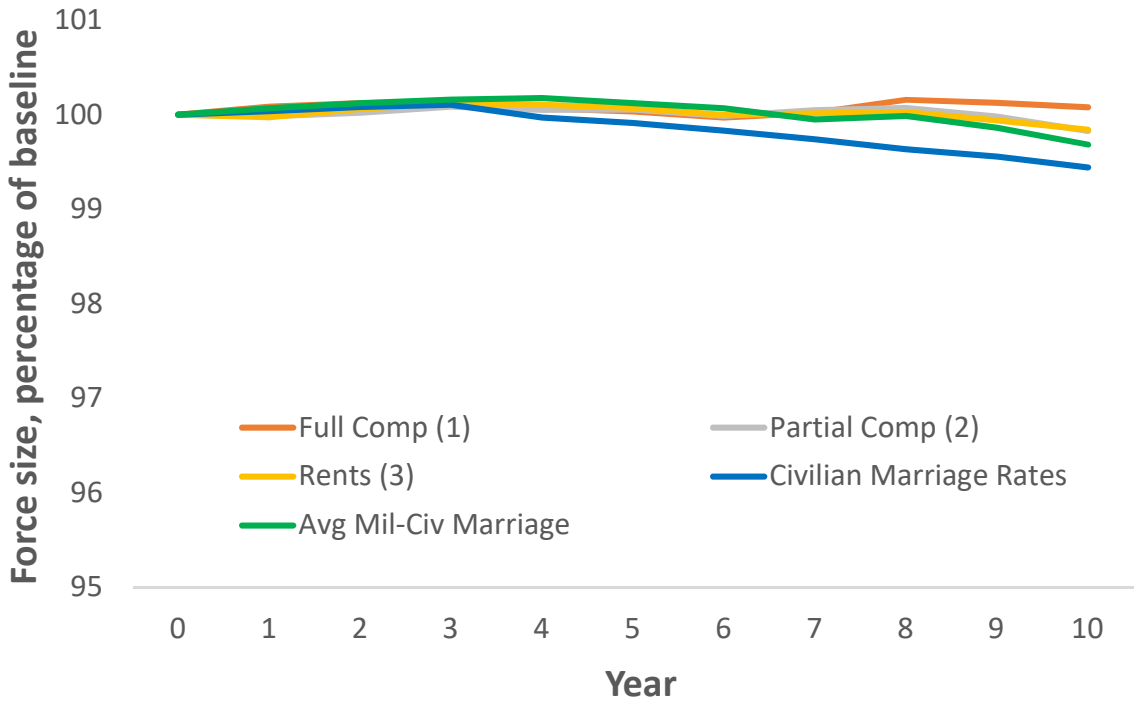


Source: CNA.

At the 10-year point, about 69 percent of Navy officers are forecast to be married under the full compensation scenario (about the same as the baseline model), while just less than 68 percent will be married under either of the two partial compensation scenarios (with or without rents), just over a 1 pp decrease, or about 2 percent lower than baseline. Under the civilian marriage rates scenario, the percentage of married officers would fall to about 63 percent.

Figure 16 shows model results for deviations from baseline in the number of Navy officers due to these changes in marriage behavior, again over a 10-year forecast period. As with enlisted, the deviation sizes are relatively small.

Figure 16. Navy officer force size, deviations from baseline under SSS scenarios



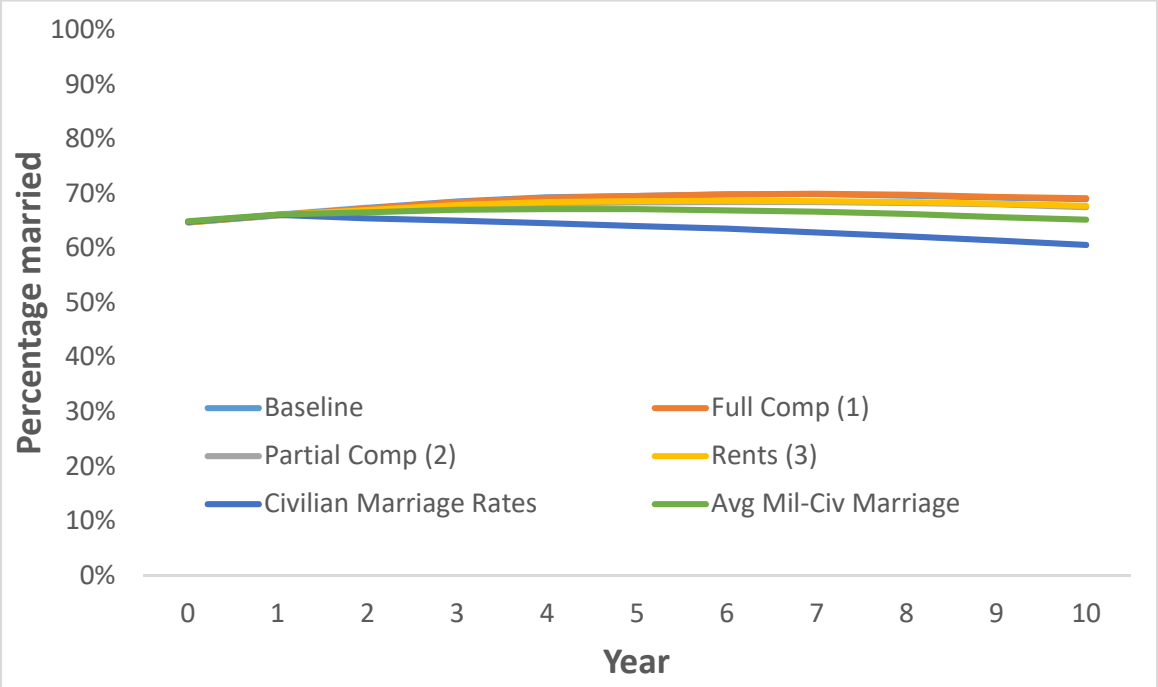
Source: CNA.

At the 10-year point, even under the most extreme civilian marriage rates scenario, the forecast for Navy officer force size is only about 0.5 percent below baseline (equivalent to just over 200 officers relative to a baseline of about 53,000). The deviations from baseline associated with the SSS implementation scenarios are even smaller, on the order of about 0.2 percent below baseline for the two partial compensation scenarios.

Marine Corps

Figure 17 shows model results for marriage rates of Marine Corps officers.

Figure 17. Marine Corps officer marriage rates under SSS scenarios

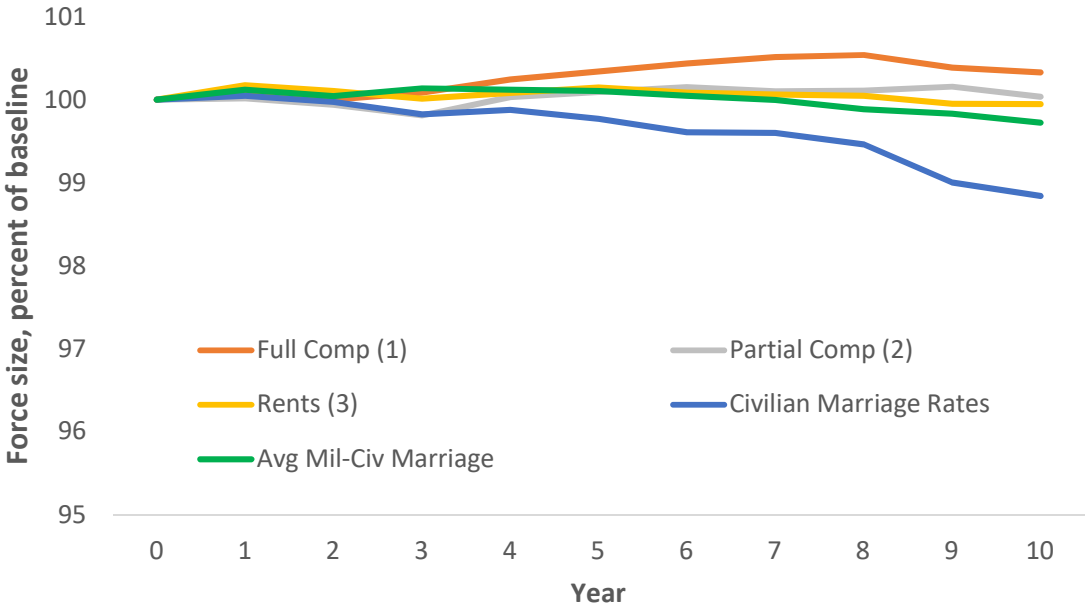


Source: CNA.

At the 10-year point, the percentage of Marine Corps officers forecast by the model to be married ranges from 68 to 69 percent compared to the baseline of 69 percent, so there is virtually no difference between marriage rates at baseline and under any of the three SSS implementation scenarios.

Figure 18 shows model results for deviations from baseline in the number of Marine Corps officers over a 10-year forecast period.

Figure 18. Marine Corps officer force size, deviations from baseline under SSS scenarios



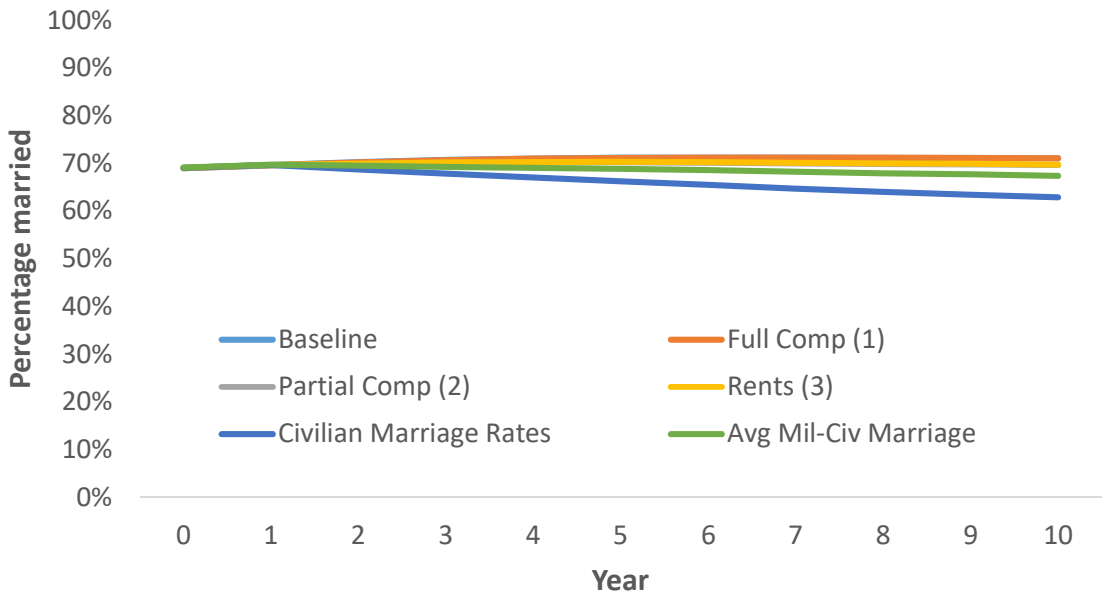
Source: CNA.

As would be expected from the negligible effects on marriage behavior, there is almost no deviation from baseline in Marine Corps officer forecasts under any of the three SSS implementation scenarios. Even under the upper-bound civilian marriage rates scenario, the model forecasts only about a 1-percent negative deviation relative to baseline (less than 200 officers relative to a baseline of about 19,000), further suggesting that the likely effects of the SSS scenarios considered here on Marine Corps officer inventory are likely to be small.

Air Force

Figure 19 shows the model's forecasts for Air Force officer marriage rates under the different SSS implementation scenarios.

Figure 19. Air Force officer marriage rates under SSS scenarios

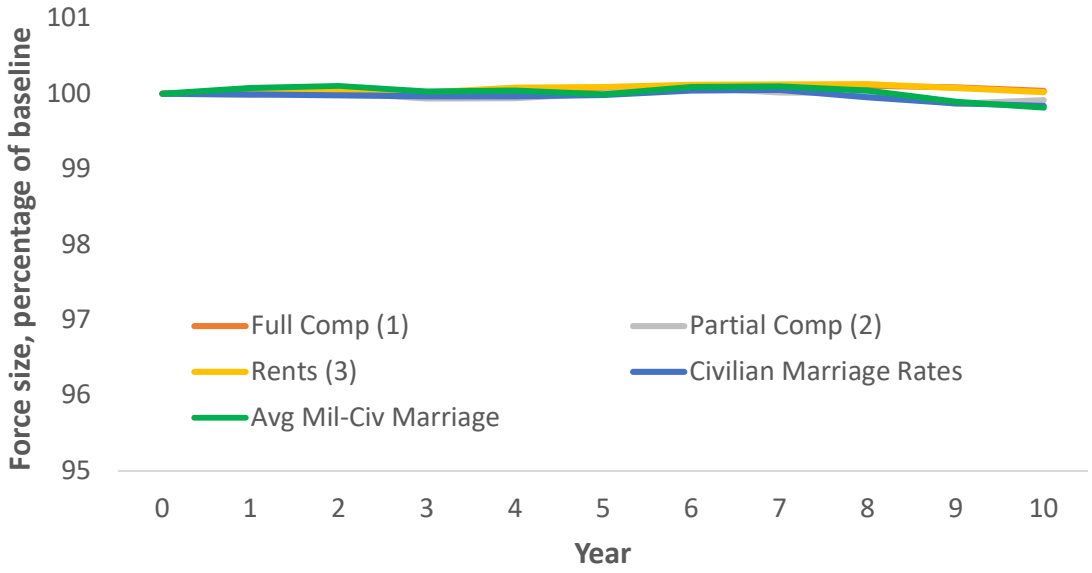


Source: CNA.

Again, there is very little difference between the model's baseline forecast for Air Force officers' marriage rate (about 71 percent) and the forecasts under the three SSS implementation scenarios (which range from 70 to 71 percent).

Figure 20 shows the model's results for force size with respect to Air Force officers.

Figure 20. Air Force officer force size, deviations from baseline under SSS scenarios



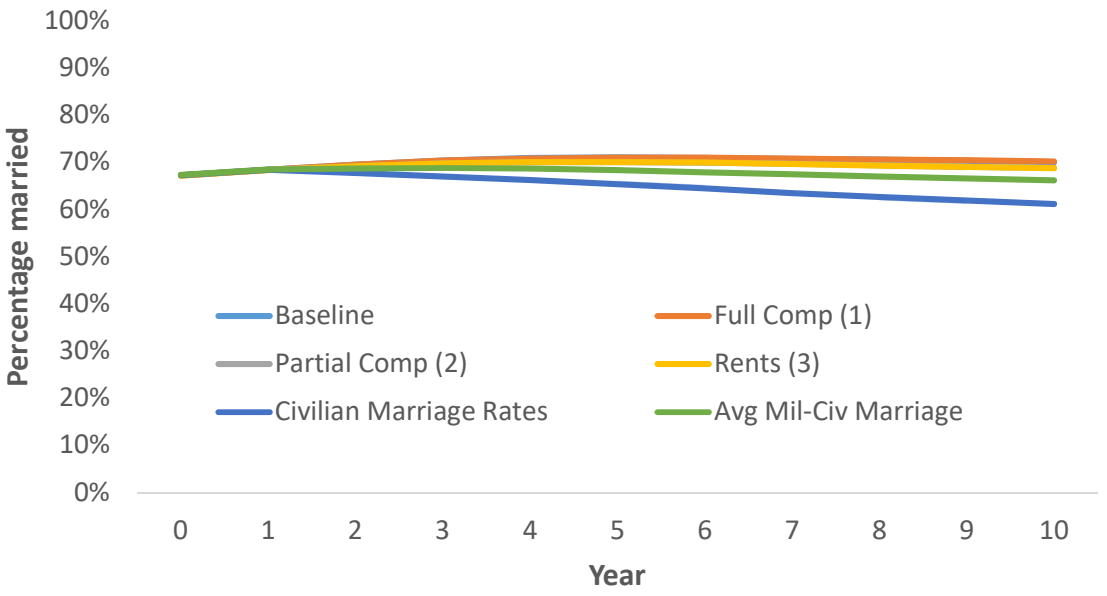
Source: CNA.

There is almost no deviation from the baseline Air Force officer force size forecast under any of the three SSS implementation scenarios. Even under the upper-bound civilian marriage rates scenario, there is almost no difference from the baseline forecast.

Army

Figure 21 shows the model's forecasts for Army officer marriage rates under the different SSS implementation scenarios.

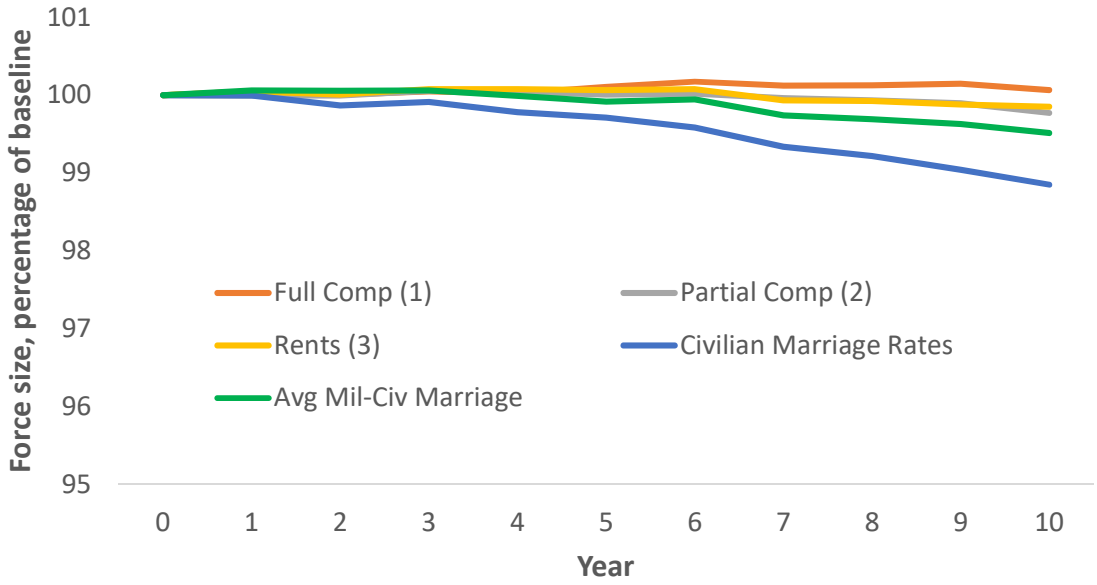
Figure 21. Army officer marriage rates under SSS scenarios



Source: CNA.

As before, there very little difference between the baseline forecast for Army officer marriage rate and those of any of the three SSS implementation scenarios. Figure 22 presents the model's forecasts for Army officer force size.

Figure 22. Army officer force size, deviations from baseline under SSS scenarios



Source: CNA.

There is very little deviation from baseline under any of the SSS implementation scenarios. The model forecasts for the two partial compensation scenarios a negative deviation of about 0.1 to 0.2 percent, the equivalent of 100 or 200 Soldiers relative to a baseline of about 78,000. Again, even for the upper-bound civilian marriage rates scenario, the model forecasts a negative deviation of about 1 percent below baseline (equivalent to less than 1,000 Soldiers).

Figures

Tables

Abbreviations

AFQT	Armed Forces Qualification Test
BAH	basic allowance for housing
BAS	basic allowance for subsistence
BRS	Blended Retirement System
CoL	cost of living
DMDC	Defense Manpower Data Center
DOD	Department of Defense
IDA	Institute for Defense Analyses
MSR	Minimum Service Requirement
NDAA	National Defense Authorization Act
OLS	ordinary least squares
pp	percentage point
QRMC	Quadrennial Review of Military Compensation
RMC	Regular Military Compensation
SSS	Single-Salary System
UIC	unit identification code
WO	warrant officer
YCS	years of commissioned service
YOS	years of service

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How a Single-Salary Compensation System Could Affect Privatized Military Housing

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with Peter Bernstein, George Tolley, Louise Collis, and Andrew Hong

DRM-2020-U-027359-Final

Abstract

If the military moves to a single-salary system (SSS), it would combine basic pay and allowances into a single, taxable compensation, with no differences regarding whether servicemembers have dependents. An SSS would mostly raise salaries for single servicemembers and reduce them for families, unless Congress substantially increased personnel outlays. We estimate a reduction in total family pay between 5 to 14 percent. Most of that reduction would come from removing tax advantages for allowances.

The director of the Quadrennial Review of Military Compensation asked CNA to examine the potential effects of an SSS on the military's privatized housing. We found that an SSS would pose serious challenges to the military's privatized family housing projects because it would eliminate the Basic Allowance for Housing (BAH) and reduce incomes for active-duty residents. Without BAH, all the current housing privatization agreements would require renegotiation. With reduced family incomes, the housing projects would need to decrease rents to keep their current resident demographics. We estimate the reduced rents would create aggregated annual losses to privatized housing projects of between $80 million to $210 million.

This work was performed under Federal Government Contract No. N00014-16-D-5003.

Cover image credit: Marine Corps photo by Cpl Alexander Mitchell

Approved by: **June 2020**

Anita Hattiangadi, Director
Marine Corps and Defense Workforce Program
Resources and Force Readiness Division

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Executive Summary

The President tasked the Thirteenth Quadrennial Review of Military Compensation (QRMC) with examining whether the military should move to a single-salary system (SSS). An SSS would combine basic pay and allowances into a single, taxable compensation with no differences in the amounts paid to single and married servicemembers.[1]

An SSS would have profound effects on many aspects of military life, including the services' privatized family housing projects. These projects are typically complex, long-term contractual agreements between the military, private developers, and lenders. All of these agreements peg rents for active-duty servicemembers to their Basic Allowance for Housing (BAH). Under an SSS, BAH would no longer be calculated, so all of these privatization agreements would require renegotiation.

Legal ramifications

Representatives from the services' general counsel offices disagreed about the difficulty of these renegotiations. The Army expected it would be challenging but feasible. The critical stakeholders would be the lenders. The Army projects have a few large lenders and many smaller ones. If deals could be reached with the larger lenders, that could set a template for the others.

The Air Force representatives argued that all Military Housing Privatization Initiative (MHPI) stakeholders would demand to renegotiate all provisions of the agreements. These simultaneous renegotiations could overwhelm their resources. The views of the Navy and Marine Corps were in between those of the other two services.

Eliminating BAH would affect more than those currently in the military. As part of its educational benefits, the Post-9/11 GI Bill, administered through the Department of Veterans Affairs, provides a housing benefit to students based on BAH rates for E5s with dependents. Most program beneficiaries qualify for a housing allowance, which accounts for the largest portion of expenditures.

[1] To be more precise, there must be no pay differences between servicemembers with or without dependents. We use the terms *with dependents*, *married*, and *families* synonymously.

Reduction in rental revenues

Unless federal outlays for military personnel are substantially increased, an SSS will result in lower total compensation for military families. We generated two alternative estimates for family compensation changes under an SSS. One required a fixed-dollar reduction in current pre-tax compensation to military families based on paygrade. The other alternative reduced current pre-tax pay and allowances by 2.6 percent for all military families. Both alternatives removed the current tax preferences for allowances, and both satisfied all the rules set down for an SSS.

We designed these alternatives to minimize income reductions to military families, while keeping federal outlays constant. Nevertheless, these alternatives would result in 5 to 14 percent cuts in Regular Military Compensation[2] (RMC) for military families depending upon paygrade and assignment location. Most of this reduction would be due to the lost tax advantage for current allowances.

Military families are the intended customer base for the privatized housing projects. If they have less income, they will be able to afford less rent. If the military services want to keep the current paygrade mix of residents in the family housing, then rents will have to decrease. Otherwise, these families will be forced to choose lower priced, lower quality housing in the community, and the privatized housing likely will have more senior and single servicemembers, along with more non-military tenants.

The relationship between changes in household incomes and housing expenditures is the "income elasticity of housing demand." We examined the economic literature for appropriate estimates of this elasticity and used them to estimate the expected reductions in rent expenditures for military families under an SSS.

To enable current residents to continue to choose privatized housing, the rents likely will have to decrease by these amounts. For each privatization housing project, we calculated low, medium, and high estimates of the rental revenue losses necessary to keep the current tenant demographics. Military-wide, these revenue losses to privatized housing projects would be between $83 million and $210 million a year. This is a reduction of between 2 to 6 percent, respectively, for rental revenues paid by military families for privatized housing.

[2] RMC includes the current tax benefit of the BAH and Basic Allowance for Subsistence (BAS). Depending upon location and paygrade, this is often a substantial portion of total compensation.

Policy challenges

We spoke with housing subject matter experts (SMEs) at each of the services about the challenges they would face under an SSS. Regarding the elimination of BAH, all of the representatives brought up similar courses of action. The services could (1) allow the projects to charge market rents for the privatized housing, (2) require or provide some continued subsidies for junior paygrades and large or special needs families, or (3) negotiate an alternative algorithm or metric to replace BAH for setting rents.

These alternatives pose a dilemma to the services. On one hand, they want to maximize project revenues to ensure high-quality maintenance and financial stability. On the other hand they want to protect the most vulnerable servicemember families. The choices make the trade-offs between project revenues and resident subsidies very explicit.

The SMEs also were very concerned about the decreased rents required to attract the current paygrade mix. In some cases, funds can be added into these projects, but that is not a desired course of action. However, the SMEs would like to keep the homes affordable to junior, large, and special needs families.

Congress has a history of being very concerned about BAH rates and funding for the privatized housing. When BAH rates were decreased by 5 percent between 2015 and 2019, Congress legislated that the Department of Defense must reimburse the projects. It is likely that moving to an SSS might trigger a similar intervention.

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Contents

Introduction

Every four years, the Department of Defense (DOD) commissions the Quadrennial Review of Military Compensation (QRMC) to fully review the compensation principles and concepts of the armed forces. This Thirteenth QRMC has been tasked by the President to specifically:

> [D]etermine whether the structure of the current military compensation system, as a system of basic pay, housing, and subsistence allowances, remains appropriate, or whether an alternate compensation structure, such as a salary system, would enhance readiness and better enable the Department of Defense to recruit and retain tomorrow's military force. [1]

Combining pay and allowances into a single-salary system (SSS) will affect the military's privatized housing projects in two fundamental ways:

1. It will eliminate the explicit annual calculation of the Basic Allowance for Housing (BAH). All of the military's family housing privatization agreements peg rents charged to servicemembers to their BAH rates. If the BAH is eliminated, all of these projects will need to be adjusted and likely renegotiated.
2. An SSS will equalize compensation levels between servicemembers with and without dependents.[3] Currently, servicemembers with dependents receive higher compensations overall due to housing assignment and BAH policies. Unless the federal government is willing to increase total compensation outlays, an SSS will result in lower compensation for servicemembers with dependents. These servicemembers are the targeted tenant population for the privatized housing. If they have smaller incomes, they will be able to afford less rent, which will impact revenue streams for the projects.

The director of the QRMC asked CNA to examine the potential effects of an SSS on the privatized housing. This paper examines both effects in turn. We then discuss potential policy decisions. The paper ends with a conclusion and two appendices about our SSS compensation estimates and their ramifications for privatized housing.

[3] In this paper we use the terms *with dependents*, *married*, and *family* synonymously. We also use *single servicemember* to mean "without dependents."

The Effect of Eliminating the Basic Allowance for Housing

Eliminating BAH and incorporating allowances into basic pay formulas is much more than an accounting issue of combining multiple compensation accounts. Eliminating BAH will have important legal ramifications for all of the military's privatized housing agreements and for other government programs as well.

Since the Military Housing Privatization Initiative (MHPI) was adopted in 1996, the military has privatized almost all of its family housing in the US. Altogether, there are currently about 200,000 units of privatized housing in roughly 90 public-private partnership agreements with about 20 different companies [2].

All of these agreements contain provisions setting the maximum rents that can be charged to active-duty military families which are pegged to the servicemembers' BAH rates. Each of the agreements would need to be changed in response to an SSS.

Legal ramifications for the privatized housing agreements

We spoke with legal experts from all of the services about the challenges that an SSS would pose to the MHPI contracts. All of them agreed that these contracts would have to be renegotiated, but they disagreed about how difficult that would be.

Army

The Army general counsel thought that the renegotiation would be challenging but could be done in a reasonable period. The critical and most difficult stakeholders in the renegotiations will likely be the lenders because they have the largest financial stake in the projects and an SSS will affect their risk. We were told that the Army projects have a few very large "lead" lenders and many smaller ones. If a deal could be struck with the large lenders, it would probably serve as a template for the others.

Coming to an agreement with the privatization partners would probably not be as difficult. The partners have a smaller, long-term financial risk. The privatization contracts are written so that the partners receive most of their profits off gross revenues, not from the residual net

revenues. This differs from most private owners whose profit comes after all the other bills are paid. For MHPI agreements, the residual profits typically go into reinvestment accounts, not to the partners. The reinvestment accounts absorb the brunt of any shortfalls from an SSS, and those accounts are controlled by the military.

If an SSS does result in revenue shortfalls, the Army has mechanisms to inject additional funds into the projects if necessary. Additional equity can be added, and secondary financing is possible.[4] Also, the Army has limited capacity to move excess funds between projects. These are not desirable outcomes, but they are possible.

Air Force

The Air Force general counsel office had a very different view. They believed that a detailed renegotiation with all MHPI stakeholders would be necessary and that renegotiation would open up all provisions of the agreements.

They were concerned that their staff would be insufficient for such a widespread and detailed simultaneous renegotiation. The MHPI projects were rolled out slowly over many years. SSS renegotiations would likely take place all at once.

The Air Force's MHPI projects were often financed differently than the projects of the other services. The Air Force projects rely more on debt financing and loan subsidies. Because of this, Air Force officials expressed concern that their capacity to inject additional funds into most of their projects is limited, should that become necessary due to an SSS.

Navy and Marine Corps

The Navy and Marine Corps' position was somewhere in between the position of the Army and Air Force. They thought a renegotiation would be long and challenging, but not impossible.

The Navy and Marine Corps' MHPI contracts have a provision that if BAH is replaced by another housing allowance system, then the rents would automatically be pegged to the new system. However, an SSS is an elimination, not a replacement, of BAH, which means that renegotiation would be necessary

The Navy and Marine Corps' projects have mechanisms available to add funding should an SSS make that necessary, but they would be very reluctant to recommend that.

[4] The Army refers to this secondary lending as "mezzanine" loans.

Summation

Although the services disagreed on how difficult renegotiations would be, they all agreed that an SSS would require changes to all of the MHPI contracts. Each project consists of a series of very detailed contracts that could make renegotiations contentious and complicated.

Political sensitivity

There is a history of political sensitivity in Congress regarding BAH rates and the housing privatization agreements. In the National Defense Authorizations Acts for fiscal years 2015 and 2016 [3-4], Congress changed the BAH calculation so that it would cover only 95 percent of the rent and utility costs of the standard BAH housing units. The change was phased in over 5 years from 2015 to 2019. Servicemembers living in town would be expected to absorb out of pocket 5 percent of the national average cost of standardized units for their paygrades.

However, the MHPI agreements prevented the projects from charging active-duty families any out-of-pocket costs to compensate for the change. Those modest cuts to BAH produced a strong, negative response from the MHPI partners and from Congress. Congress ordered DOD to reimburse the privatization projects directly for the 5 percent reduction in BAH revenues from their military tenants.[5] An SSS may provoke a similarly strong response.

Effect on other programs

BAH does not just affect active-duty servicemembers and the privatized housing. It also affects other programs such as the Post-9/11 GI Bill, administered through the Department of Veterans Affairs.

As part of its educational benefits, the Post-9/11 GI Bill provides a housing allowance that is pegged to the E5 with-dependents BAH rate at the location where a student attends most of his or her classes. According to the Congressional Budget Office (CBO), 90 percent of Post-9/11 GI Bill beneficiaries attended programs more than half time, "which qualified them for part or all of the housing benefit" [6].

[5] See section 606 of the National Defense Authorization Act of 2019 [5].

CBO reported that from 2010 through 2016, the government provided $65 billion[6] to 1.6 million beneficiaries. In 2018, there were 700,000 beneficiaries. Housing is the largest portion of the program and accounts for about half the spending [6].

If BAH is eliminated from adopting an SSS, then a substitute metric will have to be found for Post-9/11 GI Bill beneficiaries as well.

[6] In 2018 dollars

The Effect of Changing Compensations

An SSS will eliminate compensation differences between service-members with and without dependents. Currently, those with dependents receive higher overall compensation levels than those without.

Servicemembers living in the US with dependents receive BAH to help pay housing costs for their families. Single servicemembers are either assigned to barracks or receive BAH at the lower, without-dependents rate.

An SSS would change this. In general, it would raise pre-tax compensation levels for single servicemembers to match the compensation levels of their with-dependents counterparts. Unless the federal government is willing to substantially increase its total expenditure on military personnel, an SSS would make it necessary to lower the compensation for servicemembers with dependents.

The QRMC specified that estimates of compensation changes made under an SSS should be cost neutral for the federal government. Therefore, the overall compensation levels for military families will decrease.[7]

Effect on privatized housing

Active-duty, military families are the intended customer base for privatized housing. Their rents are currently capped at their BAH rate.[8] They also receive priority over other potential tenants. Tenants who are not military families are considered "waterfall tenants" and have varying lower priority levels for housing depending upon their relationship to the Department of Defense (DOD).

[7] Under an SSS, single servicemembers who currently receive BAH will typically receive increases in their pre-tax compensation, but also decreases after taxes due to the elimination of the tax advantage for allowances. Single servicemembers who do not currently receive BAH will receive large increases in compensation both pre- and post-tax under an SSS.

[8] So long as the military family selects a unit that is sized to their entitlement level, they cannot be charged more than their BAH as rent. The size of the entitled unit is based on paygrade and the number of dependents. If the servicemember chooses a larger unit, they may have to pay some out-of-pocket costs. Although rents are typically capped at BAH, discounts may be offered to the servicemember, making the effective rent lower than their BAH.

An SSS will reduce incomes for military families, meaning that families will be forced to reduce their expenditures overall, including on housing.[9] Residents who would currently choose privatized housing will likely demand lower rents or choose to live in less-costly, lower-quality housing in the private sector.

The military services will have to decide whether to change policy to accommodate the reduced family incomes. If the services want to maintain the current demographic mix of servicemember families in their privatized housing projects, they will have to charge lower rents, which will reduce rental revenues to these MHPI projects.

Alternatively, the services could decide to keep the current rent levels, which would likely mean that the residents of privatized housing would be more senior paygrades, more single servicemembers, and more waterfall tenants.

Calculating potential revenue losses to privatized housing projects

If the services want to maintain the current tenant mix, rents for privatized housing will have to decline. This section estimates the necessary revenue loss each privatized housing project would experience to keep its current residents under an SSS.[10]

Our methodology for estimating revenue losses to the MHPI projects under an SSS consisted of three steps:

1. Estimate the effect on incomes to military families, the intended tenant base for MHPI housing
2. Estimate how changes to income affect housing expenditures
3. Quantify the potential revenue shortfalls to privatized housing projects, if the services want to keep the current demographic mix of tenants.

The next three sections describe and implement this methodology step by step. We then use this methodology to project the necessary revenue shortfalls that each of the military's privatized housing projects would experience to keep their current mix of tenants.

[9] Housing expenditures typically increase and decrease with household income, but not strictly proportionally [7].

[10] Based on our discussions with housing SMEs, each service expressed a desire to keep the current tenant mix in privatized housing. This is an underlying assumption of our revenue estimates.

Step 1: Estimate the effect on incomes to military families

Compensation estimates under an SSS must fulfill three basic rules set by the QRMC:

- Military basic pay and allowances must be combined into a single taxable amount for each servicemember.
- No pay differences should exist based on whether a servicemember has or does not have dependents.
- As a whole, total federal expenditures for military compensation should remain constant with current costs[11]

Many potential pay distributions will satisfy these rules. Therefore, additional assumptions must be developed regarding compensations between different paygrades and localities. Such assumptions are critical to the fairness and acceptability of an SSS.

We developed two alternative compensation distributions for an SSS to support our analysis of revenue changes to privatized housing.[12] We chose these alternatives because of their simplicity and fairness in terms of pre-tax compensations.

SSS distributions generally increase pre-tax compensation to single servicemembers, especially those not receiving BAH. They reduce compensation to servicemembers with dependents. We designed both our alternatives to minimize the pre-tax pay reductions to servicemembers with dependents while remaining consistent with the SSS rules.

Both alternatives start by providing the full with-dependents BAH rate to all servicemembers in the US[13], and then they use different formulas to reduce pay levels so federal outlays remain constant.[14]

[11] Currently, the Basic Allowance for Subsistence (BAS) and the BAH are tax exempt. The value of these tax exemptions are calculated and included in the baseline of current federal outlays for military compensation.

[12] We examined several compensation distributions for an SSS that had been developed by others. However, those estimates were either not detailed enough, were inconsistent in their pre-tax estimates with SSS rules, or produced variations between localities that were too dramatic for a reasonable analysis of housing demand and rental revenues. Therefore, we developed our own compensation estimates consistent with the basic SSS rules set by the QRMC.

[13] In our sample of 1.2 million servicemembers, providing the full with-dependents BAH rate to all singles (without other pay cuts) would raise federal outlays by $175 million per month. See Appendix A for additional details.

[14] Our estimate of federal outlays include the current foregone taxes from the exemption of allowances. Federal outlays after tax collection will remain constant.

Alternatives 1 and 2 are summarized below. Appendix A contains a more detailed discussion of both methodologies.

Alternative 1

Alternative 1 subtracts a fixed dollar amount from each married servicemember's current pre-tax compensation.[15] These pay subtractions help bring single servicemember pay rates up to their married counterparts. Alternative 1 is similar to the approach currently used to estimate BAH absorption rates—they are calculated so that a married servicemember assigned to any location in the US will have to absorb a specific absolute dollar amount of reduced pay under the SSS. Table 1 shows how this SSS distribution will affect servicemembers with dependents in each paygrade.

Currently, a servicemember's full compensation includes the tax advantage from the BAH and the Baisc Allowance for Subsistence (BAS). The value of this tax advantage varies in different locations because BAH rates vary. It also varies by family income. We estimate that the full compensation loss to military families, including the loss of the tax advantage, will range between 6 to 13 percent depending upon paygrade and assignment location.

The loss of this tax advantage for BAH and BAS is a larger component of a military family's full pay reduction under an SSS than the pre-tax pay difference. It accounts for about 70 percent of the full reduction in pay to military families due to an SSS.

The Alternative 1 SSS has a very different effect on single servicemembers. As a group, they will receive an average 28 percent pay raise. Single servicemembers not currently receiving BAH will receive an average pay raise of 55 percent under the SSS.[16] However, most of the single servicemembers currently receiving BAH will receive pay cuts, although these cuts will be smaller than those for families. On average, single servicemembers currently receiving BAH will experience a reduction of about 5 percent due to the lost tax advantage exceeding any increase to their pre-tax pay.

[15] Pre-tax compensation consists of basic pay, BAH, and BAS.

[16] One reason for this very large increase is that we do not include in current pay estimates any value for imputed rent that servicemembers may receive when they are assigned to barracks or deployed.

Table 1. SSS Alternative 1 effect on compensation to servicemember families within the US

Paygrade	Monthly dollar change in pay	Additional loss
E1	- $71.18	Loss of tax advantage from current Basic Allowance for Housing (BAH) and Basic Allowance for Subsistence (BAS)
E2	- $79.78	
E3	- $83.90	
E4	- $102.98	
E5	- $127.10	
E6	- $154.83	
E7	- $195.21	
E8	- $221.57	
E9	- $284.85	
W1	- $188.23	
W2	- $211.75	
W3	- $265.13	
W4	- $314.55	
W5	- $373.94	
O1	- $135.02	
O2	- $204.04	
O3	- $251.69	
O4	- $332.27	
O5	- $391.43	
O6	- $471.02	
O7	- $549.89	
O8	- $635.45	
O9	- $669.07	
O10	- $669.07	
O1E	- $194.98	
O2E	- $233.70	
O3E	- $303.74	

Source: CNA.

Alternative 2

Alternative 2 is similar to the previous alternative, because it also reduces the pre-tax compensation of military families and redistributes those funds to equalize the pay of single and married servicemembers. In Alternative 2, servicemember families receive a straight reduction of 2.6 percent of their current pre-tax pay and allowances. Because the current BAH rates vary throughout the country, the absolute pre-tax dollar reduction to servicemember families will vary.

The across-the-board 2.6 percent pay and allowance reduction to military families in Alternative 2 does not include the value of the lost tax advantage from current allowances. This tax advantage varies by location and family income. We estimate that the total reduction in pay, allowances, and the lost tax advantage will vary in Alternative 2 from between 5 to 14 percent for military families, depending upon location and paygrade.

As in Alternative 1, the lost tax advantage to military families is much more than the reduction in pre-tax pay. Under Alternative 2, it makes up about 73 percent of the full reduction in pay to military families.

Alternative 2 has a very similar effect on single servicemember compensations as Alternative 1. As a group, they will receive an average 28 percent pay raise. Single servicemembers not currently receiving BAH will receive an average pay raise of 54 percent under Alternative 2, but those currently receiving BAH will receive a 5 percent reduction due to the lost tax advantage.

Using Alternatives 1 and 2

Alternatives 1 and 2 will generate estimated pre-tax compensation levels for servicemembers in every paygrade and Military Housing Area (MHA) in the US. When compared to Regular Military Compensation (RMC)[17] levels, both alternatives provide an estimated percentage of the compensation change from an SSS for each paygrade and location.

The alternatives do not consider the loss of the state tax advantages from current allowances.[18] Therefore, they may somewhat underestimate the total burden of an SSS on servicemember families and singles currently receiving BAH.

[17] RMC includes basic pay, allowances, and the federal tax advantage from those allowances.

[18] Currently, BAH and BAS are not considered taxable under federal or state tax law. An SSS would make that income taxable in both entities. The QRMC rules adjust compensation for the increased federal taxes, but not for the increased state taxes.

Step 2: Estimate how changes to income affect housing expenditures

Economists consider housing to be a "normal good"[19] in the sense that as household income increases, housing expenditures usually increase. When income decreases, housing expenditures usually decrease.[20] However, the share of housing expenditures does not increase or decrease proportionally with income. For example, most economic estimates show that an increase or decrease in income of 10 percent will produce less than a 10 percent change in housing expenditures.

The "income elasticity of demand for housing" measures the percentage change in the demand for housing in response to a given percentage change in income. Economists treat the demand for housing as the expenditures on housing.

As part of this study, CNA commissioned a review of the economic literature on the income elasticities of housing. RCF Economic & Financial Consulting, Inc. which specializes in urban economics, conducted the review focusing on rental housing, because privatized military family housing is rental housing. We derived this elasticity discussion and estimates from that review [7].

General findings from the economic literature

Most economic studies find the income elasticity of housing to be between 0.2 and 0.5. This means that a 1 percent change in household income will result in a change in housing expenditures of between 0.2 percent and 0.5 percent. The best overall estimate of the income elasticity of housing is 0.35 [7].

Estimates of the income elasticity of housing in the economic literature increase as household income increases. However, other potential factors, such as family size, age, and geographic location, do not significantly affect the estimates of the income elasticity for housing [7].

Specific estimates of the income elasticity of housing

Table 2 shows low, average, and high estimates of the income elasticity of rental housing for different income levels.

[19] This is in contrast to an "inferior good" whose consumption increases with reduced incomes.

[20] Holding other potential economic effects constant.

Table 2. Income elasticity of demand for rental housing by household income level

Household income	Low elasticity estimate	Average elasticity estimate	High elasticity estimate
$ 30,000	0.15	0.25	0.36
$ 45,000	0.19	0.33	0.47
$ 60,000	0.22	0.38	0.54
$ 75,000	0.23	0.41	0.58
$ 90,000	0.24	0.43	0.61
$ 120,000	0.25	0.44	0.63
$ 150,000	0.25	0.44	0.63

Source: [7-8]

Reference [7] also fitted these elasticities to an explicit function of household income.[21] Equation (1) shows the formula for calculating the average income elasticity of rental housing based on household income.

$$Average\ Income\ Elasticity\ of\ Rental\ Housing = -0.255 + (0.6984 / (1 + exp(-0.0000437 * (Household\ Income - 7278)))) \quad (1)$$

Equations (2) and (3) show how to transform the average income elasticity estimate for rental housing into the low and high elasticity estimates, respectively [7].

$$Low\ Elasticity\ Estimate = \left(\frac{0.2}{0.35}\right) * Average\ Elasticity\ Estimate \quad (2)$$

$$High\ Elasticity\ Estimate = \left(\frac{0.5}{0.35}\right) * Average\ Elasticity\ Estimate \quad (3)$$

Using the housing elasticity estimates

We applied these estimates of the income elasticity of rental housing to project how servicemembers' demand for housing will change under an SSS. Multiplying the percentage

[21] These equations are based on Table III in [8] with incomes adjusted for inflation using the consumer price index. The elasticity at the mean income is 0.35.

change in household income by the elasticity will give the expected percentage change for rental housing expenditures, as described in equation (4).

$$Expected\ Percentage\ Change\ in\ Rental\ Expenditures = (Income\ Elasticity\ of\ Rental\ Housing) * (Percentage\ Change\ in\ Household\ Income) \quad (4)$$

Alternatives 1 and 2 provide estimates of the new compensation levels for servicemembers under an SSS based on the current pre-tax basic pay[22] and allowances for each paygrade at every MHA in the US.

We then calculated the percentage change from these SSS compensations comparing them to RMC, which includes the tax advantage of allowances being exempt from income tax.

Plugging this percentage change into equation (4) along with the elasticity appropriate to the servicemember's income level will estimate the percentage reduction in rent.

If we assume that residents of privatized housing are currently paying their full BAH in rent and utilities, then we can multiply BAH by that percentage reduction to estimate the dollar decrease in rental expenditures. Equation (5) summarizes this process.

$$Expected\ Dollar\ Change\ in\ Rental\ Expenditures = (Income\ Elasticity\ of\ Rental\ Housing) * (Percentage\ Change\ in\ Household\ Income) * (With\text{-}Dependents\ BAH\ Rate) \quad (5)$$

Spousal income considerations

If a servicemember's spouse earns income, then those earnings are part of the total household income and should be included in the elasticity and rental change calculations. We have limited information about the percentage of military spouses' employment and earnings.

Data from the American Community Surveys (ACS) by the US Census Bureau from 2010 through 2018[23] show that about 60 percent of respondents in the military had spouses

[22] We use paygrade and the average years of service for members within that paygrade to calculate basic pay levels.

[23] The Census ACS data were accessed through the Integrated Public Use Microdata Series (IPUMS-USA) website, compiled by the Minnesota Population Center of the University of Minnesota [9].

earning income. The median spousal earnings for those 60 percent of respondents was about $25,000 a year [9].

Those with earning spouses were more likely to live in owner-occupied housing, but other housing statistics looked very similar between those with earning and non-earning spouses. Servicemembers with earning spouses who rented tended to pay similar or even lower rents than those with non-earning spouses [9].

Commuting times for renters in both groups were very similar. Roughly half of the servicemembers who reported having commute times of 10 minutes or less between the years 2010 and 2018 had earning spouses [9].

We assumed that most of these servicemembers with very short commutes are living in privatized housing. Although we do not have direct evidence, these Census data suggest that about half of the residents in privatized housing probably have spouses earning income; this is a smaller proportion than the overall percentage of servicemembers with earning spouses.

To estimate the desired rent reductions from an SSS for those with earning spouses, we assumed that a spouse with earnings adds $25,000 to his or her household's incomes.

Step 3: Quantify the potential revenue shortfall to privatized housing projects

Steps 1 and 2 provide estimates for how an SSS will reduce incomes and the desired rent payments for military families. All of the military services provided us with 2019 occupancy data for their privatized housing projects by paygrade. If the military services want to keep these tenant demographics, they will have to reduce rents accordingly under an SSS.

Knowing the occupancy and the estimated rent changes for these occupants under an SSS allows us to straightforwardly estimate potential revenue shortfalls. For the military to keep these tenants, the overall revenue reduction would be the sum of the required rent change per resident multiplied by the number of residents in that paygrade.

Limitations of these estimates

These estimates are the maximum potential revenue shortfall due to an SSS.[24] The calculations assume that all military families are paying their full BAH in rent. In reality, many of them currently may be receiving discounts, which means the BAH factor in equation (5) would be too high. A more accurate estimate of effective current rents, incorporating the discounts, would produce a smaller expected reduction.

[24] Implemented with the corresponding Alternative 1 or Alternative 2 compensations.

This analysis is a static analysis, focused on inducing current residents of privatized housing to make the same choices under an SSS. A more dynamic analysis would take into account the changing choices of servicemembers living off base as well. An SSS could produce a different population choosing privatized housing. Depending upon the relative rents paid by these new residents versus current residents, total revenue changes to the projects could differ from our estimates.

For example, the reduced incomes to military families might induce more servicemembers to choose privatized housing. If this crowds out existing waterfall tenants, then the critical factor would be whether these waterfall tenants pay more or less in rent than active-duty tenants. A 2018 study of the effect of the 5 percent BAH reduction on Navy privatized housing revenues found that waterfall tenants appear to pay less than active-duty servicemembers [10].[25] If this is also the case military-wide, then crowding out waterfall tenants could mitigate some of the expected losses.

Another big factor would be the priorities of the military services. With an SSS, will they want to keep the current demographics and, if so, who would cover the costs?

Estimated maximum revenue losses to privatized housing projects

Using the three-step methodology, we estimated the revenue losses that would be necessary to retain the current tenant paygrade mix at the military's privatized housing projects.

Here we present tables estimating the revenue losses for each service's housing projects under the Alternative 1 SSS compensation distribution assumptions. Appendix B contains tables with the corresponding estimated revenue losses using the Alternative 2 SSS distribution assumptions.[26]

The estimation tables show low, medium, and high revenue loss predictions based on the different income elasticities for housing. They also show the estimated medium monthly revenue loss per unit of housing in the project.[27]

[25] This may be because the privatized housing is specifically located and provides amenities to benefit military families, who may find the housing more valuable than waterfall tenants.

[26] Alternatives 1 and 2 tend to have fairly similar overall effects on the predicted changes to privatized housing revenues. The Alternative 2 tables are presented in Appendix B for completeness.

[27] The estimated revenue losses per unit of housing can vary greatly, depending upon the proportion of waterfall tenants in the housing project. Rents charged to waterfall tenants presumably will not be affected by an SSS.

Since the available evidence suggests that about half the spouses in privatized housing have earned incomes, we averaged the predicted effects between servicemembers with earning and non-earning spouses.

Tables 3 through 6 show the predicted monthly revenue reductions for privatized housing projects for the Army, Navy, Marine Corps, and Air Force, respectively. These are the losses necessary to retain the current tenant demographic mix.

Table 3. Estimated monthly revenue losses to Army privatized housing projects under an SSS using the Alternative 1 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Aberdeen Proving Ground	775	$13,111	$22,945	$32,778	$30
Carlisle Barracks / Picatinny Arsenal	348	$15,513	$27,147	$38,782	$78
Fort Belvoir	2,094	$124,213	$217,373	$310,533	$104
Fort Benning	4,001	$99,070	$173,373	$247,675	$43
Fort Bliss / White Sands MR	4,586	$110,727	$193,773	$276,818	$42
Fort Bragg	5,959	$134,559	$235,478	$336,397	$40
Fort Campbell	4,452	$117,646	$205,881	$294,116	$46
Fort Carson	3,376	$111,401	$194,951	$278,501	$58
Fort Detrick / Walter Reed	585	$10,533	$18,432	$26,332	$32
Fort Drum	3,779	$111,829	$195,702	$279,574	$52
Fort Eustis / Story	1,126	$34,997	$61,244	$87,492	$54
Fort Gordon	1,068	$21,975	$38,457	$54,939	$36
Fort Hamilton	221	$11,292	$19,761	$28,230	$89
Fort Hood[a] (including Liberty Village)	5,397	$108,463	$189,810	$271,157	$35

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Fort Huachuca / Yuma PG	1,264	$23,445	$41,029	$58,613	$32
Fort Irwin / Moffett / Parks[b]	2,879	$92,654	$162,144	$231,634	$56
Fort Jackson	850	$22,115	$38,701	$55,287	$46
Fort Knox	2,379	$41,103	$71,930	$102,757	$30
Fort Leavenworth	1,680	$41,168	$72,044	$102,920	$43
Fort Lee	1,485	$43,416	$75,977	$108,539	$51
Fort Leonard Wood	1,802	$29,048	$50,835	$72,621	$28
Fort Lewis / McChord AFB	5,098	$208,620	$365,085	$521,550	$72
Fort Meade	2,615	$93,957	$164,424	$234,892	$63
Fort Polk	3,639	$64,764	$113,337	$161,910	$31
Fort Riley	3,820	$82,001	$143,501	$205,002	$38
Fort Rucker	1,401	$26,874	$47,030	$67,185	$34
Fort Sam Houston	912	$29,717	$52,004	$74,292	$57
Fort Shafter[c]	7,704	$559,799	$979,648	$1,399,496	$127
Fort Sill	1,808	$34,766	$60,840	$86,915	$34
Fort Stewart[d]	3,238	$80,105	$140,183	$200,261	$43
Fort Wainwright[e]	1,926	$76,835	$134,461	$192,087	$70
Presidio of Monterey[f]	2,355	$99,290	$173,758	$248,225	$74
Redstone Arsenal	354	$1,994	$3,490	$4,986	$10
West Point	812	$46,305	$81,034	$115,762	$100
Total	**85,788**	**$2,723,304**	**$4,765,781**	**$6,808,259**	**$56**

Sources: [11-12] and CNA.

[a] It was not clear from [12] whether the number of units available at Fort Hood housing included Liberty Village, so the number of homes in this entry may be an undercount. However, the estimated monthly losses do include the residents of Liberty Village.
[b] Reference [12] grouped Fort Irwin with Moffett Field and Camp Parks. Reference [11] provided data on occupants from Fort Irwin, but we were unable to distinguish between occupants from Moffett Field and Camp Parks. Since Moffett Field and Camp Parks have different BAH rates, we used averages to estimate revenue losses for Moffett Field and Camp Parks.
[c] Although reference [11] lists its occupancy numbers as only being for homes at Fort Shafter, additional data, including reference [12], suggest these numbers are more consistent with Army privatized housing throughout Hawaii. Therefore, we believe the monthly loss estimates likely include all Army housing in Hawaii.
[d] Monthly loss estimates for Fort Stewart may also include Hunter Army Air Field. The number of homes listed includes both installations.
[e] Monthly loss estimates for Fort Wainwright may also include Fort Greely. The number of homes listed includes both installations.
[f] Reference [12] listed the Presidio of Monterey combined with the Naval Postgraduate School, so the "number of homes" may be overstated. However, we calculated the estimate of monthly losses for the Presidio of Monterey itself.

Table 4. Estimated monthly revenue losses to Navy privatized housing projects under an SSS using the Alternative 1 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Anacostia	217	$11,602	$20,303	$29,004	$94
Annapolis	253	$10,875	$19,032	$27,188	$75
Charleston	877	$24,760	$43,329	$61,899	$49
China Lake	192	$3,984	$6,971	$9,959	$36
Colts Neck	84	$4,387	$7,677	$10,967	$91
Corpus Christi	257	$7,050	$12,338	$17,625	$48
Dahlgren	184	$4,519	$7,909	$11,298	$43
El Centro	98	$1,930	$3,377	$4,824	$34
Everett	141	$7,694	$13,465	$19,235	$95
Fallon	188	$3,082	$5,393	$7,704	$29
Ft Worth	82	$3,066	$5,366	$7,666	$65
Great Lakes	1,141	$44,250	$77,438	$110,625	$68
Gulfport	550	$10,056	$17,598	$25,140	$32
Hampton Roads	4,208	$145,357	$254,376	$363,394	$60
Indian Head	136	$5,280	$9,239	$13,199	$68
Ingleside	104	$87	$152	$217	$1
Jacksonville	302	$11,077	$19,384	$27,692	$64
Crane	11	$291	$509	$727	$46
Kauai	54	$2,021	$3,536	$5,052	$65
Key West	715	$34,879	$61,038	$87,197	$85
Kings Bay	431	$9,409	$16,466	$23,523	$38
Kingsville	102	$1,864	$3,262	$4,660	$32
Kitsap	1,699	$67,241	$117,672	$168,103	$69

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Lakehurst	98	$2,790	$4,882	$6,974	$50
Lemoore	1,628	$42,509	$74,392	$106,274	$46
Mayport	829	$27,633	$48,357	$69,082	$58
Mechanicsburg	31	$1,298	$2,271	$3,245	$73
Meridian	161	$2,829	$4,951	$7,073	$31
Midsouth	280	$7,921	$13,861	$19,802	$50
Mitchel	189	$11,497	$20,119	$28,742	$106
New London	1,297	$39,239	$68,669	$98,099	$53
New Orleans	834	$20,168	$35,294	$50,420	$42
Newport	644	$31,864	$55,762	$79,660	$87
Oahu	4,392	$323,180	$565,565	$807,949	$129
Panama City	49	$1,701	$2,977	$4,253	$61
Patuxent River	735	$20,544	$35,952	$51,361	$49
Pensacola	538	$11,906	$20,835	$29,765	$39
Portsmouth, NH	210	$9,674	$16,929	$24,185	$81
San Diego	9,096	$653,394	$1,143,439	$1,633,484	$126
Saratoga	150	$2,954	$5,170	$7,385	$34
Seal Beach	185	$14,222	$24,889	$35,555	$135
Ventura	1,223	$78,230	$136,903	$195,576	$112
Whidbey Island	1,493	$64,048	$112,084	$160,120	$75
Whiting Field	207	$2,293	$4,012	$5,732	$19
Totals	**36,295**	**$1,784,653**	**$3,123,142**	**$4,461,631**	**$86**

Sources: [13] and CNA.

Table 5. Estimated monthly revenue losses to Marine Corps privatized housing projects under an SSS using the Alternative 1 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Albany	110	$1,969	$3,446	$4,922	$31
Beaufort	1,450	$45,052	$78,841	$112,630	$54
Bridgeport	111	$2,715	$4,751	$6,787	$43
Lejeune	4,933	$103,770	$181,597	$259,424	$37
Pendleton	7,718	$487,465	$853,064	$1,218,662	$111
Cherry Point	1,450	$26,052	$45,592	$65,131	$31
Chicopee	124	$3,945	$6,903	$9,861	$56
Kansas City	76	$2,077	$3,635	$5,193	$48
Hawaii	2,522	$202,310	$354,043	$505,775	$140
Quantico	1,137	$49,614	$86,824	$124,035	$76
San Diego	5	$339	$594	$848	$119
Stewart	171	$4,053	$7,093	$10,132	$41
Twentynine Palms	2,200	$41,247	$72,182	$103,117	$33
Totals	**22,007**	**$970,607**	**$1,698,563**	**$2,426,518**	**$77**

Sources: [13] and CNA.

Table 6. Estimated monthly revenue losses to Air Force privatized housing projects under an SSS using the Alternative 1 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Academy	663	$8,725	$15,268	$21,811	$23
Altus	529	$6,169	$10,796	$15,424	$20
Andrews	1,091	$40,000	$70,000	$100,000	$64
Arnold	22	$498	$872	$1,246	$40
Barksdale	1,090	$19,945	$34,903	$49,862	$32
Beale	509	$23,034	$40,310	$57,586	$79
Bolling	815	$41,567	$72,742	$103,918	$89
Buckley	351	$16,583	$29,021	$41,459	$83
Cannon	1,038	$20,423	$35,740	$51,057	$34
Cavalier	14	$341	$597	$853	$43
Charleston	559	$16,797	$29,395	$41,993	$53
Columbus	453	$7,267	$12,717	$18,167	$28
Davis-Monthan	1,173	$25,542	$44,699	$63,856	$38
Dover	982	$22,243	$38,925	$55,607	$40
Dyess	402	$1,907	$3,338	$4,768	$8
Dyess (ACC III)	674	$14,288	$25,005	$35,721	$37
Edwards	735	$29,706	$51,986	$74,265	$71
Eglin	853	$24,458	$42,802	$61,145	$50
Eielson	901	$29,912	$52,346	$74,780	$58
Ellsworth	500	$12,205	$21,358	$30,511	$43
Fairchild	641	$17,133	$29,983	$42,833	$47
FE Warren	748	$15,461	$27,058	$38,654	$36
Goodfellow	241	$6,402	$11,203	$16,004	$46

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Grand Forks	547	$14,020	$24,536	$35,051	$45
Hanscom	1,462	$49,940	$87,395	$124,850	$60
Hickam	2,485	$172,978	$302,712	$432,445	$122
Hill	1,089	$27,516	$48,152	$68,789	$44
Holloman	1,061	$16,909	$29,591	$42,273	$28
Hurlburt	379	$11,862	$20,758	$29,654	$55
JBER I	828	$21,487	$37,603	$53,718	$45
JBER II	1,194	$40,414	$70,724	$101,035	$59
JBER III	1,240	$49,654	$86,895	$124,136	$70
Keesler Main	841	$16,398	$28,696	$40,995	$34
Keesler NDSU	325	$2,368	$4,143	$5,919	$13
Kirtland	1,301	$23,451	$41,039	$58,628	$32
Lackland	874	$25,838	$45,217	$64,596	$52
Langley	1,430	$48,921	$85,611	$122,302	$60
Laughlin	451	$6,591	$11,534	$16,477	$26
Little Rock	989	$12,164	$21,286	$30,409	$22
Los Angeles	615	$24,934	$43,635	$62,336	$71
Luke	550	$16,381	$28,668	$40,954	$52
MacDill	549	$24,117	$42,206	$60,294	$77
Malmstrom	1,116	$19,629	$34,350	$49,072	$31
Maxwell	511	$10,574	$18,505	$26,435	$36
McConnell	381	$8,618	$15,082	$21,545	$40
Minot	1,438	$32,724	$57,266	$81,809	$40
Moody	287	$5,193	$9,088	$12,983	$32

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Moody (ACC III)	101	$2,326	$4,070	$5,814	$40
Mt. Home	844	$17,576	$30,759	$43,941	$36
Nellis	1,180	$36,979	$64,713	$92,447	$55
Offutt	1,867	$23,874	$41,780	$59,685	$22
Patrick	616	$11,653	$20,393	$29,134	$33
Peterson	669	$23,525	$41,169	$58,813	$62
Randolph	317	$10,019	$17,533	$25,047	$55
Robins I[a]	672	$2,105	$3,683	$5,262	$5
Robins II[a]	254	$5,976	$10,458	$14,940	$41
Schriever	242	$7,896	$13,818	$19,741	$57
Scott	1,593	$33,819	$59,182	$84,546	$37
Seymour Johnson	686	$14,018	$24,532	$35,045	$36
Shaw	632	$13,381	$23,416	$33,452	$37
Sheppard	708	$11,300	$19,776	$28,251	$28
Tinker	642	$8,757	$15,324	$21,891	$24
Travis	1,260	$75,609	$132,317	$189,024	$105
Tyndall[b]	N/A	N/A	N/A	N/A	N/A
Vance	242	$4,025	$7,043	$10,062	$29
Vandenberg	991	$38,071	$66,624	$95,178	$67
Whiteman	890	$16,335	$28,586	$40,838	$32
Wright-Patterson	1,464	$16,848	$29,483	$42,119	$20
Totals	**52,797**	**1,457,382**	**2,550,418**	**3,643,454**	**$48**

Sources: [14-15] and CNA.

[a]The large differences in the estimated losses and losses per housing unit between Robins I and II are due to the large differences in the numbers of current waterfall tenants in the two projects.

[b] Tyndall housing does not appear to be in use currently due to the effects of Hurricane Michael in 2018.

Interpretation and summary estimates

Tables 3 through 6 are our best estimates of the revenue losses that each privatized housing project would experience for the services to keep the current tenant demographic mix. We calculated these estimates using our Alternative 1 assumptions about compensations under an SSS; we chose this alternative because its straightforward redistribution minimizes compensation losses to current servicemembers with dependents. Other redistribution strategies are possible while keeping federal outlays constant, but they will likely result in more uneven effects on servicemember families.

We also assumed that half the current residents have earning spouses and averaged the estimated housing cost preferences for servicemembers with and without earning spouses.

Comparison to the costs of the 5-percent BAH reduction

These estimates differ in their intent from the payments that Congress required DOD to pay the MHPI projects in compensation for the 5-percent BAH reduction. By not having to pay rents above their new BAH rates, servicemembers choosing base housing were being fully compensated for the effective cut in allowances. In contrast, the estimates in this paper calculate the rent reduction required to attract the same paygrades to privatized housing as present. These reductions will not fully compensate servicemember families for the total reduction in pay due to an SSS.

Summary results

Table 7 shows the total annual revenue loss by military service from their privatized housing projects under an SSS. DOD-wide, our medium estimate for keeping the current tenant mix will require a revenue loss of $146 million dollars a year. That comes out to $740 per unit of privatized housing. Our low estimate is $83 million and our high estimate is $208 million per year.

Assuming that all the active-duty residents of the privatized housing projects are paying their full with-dependents BAH as rent, the annual rental revenues of the projects would be about $3.64 billion. That means that the estimated revenue losses would be 2 percent, 4 percent, and 6 percent for the low, medium, and high estimates, respectively.

Table 7. Summary of annual revenue losses by service to attract current demographics to privatized housing under an SSS with the Alternative 1 compensations

Service	Number of homes	Low annual loss estimate	Medium annual loss estimate	High annual loss estimate	Medium estimate loss per home
Army	85,788	$32,679,642	$57,189,375	$81,699,107	$667
Navy	36,295	$21,415,830	$37,477,703	$53,539,576	$1,033
Marine Corps	22,007	$11,647,286	$20,382,750	$29,118,215	$926
Air Force	52,797	$17,488,580	$30,605,015	$43,721,450	$580
Totals	**196,887**	**$83,231,340**	**$145,654,844**	**$208,078,349**	**$740**

Source: CNA.

Potential Policy Actions in Response to an SSS

Akin to the legal and financial challenges previously discussed, an SSS will pose corresponding policy challenges in both of these areas:

- What should be the new mechanism for setting servicemember rents in privatized housing?
- If the services want to keep the current tenant demographics in their privatized housing projects, how will the expected revenue shortfalls be handled?

We met with subject matter experts (SMEs) from all of the services for general discussions on these issues.

Possible mechanisms for setting rents in the absence of BAH

We met separately with each service's housing SMEs. When the potential elimination of BAH under an SSS was mentioned, all of them immediately brought up three fundamental possibilities:

- Allow the projects to charge market rents for the housing
- Provide some continued subsidies for junior paygrades and large or special needs families
- Create an algorithm or metric to replace BAH for setting rents

We will briefly discuss these three potential strategies.

Charge market rents

Permitting the partners to charge market rents for the privatized housing will maximize project revenues.

When the BAH rent cap is binding, it means that the servicemembers are effectively receiving a subsidy by choosing the privatized housing. The subsidy can be especially valuable for large, junior paygrade, and special needs families, because they receive larger homes than

their BAH could rent in the civilian community.[28] Without the BAH rent cap, the projects could charge more in rent for these units.

In some cases, the projects provide discounts to servicemembers, effectively renting the units below their full BAH rates. In these cases, the BAH is effectively above market rents and the project is forced to lower rents to attract tenants. The rent paid by these tenants is the market rent. For waterfall tenants, who have no BAH cap, all rents are market rents.

We do not know how many privatized housing units are rented at discounts, and we do not know the rents paid by waterfall tenants. Without that data, we cannot assess the effects of allowing the projects to charge market rents.

Although all the SMEs brought up this alternative, they were all torn by it. They would like to maximize the revenues to the projects to ensure high-quality maintenance and financial stability. However, they also want to protect the most vulnerable servicemember families. This option makes that tradeoff explicit.

Provide continued support for junior paygrade, large, and special needs families

Because all the SMEs are concerned about vulnerable servicemember families, they all brought up mechanisms for continuing to provide targeted rent subsidies. The suggested possibilities included capping rents for these families, as part of the renegotiated project agreements or providing another subsidy mechanism.

One such mechanism would be to use rent-differential payments to subsidize rents for vulnerable families. Rent-differential payments are one of the authorities within the MHPI enabling legislation. These payments could be funded within individual projects, by the projects as a group, or outside the projects.

Again, the SMEs were torn by the potential tradeoff between project revenues and subsidies to protect servicemembers.

[28] When choosing privatized housing, servicemembers are entitled to homes that are sized for their families. In other words, larger families can rent larger homes in privatized housing, but the rent is still capped at their BAH rates.

Create another algorithm for setting rents

All of the SMEs also suggested creating an algorithm or rent-setting metric as an alternative to BAH. The SMEs didn't necessarily want to replicate BAH; rather, they wanted to come up with an alternative mechanism for ensuring affordable rents.

Making up for revenue losses from an SSS

All of the SMEs were concerned that trying to keep the current tenant demographics under an SSS would result in lower rental revenues.

They were reluctant to accept changes to the current demographics. They brought up potential mechanisms for making up for revenue shortfalls including adding equity, additional loan subsidies and forgiveness, and service-funded rent-differential payments. However, adding funding to the MHPI projects may become a necessity under an SSS, but it is not a desired approach.

Conclusion

An SSS will pose special challenges for the military's housing privatization projects, including the elimination of BAH, reduced compensation to military families, reduced rent affordability by military families, and potential revenue losses to MHPI housing projects.

Elimination of BAH

The elimination of BAH under an SSS will require all of the MHPI agreements to be renegotiated. The services differed on their assessments of how difficult these renegotiations would be. Based on its past history of concern about the MHPI projects and BAH, Congress will likely become involved in these renegotiations as well.

Eliminating BAH will affect other government programs, such as the Post-9/11 GI Bill, administered through the Department of Veterans Affairs. Those education benefits include a housing allowance set to the E5 with-dependents BAH rate, which accounts for about half of the benefits paid.

Reduced compensation to military families

An SSS requires that servicemembers receive the same pay and allowances whether or not they have dependents. Currently, servicemembers with dependents receive higher allowances than those without dependents. The QRMC requires that SSS compensation estimates be cost neutral to the federal government. This condition means that under an SSS, single servicemembers will receive an increase in pay, while those with dependents will receive a decrease in pay.

We generated two alternative distributions of compensation under an SSS that meet these requirements. Alternative 1 estimates a fixed-dollar reduction in pre-tax compensation based on paygrade for servicemembers with dependents regardless of location. Alternative 2 estimates a 2.6 percent cut in basic pay and allowances for servicemembers with dependents.

In addition, both alternatives eliminate the current tax advantage to BAH and BAS. Taking the loss of the tax advantage into account, our estimates show a reduction in compensation to servicemember families of between 5 to 14 percent depending upon paygrade and location.

About 70 percent of the full pay reduction to military families in an SSS comes from the loss of this tax advantage.

Reduced rent affordability by military families

The reduced compensation to military families under an SSS means they would be unable to pay as much in rent. The relationship between changes in income and changes in desired rent payments is the "income elasticity of housing."

The economic literature estimates that, on average, this elasticity is 0.35. However, the elasticity does increase with household income.

The 0.35 elasticity means that if a family receives a 10 percent reduction in income, their desired rental costs will decrease by 3.5 percent.

Potential revenue losses to MHPI housing projects

Military families are the intended tenant population for the MHPI projects. For those families to continue to choose privatized housing under an SSS, their rents will need to decrease. Otherwise, their lower compensation will force them to choose lower cost and lower quality housing in the community.

If the military wants their privatized housing projects to keep the current paygrade demographic mix, they will have to reduce rents. This will result in revenue losses for the projects. Our midrange estimate for these losses to DOD as a whole is $146 million per year. This is about 4 percent of the total BAH amounts being paid in rental revenues to the privatized housing projects by military families.

Based on the differing estimates of the income elasticity of housing, those losses to the MHPI projects could be between $83 million and $208 million per year, which are 2 and 6 percent of the BAH rental revenues, respectively.

These potential losses will pose serious policy challenges to the services if they want to continue using privatized housing as a way to help junior, large, and special needs military families.

Appendix A: Methodologies for Estimating SSS Compensation Redistributions

This appendix details the methodology and assumptions used to create the Alternative 1 and Alternative 2 compensation redistributions for an SSS.

Data source and strategy

We used Defense Manpower Data Center (DMDC) data from December 2019 which contained aggregated counts of the numbers of servicemembers by paygrade and their BAH ZIP codes in the US. The data contained counts of single and married servicemembers and whether they were receiving BAH [16].

We did not directly use expenditure data. This is because DMDC expenditure data provide an incomplete picture. Many locations will show compensation levels that do not match allowance levels or basic pay levels. Presumably, servicemembers are being paid their full salary and allowances, but it may be recorded in multiple locations, especially if the servicemember was in a Permanent Change of Station (PCS) move at the time. During PCS moves, it may take a few months for pay records to catch up with servicemembers.

Instead, we used the DMDC data as a snapshot of where servicemembers are located. We then generated current compensation estimates by calculating pay and allowances as if the servicemembers were at that location and paid for the full month.[29] We calculated the servicemembers' full RMC including an estimate of the tax benefit from their allowances. This became our baseline of federal outlays that could be redistributed by an SSS.

[29] When the DMDC data indicated that servicemembers qualified for BAH, we calculated their appropriate BAH rates depending upon whether they were listed as being single or married.

Alternatives 1 and 2 redistribute this baseline of compensation among the same set of servicemembers. As long as our sample of servicemembers is representative of the military, this methodology should produce an accurate estimate of the effects of an SSS.[30]

Data concerns

We were concerned that some of the BAH ZIP codes were not US ZIP codes—they were Air/Army Post Office (APO), Diplomatic Post Office (DPO), and Fleet Post Office (FPO) ZIP codes. Because we could not match a US location with these servicemembers, we were forced to assume they were deployed and had to drop them from our data set.

The original DMDC file showed a total personnel count within the US of 1.3 million active-duty servicemembers. We matched 1.2 million or about 90 percent of those servicemembers to valid BAH MHAs. Since we used the same set of servicemembers to generate both the baseline compensation and the SSS redistributions, the results are statistically valid.

Basic methodology

An SSS requires that single and married servicemembers receive the same pre-tax pay. The first step in our methodology was to assign all single servicemembers the full with-dependents BAH rates for their paygrade and location. Doing so reveals how much federal outlays would have to increase if an SSS created equity at current levels. We found that the difference in monthly costs was $175 million per month more than our total RMC baseline.[31]

However, an SSS requires that federal outlays be cost neutral. Therefore, the aggregate pay of the 1.2 million servicemembers in that first SSS estimate would need to be reduced by $175 million. Alternatives 1 and 2 take different approaches to achieve that reduction.

Alternative 1 distribution

For Alternative 1, we reduced each servicemember's compensation by a fixed dollar amount weighted by the basic pay level for that servicemember's paygrade. This approach ensured that higher paygrades would take proportionately higher pre-tax cuts to make up for the

[30] We did not include servicemembers stationed abroad. We did not have data for them or their corresponding Overseas Housing Allowance (OHA) costs. It was also not clear how an SSS would handle OHA. Other researchers who are generating SSS estimates for the QRMC are also not including servicemembers stationed abroad, so our methodology and assumptions are consistent with theirs in this area.

[31] We made no adjustments for the value of in-kind housing received by servicemembers assigned to barracks. Our estimates assume that those imputed rents cannot be forcibly charged to servicemembers.

$175 million. However, the effects of the lost tax advantage for allowances is greater than the reduction in pre-tax pay amounts. The loss of the tax advantage accounts for about 70 percent of the overall reduction in RMC to military families and will vary by paygrade and location.

The fixed pre-tax pay cut for servicemember families allows for a straightforward summary of the effects of Alternative 1 as was expressed in Table 1.

Most single servicemembers would receive an increase in pre-tax compensation under this version of the SSS. Single servicemembers, not currently receiving BAH, will receive very large compensation increases. However, most single servicemembers, who do receive BAH, will usually find that the lost tax advantage is larger than the nominal pay increase.

Alternative 2 distribution

Instead of reducing each servicemember's compensation by a fixed dollar amount, Alternative 2 takes a fixed percentage to make up for the $175 million. Alternative 2 subtracts 2.64 percent of the pre-tax pay and allowances from all of the 1.2 million servicemembers in our sample. As a result, federal outlays come out neutral; however, married servicemembers in high-cost areas would receive a higher absolute dollar reduction in compensation from the Alternative 2 SSS redistribution.

Underlying assumptions

Both Alternatives 1 and 2 make an underlying assumption that should be noted. They implicitly assume that the current BAH rates are appropriate adjustments for the different costs of living at locations within the US.

In the SSS analytical effort, there were discussions about using other locality cost metrics, including the Office of Personnel Management (OPM) Locality Pay. Using the OPM Locality Pay adjustments would produce radically varying impacts on servicemember pay and privatized housing revenues because the OPM Locality Pay is not a cost-of-living adjustment, but a cost-of-hiring adjustment. It measures how much it costs the government to hire a local employee and can produce very different results from the current BAH rates.

For example, Hawaii has one of the highest housing costs and BAH rates in the US (the E5 with-dependents monthly BAH rate is $2,913 in Honolulu County). However, its OPM Locality Pay adjustment is only 19.56 percent compared with 15.95 percent for OPM's "Rest of United States" adjustment. Houston, Texas, which has relatively inexpensive housing (the E5 with-dependents BAH rate is $1,692), has an OPM Locality Pay adjustment of 33.32 percent [17-18].

We chose to use current BAH rates as our implicit cost-of-living metric because it is consistent with current DOD practices. If we had used the OPM Locality Pay adjustments, it would have produced unrealistically severe effects on privatized housing revenues at many locations.

Value of in-kind barracks housing

Both alternatives also assume that no rent can be forcibly charged to single servicemembers assigned to barracks. Matching their compensation levels with those receiving BAH means that they will receive large pay increases under an SSS.

Appendix B: Estimates of Revenue Losses under Alternative 2

Tables 8 through 12 contain estimates of the revenue losses to privatized housing using the Alternative 2 compensation distributions for an SSS. Both Alternatives 1 and 2 satisfy the QRMC's rules for an SSS, but they meet these requirements differently. Alternative 2 reduces the pre-tax basic pay and allowances for military families by a straight 2.64 percent regardless of paygrade or location. Alternative 1 reduces pre-tax basic pay allowances by a fixed absolute dollar amount based only on paygrade. Both Alternatives 1 and 2 eliminate the current tax advantages of servicemember allowances.

These tables correlate with Tables 3 through 7 in the main text, except that they use the Alternative 2 assumptions. As we did in those previous tables, we include low, medium, and high estimates of revenue losses, depending on the predominant range of estimates of the income elasticity for housing in the economic literature. Elasticity estimates also depend on household incomes. We averaged the expected reductions among servicemembers with and without earning spouses.

Tables 8 through 11 show the predicted monthly revenue reductions for privatized housing projects for the Army, Navy, Marine Corps, and Air Force, respectively. These are estimated losses necessary to retain the current tenant demographic mix under an SSS.

Table 12 provides estimates of the annual revenue losses by service and military-wide.

Table 8. Estimated monthly revenue losses to Army privatized housing projects under an SSS using the Alternative 2 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Aberdeen Proving Ground	775	$12,825	$22,443	$32,061	$29
Carlisle Barracks / Picatinny Arsenal	348	$14,785	$25,873	$36,961	$74
Fort Belvoir	2,094	$125,262	$219,208	$313,154	$105

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Fort Benning	4,001	$96,058	$168,101	$240,144	$42
Fort Bliss / White Sands MR	4,586	$108,049	$189,085	$270,122	$41
Fort Bragg	5,959	$131,630	$230,352	$329,074	$39
Fort Campbell	4,452	$116,337	$203,590	$290,843	$46
Fort Carson	3,376	$111,312	$194,797	$278,281	$58
Fort Detrick / Walter Reed	585	$10,584	$18,523	$26,461	$32
Fort Drum	3,779	$109,945	$192,405	$274,864	$51
Fort Eustis / Story	1,126	$34,791	$60,884	$86,977	$54
Fort Gordon	1,068	$21,451	$37,540	$53,628	$35
Fort Hamilton	221	$11,644	$20,377	$29,109	$92
Fort Hood[a] (including Liberty Village)	5,397	$105,415	$184,476	$263,537	$34
Fort Huachuca / Yuma PG	1,264	$22,062	$38,609	$55,156	$31
Fort Irwin / Moffett / Parks[b]	2,879	$91,667	$160,417	$229,167	$56
Fort Jackson	850	$21,607	$37,813	$54,019	$44
Fort Knox	2,379	$38,354	$67,120	$95,886	$28
Fort Leavenworth	1,680	$38,300	$67,025	$95,750	$40
Fort Lee	1,485	$42,056	$73,598	$105,140	$50
Fort Leonard Wood	1,802	$27,315	$47,802	$68,289	$27
Fort Lewis / McChord AFB	5,098	$211,613	$370,323	$529,032	$73
Fort Meade	2,615	$95,368	$166,894	$238,420	$64

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Fort Polk	3,639	$62,225	$108,894	$155,563	$30
Fort Riley	3,820	$79,501	$139,126	$198,752	$36
Fort Rucker	1,401	$25,216	$44,128	$63,040	$31
Fort Sam Houston	912	$28,763	$50,335	$71,908	$55
Fort Shafter[c]	7,704	$580,964	$1,016,687	$1,452,409	$132
Fort Sill	1,808	$33,069	$57,871	$82,673	$32
Fort Stewart[d]	3,238	$79,508	$139,140	$198,771	$43
Fort Wainwright[e]	1,926	$77,643	$135,876	$194,108	$71
Presidio of Monterey[f]	2,355	$101,286	$177,251	$253,216	$75
Redstone Arsenal	354	$1,825	$3,194	$4,563	$9
West Point	812	$45,257	$79,200	$113,142	$98
Total	**85,788**	**$2,700,864**	**$4,748,954**	**$6,784,220**	**$55**

Sources: [11-12] and CNA.

[a] It was not clear from [12] whether the number of units available at Fort Hood housing included Liberty Village, so the number of homes in this entry may be an undercount. However, the estimated monthly losses do include the residents of Liberty Village.

[b] Reference [12] grouped Fort Irwin with Moffett Field and Camp Parks. Reference [11] provided data on occupants from Fort Irwin, but we were unable to distinguish between occupants from Moffett Field and Camp Parks. Since Moffett Field and Camp Parks have different BAH rates, we used averages to estimate revenue losses for Moffett Field and Camp Parks.

[c] Although reference [11] lists its occupancy numbers as being for homes at Fort Shafter only, additional data, including reference [12], suggest that these numbers most likely include Army privatized housing occupancy throughout Hawaii. Therefore, we believe the monthly loss estimates likely include all Army housing in Hawaii.

[d] Monthly loss estimates for Fort Stewart may also include Hunter Army Air Field. The number of homes listed includes both installations.

[e] Monthly loss estimates for Fort Wainwright may also include Fort Greely. The number of homes listed includes both installations.

[f] Reference [12] listed the Presidio of Monterey combined with the Naval Postgraduate School, so the "number of homes" may be overstated. However we calculated the estimate of monthly losses for the Presidio of Monterey itself.

Table 9. Estimated monthly revenue losses to Navy privatized housing projects under an SSS using the Alternative 2 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Anacostia	217	$11,846	$20,730	$29,615	$96
Annapolis	253	$10,716	$18,752	$26,789	$74
Charleston	877	$25,132	$43,981	$62,830	$50
China Lake	192	$3,785	$6,624	$9,463	$35
Colts Neck	84	$4,480	$7,840	$11,199	$93
Corpus Christi	257	$7,018	$12,281	$17,544	$48
Dahlgren	184	$4,506	$7,885	$11,264	$43
El Centro	98	$1,890	$3,308	$4,726	$34
Everett	141	$7,780	$13,615	$19,449	$97
Fallon	188	$2,980	$5,215	$7,450	$28
Ft Worth	82	$3,080	$5,389	$7,699	$66
Great Lakes	1,141	$44,622	$78,089	$111,556	$68
Gulfport	550	$9,865	$17,263	$24,662	$31
Hampton Roads	4,208	$146,531	$256,430	$366,328	$61
Indian Head	136	$5,440	$9,520	$13,600	$70
Ingleside	104	$86	$151	$215	$1
Jacksonville	302	$11,160	$19,530	$27,900	$65
Crane	11	$270	$473	$676	$43
Kauai	54	$2,041	$3,572	$5,103	$66
Key West	715	$35,933	$62,883	$89,833	$88
Kings Bay	431	$9,313	$16,298	$23,283	$38
Kingsville	102	$1,856	$3,248	$4,640	$32
Kitsap	1,699	$68,476	$119,833	$171,190	$71

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Lakehurst	98	$2,830	$4,953	$7,075	$51
Lemoore	1,628	$41,984	$73,472	$104,961	$45
Mayport	829	$27,711	$48,495	$69,278	$58
Mechanicsburg	31	$1,240	$2,170	$3,099	$70
Meridian	161	$2,686	$4,700	$6,715	$29
Midsouth	280	$7,699	$13,473	$19,248	$48
Mitchel	189	$11,968	$20,944	$29,919	$111
New London	1,297	$39,318	$68,806	$98,294	$53
New Orleans	834	$19,898	$34,821	$49,745	$42
Newport	644	$31,431	$55,005	$78,578	$85
Oahu	4,392	$334,885	$586,050	$837,214	$133
Panama City	49	$1,676	$2,934	$4,191	$60
Patuxent River	735	$20,345	$35,604	$50,863	$48
Pensacola	538	$11,672	$20,425	$29,179	$38
Portsmouth, NH	210	$9,842	$17,224	$24,606	$82
San Diego	9,096	$680,279	$1,190,489	$1,700,699	$131
Saratoga	150	$3,009	$5,266	$7,523	$35
Seal Beach	185	$14,837	$25,965	$37,094	$140
Ventura	1,223	$81,572	$142,752	$203,931	$117
Whidbey Island	1,493	$65,074	$113,879	$162,685	$76
Whiting Field	207	$2,256	$3,947	$5,639	$19
Totals	**36,295**	**$1,831,019**	**$3,204,284**	**$4,577,548**	**$88**

Sources: [13] and CNA.

Table 10. Estimated monthly revenue losses to Marine Corps privatized housing projects under an SSS using the Alternative 2 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Albany	110	$1,864	$3,262	$4,659	$30
Beaufort	1,450	$45,578	$79,762	$113,945	$55
Bridgeport	111	$2,645	$4,629	$6,614	$42
Lejeune	4,933	$101,149	$177,010	$252,871	$36
Pendleton	7,718	$509,305	$891,283	$1,273,262	$115
Cherry Point	1,450	$26,009	$45,515	$65,022	$31
Chicopee	124	$3,946	$6,906	$9,866	$56
Kansas City	76	$2,041	$3,572	$5,103	$47
Hawaii	2,522	$210,903	$369,081	$527,258	$146
Quantico	1,137	$48,963	$85,685	$122,406	$75
San Diego	5	$321	$563	$804	$113
Stewart	171	$3,932	$6,881	$9,829	$40
Twentynine Palms	2,200	$39,937	$69,889	$99,842	$32
Totals	**22,007**	**$996,592**	**$1,744,037**	**$2,491,481**	**$79**

Sources: [13] and CNA.

Table 11. Estimated monthly revenue losses to Air Force privatized housing projects under an SSS using the Alternative 2 compensation distributions

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Academy	663	$8,462	$14,809	$21,156	$22
Altus	529	$5,828	$10,199	$14,570	$19
Andrews	1,091	$40,733	$71,283	$101,833	$65
Arnold	22	$461	$807	$1,154	$37
Barksdale	1,090	$19,565	$34,239	$48,913	$31
Beale	509	$23,299	$40,773	$58,247	$80
Bolling	815	$41,526	$72,671	$103,815	$89
Buckley	351	$16,927	$29,623	$42,319	$84
Cannon	1,038	$19,630	$34,353	$49,076	$33
Cavalier	14	$324	$566	$809	$40
Charleston	559	$16,938	$29,641	$42,345	$53
Columbus	453	$6,834	$11,959	$17,084	$26
Davis-Monthan	1,173	$25,111	$43,945	$62,778	$37
Dover	982	$22,296	$39,017	$55,739	$40
Dyess	402	$1,893	$3,312	$4,732	$8
Dyess (ACC III)	674	$13,829	$24,201	$34,573	$36
Edwards	735	$29,376	$51,408	$73,440	$70
Eglin	853	$24,198	$42,346	$60,494	$50
Eielson	901	$30,186	$52,825	$75,465	$59
Ellsworth	500	$11,926	$20,870	$29,814	$42
Fairchild	641	$16,848	$29,484	$42,120	$46
FE Warren	748	$14,938	$26,142	$37,346	$35
Goodfellow	241	$6,212	$10,872	$15,531	$45

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Grand Forks	547	$13,687	$23,953	$34,219	$44
Hanscom	1,462	$50,852	$88,992	$127,131	$61
Hickam	2,485	$176,944	$309,651	$442,359	$125
Hill	1,089	$26,972	$47,200	$67,429	$43
Holloman	1,061	$16,214	$28,375	$40,536	$27
Hurlburt	379	$11,758	$20,577	$29,396	$54
JBER I	828	$22,011	$38,520	$55,029	$47
JBER II	1,194	$41,064	$71,862	$102,660	$60
JBER III	1,240	$49,527	$86,672	$123,816	$70
Keesler Main	841	$15,659	$27,403	$39,147	$33
Keesler NDSU	325	$2,317	$4,054	$5,792	$12
Kirtland	1,301	$22,764	$39,838	$56,911	$31
Lackland	874	$25,405	$44,459	$63,513	$51
Langley	1,430	$48,044	$84,077	$120,109	$59
Laughlin	451	$6,214	$10,875	$15,536	$24
Little Rock	989	$11,874	$20,779	$29,684	$21
Los Angeles	615	$25,441	$44,522	$63,603	$72
Luke	550	$16,482	$28,844	$41,205	$52
MacDill	549	$23,791	$41,634	$59,478	$76
Malmstrom	1,116	$18,662	$32,659	$46,656	$29
Maxwell	511	$9,854	$17,244	$24,634	$34
McConnell	381	$8,388	$14,679	$20,970	$39
Minot	1,438	$31,938	$55,892	$79,846	$39
Moody	287	$5,079	$8,888	$12,696	$31

Installation	Number of homes	Low monthly loss estimate	Medium monthly loss estimate	High monthly loss estimate	Medium estimate loss per home
Moody (ACC III)	101	$2,219	$3,884	$5,549	$38
Mt. Home	844	$17,010	$29,768	$42,525	$35
Nellis	1,180	$36,604	$64,057	$91,510	$54
Offutt	1,867	$23,566	$41,240	$58,915	$22
Patrick	616	$11,570	$20,248	$28,926	$33
Peterson	669	$22,847	$39,982	$57,117	$60
Randolph	317	$9,484	$16,597	$23,710	$52
Robins I[a]	672	$2,091	$3,659	$5,228	$5
Robins II[a]	254	$5,722	$10,013	$14,305	$39
Schriever	242	$7,769	$13,595	$19,422	$56
Scott	1,593	$32,222	$56,388	$80,555	$35
Seymour Johnson	686	$13,508	$23,639	$33,769	$34
Shaw	632	$12,905	$22,583	$32,261	$36
Sheppard	708	$10,817	$18,929	$27,042	$27
Tinker	642	$8,524	$14,917	$21,310	$23
Travis	1,260	$77,814	$136,175	$194,536	$108
Tyndall[b]	N/A	N/A	N/A	N/A	N/A
Vance	242	$3,811	$6,670	$9,529	$28
Vandenberg	991	$38,090	$66,658	$95,226	$67
Whiteman	890	$15,793	$27,638	$39,483	$31
Wright-Patterson	1,464	$16,417	$28,730	$41,043	$20
Totals	**52,797**	**$1,447,066**	**$2,532,366**	**$3,617,666**	**$48**

Sources: [14-15] and CNA.

[a]The large differences in the estimated losses and losses per housing unit between Robins I and II are due to the large differences in the numbers of current waterfall tenants in the two projects.

[b] Tyndall housing does not appear to be in use currently due to the effects of Hurricane Michael in 2018.

Table 12. Summary of annual revenue losses by service to attract current demographics to privatized housing under an SSS with the Alternative 2 compensations

Service	Number of homes	Low annual loss estimate	Medium annual loss estimate	High annual loss estimate	Medium estimate loss per home
Army	85,788	$32,564,256	$56,987,448	$81,410,640	$664
Navy	36,295	$21,972,231	$38,451,404	$54,930,578	$1,059
Marine Corps	22,007	$11,959,110	$20,928,442	$29,897,775	$951
Air Force	52,797	$17,364,792	$30,388,392	$43,411,992	$576
Totals	**196,887**	**$83,860,389**	**$146,755,687**	**$209,650,984**	**$745**

Source: CNA.

Tables

Abbreviations

APO	Air/Army Post Office
BAH	Basic Allowance for Housing
BAS	Basic Allowance for Subsistence
CBO	Congressional Budget Office
DMDC	Defense Manpower Data Center
DOD	Department of Defense
DPO	Diplomatic Post Office
MHA	Military Housing Area
MHPI	Military Housing Privatization Initiative
OHA	Overseas Housing Allowance
QRMC	Quadrennial Review of Military Compensation
RMC	Regular Military Compensation
SME	Subject Matter Expert
SSS	Single-Salary System
VA	Department of Veterans Affairs

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The Single Salary System for Military Personnel: A Review of Existing Practices and Literature

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DRM-2019-U-019421-Final

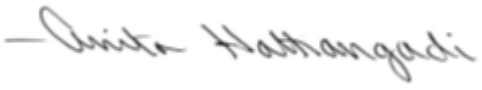
Abstract

The 13th Quadrennial Review of Military Compensation (QRMC) is considering whether the U.S. military should move from its current regular military compensation (RMC) structure to a single-salary system (SSS) that would eliminate the basic allowances for housing (BAH) and subsistence (BAS) and increase basic pay. To inform this potential policy change, this study provides information about: the potential advantages and disadvantages to the U.S. military of moving to an SSS; potential design features of an SSS to meet key objectives; and, important implementation challenges that the Department of Defense (DOD) may face if it goes forward with a military SSS. To provide insight into these issues, we conducted a literature review on the compensation preferences of servicemembers and civilians, a review of U.S. civilian-sector compensation practices based on a literature review and subject-matter expert (SME) discussions, and a review of foreign military compensation practices based on discussions with foreign military compensation experts and a review of policy documents.

This work was performed under Federal Government Contract No. N00014-16-D-5003.

Cover image credit: Key West, Fla. (Dec. 5, 2006) - Command Master Chief Al Holland assigned to the Navy's Center for Personal and Professional Development, Millington, Tenn., conducts First Line Leadership training for first and second class petty officers at Naval Air Station Key West. The training, which was part of the air stations daylong Career Management Symposium, covered a variety of topics related to the fleets effort to develop 21st century leaders, including pay and compensation, force shaping and retirement. U.S. Navy photo by Mass Communication Specialist 2nd Class Timothy Cox (RELEASED).

Approved by: **March 2019**



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Executive Summary

The 13th Quadrennial Review of Military Compensation (QRMC) is considering whether the US military should move from its current regular military compensation (RMC) structure to a single-salary system (SSS) that would eliminate the basic allowances for housing and subsistence (BAH and BAS) and increase basic pay. In this study, we focus on three questions:

1. What are the potential advantages and disadvantages to the US military of moving to an SSS in terms of pay transparency and equity, incentives and manpower outcomes, and cost?
2. How might an SSS be designed to meet objectives, including equity and pay comparability, adequate recruiting and retention, and minimal additional costs to the federal government?
3. What are some important implementation challenges that the Department of Defense (DOD) will face if it goes forward with an SSS for the military?

To provide insight into these issues, we conducted a literature review on the compensation preferences of servicemembers and civilians, a review of US civilian-sector compensation practices based on a literature review and subject-matter expert (SME) discussions, and a review of foreign military compensation practices based on discussions with foreign military compensation experts and a review of policy documents provided by our foreign military SMEs. Taken together, the reviews provide a rich set of information about compensation preferences and US federal civilian, private-sector, and foreign military compensation systems that can inform decisions about whether and how the US military might move to an SSS. The information gathered suggests some key implications for a move to a military SSS, including the following:

- There is a need for compelling evidence to justify a change to an SSS.
- If DOD decides to go forward with an SSS, it will be important to:
  - Assess the advantages and disadvantages of using the General Schedule (GS) system as a model.
  - Ensure that the new system is viewed as fair by servicemembers and their families.
  - Determine to what extent military pay should be benchmarked to civilian pay for similar occupations.

- Determine whether a salary should include a "military factor" that compensates servicemembers for the unique demands of military service.
- Determine whether "cost containment" implies strict budget neutrality or would allow additional budgetary costs to be offset by additional tax revenues.
- Determine whether and how to structure opt-out provisions.
- Ensure transparency, effective messaging, and leadership buy-in in the transition to an SSS.

We also include, as appendixes, the three memoranda that review compensation preferences, civilian compensation systems, and foreign military compensation systems.

Appendix A: Compensation Preferences

The key points of Appendix A follow:

- **Transparency.** The current US military compensation system continues to lack transparency. Servicemembers tend to be uncertain about the structure of their compensation, especially the value of the tax advantage (resulting from the nontaxability of BAH and BAS) and the amount that DOD contributes to benefits, such as health care and retirement.
- **Pay equity and incentives.** There is some support for the principle of "equal pay for equal work," including among some servicemembers for a compensation system in which dependent status plays a less important role, and some support among civilians for allocating a "moderate" level of pay to performance-based components.
- **Nonmonetary forms of compensation.** There is some evidence for an increase in the importance of nonmonetary forms of compensation involving greater choice and flexibility in work locations and career paths among servicemembers.
- **Demographic differences.** Preferences for different types of compensation can vary significantly based on demographic and other personal characteristics of individuals, including age, gender, education level, and rank. This fact will make it difficult to design a compensation system that will satisfy all servicemembers.

Appendix B: Civilian Compensation Systems

Two of the main topics discussed in Appendix B include:

- **GS system as a model for a military SSS.** The federal civilian GS system might be a natural model for a military SSS. The GS system has drawbacks, however, including

insufficient focus on rewarding excellent performance and pay comparability with the civilian sector.

- **Clear communication.** It's important to share clear, readily accessible information with employees about their compensation packages, in a variety of formats. Clear communication helps them understand the full value of their compensation package, the standards needed to achieve performance-related salary increases or bonuses, and the rationale behind the structure of the compensation system, especially when changes are being made.

Appendix C: Foreign Military Compensation Systems

Below we summarize the main points of Appendix C:

- **Pay comparability and salary benchmarking.** All three foreign militaries we studied (the United Kingdom (UK), Canada, and Australia) explicitly benchmark the salary component of military compensation to the pay levels of sectors outside the military to ensure pay comparability with the civilian sector.
- **Compensation for the unique nature of military service.** All three foreign military pay systems add to the benchmarked base salary a component intended to compensate members for the unique aspects of military service that conventional benchmarking does not capture (the UK's "X-Factor," Canada's "military factor," and Australia's service allowance).
- **Skill-based pay differentials.** All of the base pay scales of the three foreign militaries include skill differentials—higher pay for members in certain occupations requiring high levels of experience or technical competence.
- **Tax advantages.** Tax advantages play a limited role in the compensation systems of the foreign militaries we studied.
- **Pay and dependent status.** The relationship between pay and dependent status also differs across the three foreign militaries. In the UK, almost no military compensation is tied to dependent status. In Canada, some relocation benefits are a function of the number of dependents, but little else. Australia, by contrast, offers a range of benefits (including housing, assisted leave travel, district allowances, and others) that are tied to the makeup of a member's family.

Contents

Introduction

The 13th Quadrennial Review of Military Compensation (QRMC) is considering whether the US military should move from its current regular military compensation (RMC) structure to a single-salary system (SSS). The current RMC structure involves four components:[1]

1. Basic pay – a cash salary that is a function of rank and years of service (YOS)
2. Basic allowance for housing (BAH) – an allowance that depends on rank, location, and dependent status to offset housing costs for members who do not receive government-provided housing
3. Basic allowance for subsistence (BAS) – an allowance that is a function of enlisted/officer status (and is higher for enlisted members) to offset members' meal costs
4. Tax advantage – tax savings resulting from the fact that BAH and BAS are not taxable at the state or federal level

Although this RMC structure has been a central component of US military compensation for decades, policy-makers are concerned that it may be overly complex, administratively demanding, and out of step with modern compensation practices in other sectors of the economy. According to the FY 2017 National Defense Authorization Act (NDAA), which mandated that the Department of Defense (DOD) study the issue, an SSS means [1]:

- **Elimination of BAH and BAS –** assumes the repeal of the BAH and BAS
- **Pay table changes –** new pay tables specifying level of pay necessary by grade and YOS to:
  - Achieve pay comparability with the civilian sector[2]
  - Effectively recruit and retain a high-quality All-Volunteer Force
- **Retirement system changes –** modifications to the military retirement system, including the retired pay multiplier, to ensure that members of the armed forces under

[1] Although most servicemembers receive this combination of basic pay and allowances, there are notable exceptions and nuances. For example, military personnel who live on base (e.g., in barracks) benefit from free housing and free meals and do not receive BAH or BAS. Furthermore, servicemembers stationed overseas do not technically receive BAH; instead, they receive a functionally equivalent allowance called the overseas housing allowance (OHA).

[2] In this paper, we use the word "civilian" to refer to people outside of the military, whether in the public sector or in the private sector. When we refer to the group of public sector employees outside of the military, we will use the terms "federal civilians" or "government civilians."

the pay structure are situated similarly to where they would otherwise be under the new Blended Retirement System

- **Cost-of-living (CoL) adjustment –** same CoL adjustment that DOD uses worldwide for civilian employees
- **Cost containment –** an SSS that will result in no or minimal additional costs to the government

In addition to basic pay and allowances, the US military provides a variety of special and incentive pays to members for service in particular environments and circumstances. These include hazardous duty pay, family separation pay, and special pays for hard-to-staff positions and occupations. Moving to an SSS probably would not change the nature of these types of pay.

The potential benefits of a move to an SSS may include reduced complexity, increased efficiency, and greater transparency with respect to how much servicemembers earn. Potential drawbacks of a switch to an SSS could include high upfront costs and increased compensation costs overall, the need to adjust compensation policies that are currently a function of basic pay (such as retirement benefits), and increased pay inequality. Moving to an SSS would represent a substantial change to military compensation policy.

This study's purpose is to help DOD decision-makers to better understand the implications of moving to an SSS—that is, how an SSS would function in the military and what effects such a system would have on manpower outcomes of interest, such as recruiting and retention, and on overall readiness. Determining whether an SSS makes sense for the US military requires examination of several factors, including transparency, equity, efficiency, and budgetary issues.

The SSS debate

The 13th QRMC is not the first to examine the feasibility of an SSS. The 1st (1967), 3rd (1976), and 7th (1992) QMRCs, as well as the Defense Manpower Commission Report (1976), discussed the potential advantages and disadvantages of transitioning to such a system. The issues discussed in these reports have remained fairly consistent over time. Typically, they fall into four broad categories: transparency issues, equity issues, incentive and efficiency issues, and budget issues.

Transparency issues

It has long been argued that, from the point of view of individual servicemembers, the current pay plus allowances system is so complex that members don't understand the full value of their compensation. Complexity arises from the proliferation of multiple types of pay plus allowances, as well as the fact that the value of the tax advantage can vary based on such factors

as a member's marital status, outside income, or spousal income, so it is hard to compute and can change frequently. Moving to an SSS, then, could increase pay transparency, make it easier for servicemembers to more accurately compare their pay with civilian-sector pay, and perhaps improve recruiting and retention outcomes.

Another potential drawback to the current pay plus allowances system is that, at an organizational level, the system results in personnel costs that are not fully transparent to military decision-makers. Because much of military compensation occurs through the tax system (in the form of reduced revenues to federal, state, and local governments rather than explicit budgetary outlays), the current system does not reflect the true cost of military compensation. By eliminating the tax advantage portion of military compensation, moving to an SSS could more clearly show decision-makers the true cost of military personnel [2-3].

Equity issues

Some have argued that the pay-plus-allowances system is inequitable because it does not embody the principle of "equal pay for equal work." The 1st QRMC (1967) argued that all military servicemembers of the same grade and YOS should receive the same compensation without regard to dependent status or location and housing arrangements [4]. According to this argument, because BAH and the tax advantage depend on such factors as a person's location, dependent status, and tax bracket, current RMC does not represent equal pay for equal work. Only the basic pay component of RMC embodies this principle [5]. Of course, a person's perceptions of pay equity may be largely dependent on his or her circumstances (single members versus those who are married with large families, for example). It also is likely that perceptions of equity and fairness may, to some extent, drive recruiting, performance, and retention outcomes.

Another set of equity-related issues involves understanding which members may benefit or be harmed financially by a transition from the current system to an SSS. For example, while a move to an SSS might (in general) enhance equity by eliminating the tax advantage (which currently favors those in higher tax brackets), predicting the effects of compensation changes on members' taxes can be complex. It has been suggested that junior servicemembers might be harmed by a move to an SSS because eliminating the tax advantage for food and housing allowances would result in increased tax liability for both state income taxes and federal Social Security payroll taxes [3]. Increased liability for state taxes would fall most heavily on junior members because a larger portion of their income is composed of the (currently nontaxable) allowances. This effect would be larger, of course, for people who live in high-tax states. Junior servicemembers also may experience losses related to federal Social Security taxes because earnings credits to their Social Security accounts forgone in earlier years would be replaced later in their careers, when earnings are higher. Even if servicemembers are not directly financially harmed, major changes to the military compensation system have the potential to

engender distrust or concern among members about the effects. It will be important to understand how any reform of the military compensation system will affect servicemembers based on rank, experience level, geographic locations, number of dependents, and other relevant factors.

Incentive and efficiency issues

Related to the transparency and equity issues is a set of incentive and efficiency issues. For example, some argue that military pay should have a closer relationship to a member's performance. The current pay-plus-allowances system obscures the link between pay and productivity because only a fraction of a member's pay currently depends on work done; the rest depends on such factors as location, dependent status, tax bracket, and food costs. From an organizational perspective, more cost transparency could improve the ability of military decision-makers to achieve given levels of recruiting effectiveness, performance, and retention at minimum cost. An SSS also might be simpler to administer in the long term, thus reducing some additional administrative costs (although the transition costs of moving to an SSS may be substantial, which could offset any longer term savings).

Budget issues

Moving to an SSS also has implications for the federal budget. Making RMC fully taxable will increase on-budget costs by requiring the federal government to fund the current tax advantage component of RMC. Unless other policies are changed, making RMC fully taxable also will increase "drag along" costs of other compensation types that increase proportionally with basic pay (such as contributions to retirement plans) [2, 5].

Organization of this report

To help DOD decision-makers to better understand the implications of moving to an SSS, we conducted evidence reviews in three major areas: employee compensation preferences, civilian compensation systems, and foreign military compensation systems. The report synthesizes the major findings from our three reviews. We first consider issues related to the design of a new SSS, including the salary component, location adjustments, housing benefits, and other features of salary systems in civilian organizations and foreign militaries. We then look at important issues concerning the desirability of DOD adopting an SSS, including potential effects on compensation transparency and equity, incentives and manpower outcomes (such as recruiting, retention, and motivation), administrative and budgetary costs, and implementation costs. We conclude with a summary of our findings and the implications for a military SSS. Appendixes A, B, and C present the three reviews (compensation

preferences, civilian compensation systems, and foreign military compensation systems, respectively). Appendix D provides our sources, subject matter experts, and points of contact.

Design of a Single-Salary System

Research on compensation preferences, civilian compensation systems, and foreign military compensation systems provides insights on basic structures and features of salary systems in other sectors, which can inform the design of an SSS for the US military.

Salary component

The General Schedule (GS) scale currently used in the federal civilian sector may be the most suitable model for a military SSS for several reasons. The grade and YOS structure of military basic pay aligns closely with the grade and step structure of the GS system and the related Law Enforcement Organization (LEO) pay schedules. In these systems, paygrades are based on education level, position, and prior experience; within each grade, steps are based on time-in-grade. These systems also include adjustments for annual salary increases reflecting cost-of-living changes, location pay differentials, and special rates that apply to hard-to-staff positions. There also are a number of situational allowances in the GS system that would apply directly to military settings. DOD employs many GS employees and, as a result, is familiar with the system and has created a crosswalk that relates military rank to GS grade [6].

Using the GS system as a model may entail addressing some of its key criticisms. These include excessive focus on maintaining "internal equity" (reflecting a person's position in the hierarchy), insufficient focus on "individual equity" to reward excellent performance, and insufficient focus on "external equity" to accommodate needed changes in pay due to supply and demand conditions in the broader labor market. Among civilian-sector employees, the perception is that the GS system overcompensates some positions and undercompensates others, and that pay increases are not adequately tied to performance. To deal with these issues, a military SSS could institute the kind of external salary benchmarking currently done in the three foreign militaries reviewed, and/or augment the GS system with more pay-for-performance features, such as pay banding, that collapse paygrades and allow more flexibility to award performance-based raises [7].

Location adjustments

The FY 2017 NDAA specified that a military SSS should assume the same cost-of-living adjustment that the DOD uses worldwide for civilian employees [1]. Models for this type of adjustment might be derived from the GS system or those of foreign militaries, such as Canada. The GS system includes locality pay, which is a location-specific adjustment for different

geographic regions that adjusts the pay table to reflect the difference in average pay in that location compared with the rest of the country. These adjustments make up 13 to 28 percent of a federal civilian employee's pay [6]. Canada's military offers its servicemembers a monthly allowance called a Post Living Differential (PLD). The PLD compensates members for the high cost of living (including rental housing costs and food costs) in certain areas of the country (typically large cities). Current PLD rates range from C$62 ($46) to C$1,485 ($1,112) per month, about 5 percent of a typical member's pay.[3] One feature of the PLD is that, unlike GS-system locality pay, it is not pensionable (does not go into the formula that determines a Canadian military member's pension). This feature removes the incentive for members to relocate to a high-cost area at the ends of their careers, which is a criticism of the GS system locality adjustment [8-10].

Housing benefits

Because the US military expects its members to relocate frequently, some subject matter experts (SMEs) believe it will be difficult to fully eliminate BAH by converting it to salary. Therefore, a new compensation system will need to ensure adequate support for frequent location and housing changes in a variety of settings.

Our reviews and SME discussions revealed a range of housing benefit options that DOD might consider. Location-based pay adjustments, such as those for DOD civilians, federal civilians under the GS system, or the Foreign Service's Overseas Comparability Pay (OCP) could be one option. A second option might be to adapt the housing allowance system used for church ministers to US military members. Under this system, housing allowances are built into ministers' salaries, but the portion spent on housing is tax-free [11]. Adapting this system for the military would incur verification costs because servicemembers (like ministers) would have to document their housing expenditures when they file annual income taxes, and it would mean that the federal government would still be bearing some of the cost of providing housing to servicemembers.

A third option could be to look to the housing benefits provided to members of some foreign militaries. Under the UK's "subsidized accommodation" program, for example, military members who are provided housing have the rent (subsidized to be about 30 percent lower than market rents) deducted from their salaries [12-13]. Australia provides a range of housing benefits to its members, including accommodations for single members, service residences for those with families (both provided at a charge), or a rent allowance for those who live in a

[3] We use the abbreviation "C$" to refer to Canadian dollars.

rented home. Each package element is designed so that members pay a similar out-of-pocket amount for housing no matter where they live [14-15].

Other design issues

In addition to the design features already discussed, our reviews suggest a number of additional issues that, although not required of a new SSS, may warrant DOD consideration in undertaking major changes to military compensation.

Skill-based pay differentials

One issue that DOD may want to consider is whether to establish different compensation tables or pay supplements for select communities that require high levels of technical skill or experience. Even though the US military currently addresses these issues using enlistment and reenlistment bonuses, special pays, and faster promotion timing for enlisted members in some fields, the fact that pay tables tend to treat each occupation uniformly can limit DOD's ability to offer salaries competitive with the civilian sector and can harm recruiting and retention in skilled occupations [16-17].[4] Each of the foreign militaries we studied in our review incorporates skill-based pay differentials directly into its pay table. The UK, for example, places certain occupations into one of four pay supplement categories, based on a detailed job evaluation process designed to achieve pay comparability with the civilian sector [12-13]. Canada has established two higher skill "specialist" pay groupings, again based on a standard job evaluation rubric, although they still have issues with recruiting and retention for some occupations [8-9, 20]. The Australian military base pay table includes ten "paygrades" that reflect the level of technical skill and experience required to master an occupation. Entire occupations can move into a higher paygrade as they require higher skill levels. An independent tribunal determines which jobs are assigned to the various paygrades [14-15].

Performance-based pay

One of the criticisms of the military compensation system has been that military pay should be more closely related to a servicemember's performance. Similarly, our review of compensation

[4] Koopman and Hansen (2005) argue that DOD's ability to recruit and retain individuals in particular specialties could be improved by creating occupational pay differentials through increased and more flexible use of enlistment and retention incentive pays. Under this proposal, pays such as selective retention bonuses (SRBs) and enlistment bonuses (EBs) would become a larger proportion of servicemember compensation [18]. See also Pilling et al. (2006) [19].

preferences suggests that civilian workers also support allocating at least some portion of their compensation to performance-based pay. In international comparisons, US employees had among the highest preference for performance-based pay [20].[5] An SSS based on grade and step schedules, however, may not offer clear advantages in this regard. Federal civilian salary systems like the GS system, for instance, have been criticized for insufficiently linking compensation to performance [7, 22]. In moving to an SSS, then, DOD may want to consider developing pay-for-performance features that are currently lacking. One option might be "pay banding" systems similar to those used in some organizations under the GS system.[6] Such systems "collapse" the 15 grades of the GS schedule into fewer bands that cover a wider range of salaries [25-27]. This approach provides managers with more opportunities to award performance-based raises without going through the formalities of promoting an employee to a new grade. Another approach adopted by some federal agencies is to award one-time performance bonuses that do not require a commitment to a permanent increase in the employee's salary [7].[7]

If DOD implements more performance-based approaches, a number of challenges will have to be addressed. SMEs in the private sector (where performance-based pay is more common) emphasize the need for transparency about the basis for merit pay increases or bonuses and how to achieve performance targets. A recent CNA study concurs with the need for transparency, suggesting that any performance-based compensation system should [28]:

[5] Our review also revealed some demographic differences in preferences for performance pay. Men are more likely to prefer compensation packages with a performance component, while women tend to prefer compensation packages with seniority-based pay [20-21].

[6] Any pay-banding approach would have to be implemented with care. Our reviews showed that some attempts to introduce pay banding, such as the UK's "Pay2000" reform or the National Security Personnel System (NSPS) instituted for DOD civilians from 2006 to 2010, either were terminated or had to be significantly revised because of such issues as excessive complexity that impaired pay transparency, inconsistent application, pay inequities, and/or a lack of stakeholder involvement [12-13, 23-24].

[7] Koopman and Hansen (2005) suggested a third option for increasing performance incentives in the U.S. military pay system: make basic pay step increases a function of time in grade instead of YOS, as each of the three foreign militaries we reviewed do. This change would provide additional performance incentives because faster promotions would create a permanent compensation differential for strong performers [18]. Increasing the importance of special and incentive pays that are linked to paygrade (such as SRBs) or other performance measures could also be part of a strategy to increase performance incentives [19].

- Be based on a performance measurement system that provides valid measures of individual performance, is able to distinguish different performance levels and types, measures performance in all of the important aspects of the job, and emphasizes recent and current performance;[8]
- Ensure that incentive payments are large enough to motivate good performance; and,
- Decide whether to reward performance levels, performance growth or improvement, or both.

Another CNA study argues that performance pay implementation should [29]:

- Set clear goals from the outset (for example: be able to achieve adequate recruiting and retention levels, motivate high performance, motivate professional development and appropriate career transitions, and be flexible enough to respond to changing military manpower needs);
- Build on best practices from the private sector; and,
- Be pilot-tested prior to full implementation to determine best practices and whether the goals of the program can be achieved.

Nonmonetary incentives

The military might be able to ease any transition to an SSS by offering additional nonmonetary incentives as part of a broader package of reforms. Some possibilities for which servicemembers have expressed a preference follow [30-35]:

- Duty station/homeport/location choice
- Geographic stability
- Telecommuting options
- Sabbaticals
- Assignment choice
- Additional training opportunities (especially for recruits and younger members)

Among the civilian workforce, there is some evidence of a decrease in the importance of traditional pay and benefits, with increased importance placed on "nontraditional" benefits,

[8] Golfin and Carey (2013) argue that simply increasing reliance on supervisor feedback in a performance measurement system can be problematic, as supervisors can be subjective and biased, and their evaluations can result in decreased morale if perceived to be based on favoritism [28]. Private-sector SMEs agreed that at times, some organizations may suffer from a lack of trust in managers to fairly implement merit pay systems if their objectives differ from rewarding current performance (for example, managers may prefer to reward people who have critical skills, or those deemed to have high potential for future performance, rather than those exhibiting high levels of current performance).

including flexible scheduling, transportation subsidies, more time off, or family-related benefits, such as paternity leave, adoption leave, or child-care benefits [36]. Also, developing tailored approaches to pay and benefits is becoming an increasingly important trend in private-sector compensation systems. More organizations are offering a core set of benefits, along with an allocation that employees can apply to a range of additional benefit options (e.g., tuition reimbursement or other professional development options). Simplifying the military compensation system by eliminating BAH and BAS could provide the opportunity for introducing more personalized or tailored benefit packages that would give servicemembers more choice. Increasing the importance of nonmonetary forms of compensation, then, might offset any negative responses by military members to other compensation changes by increasing choice while limiting the direct budgetary impact of the changes.

Opt-out provisions

One additional issue to consider is that, if current servicemembers are allowed to opt out of some or all aspects of a new SSS, the take-up rate of the new system may depend on how the choice is framed. Our review of compensation preferences describes a well-documented tendency for people to accept default options, even when offered a menu of alternatives. For example, establishing automatic enrollment as the default option greatly increases participation rates in savings plans (although there is not much research on whether these effects carry over to the choice of salary systems) [37-46]. Establishing opting-in to a new SSS as the default option may increase the proportion of servicemembers who adopt it, if such a choice is provided.

SSS: Key Issues

Important considerations in determining whether the US military should adopt an SSS include the following questions: How will an SSS likely affect the transparency and equity of the military compensation system? What will be the effect on personnel outcomes of moving to an SSS? How will the adoption of an SSS affect administrative and budget costs? What might be some of the implementation challenges in moving to an SSS? In this section, we put together information from our three reviews to shed light on some of these issues.

Transparency

One potential benefit of an SSS is that the compensation package would be more transparent to servicemembers than the current RMC is. Our SME discussions revealed multiple dimensions of transparency that may apply to military compensation, depending on the nature of any redesign. First, public-sector SMEs emphasized the need to make sure employees understand the full value of their compensation package and possibilities for future earnings. This is an important issue with respect to the current RMC system because our review of compensation preferences showed that US servicemembers do tend to be uncertain about the structure of their compensation packages, and they tend to underestimate the amount of their total compensation relative to their potential private-sector earnings.

Private-sector SMEs emphasized a second dimension of transparency—ensuring that employees understand the basis for merit pay increases and how to achieve performance targets that lead to salary increases or bonuses. This transparency dimension is likely to become more important if the military adopts performance pay or institutes other types of compensation flexibilities in the future.

Equity and pay comparability

Another argument in favor of an SSS is that it better embodies the principle of "equal pay for equal work." By this standard, pay should compensate servicemembers for work done, and not for other factors (such as dependent status). Public-sector SMEs indicated a need for compensation systems to move closer to an ideal of rewarding work done and strong performance. Adoption of an SSS could be seen as a move in that direction (since basic pay is the current RMC component that best reflects the equal-pay-for-equal-work principle). Our review of compensation preferences suggests that the equal-pay principle may have support among servicemembers. For example, some senior enlisted personnel have expressed

dissatisfaction with their basic pay, especially when compared with that of junior officers, on the grounds that those officers have less experience and often rely on enlisted personnel for on-the-job training. There also is some evidence that at least some servicemembers may prefer a compensation system that does not include additional pay for those with dependents [47].

Related to the principle of equal pay for equal work is the concept of pay comparability. The FY 2017 NDAA specifies that any new SSS should achieve pay comparability with the civilian sector [1]. In our interviews with public-sector SMEs, it was apparent that pay comparability is an important equity issue in compensation that, if not addressed, can create dissatisfaction among employees. For example, SMEs stressed the importance of the need to offer equal pay for equal work across government agencies, especially when personnel from different agencies perform similar work closely together, in similar circumstances. External equity with the private sector also is an important consideration. Each foreign military that we looked at conducts some kind of pay comparability analysis or salary benchmarking to ensure that military pay tracks civilian-sector pay. For example, the UK conducts an annual in-depth pay-review process, including labor market analyses for some military occupations, with the goal of achieving broad pay comparability between military pay and the civilian labor market [12-13]. In Canada, military pay for both noncommissioned members and officers is benchmarked externally against similar jobs in the Canadian federal civil service [9, 48-49]. Australian military salaries also are benchmarked against occupations outside the military where comparisons are possible [14]. All three foreign military pay systems also add to the benchmarked base salary a pay component intended to compensate members for the unique aspects of military service that conventional benchmarking does not capture (namely, the UK's "X-Factor," Canada's "military factor," and Australia's service allowance).[9]

A related equity issue is the extent to which pay should vary according to whether a servicemember has dependents. Integrating BAH into salary would remove pay differentials

[9] Comparisons of US military and civilian compensation suggest that, on average, servicemembers' earnings compare favorably to their similarly educated and experienced counterparts in the civilian sector. A 2006 Congressional Budget Office analysis showed that, on average, RMC exceeded the 75th percentile of earnings for comparably educated civilians. A subsequent CNA analysis for the 11th QRMC based on 2009 data found that average RMC had risen relative to the civilian wage distribution, (a) reaching the 90th percentile relative to the combined comparison group, consisting of civilians with high school diplomas, those with some college, and those with two-year degrees, and (b) reaching the 83rd percentile for officers relative to the combined group of civilians with bachelor's degrees and those with master's degrees or higher. In other words, more than 80 percent of civilians had earnings lower than the earnings of comparably educated and experienced servicemembers in 2009. To some extent, then, there may already be a so-called military factor that is implicitly included in US servicemembers' pay [50-52]. Note that these findings on average military earnings do not preclude the possibility that military pay may lag behind civilian pay for those in specific occupations that require specialized training and education, or are in high demand in the civilian sector [53].

based on a servicemember's marital or dependent status. Our compensation preference review suggests that some servicemembers favor offering the same level of BAH to all members regardless of dependents [47]. Such a move also would align military pay more closely with private-sector practices, where varying compensation based on dependent status is nearly nonexistent.[10] Others, however, fear that such a move could be viewed negatively, as "anti-family," and also could remove an important recruitment and retention incentive for servicemembers with families. This effect may be particularly problematic in an environment of increasing demand for mid- and senior-level officers and enlisted personnel [16-17]. Consequently, it is important to take into account dependents' views and the potential reactions of family units (not just those of the individual servicemember) when implementing compensation changes.

Incentives and personnel outcomes

Recruiting and retention

While the FY 2017 NDAA specified that any new SSS should set compensation at a level that permits effective recruiting and retention of a high-quality All-Volunteer Force, the effects of a new SSS on recruiting and retention were unclear in our reviews and SME discussions. Our compensation preferences review suggests that, in general, servicemembers may favor a compensation system that increases cash compensation [54]. However, the same review also finds that compensation preferences can vary substantially between different groups of servicemembers, suggesting that recruiting and retention effects might not be uniform (for example, the effects on recruiting and retaining members with families, as just discussed). For instance, older servicemembers (who also are likely to be the most skilled and experienced) have expressed a strong preference for compensation approaches that would increase or maintain the value of their retirement benefits (such as increased contributions to the Thrift Savings Plan (TSP)) [30]. This fact highlights the importance of meeting the FY 2017 NDAA's mandate that any new SSS ensure that members of the armed forces under the pay structure are situated similarly to where they would otherwise be under the current Blended Retirement System (BRS). Also, there is some evidence that increasing the availability of nonmonetary forms of compensation (such as geographic stability, or additional training for recruits and younger members, or adding more choice among different types of compensation) might provide effective recruiting and retention incentives.

[10] In the foreign militaries we considered, treatment of dependents by the compensation system varies. In the UK, little military compensation depends on whether a member has dependents. In Canada, some relocation benefits are tied to the number of dependents, but little else. In Australia, by contrast, the ADF provides a range of benefits (including housing, assisted leave travel, and district allowances) that all rely on dependent status [8, 12, 14].

In addition, the recruiting and retention effects of an SSS will almost certainly depend on its design. One design principle that could be helpful in avoiding major negative effects on manpower outcomes is to avoid pay cuts. Both our compensation preference review and our SME discussions suggest that servicemembers might be less accepting of an SSS if it lowers, or is perceived to be lowering, the total value of compensation received [54]. Foreign militaries have dealt with this issue by instituting "pay protection" policies specifying that members will not receive a pay cut, or by phasing in adverse changes to members' compensation over a number of years.

Another set of issues (that would not necessarily be addressed by a move to an SSS unless other features were added to it) involves the limitation on recruiting and retention of highly skilled personnel in occupations that also are in demand in the private sector. The US military's current one-size-fits-all approach to basic pay limits its ability to offer compensation that is competitive with the civilian sector and, thus, hurts recruiting and retention in these occupations [16-17]. Foreign militaries, including those of the UK, Canada, and Australia, typically incorporate skill differentials directly into their basic pay tables. The special rates established under the GS system for hard-to-fill positions, which increasingly have been applied to such high-demand occupations as technology, health care, and engineering, could potentially serve as a model for compensating skilled members.

Performance-based incentives

In addition to recruiting and retention issues, the design of a new SSS should consider the issue of individual motivation and performance incentives. Our civilian compensation review showed that SSSs currently in place in the public sector (including the GS system) tend to be much more heavily weighted toward tenure and job classification than performance [7]. Performance-based pay increases are possible, but rare. In the military (and the Foreign Service), up-or-out promotion systems provide additional performance incentives that many public-sector civilian personnel systems lack; however, in moving to an SSS, DOD may also want to consider how to incorporate performance-based approaches, such as pay banding.[11]

[11] There is some evidence that servicemembers are somewhat skeptical about the degree to which the promotion system provides incentives for good performance. According to Kane (2017), who surveyed a sample of 360 officers and noncommissioned officers, servicemembers perceive the promotion system to be a relatively weak component of military talent management, believing that the system allows poor performers to be promoted, and that promotions may depend to some extent on seniority or favoritism rather than merit [55]. Wayland (2002), who surveyed Air Force officers, concurs, writing that the objective of "ensuring the best officers are promoted and exceptional officers are promoted ahead of their peers may not be met in our current system." Survey respondents indicated a perception that the promotion system was "subjective" in nature, and that such factors as a supervisor's writing ability played an important role in who receives promotions [56]. Sims and Hiatt (2011),

Administrative costs

Our SME discussions indicate that DOD will need to weigh the potentially hefty administrative costs of transitioning to an SSS against possible reduced administrative costs once the transition is complete. SMEs with experience in compensation systems caution that the transition costs of moving to an SSS are likely to be large. Depending on the exact design of the system, costs could include revisions to pay tables and retirement policies, implementation of a CoL adjustment, establishment of a procedure to ensure pay comparability with the civilian sector (a very time-consuming and costly set of tasks for an organization the size of the US military with numerous occupations to be evaluated), and conversion of information technology systems to the new compensation system. There may also be considerable additional costs associated with "second- and third-order" effects of moving to an SSS, referring to the numerous changes that may be required to other military compensation policies that currently depend on levels of basic pay, BAH, or BAS. Even small firms incur costs in the hundreds of thousands of dollars to implement major compensation changes. For an organization the size of the US military, transition costs are likely to run into the billions.[12]

SMEs indicate, however, that once the transition is made, an SSS (like the GS system) is likely to be more administrative- and cost-efficient than a more allowance-based system, such as the current military compensation system, because of "economies of scale." One SME noted, for instance, that the overhead costs of administering the GS system for roughly 1 million federal employees is smaller than the cost of collecting CoL data for allowance areas, many of which affect fewer than 50,000 servicemembers.

Budget costs

DOD also should consider the issue of long-term budget impact in evaluating a potential move to an SSS. The FY 2017 NDAA indicates that any new SSS should "result in no or minimal additional costs to the Government…when compared with the continuation of the current pay system." It may be difficult to meet this objective while fully compensating servicemembers for the loss of BAH, BAS, and the associated tax advantage.

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who linked Marine Corps promotion data to late 1980s-early-1990s job performance records from the Joint Service Job Performance Measurement (JPM) project, also concluded that promotion was not a good surrogate for satisfactory job performance (nor were other potential performance measures such as job knowledge tests, training course grades, proficiency marks, or conduct marks) [57].

[12] A 1977 General Accounting Office (GAO) study reported that the net cost to the federal government of converting to an SSS was estimated by DOD to be in the range of $3 billion to $5 billion (in 2017 dollars), depending on how the change was to be implemented [58].

One issue is the need to offset the loss of tax advantage that servicemembers currently receive through BAH and BAS. If these allowances are absorbed into salaries, all of RMC would become taxable. To fully compensate servicemembers for this loss of tax advantage, the military would have to increase members' basic pay. This increase in basic pay would convert what is now a tax break into an on-budget expenditure, thus potentially conflicting with the goal of minimal additional costs to the government (depending on whether "cost containment" implies strict budget neutrality, or would allow for additional budgetary costs to be offset by additional tax revenues).

Another issue concerns servicemembers who, for one reason or another, do not currently receive one or more of the allowances. For example, servicemembers who live in onbase government housing do not receive BAH, and reservists in most cases do not receive either BAH or BAS. Any increase in basic pay to compensate for the loss of these allowances will result in a pay "windfall" for those who do not currently receive them. These issues could be dealt with (e.g., by charging members living in onbase housing or by changing the pay formula for reservists), but such solutions would introduce another level of complexity into the transition process.

A third budget issue concerns the impact on the new BRS if basic pay is increased to offset the loss of allowances and related tax advantages. Such a change would result in increased government contributions to retirement because those contributions are based on basic pay. Consequently, changes to contribution and pension multipliers (which apply to the level of basic pay), or changes to continuation pay policies (also a function of basic pay), may be needed to counteract the potential budgetary effects of an increase in basic pay.

The importance of clear communication

A primary challenge to successful implementation of an SSS will be managing how servicemembers interpret and react to changes to the compensation structure. Our SME discussions indicate that the success of compensation reforms in large part depends on the perceptions of equity among servicemembers. Canada's unsuccessful attempts to expand skill pay differentials (which would have raised pay for high-skilled/in-demand occupations and lowered it or slowed its growth for lower skilled occupations, thus engendering resistance and dissatisfaction) illustrate this point [9, 48]. Moreover, SMEs report that employees are typically suspicious of changes to the way in which they are compensated, often fearing that such changes are actually disguised pay cuts. Pay and incentive preferences and their impact also vary with servicemembers' career stages, personal lives, or career goals, making it difficult to construct a one-size-fits-all compensation package that pleases everyone [59]. If compensation changes are viewed as unfair by particular groups (regardless of their true impact), issues may arise in retaining and recruiting these types of individuals, which could compromise

readiness.[13] To maintain servicemember perceptions of equity, special policy initiatives limiting the immediate effects of any pay changes may be required. When introducing a new pay system in 2016, for example, the UK's Ministry of Defence instituted a pay protection measure that ensured that no members received a pay cut for three years (later extended to six years) [12].

Private-sector SMEs note that, to achieve servicemember acceptance of an SSS, DOD must clearly communicate its intentions and fully share relevant information. Information must be made available in a variety of formats to help servicemembers quickly and easily access and understand their full compensation package and benefits. Similarly, if the new system incorporates performance-based features, clear information should be shared about the competency and proficiency markers needed to advance in the system. Messaging about all aspects of the new system should make clear the philosophy behind the system. SMEs report that employees also are more likely to understand and accept a new system if it flows from and connects to the overall organization's culture and values. In the context of the military, this may require illustrating how changes to compensation are necessary for mission success or force readiness.

Clear communication is especially important when a compensation change involves pay cuts. If compensation reductions cannot be avoided, our SME discussions indicated that it is even more important to formulate and clearly communicate a justification that resonates with people. In the private sector, such explanations typically come down to "the survival of the firm—your job—depends on this change."

Our SME conversations also indicated the critical importance of gaining senior leadership buy-in and support in compensation system changes. Because senior leaders will be responsible for selling and implementing the new system, these leaders must understand and support the change.

Compensation reform and implementation challenges in foreign militaries

In the late 1960s and early 1970s, all three of the foreign militaries that we studied (the UK, Canada, and Australia) converted from pay and allowance systems to salary systems as the

[13] Our literature and policy reviews and SME discussions recommend that having servicemembers and their families perceive any new compensation system as treating them fairly should be an important objective for DOD. One option for better understanding servicemember perceptions of an SSS would be to conduct surveys or focus groups of servicemembers in order to identify their preferences for different types of pay and benefits and their attitudes toward different policy options under an SSS.

primary form of military compensation. Subsequently, each has faced additional challenges in implementing changes within the framework of a salary-based system. This subsection of the report provides a summary of some of the major changes—both for the transition to a salary system and for more recent reforms—and some of the challenges these nations faced in implementing military compensation system changes.

United Kingdom

Conversion to a salary system

Before 1970, UK military compensation took the form of a pay and allowance package. Servicemembers' basic pay took the form of a "spot rate," a specified daily amount that depended on rank, with higher rates established for taking on additional duties (such as piloting, parachuting, or serving in submarines). There was no annual salary. UK servicemembers also received in-kind benefits in the form of free housing and food. In addition, some members were entitled to cash allowances in lieu of the in-kind food and housing benefits or to compensate for special circumstances, such as relocation expenses [5, 12, 58].

By the 1960s, this compensation system was perceived to have a number of disadvantages. The spot rates were set such that military pay was well below civilian levels (although this was partially mitigated by the in-kind benefits and allowances). There was also a perceived lack of equity in the system because married members were eligible for allowances and benefits (including a cash marriage allowance, a cash food allowance, and family housing) that were unavailable to single members. The pay system was also thought to lack transparency, in that it was difficult for members to properly value the in-kind benefits and thus make accurate comparisons between their compensation and that of civilian-sector employees [5, 58].

In 1970 and 1971, the UK converted to a salary system in which the housing and food benefits were eliminated, with their value included in a larger annual salary payment to members that reflected private-sector pay rates. The pay gap between single and married members was eliminated; all servicemen of the same rank and occupation were paid the same salary. Because the new system meant a large increase in pay for single members, the increase was implemented over a two-year period (1970–1971). Implementation planning for the new system took about three years, and involved (a) conducting job evaluations and establishing acceptable pay linkages to ensure pay comparability between the military and civilian sectors, (b) establishing methods for calculating charges for government-provided housing and food, (c) revising regulations on pay, pensions, and allowances, (d) studying ways of making annual adjustments to base salary and other pay components, and (e) assessing the short- and long-term costs of adopting the new system. A 1977 General Accounting Office (GAO) report provided one estimate of the costs of moving to the new pay system—equivalent to about a 23 percent pay increase, which may have helped to ease the transition process [5, 58].

More recent changes: Pay 2000 and Pay 16

In April 2016, the British Armed Forces transitioned to a new core pay system, known as Pay 16, which consists of the core basic pay scheme described above. Pay 16 consists of a single-pay spine with four pay supplements. Each trade receives a Trade Score and is placed into one of the supplements to ensure pay comparability with the civilian labor market. Assignment of occupations to the four pay supplements is determined by a Job Evaluation process.

Pay 16 was introduced to simplify the compensation system and make it easier for servicemembers to anticipate what they would earn in the future. The previous pay system, Pay 2000, was introduced in April 2001. It included two pay bands (high and low), which were applied at each rank within each trade. This meant that there were 128 possible permutations of pay schemes for servicemembers throughout their careers. The Pay 2000 system largely was perceived to be overly complex, and Pay 16 made the pay system easier to interpret and predict future salary levels. The X-Factor was not affected by the transition to Pay 16 [23].

In addition to being complicated, many servicemembers were dissatisfied with Pay 2000 because it led to situations where they could experience pay cuts. The system led to instances of "flip flop," in which personnel moved from a higher pay band in one rank to the lower pay band in the subsequent rank when promoted. The compensation offered through the lower band in their new rank was sometimes less than what they had been receiving in the higher band of their previous rank. There also were instances of overtaking, where individuals overtook others in the same trade and rank who were promoted earlier. Servicemembers were especially concerned about the loss of pay through the flip-flop scenario because it affected the potential value of their pensions.

Pay 16 was designed to be easier for servicemembers to understand, and it ensured that servicemembers would no longer experience pay cuts through a flip-flop scenario. The new pay system was not intended to serve as a cost-cutting measure for the military. Instead, Pay 16 rebalanced existing investments in compensation to increase the effectiveness and efficiency of the pay system [13, 23].

When Pay 16 was implemented, the Ministry of Defence instituted a pay protection measure that would ensure that no servicemembers received a pay cut under the new plan [13, 23]. The pay protections initially were put in place for three years but subsequently were extended to six years. The measure helped assuage servicemembers who were concerned that their compensation might be reduced under Pay 16 [12]. In the long term, through-career pay under Pay 16 increased or remained broadly the same for two-thirds of servicemembers of other ranks (enlisted) relative to Pay 2000 [23]. A subject matter expert on compensation from the Ministry of Defence indicated that most servicemembers are satisfied with the compensation that they receive under Pay 16 [12].

Canada

Conversion to a salary system

The current Canadian military compensation structure was put in place during the late 1960s. Before 1966, Canada's military pay system was a pay and allowances system in which basic pay (the salary component) was based on a comparison of private-sector jobs with comparable military jobs. There were special pays for pilots, navigators, medical, dental, and legal officers. Allowances included a tax-advantaged subsistence allowance (only two-thirds of the total was taxable) that varied by rank, type of housing occupied, and marital status, and a separate "marriage allowance" of C$30 per month (C$40 for officers) for married members. Each of these components was pensionable—that is, parts of the base from which pension payments were calculated [5, 58].

In 1966, Canada began converting to the current compensation system for military members in which basic pay, the subsistence allowance, the marriage allowance, and some specialist pays were converted to salary. The reasons for this change included perceptions that the older pay system was inequitable because it paid married members more for the same level of work, and it treated those living in military-provided housing differently than those living in privately owned homes. The system was also thought to lack transparency because military members could not easily compare their pay to pay in the civilian sector [5, 58].

The conversion process occurred in two stages. In 1966, compensation elements under the older pay and allowances system were changed over to salary. This involved combining the marriage and subsistence allowances into a single pay, based on rank and time-in-rank, and instituting a system of charges for government-provided housing. The conversion of these pay elements to salary resulted in a 14 percent increase in compensation costs: about 3 percent related to the elimination of the difference between pay for single and married personnel, 1.4 percent owing to elimination of the tax advantage for the subsistence allowance, and about 10 percent attributable to a general pay increase. The second stage of the conversion process, establishing pay comparability between the military and the Canadian civil service, required further study and planning and was implemented in stages in 1970 and 1971. As part of this pay comparability planning process, it was determined that public service pay was, on average, about 22 percent higher than military pay, and this additional pay increase was incorporated into military members' pay in 1970 and 1971. By some accounts, these changes resulted in reduced administrative cost, although there is no exact figure for how large these savings may have been [5, 9, 48, 58].

The process of including skill-based "specialist" pay categories into the salary table was not completed until 1975 because of disagreements between the military and treasury officials on the right procedures for establishing pay comparability between specialist occupations in the military and in the Canadian public service. Although military planners had anticipated that

only a small percentage of servicemembers would receive higher specialist pay (perhaps 3 to 5 percent of members), by 1976 about 20 percent of members were receiving the higher pay levels, so the Canadian Armed Forces (CAF) were spending substantially more on specialist pay than had been forecast [5, 9, 48].

More recent changes: Compensating skill

Since the conversion to a salary system, there have been no major redesigns of the compensation structure. Instead, the system has evolved slowly, becoming more similar to that of the Canadian Public Service, as well as increasingly complex. The single set of compensation rules developed in the 1960s has grown over time to account for increasingly diverse requirements of military service, including a growing number of posting and deployment locations and greater family pressures [9].

One issue that has not successfully been dealt with is how best to compensate people with valuable technical skills. The "team concept" applied to Canadian military pay, in which most occupations of the same rank are paid the same amount, tends to flatten the pay structure with respect to skill, making it difficult to recruit and retain technically skilled personnel. Multiple attempts to modify Canadian military compensation to better compensate skilled personnel have been unsuccessful. In the 1970s, for example, CAF attempted to expand the number of pay fields from three (standard, specialist 1 and specialist 2) to five. This attempted reform resulted in great dissatisfaction among some personnel, and some groups refused to perform extra or even traditional work tasks. These issues became so divisive that the reform quickly was abandoned. In the late 1980s and early 1990s, an initiative to introduce a new pay scale that combined rank and skill-based pay increments was never implemented because policy-makers feared dissatisfaction among lower skilled personnel and were concerned about a potentially high implementation cost. The issue of compensating skill still is a problem. In recent years, it has become increasingly difficult to attract and retain technically proficient people at both the non-commissioned member (NCM) and general-service officer (GSO) levels. A partial response to this problem has been expanded use of recruitment allowances as bonuses [9, 48, 60].

Australia

Conversion to a salary system

Until 1971, military pay in Australia for other ranks (enlisted personnel) was based on a "group pay system" in which pay rates were based on comparisons between military jobs and civilian jobs with comparable functions and skills. When the system was initiated in the late 1950s, there were 7 pay groups; by 1971, the number of groups had expanded to more than 30. There was much dissatisfaction with this system, due to the proliferation of pay groups and a belief that the group pay system placed too much emphasis on occupations and technical skills with

civilian counterparts and undervalued personnel whose main skill was military (and thus hard to compare to private-sector jobs). There was also a lack of transparency—members did not fully understand what pay elements were included in their compensation, the relationship between military and civilian pay rates, and how annual pay adjustments were determined—as well as perceived inequities between single and married members [5, 58].

Between 1971 and 1973, the Australian military converted to a salary system for military members in two stages. In the first stage, completed in 1971, pay linkages were established with the Australian public service through a military job audit process that evaluated the work content of military duties for both officers and other ranks (enlisted). These job audits involved studies conducted by joint teams of management consultants and uniformed military members, using surveys and interviews to determine the nature and requirements of individual assignments. Salary scales were based on these audits, with military pay aligned to rates applying to comparable civilian-sector jobs. The second stage of the process, completed in 1973, converted pay elements under the older system into salary [5, 58].[14]

One estimate of the costs of this conversion process was about 15 percent of pay to achieve pay comparability with the public service in the first stage, and about 8 percent to convert the pay elements under the old system into salary in the second stage. In dollar terms, these costs have been estimated at $A72.9 million (in 1970 terms), which would be equivalent to at least $600 million (US) in 2017.[15] Roughly half of this cost was attributed to the restructuring of pay and continuing allowances and the introduction of the service allowance (which compensates members for unique aspects of military service not accounted for in salary benchmarking), about 40 percent was attributed to the need for additional pay increases for other ranks (enlisted) to prevent individuals from receiving less pay under the new system, and the rest stemmed from the net costs of eliminating some allowances and establishing charges for housing and food (5 percent) and the costs of additional pay increases for junior member and trainees (about 7 percent) [5, 58].

More recent changes: Adopting a defined-contribution pension

The important recent change to the Australian military compensation system involves the move from a defined-benefit retirement system to the new defined-contribution "superannuation" system that was implemented in 2016. Because the US already has moved to its new Blended Retirement System, the history of the Australian reform is probably less relevant to the potential move to an SSS. Note, however, that the Australian military is having

[14] Despite these changes the Australian military compensation system still includes substantial housing benefits for servicemembers, as well as a range of benefits that are tied to whether or not a member has dependents, as described in Appendix C.

[15] We use the abbreviation "A$" to refer to Australian dollars.

some of the same issues in its transition to superannuation as the US is having in its transition to BRS, including low take-up rates among incumbent members who were given a choice between the old and new retirement systems [14].

Conclusion

The 13th Quadrennial Review of Military Compensation is considering whether the US military should move from its current regular military compensation structure to a single-salary system that would eliminate BAH, eliminate BAS, and increase basic pay. In this study, we have focused on the following issues:

- What are the potential advantages and disadvantages to the US military of moving to an SSS in terms of pay transparency and equity, incentives and manpower outcomes, and cost?
- How might an SSS be designed to meet such objectives as equity and pay comparability, adequate recruiting and retention, and minimizing additional costs to the federal government?
- What are some important implementation challenges that DOD will face if it goes forward with an SSS for the military?

To provide insight into these questions, we conducted a literature review on the compensation preferences of servicemembers and civilians, a review of US civilian-sector compensation practices based on a literature review and SME interviews, and a review of foreign military compensation practices based on (a) interviews with foreign military compensation experts and (b) a review of policy documents provided by our foreign military points of contact. The information gathered through these reviews suggests three key implications that center on:

1. The need for compelling evidence to justify the change to an SSS
2. Alternatives to an SSS
3. Considerations in adopting an SSS

The need for compelling evidence

Challenges to redesigning the military compensation system highlighted in the preceding sections suggest that such a change should only be made if there is strong and compelling evidence that an SSS presents clear advantages. Our review of compensation preferences indicated that, in general, servicemembers are satisfied with the military compensation package as a whole, despite dissatisfaction with some aspects of the system [47, 54]. These findings suggest that compensation reforms aimed at particular areas of dissatisfaction might be more widely accepted by servicemembers (see the next subsection, "Alternatives to an SSS," for examples).

In addition, some areas of dissatisfaction are not necessarily addressed by an SSS. For instance, such systems do not necessarily address special pay and incentives, which some servicemembers perceived as unfair. Similarly, an SSS does not inherently address the call for more performance-based incentives.

Another issue is cost—the potentially very large cost of transitioning to a new compensation system and the possible long-term budget effects of absorbing allowances and related tax advantages into servicemembers' salaries. As we have discussed, pay increases to offset the loss of allowances could negate any administrative cost savings once the new system is in place. Detailed analysis of such costs will be needed to illuminate how costs and benefits might balance out.

Experience with major compensation and benefits changes also reinforces the adage that "change is hard." For instance, Canada's attempts to modify its military compensation system to better compensate skilled personnel have been unsuccessful because of dissatisfaction among key personnel, coupled with high implementation costs [9]. In addition, changes to military retirement benefits in both Australia and the US have seen relatively low take-up rates among incumbent members who are given a choice between the old and new systems [14]. This precedent, as well as research showing that employees tend to go with default options when given a choice, suggests a potentially long implementation timeline for a new compensation system if there are opt-out provisions for current servicemembers. Taken together, these challenges suggest that compelling evidence and sound justification for switching to an SSS should be established before making such a resource-intensive change.

Alternatives to an SSS

If it is determined that the costs and challenges of implementing an SSS outweigh the benefits, DOD might consider how to improve some of the more problematic aspects of the existing system without fully replacing it. We describe three possibilities:

- **Increasing transparency.** To ensure that servicemembers understand the total value of their compensation packages (including government contributions), more complete information might be provided through such means as annual personal benefit statements that include information on earnings, leave, benefits, tax-free and tax-deferred compensation, and retirement forecasts.
- **Alleviating equity concerns.** One of the largest equity issues focuses on the higher BAH provided to servicemembers with dependents, even when they do the same work as single servicemembers (thus violating the equal-pay-for-equal-work principle) [47]. DOD might consider how to modify BAH in ways that are not perceived as "anti-family," while addressing the equity issue. One option would be to retain BAH but close

the gap between the amounts received by members with and without dependents in stages, over time, until the gap is eliminated. A second approach might be to consider adopting a version of the system of housing allowances for religious leaders. These allowances are built into ministers' salaries, with all or part of the allowance excluded from taxes [11]. While this system takes into account actual housing expenses—which are likely to vary based on family size—number of dependents is not the explicit basis for allowances. Such an approach may alleviate current BAH equity concerns.

- **Improving incentives.** To address concerns that military pay should be more closely related to a servicemember's performance, DOD might consider modifications of the existing compensation system, servicemember incentive preferences, as well as private-sector trends that may have appeal; for instance:
  - Increasing the importance of special and incentive pays that are linked to paygrade (such as SRBs) could provide additional performance incentives as faster promotions for strong performers would create a larger pay differential.
  - Given servicemembers' preference for nonmonetary incentives, such as duty station choices and guaranteed assignments, DOD might consider offering such incentives to servicemembers as a reward for strong performance.
  - Task-based compensation is an emerging trend in the private sector that may be worth a closer look. Such an approach might offer a way to incentivize servicemembers by giving them the opportunity to apply to perform particular or specialized tasks for a specified amount of compensation. Such an approach would require development of task-specific compensation packages for which qualified servicemembers could apply, with compensation awarded upon successful completion.

Important considerations if moving to an SSS

If it is determined that the benefits of an SSS outweigh the costs and challenges of making such a change, several considerations will be important in designing and transitioning to the new system. These considerations include understanding the pros and cons of the GS system, ensuring that the new system is viewed as fair, determining whether and how to structure opt-out provisions, and ensuring transparency and effective messaging. We describe these considerations below:

- **Pros and cons of the GS scale.** As discussed in our section on civilian compensation systems, the GS system could be a natural successor to the military compensation system for a number of reasons. Because DOD employs many GS employees, it is familiar with the system and has created a crosswalk that explicitly relates military

rank to GS grade. In addition, locality pay or situational allowances, such as the Living Quarters Allowance (LQA), could be used in place of the BAH, and special rates might provide a mechanism for filling high-demand, hard-to-fill occupations. Using the GS system as a model, however, may entail addressing some of its drawbacks, including excessive focus on compensating a person's position in the hierarchy, and insufficient focus on rewarding excellent performance and accommodating changes in pay needed due to changing labor market conditions.

- **Ensuring that system is viewed as fair.** Because salaries in a new system would be taxable, moving to an SSS would require measures to offset the loss of tax advantages. These kinds of tax advantages are rare in the civilian sector and in foreign military systems, so messaging this may help servicemembers appreciate the change. Other ways of managing the compensation loss include increasing salaries to offset the loss of tax advantages or building in pay protection measures similar to those used in the UK. If pay reductions are necessary for budgetary reasons, DOD might consider offsetting these reductions with nonmonetary incentives that are highly valued by servicemembers, such as choice of duty station, guaranteed duty assignment, or homesteading (remaining in the same geographic location for several tours).
- **Structuring opt-out provisions.** If DOD wishes to allow current servicemembers to choose the existing compensation system or the SSS, some consideration should be given to offering the SSS as the default option, given that research shows a bias toward selecting default options when given a choice. Such an approach might help with a more rapid transition to the new system.
- **Ensuring transparency and effective messaging.** The importance of transparency and messaging emerged repeatedly throughout our research, particularly in connection to making changes in compensation systems. Private-sector SMEs emphasized the importance of sharing a rationale that resonates with employees (i.e., how the new system is advantageous for them and for the organization). It also will be important to provide detailed information that makes clear the total compensation and incentives that servicemembers will receive under the new system, and how the new system compares with the old one. Leadership buy-in is a key element to effective messaging, and leaders should be well educated about the new system, its advantages, and messaging.

In conclusion, available evidence indicates that servicemembers are satisfied with the existing compensation package as a whole, although they believe that they deserve higher compensation and they dislike aspects of the system. Implementing a new system may incur high transition and long-term budget costs, and experience with changing compensation systems both in the US and in allied military systems indicates many challenges that often have resulted in failed attempts. Even so, compensation reforms have succeeded when challenges

are anticipated and effectively addressed, such as the UK's Pay 16 system. We have highlighted likely challenges and potential approaches to addressing those challenges either through improvements in the current compensation system or in the transition to an SSS. DOD will need to weigh all of these issues in making a decision about whether to implement an SSS.

Taken together, the reviews provide a rich set of information about compensation preferences and US federal civilian, private-sector, and foreign military compensation systems that can inform decisions about whether and how the US military might move to an SSS. This information is relevant to issues related to the design of an SSS, including the salary component, location adjustments, housing benefits, and other features of salary systems in civilian organizations and foreign militaries. This information also is relevant to assessing the desirability of DOD adopting an SSS, including potential effects on pay transparency and equity, incentives and manpower outcomes, and administrative and budgetary costs. Our reviews suggest some key implications for a move to a military SSS. First, there is a need for compelling evidence to justify a change to an SSS. Second, if DOD decides to go forward with an SSS, the following actions will be important:

- Assess the advantages and disadvantages of using the GS system as a model.
- Ensure that the new system is viewed as fair by servicemembers and their families.
- Determine to what extent military pay should be benchmarked to civilian pay for similar occupations.
- Determine whether an SSS should include a so-called military factor that explicitly compensates servicemembers for the unique demands of military service.
- Determine whether "cost containment" implies strict budget neutrality or would allow additional budgetary costs to be offset by additional tax revenues.
- Determine whether and how to structure opt-out provisions.
- Ensure transparency, effective messaging, and leadership buy-in in the transition to an SSS.

If DOD decides against moving to an SSS, alternative courses of action might include (a) increasing pay transparency by providing more complete information to servicemembers through such means as annual personal benefits statements that include information on earnings, leave, benefits, tax-deferred compensation, and retirement forecasts and/or (b) addressing equity and incentive issues through modifying the existing BAH system to eliminate disparities based on dependent status, increased emphasis on pay for performance, or nonmonetary forms of compensation.

Appendix A: Compensation Preferences

A central consideration in undertaking any type of compensation reform is that military personnel are likely to have specific preferences about *how* they are compensated. Transitioning to an SSS has the potential to affect how favorably servicemembers view their military compensation. This appendix is intended to provide a foundational understanding of individual compensation preferences for those serving in the military and those employed in the private sector. We describe findings from numerous sources, including previous CNA studies, sources archived in the Defense Technical Information Center (DTIC), academic databases (EBSCOHost, ProQuest, JSTOR, and LexisNexis Academic), and Google Scholar. Social science research demonstrates that people may prefer some forms of compensation over others, even if the value of each compensation type is held constant. Understanding these preferences is important to predict several consequences of an SSS, especially implications for servicemember retention.

This appendix summarizes relevant military research, including how preferences for and the relative value of different types of compensation vary by servicemembers' military service and demographic characteristics. The rest of the appendix synthesizes the academic research on civilian employees' compensation preferences, drawing from labor economics, human resource management, psychology, and organizational sciences. The appendix concludes with a summary of research related to behavioral biases toward default compensation options; this summary focuses on automatic enrollment in retirement savings accounts.

The research covered in this review is intentionally broad and captures several forms of compensation that would not directly be part of any SSS (e.g., bonuses). We cast a wide net because our goal is to provide a comprehensive description of people's compensation preferences and how those preferences affect decision-making. Put simply, the findings documented below collectively provide key insights into how servicemembers might respond to *any* change in their compensation's structure.

The most important conclusions of this review include the following:

- **Transparency.** The current US military compensation system lacks transparency; servicemembers tend to be uncertain about the structure of their compensation, especially the value of the tax advantage (resulting from the nontaxability of BAH and BAS) and the amount that DOD contributes to benefits, such as health care and retirement. There is also some evidence that younger workers in the civilian sector especially value transparency in compensation.

- **Pay equity and incentives.** There is some support, including among some servicemembers, for the principle of equal pay for equal work:
  - Senior enlisted personnel express dissatisfaction with their base pay relative to that of junior officers, who are often less experienced than the enlisted personnel and rely on enlisted personnel for training.
  - There is also some sentiment among servicemembers (although not universal) for a compensation system in which dependent status plays less of a role—that is, for single members to receive the same level of BAH as do members with dependents.
  - Among civilians, there is some support for allocating a "moderate" level of pay to performance-based components.
- **Cash versus noncash compensation.** Some servicemembers express a preference for cash over noncash compensation, but there are also concerns among servicemembers that increases in cash compensation are actually disguised pay cuts.
- **Nonmonetary forms of compensation.** There is some evidence to support an increase in nonmonetary forms of compensation involving greater choice and flexibility in work locations and career paths among servicemembers.
- **Demographic differences.** Preferences for different types of compensation can vary significantly based on people's demographic and other personal characteristics, including age, gender, education level, and rank. This fact will make it difficult to design a compensation system that will satisfy all servicemembers.

Studies on servicemembers' compensation preferences

Servicemembers' preferences for different compensation types can provide insight into how they would respond to the implementation of an SSS. Analysts at CNA and other research organizations have conducted surveys and focus groups to understand the relative value that servicemembers place on different compensation types. These studies find that compensation preferences vary by servicemembers' characteristics, including age and officer or enlisted rank.[16]

In designing any type of compensation reform, it also will be important to understand how demographics affect compensation preferences because the military is not composed of a

[16] In addition, one CNA study focused on whether certain compensation approaches are more attractive to reservists and more likely to incentivize their reserve reenlistment [61].

random selection of the population. For example, compared with the overall civilian population, it is disproportionately younger and male. An understanding of demographic differences in compensation preferences can help policy-makers to predict how different groups of servicemembers may respond to the implementation of an SSS (e.g., predict who will opt in to a reformed SSS under a grandfathering clause) or to better understand how to target segments of the population (e.g., women) for increased recruitment or retention.

Servicemembers' preferences for cash and nonmonetary incentives

In 2005, the Government Accountability Office (GAO) conducted an in-depth study on servicemembers' perceptions of the military compensation system, including their satisfaction level and any recommended changes [54]. The study's authors reviewed DOD's Status of Force Survey data on satisfaction with compensation. In addition, they conducted 40 focus groups with 400 servicemembers at eight US military installations. Respondents represented all four service branches and both enlisted and officer paygrades. While the focus groups were not representative of the entire military, they provided additional details and context that would not have been available in the survey results alone.

Preferences for cash benefits

Servicemembers often were dissatisfied with specific compensation components. In 35 of 40 focus groups, respondents indicated a preference for cash benefits; they would be willing to accept lower amounts of noncash benefits to receive additional cash subsidies. For example, servicemembers would rather receive a cash subsidy for shopping at offbase stores than discounts at commissaries or exchanges. Other respondents said that they would prefer cash subsidies or a cafeteria allowance for health care, because of limited provider choices. Finally, some servicemembers who did not intend to stay in the military long enough to earn their retirement benefits (20 years) wanted a cash subsidy that they could invest toward retirement.[17]

Preferences for current versus deferred pay

Similarly, other studies find that servicemembers prefer *current* pay to *deferred* pay, which often is in the form of retirement benefits. Ausink and Wise (1996) studied the effects of compensation changes on Air Force pilots' decisions to leave the military, with specific attention paid to the two incentive programs offered in 1992: the Voluntary Separation

[17] The new Blended Retirement System (BRS) addresses this issue. The BRS combines the military's traditional defined-benefit retirement plan with a defined-contribution plan (similar to civilian 401(k) plans). Under the BRS, fully vested personnel who leave before 20 YOS will receive all of the contributions (both the individual servicemember's and DOD's) from the defined-contribution portion of the plan.

Incentive (VSI) and the Special Separation Benefit (SSB) [62]. While the former provided annual payments that lasted for two times the servicemembers' years of service, the latter was a one-time, lump-sum payment. Both amounts were a function of base pay and years of service. Although the present value of SSB was much less than the present value of VSI, initial applications to leave the Air Force under one of those two programs revealed a large preference for SSB, suggesting a preference for the current, lump-sum payment as opposed to future, annuity payments [62].

Warner and Pleeter (2001) studied the same VSI/SSB decision in the Army, Air Force, and Navy, noting evidence of particularly high personal discount rates (meaning future income is *discounted* as compared to current income) among their sample of military separatees [63].[18] Although DOD predicted that roughly half of the enlisted population and no officers would take the lump-sum option (SSB), over half of officers and 90 percent of enlisted opted for it (implying an enlisted discount rate of at least 18 percent) [63]. The authors note that military compensation is, in general, more heavily deferred than private-sector compensation, in part because the retirement plan (at the time, before BRS) vested servicemembers only after 20 years in the military [63]. As a result, retention rates should differ by an individual's preference for current versus deferred pay. The military system is more attractive, in the long run, to those with lower personal discount rates; those who stay and ultimately earn a military retirement should have lower discount rates (i.e., a preference for deferred pay), while those who separate will have higher discount rates (a preference for current pay) [63]. The extent to which the adoption of the BRS will change these retention behaviors remains to be seen.

These preferences provide preliminary evidence that servicemembers might support an SSS that increases cash compensation received. However, according to the GAO study, some servicemembers had reservations about replacing noncash incentives with cash. In 16 of 20 focus groups, participants were concerned that new cash subsidies might be lower in value than current noncash or deferred benefits. These results indicate that servicemembers might be less accepting of an SSS if it lowered the total value of compensation received. More experienced military members indicated that more cash compensation might not be in the best interest of younger servicemembers, who (older members worry) might not be responsible in their personal finances [54].

Preferences for current versus deferred pay by servicemember characteristics

There also is literature highlighting demographic and situational differences in personal discount rates. Asch and Warner (1994), for example, note that young people are known to

[18] The Marine Corps was excluded from the analysis because the authors were unable to reconstruct VSI and SSB eligibility.

have high personal discount rates and, in fact, value deferred compensation at a lower rate than it costs the government to *pay* deferred compensation, suggesting it might be most effective for the services to reduce retirement pay and instead increase active pay to their youngest members [59]. In a similar vein, Asch and coauthors indicate in more recent work that personal discount rates are expected to be lower for those with more education, perhaps suggesting that young servicemembers' preference for current over future compensation may be a misinformed preference [64]. Warner and Pleeter, similarly, find noticeable differences in enlisted/officer personal discount rates: they range between 10.4 and 18.7 for officers, and between 35.4 and 53.6 for enlisted [63]. Finally, Simon, Warner, and Pleeter (2014) also have found measurably lower discount rates (and thus greater patience) among those who are more cognitively adept, such as doctors [65]. There also is evidence that personal discount rates vary across the services. Asch et al. report a personal discount rate of 14.9 percent for the Army, 9.9 percent for the Navy, 13.6 percent for the Air Force, and 17.6 percent for the Marine Corps, though it is not clear whether these discount rates are for officers, enlisted, or both combined [64]. Of course, these service-level discount-rate differences could be related to demographic differences across the services.

Pay preferences and the impact of incentives have been found to vary not only with servicemember characteristics but also with the situation in which they find themselves. For example, Mehay and Hogan (1998), in their study of VSI/SSB decisions made by enlisted Navy and Air Force personnel, noted that voluntary quit rates increased notably at times when uncertainty regarding service layoffs was high—that is, an increase in future uncertainty led servicemembers to opt for the more guaranteed, immediate cash option [66]. Asch and Warner highlight the importance of properly designing incentives to get the desired behavior; specifically, they ask whether the current system induces the most qualified personnel to stay and seek promotion [59]. Because of the pyramid nature of the military promotion system, in which future leaders are grown from the entry pools, it is especially important that those who have reached their terminal grade are incentivized to keep contributing and revealing their full potential, even though there are no further promotions available to them [59]. For these reasons, careful and effective management of servicemembers' compensation is important, at all levels, and it may be difficult to construct a one-size-fits-all compensation package.

A 2005 CNA study showed that older servicemembers place more value on retirement benefits (deferred compensation) than do younger members. The report noted that, while few people join the military to secure retirement benefits (in fact, the value that younger servicemembers attribute to retirement benefits is less than the government's cost to provide them), retirement and retirement health care are extremely important to older servicemembers. Active component servicemembers with at least 10 years of experience indicate that retirement benefits are (or, in the pre-BRS era, have been) a primary reason to continue to serve until 20 years of service. In fact, very few servicemembers have left as they approached retirement

eligibility. Servicemembers have been much more likely to leave after 20 years of service because they earn only marginal increases in retirement benefits after that point. Again, the degree to which BRS will change these behaviors is still to be determined. The study's results indicate that older servicemembers have a strong preference for compensation approaches that would increase or maintain the value of their retirement benefits [30].

Preferences for nonmonetary compensation

Other studies have focused on servicemembers' preferences for nonmonetary incentives. Even though these benefits are not direct compensation, information on servicemembers' relative preferences for nonmonetary rewards could inform how they respond to an SSS. In addition, as discussed in the 7th QRMC, the implementation of an SSS may not be revenue neutral. To fully monetize the tax benefits that servicemembers currently receive, DOD would need to increase its investment in personnel [3]. If there is insufficient budgetary capacity or political will to do so, many servicemembers likely would receive lower monetary compensation under an SSS. If servicemembers prioritize nonmonetary incentives, however, the military might be able to compensate for lower overall salaries under an SSS by offering additional nonmonetary incentives.

To what extent should the military's compensation structure emphasize cash versus nonmonetary forms of compensation? As was discussed in a 2004 Congressional Budget Office (CBO) Issue Brief, arguments can be made for either a more cash-based or less cash-based compensation structure. For purposes of both recruiting and retention, it is critical that DOD offer compensation packages that are not only competitive with the civilian sector but also reward servicemembers for the extra risks and rigors that are part of military life [31]. In this vein, noncash benefits are a stable form of compensation that ensures good quality of life for younger servicemembers—thus not only attracting high-quality recruits but also encouraging those with valuable experience to stay in service—and it does so at a lower cost via the discounts provided to the military from benefits such as group health insurance [31]. Noncash benefits also promote readiness. For example, servicemembers feel that their families are well provided for because of such benefits as subsidized physical fitness centers and family support programs [31].

However, after considering that installation-based benefits are the second-largest noncash component of military compensation after health care and that today's military is much more expeditionary and less garrison based than when these programs were developed, there are certainly arguments to be made for a more cash-based compensation package as well [31]. Specifically, today's servicemembers are deploying overseas *without* their families and for shorter periods, making many of the family- and installation-based noncash benefits less necessary [31]. There is less value from subsidized housing, shopping, schools, and child care, among other noncash benefits, if families are not living on base. Most active-component and

reserve servicemembers who are *not* living on base may prefer benefits that are not tied to a specific geographic location [31]. Increasing the cash percentage of military compensation would give servicemembers more choice in how to spend their compensation based on their individual needs and could be targeted to those who are most productive or possess critical skills, making it less costly to DOD [31]. In addition, cash's value is likely more recognizable by potential recruits and those making reenlistment decisions, perhaps providing a less costly and more effective avenue for meeting recruiting and retention needs [31].

With respect to nonmonetary incentives, earlier CNA research supports the finding that such incentives are important to servicemembers. In late 2006 and early 2007, CNA conducted a series of focus groups with 743 Marines that included questions about the monetary and nonmonetary reenlistment incentives that were important to respondents. Participants indicated that they highly valued tax-free income; they tended to overestimate the tax-free value of Selective Reenlistment Bonuses (SRBs) received when reenlisting in theater. In addition, focus group results indicated that Marines placed value on duty station choice, either to start a family or maintain family stability. Heavily deployed respondents were interested in base and station billets. The study recommended, based on focus group results, that the Marine Corps offer 15 to 30 days of Permissive Temporary Additional Duty (time off to assist with transitions to a new duty station) as a reenlistment incentive (or a number of days dependent on commitment length) [32].

In 2003, CNA administered the Navy Survey on Reenlistment and Quality of Service to understand how sailors weigh monetary and non-pay-related incentives in their reenlistment decisions. The results indicated that nonsalary incentives are important to sailors. Sailors valued guaranteed location preference as equivalent to a 5.7 percent increase in pay. A guaranteed duty assignment was equivalent to a 4.3 percent increase in pay. Respondents rated a larger employer contribution (7 percent, or a 2 percent increase over the status quo) to the federal Thrift Savings Plan as equivalent to a 2.8 percent increase in basic pay. This reenlistment effect is larger than the benefit's actual value [33]. Given that sailors place relatively high equivalent cash values on nonmonetary incentives, there is evidence that the military might be able to compensate for lower salaries under an SSS by offering additional nonmonetary incentives, although perhaps at the cost of greater administrative complexity. Based on the studies described above, servicemembers prefer guaranteed duty assignment and location. The military might consider offering these benefits to the extent that it is feasible, recognizing that not all military personnel will receive their preferred location or assignment.

More recently, CNA reviewed the literature on incentive programs designed to increase Navy manning in sea duty billets. Like the earlier studies, the report emphasizes the importance of nonmonetary incentives. Sailors place high value on homesteading, which allows them to remain in the same geographic location for several tours. Homesteading is especially popular with senior sailors and those with families. Research indicates that sailors are more likely to

reenlist and serve additional sea time to take advantage of homesteading [34]. A 2008 CNA study estimated the range of monetary value that sailors placed on geographic stability, estimating a range of $4,400 to $15,700 (in 2008 dollars), depending on the rating, the location, and the length of sea duty [35].

Preferences for nonmonetary incentives by servicemember characteristics

Prior scholarly research indicates that servicemembers value nonmonetary incentives, but that different individuals often value them differently. Researchers from the Naval Postgraduate School examined the relative importance that sailors place on different types of nonmonetary benefits and found that preferences vary widely [67]. The authors surveyed Naval Surface Warfare Officers and members of two enlisted communities (air traffic controllers and fire controlmen). The survey asked respondents to indicate the reenlistment or retention bonus they would require to continue in the Navy and then asked how much of this bonus they would sacrifice to receive a particular nonmonetary incentive. Overall, the authors found three major sources of variability in the responses: (1) variability between officers and enlisted personnel, (2) variability within populations of officers or enlisted, and (3) variability when different nonmonetary incentives were offered in combination. That is, some servicemembers value some combinations of nonmonetary incentives more than the sum of the value that they place on an individual nonmonetary incentive.

Given the high levels of variability across these dimensions, it was difficult to identify specific nonmonetary incentives that had value for even half of the respondents. Nonetheless, preference patterns did emerge. On average, officers placed the highest value on geographic stability, followed by the ability to telecommute and the possibility of a one-year paid sabbatical. Meanwhile, enlisted personnel placed the highest value on homeport of choice, followed by telecommuting and the ability to choose their assigned billets. The average dollar amount assigned to each nonmonetary incentive was higher for officers, but that was mainly a reflection of the larger average retention bonus that they reported they would require. Enlisted, however, placed cash values on nonmonetary incentives that were a larger percentage of their projected retention bonuses compared with officers. These averages, however, mask variation in values across those within the enlisted and officer communities.

A 2005 CNA study found that young, potential recruits consistently mention additional training as a highly attractive piece of the compensation package. According to the results of the Youth Attitude Tracking Study Survey cited in the report, approximately one-third of young people who said that they were likely to consider joining the military cited additional training as a primary reason. In addition, one-third cited education benefits as an incentive to enlist in the military (this percentage rose to about half when a similar survey was conducted in 2017) [30, 68]. Those who actually enlist express similar preferences. For example, Marine recruits are

likely to indicate training as an important factor in their decisions to enlist [30]. If education and training benefits are a high priority for young recruits and prospective recruits, it is possible that they would join regardless of an SSS.

The takeaway from this research is that servicemembers' preferences for nonmonetary incentives are extremely diverse. Thus, it would be difficult to develop nonmonetary benefit packages in conjunction with an SSS that included incentives that would be of value to a majority of servicemembers. The authors of the Naval Postgraduate School study conclude that DOD could reduce the cost of military compensation by incorporating additional nonmonetary incentives into the compensation package, but it would need to individualize compensation packages to accommodate servicemembers' diverse preferences.

Perceptions about current military compensation

The 2005 GAO study provided additional context for servicemembers' compensation preferences by documenting their perceptions and levels of satisfaction with current military compensation. A large percentage of servicemembers were dissatisfied with one or more aspects of their compensation package, such as basic pay, BAH, or BAS. Like the Naval Postgraduate School study, the GAO study disaggregated results based on whether respondents were officers or enlisted.

In more than half of the 40 focus groups, servicemembers cited at least one of these compensation components as contributing to their levels of dissatisfaction with the entire compensation package. In eight focus groups, respondents indicated that they wanted single servicemembers to receive the same BAH as those with dependents. Overall, officers were more satisfied than enlisted servicemembers with their basic pay. Participants in six of the eight focus groups with senior enlisted personnel indicated that they were dissatisfied with their base pay, especially compared with junior officers, who have less experience and often rely on enlisted personnel for on-the-job training. With respect to the total compensation package, different studies come to somewhat different conclusions about servicemember perceptions. For example, while GAO study respondents often were dissatisfied with specific compensation components, many expressed satisfaction with the total compensation package. According to results from the 2003 and 2004 Status of Forces Surveys, however, less than half of servicemembers were satisfied with their overall compensation levels, although in more recent surveys the percentage of servicemembers who report being satisfied with their overall compensation has increased to 55 to 60 percent [47].

The GAO focus groups also documented that servicemembers were confused about the structure of their compensation packages and held misconceptions about the compensation received. Servicemembers consistently underestimated the value of their total compensation packages relative to those available in the private sector. In fact, nearly 80 percent of focus

group participants thought that they could earn more in the private sector. In reality, their compensation packages often were competitive with those in the private sector. These servicemembers likely did not take into account how the tax-free status of allowances increases their real income. Focus group participants also were likely to underestimate DOD spending on their compensation packages, including pay, health care, and retirement. These findings underscore the discussion in the 7th QMRC that RMC is not transparent to those who receive it. Moving to an SSS would allow servicemembers to more accurately compare the total compensation that they receive with the pay that they would receive as a civilian. Focus group participants also expressed concern that their benefits were decreasing, despite DOD efforts in these years to enhance military benefits [54].

Studies on civilian compensation preferences

Because the military recruits from the broader civilian population, and competes with civilian-sector employers in retaining servicemembers, an understanding of civilian compensation preferences should inform the design of military compensation policies. Overall, the literature on civilian employees' compensation preferences is limited. Only one survey, conducted by the Corporate Executive Board (CEB) in 2014, is representative of US employees. The sample size for most studies is small (i.e., less than 200) and specific to particular contexts that are not generalizable to other groups of employees. In addition, the results are largely based on self-reported surveys. Since the findings reflect intended rather than actual behavior, they may not be reliable. Finally, a small number of studies, usually one or two, support each research conclusion. Although there is not conflicting evidence in the literature, it is unknown whether additional research would yield the same findings.

It is not surprising that the limited literature on general compensation preferences indicates that pay is the most important factor in determining whether a prospective employee applies for a job. However, the recent CEB study found that employees tend to place more emphasis on nontraditional benefits, including those that contribute to their work-life balance, than in the past. In general, the literature finds that employees are receptive to devoting at least some portion of their compensation to individual performance-based pay, which they are more receptive to than team-level performance pay. As with military studies, the academic literature indicates that employees' compensation preferences vary by their demographic characteristics. The academic literature also indicates that preferences vary by personality traits.

General civilian compensation preferences

CEB regularly collects trend data on reward preferences—traditional rewards (e.g., salary, health care, and retirement benefits) as well as nontraditional ones (rewards and recognition,

wellness benefits, and work-life balance benefits, such as flexible schedules). The most recent survey in 2014 found that US employees' preferences regarding benefits changed relative to the previous survey in 2011. The importance that employees place on some traditional benefits (e.g., advancement and promotion potential, base pay equity, health-care benefits, and retirement benefits) all decreased in relative importance. Nontraditional benefits, however, increased in relative importance, including work-life balance benefits (flexible scheduling, transportation subsidies, and paid time off) and family-related benefits (paternal leave, adoption leave, and child-care benefits). The survey authors recommend that employers consider their competitiveness in offering these types of benefits. Note that the data show that the value for many of these offerings comes from employers providing them at all, rather than providing them in a way that is competitive with other employers.

A second CEB survey finding is that US employees place greater value on rewards that are available immediately, as opposed to delayed benefits (such as promotion potential), and rewards that are less variable. For example, respondents placed greater value on a 5 percent bonus that has a 50 percent payout probability than on a 10 percent bonus that has only a 25 percent payout probability. The study authors speculated that workers still were recovering from the Great Recession. They also may anticipate changing jobs frequently and, therefore, be less interested in long-term payouts [36].

Cable and Judge investigated the degree to which pay preferences influenced college students' decisions to apply for jobs and the types of compensation systems that applicants generally prefer [69]. The study included several hypotheses related to the types of pay systems that applicants would prefer:

- Applicants will be more attracted to organizations that offer higher pay.
- Job seekers will prefer organizations that offer flexible benefit plans, which allow employees to choose the benefits that are most useful to them.
- Prospective employees will prefer jobs that set compensation levels based on individual, rather than group or team, performance.
- Job seekers will prefer pay levels that are fixed, as opposed to contingent on work outcomes, such as output or sales.
- Applicants will prefer compensation levels that are based on their job descriptions to skill-based pay systems that reward employees for developing new skills. The authors grounded this hypothesis in prior literature that employees tend to perceive skill-based pay systems as more uncertain than job-based compensation.

The study subjects included 171 college students who were looking for permanent, full-time jobs. The researchers presented them with a series of potential jobs, including information about their compensation levels and structures. Participants rated their likelihood of applying for a job, along with which compensation factors were important to their decisions. The results

generally supported the hypotheses. As a group, job seekers were likely to report that they would apply for positions with high pay levels, pay based on individual performance, fixed rather than contingent pay, and compensation based on job duties. Overall, pay level was the most important variable in determining whether students would apply for a job. However, when pay levels were equal, the other attributes had effects on job search decisions.

Preferences for performance-based pay

In general, the academic literature indicates that workers support allocating at least some portion of their compensation to variable, performance-based pay systems [70]. For example, a study surveyed bank employees in four countries to determine employees' preferences for pay. Across cultures, employees ranked performance as the most important criterion for determining pay level, followed by human capital (defined as skills and education) and job duties [71]. A 2006 survey of 195 US college students asked them to rank their preference for compensation packages with different proportions of performance-based pay. Participants ranked the compensation packages with relatively small amounts of performance-based pay as significantly preferable to a package with no performance-based pay and options with high percentages of performance-based pay. Although respondents did not prefer that a high percentage of their salaries be based on performance, they indicated that they would prefer at least some portion of their salaries to be contingent on how well they executed their job duties [21]. Given that civilian employees are generally supportive of at least some component of their pay being based on performance, it is possible that servicemembers would be similarly supportive if an SSS incorporated a merit-based pay component.

Demographic differences in civilian compensation preferences

Several studies have examined whether demographic characteristics affect civilian employees' pay preferences. As previously discussed, understanding how demographic characteristics affect pay could potentially inform how individuals from different groups could respond to any transition to an SSS. Variations in preferences by demographics also will likely inform whether specific groups of individuals choose to be grandfathered into the current salary system or transition to an SSS, if given a choice. Some scholars have examined preference differences related to gender or age. Tocher, Feild, and Giles surveyed nearly 200 college students who were looking for jobs to determine which compensation and benefits items were most important to them [21]. They also examined whether these preferences varied by gender. Consistent with prior research, the study found that participants preferred salary- and security-related benefits (such as retirement benefits, health benefits, or the opportunity to buy stock options at a reduced rate) relative to time-related (e.g., paid time off) and family-related benefits (e.g., child-care subsidies). The authors note that these preferences likely shift as workers get older and are more likely to have greater family responsibilities.

In terms of gender, the authors found that men were more likely to prefer compensation packages with a performance component, while women were more likely to prefer compensation packages without one. These findings are consistent with prior literature that focused on more experienced workers and found that women tend to be more satisfied with pay systems that do not tie portions of their salaries to incentive pay [21]. In addition, other recent research has confirmed that men tend to prefer performance-based pay more than women do and that women are more likely to prefer seniority-based pay [20].

Other studies have examined how compensation preferences vary by age. Scott et al. conducted a seven-country survey on pay preferences [20]. While the study examined correlations between a number of employee characteristics and compensation preferences, there were several key findings on age differences. First, older respondents have a stronger preference for variable, nonguaranteed pay than younger workers do. In addition, younger workers sought more transparency than older workers in how compensation was awarded. The authors speculated that younger workers might be more willing to share such information and, thus, expected that it would be shared with them. If pay transparency also is a priority for more junior servicemembers, it is possible that this preference would make an SSS attractive relative to the current RMC approach. An SSS would make it easier for younger military personnel to accurately calculate their total compensation and compare it to what they would earn as a civilian employee. The study also examined pay preference differences by nationality. Of interest, workers in the United States had among the lowest preferences for pay transparency, yet they had among the highest preference for pay variability based on individual or group performance. The authors do not speculate about specific reasons for these results but state that country-specific results are likely grounded in culture, labor laws, and employment history [20].

Hallock and Olson examined detailed data from a company that provided an unusual choice to its employees related to salary allocation [72]. At the start of each year, the firm gave every employee nearly complete choice to allocate the percentages of pay that would be guaranteed (salary) and contingent (stock options and bonuses). The authors found substantial variation in the amount allocated to guaranteed versus uncertain pay, with some choosing to allocate nearly all of their compensation to one option or the other. In general, however, the employees allocated most of their pay packages to guaranteed salaries, an average of 83 percent of the total pay package. The researchers found that younger workers, more experienced employees, higher paid employees, and male employees were more likely to allocate large fractions of their compensation to the risk-dependent options. Although these results may be less directly relevant to the SSS (because servicemembers may not have a choice of allocating a certain percentage of their salary to pay contingent upon risk), if the military were to consider a contingent or risk-based component in its salary system, it is important to acknowledge that some groups may be more receptive to such a change than others.

Personality traits and compensation preferences

The study by Cable and Judge also included several hypotheses focused on how job seekers' dispositions affect their likelihood to apply for specific jobs [69]. First, the authors hypothesized that job seekers who were more materialistic would prefer higher salaries than those who were not. Second, they proposed that job seekers with stronger internal loci of control (that is, an individual's belief that he or she can influence events and outcomes that affect him or her) would be more attracted to flexible benefit plans, which allow employees to select the benefits that are most useful to them. Third, they hypothesized that job seekers who are highly individualistic in nature (e.g., those who prefer to work alone and place value on autonomy and privacy) would be more likely to prefer individual-based pay. Those who were collective in nature (e.g., those who derive satisfaction from group accomplishment and believe that individuals should make sacrifices for the group) would be less likely to prefer individual-based pay. Finally, they hypothesized that workers with high self-efficacy (belief in one's ability to accomplish a task) would be attracted to performance-based, contingent and skill-based pay systems.

The results supported most of these hypotheses. However, the authors found that prospective workers with high levels of self-efficacy did not prefer contingent pay systems more than those with low self-efficacy. Workers with internal loci of control also were not more attracted to contingent pay systems than those with external loci of control. Although it was not a study hypothesis, the research findings revealed that risk-averse people placed less emphasis on pay in their job search processes. Other studies also have confirmed that personality traits affect whether a person prefers fixed or contingent, performance-based pay. Dohmen and Falk found that those who assessed their work quality as high relative to others and those who were less risk averse (that is, more willing to accept uncertainty or variability in pay) were more likely to prefer contingent, performance-based pay systems [73]. A third study found a correlation between intrinsic motivation and a preference for merit pay [74].

Bias toward default options

Another issue to consider when designing compensation structures is that people have a documented tendency to accept options that they are offered automatically (i.e., default options), even when they are free to choose from a menu of alternatives. This bias toward default options could play a role in an SSS if a "grandfathering" policy is enacted that allows current servicemembers a choice of whether to switch to the new system. If current servicemembers are grandfathered into the existing RMC system as the default option, they may be less likely to choose to transition to an SSS compared with an alternative design in which the SSS was the default option. In addition, there are other forms of military compensation that incorporate default options dependent on basic pay. If the default options

stay the same under an SSS, it will likely have cost ramifications for the military because the salaries on which they are based will be higher.

Unfortunately, little of the literature on default options focuses on salary/wage structures. Instead, the most relevant literature in this area examines automatic enrollment in retirement savings plans and the default structures of those plans. A robust body of literature indicates that establishing automatic enrollment as the default option greatly increases participation rates in savings plans [75] [38]. In addition to increasing overall participation rates, default options are especially effective at increasing participation among employees who are least likely to participate in retirement savings plans, including young workers, those with short tenures, lower paid workers, and African-American and Hispanic employees [43] [42]. Related literature documents the following:

- Employees also are biased toward default saving rate and investment vehicle options. If the default contribution rate is higher, people tend to save more [75] [38] [46]. Default options in retirement savings plans also can influence how a retiree receives payouts [39].
- "Active enrollment" policies, in which employees are required to make an election about whether to participate, also have been shown to increase plan participation and savings rates in some studies [40].
- "Elective defaults," which provide employees with efficient ways to sign up for participation or allow them to select future default levels for investments, have been associated with higher participation and savings rates [41].

The research literature has documented several potential reasons why employees might be biased toward default options. First, people may choose to invest at default levels because they perceive the default to be a corporate endorsement and, therefore, in their best interests [75] [42]. Other reasons for choosing the default option include procrastination and the need for cognitive closure (that is, the desire to make a decision) [44]. Another study found that those with lower levels of financial knowledge were more likely to remain with the default option than those with higher levels of financial knowledge [45].

Conclusion: Compensation preferences

Through the 13th QRMC, DOD is considering whether the current military compensation system—composed of basic pay, BAH, and BAS—remains the most effective approach or whether an alternate compensation structure, such as an SSS, would be preferable. In support of this effort, this appendix provides an overview of the academic literature and military manpower literature on compensation preferences.

Overall, the military and academic literature on compensation strategies is quite limited. Only one military-specific study, conducted by GAO, asked respondents to indicate changes that they would make to the current compensation system. Participants expressed a preference for cash compensation, and many were willing to forgo noncash benefits for additional cash. These results suggest that military servicemembers might support higher compensation through an SSS, although DOD should not draw conclusions from a single study. Other military-specific studies focused on which compensation and benefit components were most important to servicemembers. Researchers found that these preferences tended to vary by servicemembers' characteristics, including age and officer or enlisted status, although several studies indicated that geographic choice and stability are important to servicemembers.

Because DOD is considering changing the default options for compensation, the review also summarized the literature on biases toward default options in the context of retirement savings plans. The literature consistently indicates that automatic enrollment in a retirement savings plan increases the percentage of employees who participate. In addition, default savings contribution rates and asset allocations incentivize employees to participate in the plans at those levels. In general, this body of literature indicates a strong behavioral bias toward electing the default option.

It is difficult to draw strong conclusions from the academic literature owing to its limitations. Overall, there are few studies that focus on employees' compensation preferences. The extant research focuses on different aspects of compensation and benefit preferences. Therefore, a limited number of studies support each research conclusion. In addition, the body of related research suffers from validity concerns, largely that samples are small and drawn from specific contexts that are not generalizable to the broader civilian workforce. Nevertheless, it is possible to draw limited conclusions. Like the military research, the academic literature concludes that compensation- and benefit-related preferences vary both by demographic characteristics, such as gender and age, and by personality characteristics. Overall, this review underscores the need for additional research on how military servicemembers value different compensation structures.

Despite these limitations, it is possible to draw some at least provisional conclusions from this literature on some of the transparency, equity, and incentive issues that have been at the center of the debate about a transition to an SSS for several decades.

Transparency

The literature reviewed here, especially the GAO study, confirms previous notions that servicemembers tend to be confused about the structure of their compensation (especially the tax advantage and the amount that DOD contributes to benefits, such as health care and retirement), and they consistently underestimate both the level and trend of the compensation

they receive relative to what they believe they could receive in the private sector. Such misperceptions clearly could be having negative effects on retention. There also is some evidence that younger workers especially value transparency in the awarding of compensation.

Equity

This literature on compensation preferences also has some important implications for individual perceptions of equity with respect to a move to an SSS. The GAO report, for example, finds a servicemember's preference for cash over noncash compensation with some reservations, especially concerns that overall compensation might be reduced as a result of a change to increased cash compensation. There also is evidence that some servicemembers prefer compensation packages in which dependent status plays less of a determining role (specifically, sentiment for single members to receive the same BAH as those with dependents). Both of these results suggest that a move to an SSS, if managed carefully (especially to avoid perceptions that pay is being cut), could increase the satisfaction of many servicemembers with their compensation.

Incentives

There is some support for the principle of equal pay for equal work in this literature. In the military literature, for example, senior enlisted personnel express dissatisfaction with their levels of base pay relative to that of junior officers because those officers often are less experienced than, and often rely on, enlisted personnel for on-the-job training. In the broader literature on compensation preferences, there is some evidence that employees value performance highly as a criterion for pay-setting and tend to support allocating at least part of their pay to performance-based pay (that varies with employee performance). US college students expressed a preference for pay packages with small amounts of performance pay to both those with none and those with high percentages of performance-based pay. Although there is no guarantee that an SSS will include explicit pay-for-performance features, these results provisionally suggest that a carefully managed move to an SSS could increase member satisfaction with their pay by more closely linking that pay to the amount of work done.

Emerging issues

The literature reviewed here raises some additional issues that may have been less strongly emphasized in previous reports.

Demographic differences in compensation preferences

One such issue is that preferences for different types of compensation can differ based on a person's demographic characteristics. Younger, less experienced employees tend to value compensation, security-related benefits, and nonfinancial rewards, such as managerial recognition. Younger servicemembers also highly value opportunities for training and education. Older, more experienced workers have shown preferences for financial rewards involving more incentive-based (variable, nonguaranteed) pay, and a greater emphasis on time- and family-related benefits and deferred compensation (including retirement benefits).

There also can be differences in compensation preferences by gender. For example, our review found some evidence that college-educated women entering the labor force may be more likely to prefer seniority-based pay, and less likely to prefer incentive or performance-based pay, than similarly situated men. As the military seeks to recruit and retain women in larger numbers, such gender-related differences in compensation preferences should be taken into account.

Changing preferences for nonmonetary compensation

Changes in compensation preferences represent another emerging issue with respect to the design of compensation packages. One such change is perhaps an increasing preference for nonmonetary forms of compensation involving greater choice and flexibility in work locations and career paths. In surveys, both officers and enlisted servicemembers placed relatively high values on geographic stability and choice, and flexibility in work site (increased ability to telecommute). In terms of career paths, officers indicated interest in increased opportunities for paid sabbaticals, while enlisted respondents expressed a preference for greater ability to choose their assignments. These results suggest that a move to an SSS might be eased by making it part of a larger set of compensation and personnel management reforms that also provide servicemembers with additional flexibilities in these areas.

Appendix B: Civilian Compensation Systems

This appendix summarizes information on civilian compensation systems, gathered from a literature review and conversations with subject matter experts in public, private, and nonprofit sectors.[19] It addresses the following objectives:

- Describe civilian compensation systems that could serve as models for a military SSS.
- Describe if and how civilian compensation systems provide allowances or in-kind benefits and whether those benefits or others have tax advantages.
- Identify compensation trends that may be relevant to military compensation reform.
- Identify the advantages, disadvantages, and implications of transitioning to an SSS.

Some of the important conclusions of the civilian compensation review follow:

- **General Schedule (GS) system as model for a military SSS**
  - The federal civilian GS system might be a natural model for a military SSS because the current structure of military basic pay closely resembles the structure of the GS system, and the GS system also includes a locational pay component.
  - The GS system has drawbacks, however. It has been criticized for focusing too much on "internal equity" (reflecting an employee's position in the hierarchy) and not enough on "individual equity" (rewarding excellent performance) or "external equity" (pay comparability with the private sector or other organizations). The military may want to adopt a modified version of the system.
- **Housing benefits.** If BAH is eliminated, the issue arises as to how to ensure that servicemembers under an SSS have adequate support for frequent relocation and housing changes in a variety of settings. One option might be to look to the approach applied to ministers, who have housing allowances built into their salaries, with the portion of salary spent on housing not taxed.
- **Clear communication:** SMEs we interviewed consistently emphasized the importance of sharing clear, readily accessible information with employees about their compensation packages, in a variety of formats, to help employees understand three things:

[19] Appendix D describes our literature review search methods and provides an overview of the numbers and types of SMEs consulted.

- The full value of their compensation package
- The competency/proficiency markers needed to achieve any performance-related salary increases or bonuses
- The rationale behind the structure of the compensation system, especially when changes are being made to the system

Overview of the current US military compensation system

The current system of compensation for military servicemembers has two primary components: basic pay and allowances. Basic pay is based solely on a servicemember's rank and years of service. Basic pay is fully taxable. In addition to basic pay, servicemembers can receive tax-free allowances for two things: housing and subsistence. The basic allowance for housing (BAH) is determined by duty location, paygrade, and whether the servicemember has dependents. Servicemembers in locations with higher housing costs, in higher paygrades, or with dependents will receive a higher BAH. If a servicemember lives in housing provided by the military at no cost, he or she does not receive BAH. The basic allowance for subsistence (BAS) is determined entirely by enlisted or officer status and is intended to cover the cost of food for the servicemember. Currently, enlisted servicemembers receive higher BAS than officers. Both BAH and BAS are unconditional transfers—meaning servicemembers do not have to provide records of payment for housing or food in order to receive the allowances—and any unused amount of the allowances can be kept by the servicemember. Servicemembers do not pay tax on either BAH or BAS.

A move to an SSS would aim to eliminate the use of housing and subsistence allowances and replace them with a proportional increase in basic pay. Doing so would result in the entirety of military compensation being subject to taxation, leading to a higher tax burden on servicemembers and lower take-home pay if no other changes were made. If the military wishes to keep take-home pay in an SSS equivalent to that in the pay-plus-allowances system, it would have to increase total disbursement to military members to offset the increase in tax liability that comes from eliminating the tax-free allowances.

In addition to basic pay and allowances, the military provides a variety of special pays to military members for service in particular environments and circumstances. These include hazardous duty pay, family separation pay, and special pays for hard-to-staff billets. Other than hazardous duty in a designated combat zone, all of these pays are subject to tax and exist for federal civilian employees both within and outside DOD. Moving to an SSS would not change the nature of these types of pay.

Finally, the military must consider the impact of an SSS on retirement contributions from both servicemembers and the services. Under the military's new Blended Retirement System (BRS), defined benefits and contributions are determined as percentages of base pay. By moving to an SSS, the military would consolidate allowances into servicemembers' basic pay. Doing so would increase the nominal contribution by both military members and their employing services under the BRS. In the absence of changes to the current BRS, a move to an SSS could significantly increase personnel costs to the services.

Overview of current civilian compensation systems

Salary systems

This subsection focuses primarily on salary systems within the public sector with an emphasis on approaches in federal civilian agencies that most closely parallel circumstances in the military services. Information on salary systems in some state government agencies also is provided. These public entities typically use a structured, transparent approach that is publicly available through wage and salary schedules posted on agency websites. Salaries in the private sector, in contrast, are considered more proprietary and generally are not publicly available. Even so, we briefly summarize general information on private-sector salary systems obtained from publicly available salary studies and SMEs who provide compensation services to private-sector companies and organizations.

Public-sector salary systems

Single-salary systems are common in the public sector. These systems are characterized by a basic pay structure that is primarily a function of position and experience, few or no allowances that parallel those in the military system, and few or no tax-advantaged components. Salary schedules in these systems typically cross-reference two factors, such as YOS and the rank of the position, or YOS and education level. In this way, base salaries in SSSs closely mirror that of basic military pay, which is determined by rank and YOS. The most widely used SSS in the public sector is the General Schedule (GS) pay system for civilian white-collar federal employees. Below, we share detailed information on the GS system and then summarize other public-sector salary systems that mirror the GS system in many respects.

GS pay system. The GS scale, maintained by the Office of Personnel Management (OPM), is the predominant SSS in the federal government, covering over 70 percent of federal employees, or about 1.5 million people. The schedule features 15 grades based on education, position, and prior experience, and 10 steps based on years of work with the federal government. Each grade has minimum requirements for education and experience, but federal employees may be

promoted from one grade to another based on performance. The employee's official title may remain the same as he or she moves up in grade. For example, a chemical engineer may receive a promotion from grade 12 to grade 13 because of performance, yet retain the official title of chemical engineer. A GS employee's step is determined by within-grade promotions related to his or her YOS. Movement from step 1 to step 2 typically takes only one year. However, the expected time between steps increases as employees progress through the steps; it typically takes 18 years to move from step 1 to step 10 [76].

Adjustments to the GS allow for annual salary increases, variation in pay by locality, and special rates for hard-to-staff positions. All three adjustments are considered fully taxable, with basic pay and adjustments combined to constitute total taxable income. The adjustments are structured as follows:

- **Annual salary increases.** The GS base pay table is adjusted every year to account for changes in the average salaries paid to private-sector employees, based on the annual rate of change in the employment cost index (ECI) minus 0.5 percentage point—although the President can and does adjust or reduce this amount based on the federal budget. Because this adjustment is made to the base pay table, the adjustment applies to all GS employees.
- **Locality pay**. An annual, location-specific adjustment, calculated separately for each geographic region, further adjusts the pay table to reflect the difference in average pay in that location relative to the rest of the country. As of 2018, OPM has designated 47 different regions for locality adjustment increases, 44 of which cover major metropolitan areas. Each of the 47 regions has an associated percentage increase (as high as 2.5 percent) that is multiplied by and added to the employee's base salary (as determined by grade and step). Anyone working outside these 47 regions is considered to work in the "rest of the United States" and receives no salary adjustment. Public-sector SMEs report that the standard practice is to allocate a percentage of payroll (e.g., 0.5 percent) for locality pay increases in a given year, and that it is typical to provide a larger share of the allocation to areas with large pay disparities.
- **Special rates**. If a federal agency or specific installation within an agency has trouble staffing a civilian position at the GS salary level, it may submit a request to OPM to offer a special salary rate. The request must clearly establish staffing difficulties in order to receive approval for the special rate (rather than request pay-matching to compete with other employers). The agency or installation must also have adequate funding to support the special pay table, which takes effect in the next pay period after approval. According to an SME, special rates commonly are applied in very rural locations that lack amenities and to which few young adults are attracted. Special rates increasingly have been applied to high-demand positions in such fields as technology,

health care, and engineering; special rates also are widely used in the federal prison system because of the nature of the work and an abundance of rural locations. If approved, the requesting agency offers the special rate rather than the established GS base pay and locality adjustment for that position. Special rates are reviewed annually for relevancy and tend to remain in place unless (1) the GS base pay plus locality adjustment meets or exceeds the special rate, (2) the agency no longer needs the rate, or (3) the annual review finds that the rate is not being used. DOD currently is the largest employer of personnel who receive special rates.

Other public-sector SSSs. While the GS schedule covers the largest share of public employees, a number of other schedules cover more specific occupations and employment types. In the federal public sector, nearly all of these other systems are tied to the GS base tables and incorporate the same annual and locality adjustments. While state and municipal pay systems may mirror that of the federal government, they are not always explicitly tied to the GS base table. The following is a list of some relevant examples and descriptions of their caveats:

- **The Foreign Service (FS) pay system** applies to US Department of State FS officers. The FS system is very similar and linked to the GS system, except the FS system has 9 (rather than 15) grades and 14 (rather than 10) steps. Like the GS system, the FS system has a base schedule as well as other schedules for specific locations (typically large metropolitan areas). A parallel to the GS locality pay is Overseas Comparability Pay (OCP), which is viewed as "makeup" pay to ensure parity between overseas and domestic FS officers. When stationed abroad, FS officers receive OCP in place of the base pay determined by their grade and step. For 2018, the OCP was 18.81 percent higher than base pay [45, 77].
- **Pay banding systems.** A number of federal agencies operate what are called pay banding systems. While they vary by agency, these systems typically collapse the 15 grades of the GS schedule into fewer "bands" that cover a wider range of salaries than each of the original 15 grades. The wider range of each band, compared to the range of the original grades, gives managers the opportunity to award more performance-based raises without having to deal with the formalities of promoting an employee to a new grade or band. These systems also commonly allow for one-time bonuses for performance without having to commit to a permanent increase in an employee's salary. Examples of agencies that use a pay banding system include the Federal Aviation Administration, the Transportation Security Administration, and the Government Accountability Office [36, 71, 78].
- **The Federal Law Enforcement Officer (LEO) scale** is tied directly to the GS scale, but it includes only grades 3 through 10. It applies to "primary" personnel who work in a secure federal corrections facility and to "secondary" personnel who have worked in such a facility for at least three years and transfer to another corrections position

(e.g., training, headquarters, or regional office). Employees on the LEO scale are subject to the same annual and locality adjustments as GS scale employees. Because of the danger associated with these positions, the LEO base salary is higher than the GS scale. In addition, SMEs report that special rates are frequently requested and approved for hard-to-staff positions and locations within the prison system [79].

- **Military Sealift Command (MSC) Civil Service Mariners pay system.** The MSC operates noncombatant, civilian-crewed ships that provide supplies and support to US Navy ships. The majority of MSC employees are federal civilian employees known as civil service mariners (CIVMARs) [40]. CIVMARs, as wage mariners, are not on the GS schedule. Instead, wages are established to align with wages in the private maritime industry. A CIVMAR is hired into a position with an associated salary, which is then adjusted depending on the size, tonnage, and horsepower of the ship to which her or she is assigned. The standard workweek is Monday through Friday, eight hours per day, and mariners are paid an established overtime rate if they work beyond that. They also may receive hazardous pay, a percentage above the salary, if assigned to a ship that carries ammunition (for instance). While on board the ship, mariners receive the in-kind benefit of housing and food with no associated tax burden for the mariner. If the ship is not able to feed or house them for some reason (such as temporary loss of water or heat), mariners are given a taxable daily allowance.
- **State law enforcement agencies** also operate on SSSs based on job classification and YOS. The SME in one such agency reported that salary schedules for law enforcement officers are determined through collective bargaining agreements; there are no locality adjustments or housing/relocation allowances, but some pay differentials are in place, such as additional pay for K9 officers to cover canine care. The SME at an agency in a different state described and shared three salary schedules with rates based on job series and classifications. Rates are established by the state auditor's office based on salary surveys and are not automatically updated for cost of living, although new job series sometimes are established. There is no locality pay and no allowances for relocation or housing, although state troopers may receive an additional $400 per month at "hardship duty stations" that are typically geographically isolated with few resources (no more than 40 such stations may be designated statewide). Moreover, to make pay competitive with city policy officers, the salary schedule for commissioned officers incorporates an automatic 10 hours per week of overtime pay. Note that we consulted with only two SMEs in state law enforcement agencies, so these approaches are not necessarily representative of approaches across all states.
- **Public school teachers** typically are considered state employees. While guidelines differ by state, most states allow each school district to determine its own pay

schedule. A school district's pay table will apply to all teachers in the school district, regardless of school, and be determined by the combination of years of experience and level of formal education. Additional, supplemental compensation will typically be paid for additional responsibilities, such as coaching a sports team or acting as a mentor to other teachers [80]. There also has been ongoing interest in providing pay differentials to attract teachers to hard-to-staff schools (typically schools in rural locations or with high percentages of poor and/or minority students), although researchers note that education systems have been extremely reluctant to adopt such approaches [81].

Salary versus wage systems. Most civilians with the same demographic composition as enlisted personnel (18-to-25-year-olds without a college degree) earn income in the form of an hourly wage. Data from the Current Population Survey on the proportion of working people who are paid on an hourly basis by education and age, respectively, indicate that over 70 percent of people without a college degree and over 80 percent of people under 25 earn an hourly wage instead of a salary [82]. Conversely, servicemembers receive their total compensation in the form of monthly, salary-based pay. As a result, the "outside" civilian option is not always directly comparable to the salary system of similar enlisted servicemembers.

The Federal Wage System (FWS) is the hourly-rate, blue-collar corollary to the GS scale. FWS rates are established by DOD because it employs the most FWS personnel. Separate FWS schedules are created for each government facility (e.g., Camp Keyes, Fort Polk, or Fort Drum) on an as-needed basis and are based on market wages relevant to the location and occupations of each facility. Similar to GS pay tables, FWS pay tables include 15 grades, but they are limited to 5 steps. An FWS employee who works beyond 80 hours in a two-week period will receive 1.5 times his or her hourly rate for each additional hour beyond 80 hours. An FWS employee who works the majority of his or her shift during nighttime hours is entitled to a 7.5–10 percent increase in hourly pay for the entirety of his or her shift [83-84].

The similar demographics of civilian wage earners and military servicemembers might suggest the FWS as a model for an alternative military compensation system. A review of the FWS and other wage-based systems, however, suggests that such systems would introduce a degree of unpredictability in costs that may have adverse effects on military budgeting and readiness. The military operates in an environment where immediate, full-force response can be necessary. This environment means that large numbers of servicemembers may be called on to work long hours with little warning. Because wage-based systems determine pay based on number of hours worked and often carry requirements of increased overtime hourly pay, unexpected operations could introduce large, unpredictable burdens on the services' budgets. Conversely, salary-based systems make monthly basic pay predictable for servicemembers and their employing services alike, even in the face of a quick-turn military response. While unexpected deployments of military personnel will still require additional circumstantial pays,

such as hazardous duty pay, operating under a system that does not pay an hourly wage can limit large variations in payroll costs.

Private- and nonprofit-sector salary systems

SMEs who provide compensation services to companies and agencies in the private and nonprofit sectors report that SSSs are the norm, and that cost of living and local wages are typically figured into salary schedules. Companies or agencies with an international presence or that require relocation may provide reimbursement for relocation or salary premiums for hard-to-staff or dangerous locations. Typically, however, all of these differentials are subject to income tax. This differs from the military, which covers all relocation costs up front, in turn not exposing the servicemember to an increased tax burden. The exception is the church minister's housing allowance, which is discussed in greater detail in the subsection, "Allowances and in-kind benefits."

Implications for switching to an SSS

The current structure of basic pay in the military (excluding BAH and BAS) most closely resembles that of public-sector SSSs. The grade and step system of the GS and LEO schedules imposes a transparent formula for determining basic pay that is similar to the grade and YOS system used in the military. In both settings, employees move through a clearly defined schedule of salaries based almost exclusively on rank and experience. Still, both GS and military personnel have the potential to be promoted in grade and rank, respectively, by their superiors as an acknowledgment of exemplary performance.

In many ways, the GS scale would be a natural successor to the current basic pay plus allowances system used by the military. DOD employs more GS employees than any other federal department, meaning a movement of military members to GS could reduce the total number of pay systems implemented by DOD. Moreover, because the proximity of GS employees and military members often leads to comparisons of the two, DOD already has created a crosswalk that explicitly relates military rank to GS grade [43]. Though the entirety of a GS salary is taxable, a number of situational allowances exist that would apply directly to military settings. We discuss these allowances in the following subsection.

A key implication of moving to an SSS is that DOD would need to increase servicemembers' basic pay to compensate for the loss of tax advantages. This move would be necessary because, in SSS, the combination of all forms of pay (e.g., base pay, locality pay, and annual adjustments) is subject to income tax. A movement of the military to an SSS would mean that—with few exceptions—all military compensation would become taxable. Thus, a base pay increase would be needed to keep total take-home pay for servicemembers constant. Again, because the comparison is frequently made between taxable civilian compensation and partially taxable military compensation, DOD already has created a tool to calculate the required pay difference [37].

Another implication is that an SSS would remove differences in pay based on marital and dependent status. Removal of incentives that increase compensation for servicemembers who are married and have dependents may reduce the proportion of married servicemembers and, in turn, reduce the services' financial obligations in other ways. The degree to which these changes offset each other is outside the scope of the current literature review. In a subsequent section, we discuss a number of specific situational compensations and how they are taxed.

Allowances and in-kind benefits

As noted earlier, the US military currently operates under a system in which total regular military compensation is the sum of base pay and allowances, plus tax advantages conferred by those allowances. A servicemember's base pay is akin to that of federal civilians in the sense that base pay (plus bonuses and overtime pay for civilians) can be viewed as the sum total of taxable income. The military's allowance component is the sum total of any cash payments that can be used by the employee without being subject to taxation. Housing and subsistence allowances are unconditional cash transfers because any amount not spent can be kept without increasing the servicemember's tax liability. Next, we consider how allowances and in-kind benefits are structured in both the military and civilian sectors.

Housing allowances

BAH. The largest allowance for military members is the basic allowance for housing, a cash allowance to offset the cost of housing while serving in the military. Because the cost of housing varies by location and family size, the amount of BAH a servicemember receives depends on his or her duty station and dependent status, in addition to his or her military rank. BAH is a cash transfer to a servicemember that does not require any documentation of living quarters and is not subject to tax. Servicemembers who live in housing provided by the military free of cost (i.e., barracks or some instances of onbase family housing) do not receive BAH. Though the amount of BAH compared to basic pay depends on location and dependency status, BAH can be up to a third of the size of basic pay [37].

When stationed abroad, servicemembers do not receive BAH. If foreign-stationed members reside in onbase or government-leased housing, they do not receive any form of housing-based allowance. However, servicemembers who live in private housing while stationed abroad are eligible to receive an Overseas Housing Allowance (OHA). OHA differs from BAH in that OHA is intended to reimburse the servicemember for the specific amount spent on housing and utilities. Once a member has secured a suitable private residence, he or she must submit a request for OHA approval. Once approved, he or she receives monthly disbursements equal to either the cost of rent and utilities or the maximum allowance available to that servicemember. Because maximum allowances are determined by location, rank, and dependent status, OHA may not always cover the full cost of living in a private house overseas [85].

Public-sector housing allowances and locality adjustments. Tax-free housing allowances are rare in the civilian labor market. The GS schedule and its associated pay schedules do, however, incorporate explicit adjustments for the cost of living in different regions of the United States. These locality adjustments increase the pay for federal employees in each region by a given percentage (less than 5 percent) and are unrelated to years of service or dependent status. Locality pay is incorporated into the employee's total salary and is subject to federal income tax. Unlike BAH, which is intended to cover the entire cost of housing for a servicemember, locality adjustments are differential payments. These payments are meant to offset the increase in living costs incurred by living in more expensive areas; they are not intended to cover the entire cost of living.

In a few select cases, employees receive housing-related payments that are *not* subject to taxation. Civilians in the Department of State and the DOD can be eligible for a Living Quarters Allowance (LQA) when stationed at a post abroad where the US government does not provide living quarters.[20] LQA is a nontaxable allowance, paid every two weeks, intended to cover the costs of rent, utilities, taxes, and other fees that a civilian employee may incur while stationed abroad. In this way, LQA is the civilian equivalent to OHA. The amount of LQA may vary by post as well as by the employee's classification or grade. The total LQA can vary by family size and family status: with family or without family.[21] If an employee receiving LQA has three dependents, but those dependents are living in the United States, the employee receives no LQA increase based on family size. In all cases, LQA is considered an allowance and is not subject to tax [33, 70].

Limited staff housing is available at some federal correctional facilities—typically offered to security personnel who need to be nearby in case of emergencies. Employees apply for this housing; if they are approved, a biweekly deduction is taken from the employee's paycheck to cover the rent. The amount of the rent is based on prevailing rental rates for comparable private housing in the geographic region where the facility is located.

Private-sector housing allowances. Tax-free housing allowances are extremely rare in the private sector. Moreover, while the majority of federal civilian employees receive locality adjustments, only about 12 percent of private-sector employees receive such a differential. Payment specific to the cost of housing is even less common. Down payment assistance, mortgage assistance, and rental assistance are all received by only 2 to 6 percent of private-

[20] Foreign-stationed federal employees who reside in government provided housing do not receive LQA. Instead, they receive housing as an in-kind benefit and are not subject to taxation for such a benefit.

[21] The LQA for people in the middle ranking group ranges from $14,300 to $87,900 per year if stationed without a family and from $15,900 to $90,500 per year for those stationed with a family [31].

sector employees. In all cases, these payments are treated as standard income and are subject to federal income tax [86].

SMEs that provide compensation services to private-sector companies report that companies or organizations with an international presence have been converting housing allowances to cash compensation or reducing the number of tiers at which allowances are offered. SMEs also report that it was once common for companies to contract with a relocation company to assist employees in relocating, but a more recent practice is to provide a bonus for employees to handle their own relocation costs. With both approaches, employees bear the tax responsibility, documented as additional income (Form 1099) when a relocation vendor is used or as straightforward compensation (Form W2) when a relocation stipend is provided. This differs from current military policy, which provides relocating servicemembers with the option to have the entirety of their relocation costs covered up front by DOD. In such cases, servicemembers do not incur any out-of-pocket cost or tax burden for the relocation. Alternatively, servicemembers may choose to handle any or all of the moving accommodations at their own expense.

SMEs in the petroleum industry report that companies with foreign locations offer various housing incentives to keep employees "whole" with respect to the compensation that they would receive in the United States, as well as to incentivize them to live in remote locations. In locations where security is challenging, the company may provide housing in a compound, with the employee's salary temporarily increased to cover the additional taxes from the imputed income of the housing. If those employees keep their houses in the United States to return to when their assignments end, they essentially have a "free" place to live overseas, but their salaries are sufficient to cover their mortgages for the US houses, so they are kept whole.

Nonprofit-sector housing allowances. In the nonprofit sector, housing allowances are offered to pastors and other eligible religious leaders when no parsonage is provided by the congregation. SMEs who provide compensation services to churches report that housing allowances are built into the minister's salary and often constitute a substantial percentage of that salary. Ministers who own homes may exclude from taxes the lowest of three amounts: the housing allowance, actual housing expenses (mortgage, rent, utilities, property tax, etc.), or the market rental value of the home. Section 107 of the Internal Revenue Code stipulates that any housing allowance paid to a qualified religious leader, up to the amount actually spent on the cost of housing, is not subject to income tax [87]. This amount, however, is subject to self-employment tax, and any amount not spent directly on housing is considered fully taxable. SMEs report that church congregations are responsible for reporting to the IRS which personnel are eligible for the tax exemption and that ministers are responsible for documenting and reporting housing allowance information when they file their annual returns. If the IRS determines that the allowance is too high, the church is not penalized, but the

minister must pay back taxes. One SME noted that it is common for the IRS to audit tax returns for ministers in large congregations with large housing allowances.

Implications for switching to an SSS. If the military moves to an SSS, compensation of servicemembers likely would no longer include BAH. As a result, the current taxable portion of compensation (basic pay) would need to increase in order to provide servicemembers with enough pay to cover the costs of housing. However, because servicemembers must forfeit a portion of this increase as tax, the increase in taxable income would need to be greater than the current BAH in order to keep the servicemember whole. In the absence of new income tax laws for military members, this means that a switch to an SSS would likely result in higher payroll costs for the services.

If the same laws that apply to parsonage could apply to military members, this might be a reasonable alternative to BAH. Current BAH values could be preserved for the various localities, but, instead of a cash transfer, could serve as a maximum possible amount a military member could spend on housing without paying income taxes. It may then be the case that the basic pay that a military member currently receives would have to be increased by his or her current BAH amount (i.e., preserve the BAH amount but pay as income, not an allowance). The military member still could receive that entire amount, tax free, but would not be able to pocket any unspent amount without paying taxes. While this would reduce the potential take-home income awarded to servicemembers, it would more properly align the housing transfer as one intended to compensate for housing. Servicemembers still could find housing for less than the current BAH value and pocket the difference. However, the difference would now be taxed as income. Moreover, the laws surrounding parsonage payments make no mention of the number of dependents. If the services did not base this type of payment on dependency status, they could address some of the standing equity concerns that surround pay that varies by dependency status.

In addition, DOD will need to determine how to ensure that servicemembers have adequate support for frequent location and housing changes in a variety of settings. Options could include locality pay adjustments or an overseas adjustment (similar to OCP in the Foreign Service). The services still could benefit from the tax advantages associated with OHA, though incorporating this into an SSS may present some administrative challenges. Under the current system, the services withhold BAH when a servicemember resides in government-provided housing. Under an SSS, however, compensation intended to cover housing would be incorporated into total pay. Thus, the services would need to find a way to reduce a servicemember's singular salary while he or she resided in government-provided housing in order to avoid simultaneously paying both costs. Such a situation would likely introduce new administrative challenges that could further raise the cost of transitioning to an SSS.

Food allowances

BAS. The second largest allowance for military members is the basic allowance for subsistence. BAS is a cash allowance given to military members to offset the cost of subsistence (food) while they serve in the US military. Unlike BAH, BAS does not cover family members and, thus, does not vary by dependent status. Similarly, annual adjustments to BAS are determined by changes in food prices and are not subject to locality adjustments. BAS is a cash transfer that does not require documentation of purchases and is not subject to tax. Servicemembers who live in the barracks on a military base do not receive BAS, but instead receive food as a nontaxed, in-kind benefit from a mess hall or a galley.

Public-sector food allowances. By far the most common approach to supporting employee food costs in the public sector is through per diem reimbursement. According to federal tax law, any payments an employee receives as reimbursement for expenses incurred during travel—particularly food—is not subject to taxation, as long as it is within the federally determined per diem rate. The next closest parallel to the BAS is the Cost-of-Living Adjustment (COLA) for FS officers when stationed at a post abroad. COLA is a tax-free allowance intended to compensate the employee when the cost of a typical basket of goods is at least 3 percent higher in a foreign location than in Washington, DC. The standard basket of goods includes clothing, personal care items, furnishings, household goods, medical services, recreation, public transportation, vehicle-related expenses, and alcohol and tobacco.

While COLA is a tax-free payment intended to cover the cost of food (among other things), it differs from BAS in that the amount of COLA received can depend on family size if the officer's family is also stationed abroad because the COLA amount is determined not only by the cost of the market basket but also by the officer's calculated "spendable income." Spendable income is measured as the proportion of salary used to purchase the goods and services in the standard basket of goods. This is determined by the combination of annual base salary and, if the officer's family is also stationed abroad, family size [88]. Thus, unlike BAS, COLA varies by location and family size.

The intent of COLA is to compensate the FS officer for the *additional* cost of goods and services in a foreign location. Consequently, only those FS officers in foreign posts where costs are higher (typically remote locations) receive the COLA. Currently, 161 of the 796 registered posts receive no COLA. For those that receive COLA, the total allowance is determined by multiplying a person's spendable income by the post allowance (the percentage of spendable income people at that post receive, in addition to their salary). Post allowances vary significantly by post, but they are typically 10 to 30 percent (meaning someone would receive an allowance equal to, for instance, 30 percent of his or her spendable income). As of 2018, Bermuda has the highest post allowance, 60 percent. These percentages are then multiplied by *spendable* income, which varies by base salary and the number of family members also stationed abroad.

The spendable income for someone stationed without any family who earns a salary in the top bracket (annual base salary greater than $139,000) is $44,700. Since the typical post allowance is closer to 20 percent, most COLAs are in the range of $2,000 to $8,000, annually [47, 89].

Private-sector food allowances. As with payments for housing, food-specific payments are rare outside the military. In the private sector, only about 16 percent of people or employers have access to an onsite cafeteria that is at least partially subsidized. In these cases, employees do not have the option to receive a tax-free allowance in lieu of company-provided food. Per diem meal allowances are slightly more common for oil and gas employees stationed abroad: almost 19 percent of oil and gas employees report receiving a meal allowance. Such allowances are typically subject to taxation. While some oil and gas companies offer additional payment to the employee to offset the additional tax that comes from the receipt of the meal allowance, that additional pay is at the cost of the company [90]. Alternatively, SMEs report that sailors on merchant ships and employees stationed on oil rigs have access to onsite cafeterias and galleys at no cost to the employee. These in-kind benefits do not create a tax liability for the employee.

Implications for switching to an SSS. Very few tax-free food allowances exist in the civilian sector. Should the military switch to an SSS, it would forfeit the tax benefits associated with the current pay plus allowances system. To switch to an SSS while keeping constant take-home pay for servicemembers, the services would have to increase the out-of-pocket payment to servicemembers to make up for the increased tax burden. While the services may be able to take advantage of the tax breaks associated with COLA, at present, these payments cover only additional costs and can be paid only while someone is stationed in an eligible foreign post. Moreover, because BAS does not vary by dependency status, ending BAS does not affect current equity concerns surrounding pay variation by dependent status, but it still increases the cost of subsistence-related compensation to the services.

Federal income tax advantage

A substantial but often overlooked aspect of military pay is built-in tax advantages that come with the BAH and BAS. In addition to being exempt from federal and state taxes, these allowances also are excluded from Social Security taxes. BAS and BAH together average over 30 percent of a member's total regular cash pay, so the tax saving from this exemption can be significant.

For an E-8 with 18 YOS and 3 dependents in Arlington, Virginia, the annual tax saving is over $5,000. This saving means not only that the servicemember takes home more of his or her paycheck than an equivalently salaried civilian, but also that the out-of-pocket cost to the services is lower than it would be if the entirety of compensation were taxable. For example, an O-5 with 18 YOS and 2 dependents currently costs the services $147,395 (the sum of basic

pay, BAH, and BAS before tax) and takes home $105,520 after paying taxes. Under an SSS where all pay is taxable, the services would need to distribute $159,283 to that servicemember to preserve his or her take-home pay at $105,520 per year.[22] In other words, under an SSS that does not use tax-free allowances, the military would have to spend an additional $11,888 per year on that servicemember to keep his or her take-home pay constant [37]. Table 1 gives selected examples for servicemembers of various ranks, YOS, and dependents. The last column of Table 1 indicates the amount by which the military would need to increase the denoted servicemember's total pay to preserve his or her current take-home pay if the military moved to an SSS.

Table 1. Basic pay, BAH, BAS, and tax advantage examples

Rank	YOS	Dependents	Basic pay	BAH	BAS	Tax advantage
			Enlisted			
E-2	2	0	22,035	21,348	4,433	**3,516**
E-6	10	1	42,764	32,472	4,433	**4,101**
E-8	18	3	61,196	33,876	4,433	**5,224**
			Officer			
O-2	2	0	48,935	28,080	3,053	**4,245**
O-5	18	2	105,246	39,096	3,053	**11,888**
O-8	28	4	171,220	39,780	3,053	**12,081**

Note: All examples are based on a servicemember who lives in Arlington, Virginia. Dependents of 1 or more assume married and filing jointly. Pay, allowances, and tax advantage are determined by the Regular Military Compensation Calculator [37].

The kinds of tax advantages offered by BAH and BAS are increasingly rare in the civilian sector, although the overseas COLA and LQA for FS workers and uniform allowances for federal civilian workers are tax exempt. Beyond those allowances, pay differentials and bonuses for public-sector workers based on specific circumstances (e.g., location, hard-to-fill positions, or hazardous duty) are almost always considered part of an employee's gross income and, therefore, subject to income tax.

Similarly, salary bonuses in the private sector, such as for taking a position in a dangerous location, are typically considered taxable income. One exception is hazard pay earned in a designated combat zone by federal civilian employees. Such pay is deemed tax exempt in the same way that hazardous duty pay in a combat zone is tax free for servicemembers. The only other exception we encountered was the tax-deductible housing allowance for church ministers, which is technically part of the minister's compensation package. The tax deduction

[22] Examples assume that the servicemember lives in Arlington, Virginia, and is filing jointly with a spouse.

occurs at the end of the year when the minister files income taxes, and the amount of the deduction is based on the market rental value of the home.

Tax-free allowances of other kinds for military personnel also are increasingly rare. In 1995, a COLA was authorized for servicemembers assigned to high-cost areas in the continental US (CONUS). The CONUS COLA became the first taxable allowance for military members due to a law change that mandated that allowances created after 1986 would be taxable [4, 38].[23]

These comparisons suggest a couple of approaches that might be taken in integrating allowances into an SSS for the military. If it can be applied to military members, the housing tax advantage used by ministers could provide significant tax savings in an SSS, though a law change would be required to apply to military members the current tax exemption. Tax exemptions for servicemembers would be limited to the total amount of money *spent* on housing (as opposed to total BAH, regardless of spending), but total military compensation could be dispersed as a single salary. The military also could take advantage of the existing situational tax-exempt allowances that apply to all federal employees, such as COLA, LQA, and hazard pay in designated combat zones. Though these allowances are limited in scope, they stand as currently usable allowances that apply to multiple situations often experienced by military members.

Special and incentive pays

Special military pay

In addition to basic pay and allowances, the military offers a variety of special pays granted when servicemembers serve in specific roles and environments. Pay of this type is intended to compensate servicemembers for working in unfavorable conditions or difficult-to-staff positions and is typically used to incentivize participation in such situations. Examples of special pays include special duty pays, family separation pay, hardship pay, and hazardous duty pay. Servicemembers required to serve in dangerous circumstances are eligible to receive hazardous duty pay, which is an increase to basic pay. Any pay earned under such conditions, including basic pay and hazardous duty pay, is not subject to taxation.

Public-sector performance awards

OPM allows agencies to allocate performance awards at their discretion, as long as the award does not exceed the biweekly rate of a grade 15, step 10 employee. Guidelines also stipulate that larger awards must be allocated to employees with higher performance ratings within

[23] Military.com, a membership organization for military servicemembers and veterans, observes that this law has not been closely followed; the CONUS COLA is currently the only taxable allowance. The website lists the full range of allowances and indicates which ones are taxable [91].

their same performance pool. Beyond these requirements, agencies may grant performance bonuses at sizes and intervals that are deemed appropriate by that agency. No restrictions are placed on the appraisal formula or the way in which performance money is allocated across each level of performance [92].

Public-sector hazard pay

Hazard or hardship pay in the federal civilian sector is available for both FS officers and domestic employees. FS workers may be entitled to both a post hardship differential and danger pay. The post hardship differential is provided for assignments to posts in areas with identified hardships in several categories, including climate, medical, environmental education, import restrictions, crime, social isolation (e.g., gender discrimination), political violence, terrorism, and harassment. The differential is paid as a percentage of basic compensation in 5, 10, 15, 20, 25, 30, and 35 percent increments, and it is included in gross income for federal income tax purposes [41].

The danger pay allowance for FS workers is additional compensation for service at designated danger pay posts because of civil insurrections, civil war, terrorism, or wartime conditions that threaten the employee's safety. The amount is 15, 25, or 35 percent of basic pay, depending on the level of danger. The danger pay allowance is in lieu of that part of the hardship post differential that applies to political violence and terrorism. Consequently, the post hardship differential rate may be reduced when danger pay is in effect. Like the hardship differential, danger pay is part of taxable income [93].

Hazard pay is also available to domestic federal civilian workers in hazardous occupations. OPM guidelines establish activities eligible for hazard pay, including exposure to hazardous weather or terrain, work with fuel storage tanks, and firefighting. Federal employees receive a hazard pay wage increase (up to 25 percent) for all hours worked under the circumstances outlined by OPM. Like the post hardship differential and danger pay in FS, hazard pay received by domestic federal civilians is subject to tax. When earned in a designated combat zone, hazard pay is not subject to taxation [41]. Occupations in which hazardous duty is inherent to the occupations (such as law enforcement) are not eligible for hazardous duty pay. Instead, such occupations typically offer higher base salaries than the GS scale.

Private-sector hazard pay

SMEs with experience in the private sector report that some occupations with locations in dangerous areas—typically abroad—usually offer a salary premium to attract and retain personnel in those locations. The amount of the premium is often related to the security rating applied to that country by the US government. This sort of premium pay is a percentage increase to the base salary, and is subject to income taxes.

Implications for switching to an SSS

The current OPM regulations stipulate that any federal employee who works under conditions deemed to incur hazard or hardship is eligible for increased basic pay while working under those conditions. In addition, if hazard pay is earned in a location designated as a combat zone, it is not subject to taxation. If the military switched to an SSS, the current process of hazard pay would be unaffected.

Retirement benefits

Because military retirement benefits are linked to base pay, any changes in base pay will affect military servicemembers' retirement accrual and annuities. Specifically, the military's Blended Retirement System, implemented in 2018, has three components, each of which is connected to base pay:[24]

1. Defined benefit component: 2 percent times the number of YOS, with payment of 40 percent of final base pay at 20 years and 60 percent at 30 years.
2. Defined contribution: A Thrift Savings Plan (TSP) in which servicemembers are automatically enrolled with a 3 percent base pay contribution, which they can increase, decrease, or terminate. The government contributes 1 percent of the member's base pay to the TSP for every 1 percent contributed by the servicemember, up to 3 percent of base pay. The government contributes 0.5 percent for each additional percent of base pay (beyond the initial 3 percent) that the servicemember contributes, up to 5 percent of his or her base pay. Together, these government contributions can add up to 4 percent of a servicemember's base pay.
3. Continuation pay: Bonus equal to 2.5 months of base pay for active duty servicemembers with 12 years of service who commit to an additional four years [30].

As the foregoing description illustrates, retirement contributions and annuities are connected to base pay; allowances are not part of the formula. Consequently, if the military switches to an SSS that rolls allowances into base pay, both the servicemember's and the government's retirement contributions will increase. While these increases could be beneficial to servicemembers' retirement annuities, if funds are insufficient to support the government contribution, adjustments to BRS may be needed. For instance, DOD has the flexibility to reduce or eliminate continuation pay; it can also request a change to the formula for government contributions to BRS.

[24] Starting in 2018, all new servicemembers are automatically enrolled in BRS. Servicemembers with less than 12 years of service were given the option to have BRS or continue with the traditional defined benefit. Those with more than 12 years of service continued with the traditional defined benefit plan.

Private-sector trends

SMEs who provide compensation services to private-sector firms report on three compensation trends in private industry that may have some relevance: simplifying compensation, developing compensation components to attract and retain young adults, and structuring compensation around specific tasks or assignments. We discuss each trend next:

- **Simplify compensation.** Like the military, private-sector SMEs report a trend toward simplifying compensation to reduce company costs and administrative burdens. The goal is to offer attractive packages with fewer components. For example, while private industry does not tend to use allowances, some companies have contracted with relocation companies to help employees move. A recent trend is to instead reimburse employees for relocation expenses.
- **Offer compensation incentives to attract younger employees.** Private-sector SMEs described several trends in private industry designed to attract and retain young adults—a key audience for the military. The trends are personalizing benefits, offering recruitment incentives for young adults just out of college, and using temporary assignments over permanent relocation:
  - *Personalizing benefits.* The SME at a private-sector consulting firm noted that young adults are accustomed to more tailored approaches (akin to online sales companies tailoring recommendations to each customer's past purchases). Similarly, companies are tailoring compensation packages to employee circumstances, such as including among health plan options high-deductible plans with catastrophic coverage, or offering a core set of benefits along with an allocation that employees may apply to a range of options, such as professional development funds or tuition reimbursement. Companies also may offer benefit options that employees pay for but at a group rate negotiated by the company. Examples include pet insurance, automobile or homeowners' insurance, and choice-based health plans.
  - *Recruitment incentives.* Two types of recruitment incentives were mentioned to attract young adults just out of college, particularly in the field of technology: student loan repayment and compensating parents whose children come to work for the company.
  - *Increase in temporary assignments* rather than permanent relocation to accommodate employees who are reluctant to permanently relocate careers and families. In some cases, companies offer temporary, short-term housing arrangements for these assignments.

- **Structure compensation around specific tasks or assignments.** Private-sector companies are more frequently structuring compensation around specific tasks or assignments. In the past, these assignments might have gone to consultants, but the new approach is to establish a "contingency workforce"—a pool of employees who are paid contingent on completing the work. Companies develop task descriptions with appropriate compensation, and employees bid on or choose the tasks for which they are qualified and interested. Performance awards are based not on tenure but on task performance. One SME described this approach as "democratizing the work." A related trend involves contracting with an entire family to complete a specified task, with the family receiving compensation when the work is complete. These approaches are reportedly popular in the UK, Middle East, Equatorial Africa, and Hong Kong, as well as in new product development and marketing. This approach may represent a way to offer extra compensation to servicemembers in lieu of BAH and BAS.

As noted above, simplifying the military compensation system could offer the opportunity for à la carte options that military servicemembers could choose to enhance their own compensation and benefits. Increasing members' salaries to compensate for the loss of BAH and BAS also may provide increased income flexibility for members to use on personalized pay and benefits options. Offering compensation for specific tasks also may provide an opportunity for servicemembers (or their families) to earn additional compensation. Such approaches could be an attractive recruitment tool for young adults and servicemembers with families.

Advantages and disadvantages of compensation systems

Several iterations of the Quadrennial Review of Military Compensation have identified a consistent set of issues regarding potential advantages and disadvantages of various compensation systems related to transparency, equity and fairness, incentives, and cost and administrative efficiencies. In this subsection, we share SME perspectives on these issues.

Transparency

A potential downside to the current military compensation system is that the numerous allowances and tax advantages may make the system so complex that servicemembers do not understand the full value of their compensation, and military decision-makers do not understand personnel costs. In discussing this issue with SMEs, a clear distinction emerged between transparency issues in the public versus the private sector. In the public sector, transparency is about making sure employees understand the full value of their compensation package and possibilities for future earnings. In the private sector, where pay is more tightly

linked to employee performance, transparency focuses on ensuring that employees understand the basis for merit pay increases—an issue that may become increasingly important if the military builds more performance-based approaches into the new salary system. Also, SMEs in both the public and private sectors emphasize the importance of messaging and accessible information when changes are made to the compensation system.

Public sector

SMEs at government agencies generally agreed that a single-salary approach is relatively transparent to employees. For example, the GS system's job grades and steps are based primarily on job responsibilities and years of experience, with locality adjustments for certain geographic areas. Salary schedules are updated and published annually so employees can see what they are currently earning and predict future earnings. While government contributions to benefits, such as health and life insurance, are less transparent, some agencies list these benefits on annual employee statements. For instance, a large state law enforcement agency provides each employee with an annual personal benefits statement that includes information on earnings, leave, benefits, and retirement forecasts.

At the same time, transparency in the federal government can be affected by the bureaucratic structure and how information is shared. Similarly, public-sector SMEs discussed the importance of communication and information so that employees can quickly and easily access clear information about their compensation and benefits. The SME at a large state law enforcement agency described several ways in which the agency shares information, including a policy manual with information on merit increases and a website that includes information about the salary range for each career and level, competency proficiency markers required to move to the next level, and benefits.

Private sector

In the private sector, transparency is an issue relative to employees understanding how to achieve performance targets that lead to salary increases or bonuses. While companies typically have a structure to determine merit increases, managers may take other issues into consideration that are not necessarily part of the design, such as current performance, need to retain employees with critical skills, and potential for future performance. Private-sector SMEs emphasize the importance of companies providing as much information as possible about what employees must do to earn salary increases and bonuses.

In addition, private-sector SMEs emphasized that, when changes are made to the compensation system, messaging should focus on the philosophy behind the new system rather than simply its elements so that employees understand the rationale. Employees also are more likely to understand and accept the new system if it flows from and is connected to the overall company culture and values. One SME provided contrasting examples of a company whose philosophy of recruiting did not match its philosophy of retention. At this company, compensation

incentives for new hires resulted in "salary compression" in which new hires sometimes made more money than experienced, tenured employees did. The lack of transparency, communication, and philosophical alignment ultimately led to the company's failure. In contrast, a university's transition from the tenure system to employing faculty on a contract basis went smoothly both because the new system was more lucrative for faculty members and because there was strong communication and transparency about the rationale and benefits of the new system.

Churches

Discussions with SMEs that consult with churches about compensation for ministers noted that pastors typically have a good grasp of their total compensation package, including housing, pay, benefits, and retirement. They attributed this to the fact that church budget committees have to establish these parameters and sometimes share the information with their congregations. Here again, making detailed information available is the key.

Implications for military compensation

Information from SMEs supports the view that an SSS is more transparent than a system with multiple components. At the same time, SMEs emphasized the importance of sharing clear, readily accessible information in a variety of formats to help employees understand their full compensation package. SMEs emphasized the importance of sharing information on the rationale behind compensation systems, especially when changes are made to those systems. In addition, if SSSs incorporate more performance-based components, information on the competency and proficiency markers needed to advance in the system also must be clear. A simplified system may make it easier to be transparent about performance-based promotion requirements.

Equity and fairness

A consistent concern expressed about the current military compensation system is that, because the housing allowance varies based on dependent status, the system favors servicemembers with families over those who are single, even when they do the same kinds of work. In addition, the tax advantages may favor some individuals based on tax bracket. Consequently, we asked SMEs whether equity and fairness issues are a concern with their compensation systems. Responses differed thematically between public- and private-sector SMEs. On one hand, SMEs in government agencies spoke about the need to offer equal compensation for equal work across government agencies and when compared with the private sector. Private-sector SMEs, on the other hand, spoke of the need to define and balance approaches to equity, fairness, and efficiency.

Public sector

Public-sector SMEs emphasized the need to ensure external equity with the private sector, individual equity in terms of rewarding strong performance, and equitable approaches to compensation for personnel working in similar circumstances. The first two themes emerged in discussions of the GS and related pay systems used by federal civilian agencies. As with the military compensation system, there has been interest for some time in modernizing the federal pay system to make it more market-based and performance-oriented, in line with private-sector compensation systems. A 2002 OPM White Paper concluded that the system is too focused on *internal equity* to reflect an employee's relative place in a hierarchy of positions; it leaves little room for *external equity* to accommodate changes in labor market rates for different occupations, as well as *individual equity* to reward excellent performance [7]. Federal civilian agency SMEs concur that there is a perception among employees that the GS system overcompensates some positions and undercompensates others, and that pay increases are not tied to performance to an extent that is viewed as fair.

Public-sector SMEs raised the issue of ensuring that federal civilians within and across agencies working in similar conditions received the same pay, and that civilian pay is comparable to military pay for similar work. In the public sector, special rates, differentials, and locality pay can raise issues of equity. For instance, special rates typically are established to relieve staffing difficulties in particular locations (e.g., rural and remote areas). Inequities may be present or may be perceived if, for example, an Air Force installation requests and receives a special rate for an airplane mechanic, but a nearby National Guard installation does not offer the rate. (In such cases, military components may be added to the special rate through an amended request.) Similarly, locality pay reflects pay levels of nonfederal workers in a given area, often resulting in higher salaries in metropolitan than in rural areas. These disparate rates can result in perceptions of inequity when locations are nearby, such as a federal prison in an urban area that is within 100 miles of a more rural facility.

SMEs reported that different approaches to compensation and benefits between Civil Service and Foreign Service workers can create perceptions of inequity. For instance, the Foreign Service has a mandatory retirement age of 65, but the Civil Service does not. Similarly, the *grade in position* approach used for the Civil Service and the *grade in person* approach for FS employees creates potential inequities. If a Civil Service desk officer works alongside an FS desk officer, the FS officer operates under an up-and-out system (like the military), and can advance based on performance. The Civil Service worker, however, would have to move to a different position to advance on the salary schedule.

Similar concerns about equity arise when military servicemembers work alongside civilian employees. For instance, military police may work alongside civilian law enforcement officers at military installations. If both groups are called on to work overtime, civilian police are

entitled to overtime pay, whereas military police are considered to be on duty all the time and, consequently, do not receive extra pay. One SME noted that several "copycat" allowances have been offered to FS officers who work alongside the military (in embassies, for instance) to make allowances equivalent. These include a *temporary separate maintenance allowance (TSMA),* which allows family members to transition to accommodations when the employee moves from a company post to an unaccompanied assignment, and *imminent danger pay* for civilians working alongside military personnel in the same environments. The FS LQA also was expanded to incorporate the equivalent of the military's *extraordinary quarters allowance*, which compensates military members in foreign posts to move to temporary quarters when post quarters are under renovation. The creation of these copycat allowances illustrates the importance placed on ensuring equitable compensation for government employees working under the same circumstances.

Private sector

Equity issues raised by SMEs who consult with private-sector companies were related to balancing equity, fairness, and efficiency. World at Work, a membership organization for human resources professionals, notes on its website that companies must balance market competitiveness, internal equity, organizational performance, and individual performance—and that issues of fairness underlie all of these areas. In particular, reward policies and practices that are not perceived as fair will not attract or retain employees [94]. An SME at one consulting firm commented that perceptions of fairness are promoted through transparency and openness so that employees understand the rationale for reward policies. The SME for another firm defined *equity* as related to equal, nondiscriminatory treatment of employees, which has been driven by social movements and legislation (e.g., greater representation of women and minorities in the workforce). *Efficiency,* however, emphasizes minimizing costs to the company by providing only the level of benefits needed to meet recruiting, retention, and performance goals. The pressure is on companies to be both equitable and efficient, which means identifying critical skill sets the company needs and outsourcing work when possible. Then, once employees are hired, companies must ensure equitable treatment of those employees who are in the same job.

Implications for military compensation

Varying compensation based on dependent status is a nearly nonexistent practice in the private and nonprofit sectors, where there seems to be no expectation of such accommodation. Absorbing BAH into an SSS would eliminate the inequity perceived by some that results when a servicemember with dependents receives a higher BAH—moving the military system toward more of an equal-pay-for-equal-work approach. At the same time, eliminating this advantage could remove an important recruitment and retention incentive for servicemembers with families. The military will need to consider what standard of equity it wishes to apply and how

to message this particular aspect as it transitions to an SSS. Consideration also should be given to the importance of ensuring equitable compensation approaches for government employees working in similar circumstances.

Incentives

Past reviews of military compensation have considered whether military pay should be more closely linked to a servicemember's performance. Consequently, our SME discussions explored the kinds of incentives built into various compensation approaches. Four themes emerged from these discussions:

- SSSs in the public sector are much more heavily weighted toward tenure and job classification than performance.
- The up-and-out system of the military and the Foreign Service is a promotion-based incentive linked to performance.
- Private-sector compensation and salary increases are more tightly linked to job performance.
- Public-sector agencies recognize the need to move to more performance-based systems.

Public-sector tenure-based systems

SMEs in the public sector noted that the GS pay system and similar approaches base compensation primarily on job classification and years of experience. Within the GS system, step increases are based not only on time in the job grade but also on acceptable performance. Employees may receive a maximum of one quality step increase (QSI) per year for strong performance, but the SME in one agency reported that such increases are rare, constituting about 0.14 percent of the payroll and awarded to fewer than 5 percent of employees. Another federal agency SME reported more frequent use of QSI, noting that the agency can recognize up to 10 percent of its workforce through QSIs, although the number recognized often is driven by the budget. The perspectives of DOD civilian employees, as reported on the 2018 Federal Employee Viewpoints survey, indicate that performance-based increases are not the norm: only 27 percent of employees agreed that pay raises in their agencies depend on how well employees perform their jobs, while 43 percent disagreed and 30 percent were neutral [22].

One way in which government agencies that use SSSs compete with the private sector is through special rates and hardship differentials that help agencies to recruit and retain personnel in hard-to-fill positions. The SME at a large state law enforcement agency reported an incentive to make salaries for state law enforcement officers competitive with city police officers—namely, building into officers' salaries an automatic 10 hours of overtime pay each pay period.

Up-or-out promotion systems

Exceptions to the tenure-based approaches in the public sector were described for FS personnel, whose promotions are modeled on the military's up-or-out system. In effect, FS workers can be in the same grade for only a specified time. Failure to be promoted during that time leads to mandatory retirement. Promotions are determined through review boards that categorize promotion candidates as promotable, mid-ranked, or low-ranked. These selection boards produce rank-ordered lists of candidates recommended for promotion, and a cut line is determined based on the number of available promotion slots. Similarly, performance standards boards assess low-ranked candidates for possible separation from service [95]. The SMEs we consulted expressed the view that this system acts as a motivator to perform, and they noted that FS officers structure their careers to work toward advancement. The system is not without detractors, however, as evidenced by online commentaries suggesting that the up-or-out system harms both the military and the Foreign Service by forcing out valuable, experienced personnel, sometimes because of the limited number of promotion slots available [96-97].

Private-sector performance-based systems

Private-sector SMEs reported that the criteria for pay increases and promotions are weighted more toward performance than tenure. In this meritocratic approach, private-sector companies typically establish an initial pay scale for specific jobs, which is paid to new college hires regardless of their alma mater. From that point forward, increases in pay and time to promotion vary based on employee performance. For personnel in upper management levels, salary bonuses also may be contingent on overall company performance. At larger companies, performance-based incentives may exist alongside across-the-board annual increases linked to the company's prior-year performance, as well as more tenure-based approaches for some employees.

Implication for military compensation

While the military's up-or-out approach to promotion is more strongly based on performance than approaches used in the public sector, the BAH and BAS components of the system are not linked to performance. Absorbing these non-performance-based components into an SSS could provide more opportunity to link compensation to performance, but military decision-makers will need to consider how to structure the system to do so. As noted earlier, survey data from federal civilian employees in the GS system indicate that employees do not perceive a strong link between employee performance and compensation. Moreover, an SSS similar to the GS pay system could suffer from the same limitations as the military's current basic pay table, which does not differentiate compensation according to the nature of the job. As recent CNA reports note, this approach limits DOD's ability to offer salaries that are competitive with the civilian sector, a particular need for some high-demand, highly skilled jobs. Possible approaches to

build into an SSS include pay banding or establishing different compensation tables for select communities that require high levels of technical skill or experience [16-17].

Cost and administrative efficiencies

Public-sector SMEs generally agreed that an SSS is more efficient in terms of administration and costs; one SME attributed this to the "economy of scale." An example was provided by an SME who reported that overhead costs for administering the GS pay system to one million employees is smaller than collecting cost-of-living data in allowance areas with fewer than 50,000 employees. One SME also pointed out that administering pay-for-performance approaches will add overhead costs to government agencies. This observation raises the question of whether moving to an SSS would allow resources to be repurposed to manage a more performance-based, flexible compensation and personnel system.

Conclusion: Civilian compensation systems

The information shared in this appendix suggests a number of implications for military decision-makers to consider as they consider a transition to an SSS. Key considerations include (1) uniqueness of military circumstances, (2) parity and fairness, (3) the importance of transparency, messaging, and communication, and (4) possible repurposing of resources.

Uniqueness of military circumstances

SMEs in both the public and private sectors cautioned that the military operates in unique circumstances that do not always parallel those of the civilian sector. The following circumstances are particularly notable:

- **Demographics.** The demographic composition of the military does not mirror that of the civilian labor force. While women represent about half of civilian employees, only about 15 percent of servicemembers are women. The age profile of labor also differs significantly across the military and civilian labor markets. On average, the number of contracted servicemembers declines as age increases because not all servicemembers sign new service contracts when their prior ones expire. The opposite, however, is true in the civilian workforce, where labor participation typically increases with age between 18 and 40 as more people enter the labor market. Average education by age also differs significantly for civilian and military personnel, particularly when focusing on enlisted members. These differences mean that civilian-wide trends and averages in compensation structures may not be entirely representative of what the military would look like if it adopted similar compensation policies. Moreover, what works for

an industry that employs more women and a larger distribution of ages may not work as efficiently for military servicemembers.

- **Occupational specialties.** Civilian and military pay structures can be difficult to compare because some military occupational specialties (MOSs), ratings, and designators do not have a clear civilian equivalent. Because military occupations, such as a nuclear submarine technician or tank gunner, do not appear in the civilian workforce, descriptions of the typical civilian pay structure may not appropriately translate to potential options for the military. In addition, comparable labor market data on which to base pay scales may not be available for some MOSs. As a result, pay structures employed in civilian positions may not always be appropriate for the recruitment and retention of people in all military occupations [50].
- **Frequent relocation.** Few other professions expect employees to relocate every 18 to 24 months, which BAH is meant to accommodate. Some SMEs expressed the view that it will be difficult to get away from BAH, which is an important incentive in the military services.

Parity and fairness

Public-sector SMEs noted that federal employees already are highly attuned to disparities in pay and benefits when employees from the Civil Service, the Foreign Service, and/or the military work alongside one another. Consequently, the Foreign Service has created some so-called copycat benefits for employees who work with military servicemembers in the same jobs and/or circumstances. These examples suggest that ensuring parity and fairness across the public sectors should be central to any compensation reform efforts.

Importance of transparency, messaging, and communication

This theme emerged from discussions with SMEs across the government and the private and nonprofit sectors. If DOD transitions from a long-standing form of military compensation to an SSS, it will be extremely important to help servicemembers understand the rationale for the changes and to highlight their benefits. These benefits may include increased income, more flexibility in how to spend their income, more fairness in terms of equal pay for equal work, and increased contributions to their retirement plans.

Repurposing resources obtained by simplifying the system

While it is unclear whether the reduced administrative costs of moving to an SSS system will offset potential increased costs from absorbing allowances into base salary, some consideration may be given to how any additional resources might be used to further enhance

the personnel and compensation system. For instance, resources might be used to manage a more performance-based, flexible compensation approach and/or offer more special pays, bonuses, and similar incentives.

In conclusion, this appendix provides information on compensation systems in the public and private sector to inform QRMC deliberations. Information gathered from public- and private-sector SMEs, literature, and documentation suggests that key issues to consider are the loss of tax advantages, possible increased costs to the services due to base pay and retirement contribution increases, the need to account for unique military circumstances (such as frequent relocation), building in performance-based incentives, and ensuring transparency and effective messaging if changes are made to the current system. Emerging private-sector compensation trends may also be of interest as QRMC considers compensation reform. The success of a transition to an SSS will largely depend on the way that DOD handles the challenges outlined in this appendix.

Appendix C: Foreign Military Compensation Systems

The purpose of this appendix is to inform the decision about whether DOD should move to an SSS by reviewing the compensation practices of three foreign militaries: the United Kingdom, Canada, and Australia. We focus on these three because they are relatively comparable to the US military in terms of grade structure and other characteristics (e.g., all are all-volunteer forces) and because all three already have a compensation system that is more focused on a salary component than is the current US system of regular military compensation.

Appendix C is organized as follows. We describe the basic military compensation structure of the three foreign militaries, looking at the salary/basic pay component, how geographic differences are accounted for, how housing and food expenses are handled, whether there are tax advantaged-components of the compensation system, and the link between retirement benefits and other pay components. We also include a brief discussion of the recent history and evolution of the three militaries' compensation systems, with an eye to understanding their implications for the implementation challenges entailed by compensation system changes. The appendix concludes with a comparison of the three militaries' pay structures—with each other, and with that of the US—and a summary of the lessons for compensation reform.

Some of the key conclusions of our review of foreign military compensation systems follow:

- **Pay comparability and salary benchmarking.** All three foreign militaries we studied (the UK, Canada, and Australia) explicitly benchmark the salary component of military compensation to pay levels of sectors outside the military to ensure pay comparability with the civilian sector.
- **Compensation for unique nature of military service.** All three foreign military pay systems add to base salary a component intended to compensate members for the unique aspects of military service that conventional benchmarking does not capture (the UK's "X-Factor," Canada's "military factor," and Australia's service allowance).
- **Skill-based pay differentials**. The base pay scales of the three foreign militaries each include skill differentials—higher pay for members in certain occupations requiring high levels of experience or technical competence, or in high demand in the civilian sector.
- **Housing benefit.** The level of housing benefit offered differs across the three foreign militaries. Canada provides a location-related allowance for its members, the UK provides subsidized housing to some of its members, and Australia provides a range

of housing benefits designed to ensure that members pay about the same amount out of pocket regardless of where they are stationed.

- **Tax advantages.** Tax advantages play a limited role in the compensation systems of the foreign militaries we studied.
- **Pay and dependent status.** The relationship between pay and dependent status also differs across the three foreign militaries. In the UK, almost no military compensation is tied to dependent status. In Canada, some relocation benefits are a function of the number of dependents, but little else. Australia, by contrast, offers a range of benefits (including housing, assisted leave travel, and district allowances) that are tied to the makeup of a member's family.
- **Compensation structure.** The percentage of a member's pay that comes from base pay (salary) differs between the US and the three foreign militaries, especially for enlisted members. For US E-4s, about 50 percent of pay is basic pay, with the other half coming from BAH, BAS, and the tax advantage. For equivalent ranks in the UK and Canada, base salary makes up about 75 percent of total pay. In Australia, because of the larger value of housing benefits, E-4 equivalents earn about 60 percent of their compensation from base pay. For US officers (O-4s), basic pay makes up about 70 percent of total pay, which is about the same as equivalent ranks in Australia, and somewhat lower than equivalent ranks in the UK and Canada.

Basic pay

United Kingdom

The primary goal of the British Armed Forces pay system is to retain a sufficient number of qualified personnel. There are two pay structures, one for officers and one for other ranks (equivalent to US enlisted personnel in the United States). A priority of the Armed Services pay system is to ensure that military pay is analogous to what servicemembers would receive in a comparable civilian role. Therefore, an independent Armed Forces Pay Review Body (AFPRB) conducts an annual review of military pay and recommends revisions as necessary. The AFPRB review process is described in detail later.

Basic offer of pay

Most servicemembers are paid using the basic offer of pay, which includes base pay, the Trade Score (for other ranks—equivalent to the US enlisted ranks), and the X-Factor components.

Base pay. Servicemembers in the UK receive base pay that increases incrementally as they gain experience in rank. The current incremental pay system, known as Pay 16, was implemented in 2016. Under Pay 16, base pay is primarily a function of rank and time in rank (step

increments). Base military pay in the UK is taxable and pensionable (meaning that it is one of the pay components that determines a member's retirement pay) [13].

Trade Score for other ranks. For other ranks (enlisted) servicemembers, Pay 16 is made up of a single core pay spine with four pay supplements, referred to as Trade Scores. Each military trade is placed into one of the supplements, designed to achieve pay comparability with the civilian labor force [13]. The determination of a Trade Score is based on a detailed Job Evaluation process, conducted by a joint services Job Evaluation Team with a civilian lead and several military analysts. The process considers six factors: (1) necessary knowledge and experience, (2) job complexity, (3) decision-making and the impact of the job's output on the organization's success, (4) use of resources and the level of supervision undertaken, (5) the level of internal and external communication and their significance, and (6) working conditions, health, and safety. Each factor has a predetermined weight in a scoring rubric [98]. Most trades (representing approximately 70 percent of servicemembers) receive one of the two lower Trade Score supplements [12]. Note that, in some respects, the US military's enlistment and reenlistment bonuses play a similar role to these Trade Score pay supplements in the UK military.

X-Factor. The X-Factor is a pensionable and taxable component of the basic offer of pay that recognizes the relative disadvantages of life in the armed forces (i.e., those aspects of service life that cannot be evaluated when assessing pay comparability with the civilian labor force). The X-Factor is made up of 13 elements, including danger, separation from family, and hours worked. The X-Factor has been a component of the basic offer of pay since 1970 with the introduction of the military salary system. Regular servicemembers, full-time reservists, and part-time reservists who are called up receive an X-Factor payment of 14.5 percent of their base salary, which includes the Trade Score supplement. Part-time reservists and full-time reservists with a limited commitment receive a 5 percent X-Factor payment. Servicemembers receive the full X-Factor payment up to and including the ranks of commander/lieutenant colonel/wing commander. The X-Factor tapers off between these ranks and up to the ranks of vice admiral/lieutenant general/air marshals. Admirals, generals, and air chief marshals do not receive X-Factor payments.

The AFPRB reviews and, if necessary, recommends changes to the X-Factor every three years. The AFPRB reviews each X-Factor component to assess its sustainability for making comparisons between modern civilian and military life. In addition, the assessment examines whether there should be changes in the salary percentage of the X-Factor payment. In 2015, the AFPRB review resulted in a half percentage-point increase in the X-Factor payment to Regular servicemembers, full-time reservists with a full commitment, and part-time reservists when called up. In addition, it reduced the number of X-Factor components from 18 to 13 [13].

Bespoke pay spines

While most servicemembers are paid using the basic offer, some occupations within the military are eligible for bespoke (customized) pay spines, or higher pay that acknowledges recruitment and retention challenges. These bespoke pay spines are referred to as Tailored Offers and are offered to servicemembers in the following occupations: pilots, special forces, divers, chaplains, doctors and dentists, nurses, veterinarians, and officers commissioned from the ranks [13].

The AFPRB and the annual pay round process

The AFPRB was established in 1971, shortly after the establishment of the military salary system. It advises the British government on the level of pay for all servicemembers, up to and including one-star brigadier generals and the equivalent. Pay adjustments for senior officers (two-stars and above) are handled through a similar process but a different independent committee. The AFPRB is an independent body composed of a chair and seven members appointed by the Prime Minister and the Secretary of State. The purpose of the AFPRB is to ensure that military pay is sufficient to recruit, retain, and motivate qualified personnel. A priority is to achieve broad pay comparability between military pay and the civilian labor market. This requirement is unique among public civilian pay review bodies in the UK. The AFPRB reviews basic pay and other aspects of compensation described in this appendix, including pensions, compensatory allowances, and accommodation and food charges.

The AFPRB undertakes the same in-depth pay review process annually. After receiving briefings from the Chief of Defence Personnel and the three Principal Personnel Officers (PPOs) from the three military service branches, the AFPRB conducts a series of visits to 20 military units between April and July. The visits involve discussions with 3,000 to 4,000 military personnel. In the fall, the AFPRB receives written evidence from the Ministry of Defence and the three services. In addition, the AFPRB Secretariat from the Office of Manpower Economics (part of the UK's Department for Business, Innovation, and Skills) provides information on pay comparability. Later in the fall, the AFPRB hears additional testimony from the three PPOs, the Secretary of State, the Chief of Defence Staff, and the Permanent Secretary. Early in the new calendar year, the AFPRB submits pay recommendations to the Prime Minister and the Secretary of State. Throughout the process, evidence submitted to the AFPRB by military officials is regulated through an independent committee focused on public-sector pay that advises the Prime Minister on pay matters, including the recommendation of the AFPRB. In February or March, the government announces the pay rates and any changes, which are subsequently implemented [13].

Canada

The Canadian Armed Forces have established overarching principles of military compensation, including addressing the key manpower requirements of recruiting, retaining, and motivating people with the appropriate skills and abilities to perform military jobs, and recognizing servicemembers' unique contributions to the nation, the special conditions under which they serve, and the impact of service life on their families. Beyond these general principles, two important criteria for development of Canadian military pay structures follow [9] [48]:

- **External relativity.** Ensure pay equity between the CAF and other organizations by anchoring the pay structure with quantifiable salary benchmarks and avoiding force-fitting groups that have high market value in the private sector into main pay structures (these groups should be dealt with separately, or by using add-ons to the main pay structures).
- **Internal relativity.** Ensure pay equity within the CAF by rewarding appropriately leadership (rank), promotion, technical skills, and experience or time in rank, avoiding pay inversions in which members in a lower rank are paid more than those in a higher rank, and providing for annual pay increases through suitable measurement mechanisms.

External relativity is achieved through salary benchmarking linking CAF pay to federal civil service pay, and forms the basic building block of the military pay structure. Internal relativity principles determine relative pay within the CAF based on experience, rank, skill, and job responsibilities. The CAF attempts to balance these criteria through a military compensation system comprised of four major components (all of which are taxable)[25] [9]:

1. **Salary benchmark.** Pay for the basic military job is compensated through a pay structure based on salary benchmarking relative to other public-sector jobs and built through pay increments for experience, rank, and skill.
2. **Military factor.** The special conditions of military service are compensated through a "military factor" added to the salary benchmark.
3. **Pay differentials.** There are additional pay differentials for individuals with special technical skills or in high-demand occupations.
4. **Incentive pay**, originally intended to reward exceptional performance, but now in reality a step increase.

[25] The only components of Canadian military pay that are not taxable are reimbursements for direct expenses when a member of the CAF is directed to do something (such as job-related travel or training), and pay when assigned to a named, international mission.

CAF members also are eligible for a number of allowances that compensate members for exposure to "austere" living environments or especially risky job conditions. Unlike the other four components, allowances are not pensionable, but they are taxable.[26] We describe each of the four components of the Canadian military pay system in turn.

Salary benchmark

In the Canadian military, the largest component of basic pay is established through a system of salary benchmarking, which is a method of generating information about how much other organizations are paying their employees for jobs that are evaluated as similar. Military jobs, both noncommissioned and officer jobs, are benchmarked externally against similar jobs in the Canadian federal civil service (known as the Public Service of Canada, or PS). There are essentially four main pay groups in the Canadian military: (1) non-commissioned members (NCMs), benchmarked to "blue collar" workers, (2) General Service Officers (GSOs), benchmarked to college-educated "white collar" workers, (3) higher level officers (colonels and above), benchmarked to high-level civil service executives, and (4) a specialist group, including members of the medical, dental, and legal professions, whose pay is benchmarked to their private-sector counterparts [48].

For NCMs of the Canadian military (the equivalent to enlisted members or warrant officers in the US military), the pay structure builds on a salary benchmark that, at the lower end, compares military "predominant jobs" at the corporal level (the second-lowest NCM rank) to blue-collar PS occupations at the journeyman level. With the low end of the NCM pay scale determined through benchmarking, the rest of the pay structure is built out through time-in-rank pay increments (1 to 2 percent, awarded annually), promotion pay increments (7 to 9 percent), skill pay differentials (6 to 13 percent depending on rank and occupation) for certain occupations from corporals to master warrant officers (the second-highest rank), and a supervisory differential (4 percent) for those appointed to master corporal [9] [99].

For GSOs (all officers in the ranks of second lieutenant to lieutenant-colonel), there are lower and upper salary benchmarks. At the lower end, second lieutenant jobs are benchmarked against those of degree-holding PS employees. For higher level officers (colonels and generals), there is one benchmark: colonels are benchmarked against the PS Executive Category (EX), typically comparable to a Canadian Public Service Director or Director General (one step below an Assistant or Associate Deputy Minister). There are some differences between pay structures for NCMs and GSOs. There are fewer GSO ranks (5) than NCM ranks (7). Specialist officer groups, including those in the medical, dental, and legal professions, are dealt with completely separately from the main group of GSOs. GSOs also include pilots, who require a pay differential because of competition from the private sector for their services. Because of these differences,

[26] We provide more information about the allowances in an addendum at the end of this appendix.

there are fewer constraints on GSO pay-setting relative to NCMs and, thus, greater flexibility to meet or exceed normal pay criteria.

For NCMs, the salary benchmarking process incorporates external relativity by evaluating PS occupations at the journeyman level with predominant jobs at the corporal level. A "predominant job" is the job that most of the corporal journeymen in each trade are doing most of the time. Predominant jobs within a single military occupation are frequently benchmarked to two or more PS occupational groups (or levels within the groups). For example, CAF material technicians are benchmarked against four different PS general labor subgroups and levels, including three distinct PS occupations (sheet metal working, metal machining, and precision working). When this happens, the CAF pay benchmark is a weighted average of the PS jobs. Only predominant jobs in the CAF with strong equivalencies in the PS can be evaluated; military-unique jobs are assumed to be equal to the average value of all evaluated CAF jobs. The process of fully reviewing the salary benchmarks is very manpower intensive and can take up to two years to complete. The last complete reevaluation of the corporal benchmark was conducted in 1988, involving the evaluation of 174 predominant jobs covering 65 of 85 NCM occupations. The benchmarking processes for GSOs and higher level officers works similarly [9] [49]. Table 2 summarizes the benchmarking strategy for various CAF groups.

Table 2. Canadian Armed Forces (CAF) current salary benchmarks

Pay group	Benchmarking strategy and components of base pay
Non-commissioned members (NCMs)	Comparability to Federal Public Service + Military Factor
General Service Officers (GSOs)	Comparability to Federal Public Service + Military Factor
Pilots	Comparability to Federal Public Service + Military Factor + Market Differential
Senior Officers	Comparability to Public Service Executive Group + Military Factor
Legal Officers	Comparability to Dept. of Justice Lawyers + Military Component
Military Judges	Comparability to Provincial Court Judges
Medical and Dental Officers	Net Earnings of Physicians in Private Practice + Military Component

Source: [4].

One of the characteristics of CAF pay that distinguishes it from PS or private-sector organizations is the "team concept." This team concept, an outgrowth of the internal relativity principle that reflects the cooperative nature of military work, considers the average value of

the work performed by all members of a specific rank level in developing pay for each member. In the PS, by contrast, an individual tends to be paid the evaluated worth for the specific position he or she is filling. The team concept results in most occupations of the same rank inside the CAF being paid the same amount. In general, the team concept tends to inflate pay rates for less-skilled occupations and deflate pay rates for higher skilled occupations (such as pilots or engineers). This pay "flattening" relative to the PS and private sector can hinder recruiting and retention in higher skilled, high-demand occupations. Although there have been several efforts to address this "team concept" constraint on CAF pay, so far success has been limited to specialist occupations, including medical, dental, and law (judges) [9] [48].

Military factor

The military factor pay component compensates members for the unique working conditions of military service, and increases incentives to join the CAF. When established in 1971, the military factor was valued at 3.5 percent, and was later raised to 4 percent in 1974. As of April 1, 2016, the military factor pay is valued at 8.7 percent for NCMs, GSOs, pilots, and all medical and dental officers and at 6.5 percent for higher level officers (colonel and above). Recent increases were in recognition of a higher operational tempo and resulting increases in separations. CAF members are also compensated for being ineligible for overtime pay at a rate of 6 percent of salary for NCMs and 4 percent of salary for GSOs [9] [60].

Skill pay differentials

Another internal relativity principle incorporated into the CAF pay structure is pay for skill. For NCMs, the pay structure includes skill differentials for corporals, sergeants, warrant officers (WOs), and master warrant officers (MWOs). There are two higher skill NCM pay groupings above a Standard level: Specialist 1 and Specialist 2. The Specialist 1 and Specialist 2 sub-groups include trades such as Fire Control Systems Technicians, Flight Engineers, Biomedical Electronics Technicians, and Marine Engineering Artificers. The allocation of an occupation to Standard, Specialist 1, or Specialist 2 levels is based on the Canadian Forces Trade Evaluation Plan (CFTEP).[27] Occupations, not individual jobs, are evaluated, and (as with external salary benchmarking) the basic evaluation unit is the "predominant job." There are currently 43 occupations classified as Specialist 1 and another 6 classified as Specialist 2. Pay differentials for NCMs between Standard and Specialist 1 range from 12 to 13 percent for corporals and sergeants (the ranks at which most technical skills are used), are 9 percent for WOs, and are just under 7 percent for MWOs. Differentials for Specialist 2 relative to Specialist

[27] CFTEP is a "standard points factor plan" with five factors and a maximum of 1,000 points. The five factors are (i) comprehension and judgment (30 percent), (ii) trades training and experience (30 percent), (iii) responsibility for resources, services, and the safety of others (16 percent), (iv) effort (mental and physical, 12 percent), and (v) working conditions (environment and hazards, 12 percent).

1 occupations range from about 6 percent for corporals and sergeants to 4 percent for WOs and 2 percent for MWOs [9].

For officers, certain occupational groups, including pilots, doctors, dentists, and lawyers, are handled differently within the compensation system (reflecting the principle of not forcing high-market-value groups into main pay structures). Because of the high private-sector demand for their services, GSO pilots require a pay differential similar to the technical skill pay for NCMs (although there is only one differential for pilots, not two). The pilot differential (over the regular GSO pay scale) ranges from about 1 percent for basic-level captains to a maximum of about 18 percent for mid-level captains. From there, the pilot differential gradually decreases to 14 percent for the highest level captains, from 13 percent to 6 percent through the major range, and from 4 percent down to 2 percent for lieutenant colonels. The intent of this differential structure is to reward the people in the ranks who do the most flying [9].

Specialists in the medical, dental, and legal professions are dealt with completely separately from GSOs. They are benchmarked separately (as indicated in Table 2), and only with medical and dental officers does the CAF have a direct private-sector benchmark. Monthly pay for medical and dental officers is roughly 75 percent to 95 percent higher than that for standard GSOs; on top of that, medical officers receive a "special military differential" of C$20,000 (equivalent to $14,665) annually, while dental officers receive an additional C$10,000 ($7,332) per year. Legal officers receive monthly pay that is 3 to 11 percent higher than GSOs at the rank of captain, and nearly 40 percent higher for high-level majors and lieutenant colonels [9].

Incentive pay (step increases)

Within each rank, there are multiple steps, which the CAF calls incentive pay categories. When a CAF member moves from one category to the next higher category, he or she receives a pay increase of 1 to 2 percent. These step increases are awarded yearly based on time in rank. Each NCM rank has 4 such incentive pay categories (except for privates, who have 3). For GSOs, captains have 10 incentive pay categories, majors have 7, and lieutenant colonels have 4. Higher level officer ranks have 3 categories each [9].

Australia

Permanent Australian servicemembers receive a base salary and a service allowance. Both of these pay components are taxable, except for salary and allowances paid to members deployed overseas in a combat environment, which are not taxed.

Base salary

The specific salary package that Australian Defence Force (ADF) members receive depends on their role and how they entered the ADF (officer or "general entry" schemes). Recruits receive initial employment training (similar to A-School and C-School in the US Navy), and they receive

a salary while in basic training, which increases when they are in initial employment training. Specific salaries depend on rank, pay increment levels, and pay grade. Pay grades (of which there are 10) reflect technical skills and experience, such as flying, submarine, special forces, and special operations skills/experience used on the job. Upon enlistment or appointment, servicemembers usually receive the minimum salary for their rank and pay grade. They may receive more depending on their experience, qualifications, skills, previous relevant military experience, previous reserve experience, or any other experience that is not continuous full-time service. If a member's employment category changes, his or her pay grade may also change. An independent tribunal determines which jobs go into which of the 10 pay grades. Within ranks, pay increment levels (steps—typically three per rank) reflect time in rank. Under the current pay scheme, for example, a noncommissioned soldier in the Australian Army earns about A$59,500 ($42,665) annually (including uniform and service allowances). A mid-ranking infantry officer earns about A$84,000 ($60,230) (again, including uniform and allowances) [14-15].

Service allowance

Similar to the UK military's X-Factor, and the Canadian military factor, the ADF's service allowance (currently A$14,271 ($10,233) per year) compensates personnel for the special demands of military service. Trainees and servicemembers above the rank of major do not receive service allowances. This allowance is taxable, except for members deployed in overseas combat operations [15].

Housing and food expenses

United Kingdom

In the US, servicemembers receive BAH, a tax-free cash subsidy to offset the cost of housing. In the UK, housing is provided for all Regular service personnel. Unlike in the US, British servicemembers pay rent on their housing. The rent is subsidized by the government, at a cost of approximately two-thirds of the market rate. At current UK housing rental rates, the average subsidy would be worth £280 per month. The military deducts the cost of rent from servicemembers' salaries as a charge. Service rank and family size determine whether a servicemember receives a Service Family Accommodation or a Single Living Accommodation. Single Living Accommodations usually are within walking districts of a servicemember's unit, while Service Family Accommodations usually are within a 10-mile radius.

In April 2016, the UK Armed Forces implemented the Combined Accommodation Assessment System (CAAS), a new system for determining rental charges. The CAAS replaced the 4-Tier Grading System, which was determined to be complex and subjective and used an out-of-date methodology to assess housing values. To ensure fair CAAS implementation, servicemembers

whose rental charges decreased were moved to the correct level immediately, while those whose charges increased are being moved incrementally to the higher charge [13].

Early in their careers, most servicemembers live in publicly subsidized rental housing and have a rental charge deducted from their paychecks. Later in their careers, many purchase homes for their families [12]. The military helps servicemembers to purchase homes through the Forces Help to Buy (FHTB) scheme [13].

As with housing, food costs are withdrawn as a charge from the salaries of British service personnel. Servicemembers who use the mess facilities on base, such as trainees, have a daily food charge withdrawn from their salaries. In other cases, servicemembers use a "pay as you dine" program, in which contractors set up dining facilities for military members. Pay-as-you-dine costs are generally comparable to what civilians would pay for food. The AFPRB determines the costs for both the daily food charge and the food charged under the pay-as-you-dine plan. Servicemembers who are away from their normal duty stations on travel can be reimbursed for food expenses [12].

Canada

There is no equivalent of the US military's BAH or BAS in the Canadian military compensation structure. The closest CAF compensation component that incorporates a geographic differential is the Post Living Differential (PLD), which is a taxable, but not pensionable, monthly allowance paid to CAF members to compensate for the high cost of living (including rental housing costs) in certain areas (typically large cities). Food costs also play a relatively minor role in determining Canadian military compensation. Local variations in food costs do play some role in determining the price indices behind PLD allowance rates, and food costs also affect the level of certain temporary duty allowances (when CAF members are entitled to meals while away from their office or while on tasking/course), which are updated periodically based on the cost of food in Canada [9].

Post Living Differential

Geographical pay differences are handled by the PLD allowance. This allowance, which is taxable, but not pensionable, is intended to compensate CAF members and their families when posted to an area (typically large cities) with a higher than average cost of living (CoL). PLD rates represent the monthly differential between the CoL at the Standard City (the Ottawa/Gatineau area) and that at other established areas. PLD rates are taxable and are set annually based on a Treasury Board-approved methodology using the Canadian consumer price index (CPI), and incorporating items such as rental housing, food, fuel, and other consumables. PLD is supplemented by a Transitional Post Living Differential (TLPD) that is paid monthly to CAF members to help offset CoL fluctuations. PLD rates (by definition) are zero in about half of the areas to which CAF members are posted. In areas where the rates are

positive, they range from C$62 per month (in Regina and Kitchener) to C$1,485 per month (in parts of Toronto). The median PLD rate for areas that have them is C$376 per month in Montreal South Shore (see Table 3) [9, 99].

Table 3. PLD rates

PLD area	Monthly PLD (C$)
Toronto Area 1	1,485
Toronto Area 5	1,167
Vancouver	1,083
Toronto Area 4	819
Victoria/Esquimalt	816
Calgary	711
Edmonton	684
Halifax	631
Kamloops/Kelowna	525
Toronto Area 3	522
Toronto Area 2	506
Montreal North Shore	505
Aldergrove	418
Hamilton	414
Saskatoon	382
Montreal South Shore	376
Red Deer	327
Cold Lake	319
Moose Jaw	284
Lethbridge	234
Guelph	167
St. John's	149
Medicine Hat	145
Quebec City - Valcartier	117
Sept -Îles -DND	107
Stratford - DND	82
Meaford-Owen Sound	77
Nanaimo	75
Cambridge	71
Kitchener, Regina	62

Source: [6].

Australia

For ADF members, housing assistance may be provided to a member who needs suitable accommodation, but does not have a home in the posting location. Some members also are

provided with low-cost meals in ADF dining halls or meal allowances. Table 4 summarizes the housing and meal benefits that are available to ADF members [15].

Table 4. Housing and meal assistance provided to ADF members

Type of assistance	Description
Housing	***Living-in accommodation*** (a barracks or similar kind of residential accommodation that is provided by the Commonwealth and serves primarily members without dependents) and ***service residences*** (SR) (residential accommodation provided by the Commonwealth) are made available to ADF members at a charge.
Temporary accommodation allowance	A member who cannot live in suitable accommodation for a short time may be given an allowance to pay for a stay in a serviced apartment or hotel.
Rent allowance (RA)	A member who lives in a rented home may be able to get an allowance to assist with a portion of the rent. The amount of RA is the difference between what the member would pay if in an SR and the rent charged, so that members in an SR or in RA pay the same contribution. RA is not taxed.
Meal costs	A member who has to live in (a barracks) may be provided with low-cost meals in the mess. Some members who live away from their families may be given an allowance to pay for meals (to help with the cost of maintaining two premises).
Utility costs	The Commonwealth may pay part of the cost of utilities, such as water, gas, and electricity.

The housing benefit package is designed so that members pay a similar out-of-pocket amount for housing, no matter where they live, while maintaining a minimum housing standard for all members (roughly equivalent to a three-bedroom house). This means that members living in higher-cost areas (such as Sydney, for example) will receive a higher housing benefit. The value of this benefit can be substantial—on the order of A$16,000 per year for ADF members—although the amount will vary by location [14].

Tax-advantaged pay and benefits

United Kingdom

Almost all aspects of UK military remuneration are taxed. There are a few exceptions, but none are comparable to the BAH and BAS that US servicemembers receive. According to a compensation subject matter expert from the British Ministry of Defence, "the government insists that everyone pay taxes." There are a few allowances that are not taxable, but that is because they constitute expense reimbursements. An operations allowance is equivalent to six

months of tax. This allowance, however, serves as a sort of compensation for taxes, rather than tax-free income.

The only other case in which British servicemembers are relieved from paying some taxes is when they are serving overseas. At that time, they do not need to pay the Council Tax, which is analogous to US local property taxes. This is because they are not using the local services for which they would otherwise be paying. This tax relief is only for servicemembers who live away from a military base. There is no Council Tax for service personnel who live on UK military installations [12].

Canada

Most of the elements of Canadian military compensation are taxable. The major exception is the tax-free status that exists for certain overseas operations. The Tax Exemption for Deployed Personnel was introduced in 2004 and created tax exemptions at both the federal and provincial/territorial level for CAF personnel deployed on overseas operations designated as "medium" or "high" risk. In 2017, all CAF personnel deployed on named, international missions became eligible for tax relief. Also, CAF members who are reimbursed for expenses (for example, meals while on travel or training) do not pay taxes on the reimbursed amount. Otherwise, and in contrast with US servicemembers, CAF members do not receive a large portion of their compensation as a tax advantage [9].

Australia

Most forms of ADF pay are taxable. The major exception is pay for members who serve overseas in a combat environment, which is tax exempt. The rent allowance (RA) housing benefit is also not taxed [14-15].

Salary packaging

With salary packaging, ADF members can pay for some items or services from pre- or post-tax income. Members can "salary package" computers, cars, child care, and superannuation (contributions to the pension fund). Members can package up to 100 percent of their salary (including the service allowance, the meal allowance for members who have to work long hours to buy meals when service-provided meals are not available, the parking contribution for a parking space permit for members posted to a specific area, and the separation allowance for spending time away from dependents for service-related reasons) [15].

Retirement benefits

United Kingdom

In the UK, there is one pension scheme for all servicemembers, and it is no contributory. There are no plans to introduce employee contributions in the future. The Ministry of Defence pays the equivalent of 1/47 of each servicemember's salary into the pension pot. Pension payments are based on the final salary (rank) at the point of retirement. The pensionable portion of a UK servicemember's salary includes the base pay (including skill differentials and step increments) and X-Factor components (overall, about 90 to 95 percent of total compensation). Other components of pay (including allowances and any subsidized accommodation benefits) do not factor into the member's pension. The typical pension-eligible age is 60. However, servicemembers can qualify for an early departure payment if they serve as Regulars for at least 20 years and reach the age of 40. If personnel have a break in service of more than 5 years, they must serve an additional 20 years to qualify for the early departure payment [13].

Canada

The Canadian Forces Superannuation Act (CFSA) established that all CAF members in the Regular Forces become Regular Forces Pension Plan contributors when they join the service. Pension benefits are based on rules that depend either on years of pensionable service or CAF service, age, earnings/salary, and circumstance at release. The components of pay that determine a CF member's pension include the salary benchmark, the military factor, the pay differentials for specialist technical skills, and incentive pay (step increments) (about 90 to 95 percent of total compensation). Allowances (such as the environmental allowances or PLD) do not factor into the determination of a CAF member's pension. The annuity formula calls for 2 percent of the member's best five average years' of salary for each year of pensionable service. A retiree with 25 years of service would receive an annual pension benefit equal to 50 percent of the average best five years of earnings; a retiree with 35 years of service would receive 70 percent, and so forth. Member contribution rates as of 2018 are 6.85 percent of earnings up to the yearly maximum pensionable earnings (YMPE) level of $51,100, and 9.2 percent of earnings above YMPE. In 2012, the Canadian government announced that the pension plan would move to a 50:50 cost-sharing ratio between the government and members (at the time the ratio was about 70:30, government to members). As a result, pension contribution rates for CAF members who contribute under the full-time pension plan have increased annually since 2013 in a move toward that ratio. The vesting period for the plan is 2 years, having been reduced from 10 years in 2007 [9, 100].

Australia

In 2016, ADF moved to a fully funded superannuation (defined-contribution) model for all prospective members. There is currently one scheme available to members who joined the ADF after July 1, 2016. The ADF contributes 16.4 percent of a member's salary to the fund (there is no required member contribution at present, but members may contribute additional funds if they wish). On retirement, the fund pays a lump sum (based on contribution and the rate of return to fund investments) that can be used to purchase an annuity or other type of investment. This system replaced the previous defined-benefit system in which ADF members received an annual pension payment that was a function of years of service and final salary. When the transition from the older defined-benefit system to the new superannuation scheme was made in 2016, the ADF permitted current members to stay in the old system, or switch to the new one. The ADF found that the adoption rate for the new system was relatively low; currently, only about 20 to 25 percent of ADF members are in the new superannuation scheme. Participation is expected to rise to about 50 percent by 2023 [14-15].

Other kinds of compensation

Servicemembers in the UK, Canada, and Australia also qualify for a number of other kinds of compensation. These compensation components are, in most cases, not pensionable and typically equivalent to the US military's special pays (for example, hazardous duty pay, family separation pay, and special pays for hard-to-staff billets). Since these types of pay fall outside the bounds of RMC, and moving to an SSS would likely not change their nature, we omit them from the body of the appendix. For the sake of completeness, however, we describe the most important of these other forms of compensation in an addendum at the end of this appendix.

Conclusion: Foreign military compensation

To conclude, we summarize the similarities and differences among the three foreign military compensation systems, we compare the pay structures of the three systems to that of the US, and we summarize some lessons learned about implementing military compensation reform from the recent histories of military compensation in the UK, Canada, and Australia.

Similarities and differences among foreign military compensation systems

There are several distinct similarities between the military compensation systems of the UK, Canada, and Australia:

- **Salary benchmarking.** Each system explicitly benchmarks the salary component of military compensation to the pay levels of sectors outside the military. The UK military has an explicit policy of ensuring broad pay comparability among civilians, while Canada benchmarks base pay to pay in the federal civil service. Australian military salaries are also benchmarked against occupations outside the military when comparisons are possible.
- **Explicit compensation for disadvantages of service life.** Each of these pay systems has a component—the UK's "X-Factor," the Canadian "military factor," and the Australian service allowance—that explicitly values the arduous nature of military service for most servicemembers and their families, and adds this value to the base salary.
- **Skill differentials.** The pay scales of the three foreign systems also include skill differentials—higher pay for members with valued technical skills or experience.
- **Limited tax advantages.** With a few exceptions (notably, individuals serving overseas in combat environments), none of the three foreign militaries considered has a substantial pay component that is exempt from taxation.

One important difference in the three foreign militaries' compensation structures is how housing benefits are handled. Military members in Australia are provided with substantial housing benefits, although these do not necessarily take the form of an explicit cash payment along the lines of the US's BAH. Some UK military personnel also receive subsidized rents (but not those who purchase their own homes, for the most part). Canadian military members (other than those living in military housing) also do not receive as much in terms of housing benefit or subsidized accommodations, although they do receive a location-related pay differential if they live in an area with a high cost of living.

There are also important differences in the relationship between pay and dependent status among these foreign militaries. In the UK, almost no military compensation is tied in any way to whether a member has dependents [12]. In Canada, some relocation benefits are tied to the number of dependents, but little else [8]. In Australia, by contrast, the ADF provides a range of benefits (including housing, assisted leave travel, and district allowances) that all rely on the makeup of a member's family [14-15].

Comparing US and foreign military compensation

In this subsection, we compare the compensation structures of the US and foreign militaries by looking at the relative importance of the various components of compensation in each military. We compare the pay components of individuals in the US military in the "middle" of the rank structure—that is, E-4 for enlisted members and O-4 for officers to their counterparts in the UK, Canada, and Australia. Table 5 summarizes the comparison ranks for each military and

service. We focus on types of compensation that are equivalent to the components of US RMC, and we omit types that are equivalent to special pays and bonuses.

Table 5. Ranks, by country and service, corresponding to US ranks E-4 and O-4

US rank	Service	US	UK	Canada	Australia
E-4	**Air Force**	Senior airman	Corporal	Corporal	Lance corporal
	Army/ Marine Corps	Corporal	Corporal	Corporal	
	Navy	Petty officer, 3rd class	Leading hand	Leading seaman	
O-4	**Air Force**	Major	Squadron leader	Major	Squadron Leader
	Army/ Marine Corps	Major	Major	Major	Major
	Navy	Lieutenant commander	Lieutenant commander	Lieutenant commander	Lieutenant commander

Enlisted

Table 6,Table 7, Table 8, and Table 9 compare the compensation structures for enlisted ranks comparable to US E-4s for the US, UK, Canada, and Australia. "Experience increment" refers to increases in pay that come from an additional year of service or year in grade. "Skill pay" or "skill increment" refers to increases in pay that come from performing an occupation requiring higher-than-standard levels of skill and/or experience.

Table 6. Components of monthly compensation for US E-4s

Pay component	Amount	Percentage of total pay
Basic pay	$2,370	49.5%
Step increment	$120	2.5%
BAH	$1,698	35.5%
BAS	$369	7.7%
Tax advantage	$230	4.8%
Total monthly pay	$4,788	

Source: [14].
Note: Assumes individual with 3 YOS, married with 1 child, stationed in the Atlanta, Georgia, area.

Table 7. Components of monthly compensation for UK OR-4s

Pay component	Amount		Percentage of total pay
	UK	US	
Base pay	£2,553	$3,273	76.5%
X-Factor (14.1%)	£360	$461	10.8%
Trade Score placement	£74	$95	2.2%
Step increment	£68	$88	2.0%
Subsidized accommodation	£280	$358	8.4%
Total monthly pay	£3,335	$4,276	

Source: [15].

Table 8. Components of monthly compensation for Canadian OR-4s

Pay component	Amount		Percentage of total pay
	Canada	US	
Base salary	C$5,014	$3,742	76.1%
Military factor (8.7%)	C$497	$371	7.5%
Skill pay	C$602	$449	9.1%
Incentive pay (step increment)	C$98	$73	1.5%
Post Location Differential	C$376	$281	5.7%
Total monthly pay	C$6,587	$4,916	

Source: [6].
Note: Assumes individual posted to the Montreal South Shore location.

Table 9. Components of monthly compensation for Australian OR-4s

Pay component	Amount		Percentage of total pay
	Australia	US	
Base salary	A$4,565	$3,237	61.6%
Service allowance	A$1,189	$843	16.1%
Pay grade (skill) increment	A$98	$69	1.3%
Step increment	A$220	$156	3.0%
Housing benefit	A$1,333	$946	18.0%
Total monthly pay	A$7,405	$5,252	

Source: [10].

For E-4s/OR-4s, the compensation structure for US servicemembers differs substantially from those for British, Canadian, and Australian military members. For US enlisted members, basic pay (the salary component of pay) makes up about half of total pay. The other half comes from the allowances and the tax advantage. For military members of equivalent rank in the UK and Canada, the base salary component makes up about 75 percent of total pay. For Australian OR-

4s, a larger proportion of compensation comes from the housing benefits, so the base salary component makes up about 60 percent of total pay.

Officers

Table 10, Table 11, Table 12, and Table 13 compare the compensation structures for enlisted ranks comparable to US O-4s for the US, UK, Canada, and Australia.

Table 10. Components of monthly compensation for US O-4s

Pay component	Amount	Percentage of total pay
Basic pay	$7,404	71.8%
Step increment	$244	2.4%
BAH	$2,091	20.3%
BAS	$254	2.5%
Tax advantage	$320	3.1%
Total monthly pay	$10,313	

Source: [14].
Note: Assumes individual with 3 YOS, married with 1 child, stationed in the Atlanta, Georgia, area.

Table 11. Components of monthly compensation for UK OF-3s

Pay component	Amount		Percentage of total pay
	UK	US	
Base pay	£4,323	$5,543	80.7%
X-Factor (14.1%)	£610	$782	11.4%
Step increment	£142	$183	2.7%
Subsidized accommodation	£280	$358	5.2%
Total monthly pay	£5,355	$6,866	

Source: [15].

Table 12. Components of monthly compensation for Canadian OF-3s

Pay component	Amount		Percentage of total pay
	Canada	US	
Base salary	C$8,919	$6,656	87.2%
Military factor	C$776	$579	7.6%
Incentive pay (step increment)	C$158	$118	1.5%
Post Location Differential	C$376	$281	3.7%
Total monthly pay	C$10,229	$7,634	

Source: [6].

Table 13. Components of monthly compensation for Australian OF-3s

Pay component	Amount		Percentage of total pay
	Australia	US	
Base salary	A$7,483	$5,307	70.4%
Service allowance	A$1,189	$843	11.2%
Pay grade (skill) increment	A$254	$180	2.4%
Step increment	A$369	$261	3.5%
Housing benefit	A$1,333	$946	12.5%
Total monthly pay	A$10,628	$7,538	

Source: [10].

The pay structures for US officers in rank O-4 and their UK, Canadian, and Australian counterparts are more similar compared with E-4s. For US officers in O-4, the basic pay component of compensation is larger relative to BAH and BAS, making up about 70 percent of a typical O-4 pay package. This is relatively close to the 81 and 87 percent of total pay that comes from the salary component for O-4 equivalents in the UK and Canada, respectively, and about the same as Australian OF-3s, who again receive a larger housing benefit than their UK and Canadian counterparts do.

Challenges in implementing compensation reforms

The recent histories of compensation reform in the UK, Canada, and Australia may provide some lessons for attempts to reform the US military compensation system. Examples follow:

- **Transparency.** The UK's attempt to introduce a new pay system (Pay 2000) and the subsequent need to simplify that system (Pay 16) highlight the importance of designing pay systems that are transparent and easy for servicemembers to understand.
- **Equity.** The success of compensation reforms depends on perceptions of equity among servicemembers. Canada's unsuccessful attempts to expand skill pay differentials illustrate this point. Maintaining perceptions of equity may require special policy initiatives, such as the UK's "pay protection" policy, which ensured that no servicemember would receive a pay cut under the new Pay 16 plan for three (subsequently extended to six) years.
- **Low take-up rates.** When current members are given a choice about whether or not to move to a newly implemented compensation system, take-up rates can be low, as Australia's recent introduction of a defined-contribution superannuation retirement scheme shows. Special efforts may be required to provide incentives for members with a choice to adopt the new system.

Addendum: Other kinds of compensation

This addendum discusses other kinds of compensation that are, in most cases, not pensionable and are equivalent to the US military's special pays (for example, hazardous duty pay, family separation pay, and special pays for hard-to-staff billets).

United Kingdom

Other kinds of compensation available to UK military members include allowances and expenses, recruitment and retention payments, and other financial incentives.

Allowances and expenses

Allowances and expenses paid to British servicemembers represent the smallest portion of total compensation funding. The annual cost of allowance and expenses has been reduced from approximately £880 million in FY 2009–2010 to approximately £560 million in FY 2017–2018. These allowances are taxable but not pensionable [13].

UK military allowances fall into two categories: compensatory and contributory. Compensatory allowances are awarded to servicemembers for activities, tasks, or conditions that are considered to be above and beyond those included in the X-Factor payment [13]. For example, there is a living allowance for substandard accommodations, which servicemembers may receive either in the UK or while serving overseas [12]. Contributory allowances provide financial assistance for additional expenses incurred due to the demands of service. The provision of an allowance lets servicemembers decide how and where they spend the cash award, whereas expenses provide refunds for actual expenses incurred during service. Expenses must be preapproved and are not discretionary. Expenses are analogous to US expense reimbursement for travel and per diem. Expenses and both types of allowances are categorized under the following activities: food and accommodation, official travel, community, UK service, overseas service, separation, deployment, relocation, servicemember training and education, education for servicemembers' children, clothing, environmental expenses, and miscellaneous. The AFPRB regularly reviews compensatory allowances. Internal work within the Ministry of Defence determines the value of other allowances and expenses [13].

There is only one allowance based on a servicemember's number of dependents: the children's educational allowance. Military members can apply for an allowance to send their children to boarding school if they are stationed overseas. The allowance helps ensure that children continue their education uninterrupted [12].

Recruitment and retention payments

Select servicemembers receive additional Recruitment and Retention Payments (RRPs). The Ministry of Defence awards RRPs to specific groups to assist with recruitment or retention requirements. RRPs also are used to address trades in which there may be a shortage of personnel that may affect operations [12]. RRP is taxable income, but it is not pensionable. There are currently 17 categories of RRP. The determination of whether an occupation receives RRP is based on four factors that may lead to recruitment or retention challenges: (1) an adverse or challenging environment, (2) the need to take on additional training or responsibility, (3) high levels of competition from the civilian labor market, such as the demand for nurses, and (4) structural factors, such as a reduced training pipeline. Some servicemembers receive RRP continuously throughout their careers. In other cases, it may be awarded on a noncontinuous basis, during a period when a skill is a secondary task for a person, based on completion of a specific task, or while he or she is called up as a reservist [13].

Other financial incentives

In addition to RRPs, the Ministry of Defence uses a variety of stand-alone financial incentives, which are short-term measures to address current or projected manpower shortfalls. These financial incentives are lump-sum payments that, like RRP, are taxable and not pensionable. Financial incentives are used to incentivize recruitment, retention, rejoining the service, transferring to high-demand trades, and committing to additional service [13].

Canada

The Canadian military compensation structure includes a system of allowances that provide eligible members with additional compensation in certain situations. These allowances are taxable, but are not pensionable. The types of allowances are environmental, special, clothing, and payments to dependents of deceased or missing personnel.

Environmental allowances

Environmental allowances compensate members whose military duties involve exposure to adverse conditions that are not normally experienced by other members. These allowances also serve as an incentive to attract and retain members willing to serve under such conditions. There are typically two types of environmental allowance for each activity/condition: one for members continuously undertaking a specific activity or exposed to a specific type of environmental condition when posted to a designated position (paid at a monthly rate), and a second, "casual" type of allowance for members periodically undertaking the activity or exposed to the condition (paid at a daily rate, with a monthly maximum equal to the noncasual monthly rate). Table 14 summarizes the different types of environmental allowances available to Canadian servicemembers (monetary values are in Canadian dollars).

Table 14. Environmental allowances (values are in Canadian dollars)

Allowance title	Description	Monthly rate (continuous)		Daily rate (casual)
		Min.	Max.	
Paratroop Allowance	Perform parachute jumping	267	393	75.71
Rescue Specialist Allowance	Perform rescue specialist duties	518	790	[a]
Aircrew Allowance	Exposure to aircrew conditions	327	621	31.13
Land Duty Allowance	Exposure to field conditions	327	822	27.16
Diving Allowance	Perform clearance diving duties	689	689	42.35
	Perform other diving duties	145	260	23.36
Diving Deep Danger Allowance	Clearance divers who dive more than 200 feet underwater in a submersible			31.18
Diving Experimental Saturation Allowance	Divers (clearance, ship, or combat) who participate in an experimental saturation dive and decompression for at least a continuous 24-hour period			[b]
Sea Duty Allowance	Perform duties on a ship or vessel	327	822	27.16
Hypobaric Chamber Allowance	Aeromedical training officers and technicians who instruct, or observe, in a hypobaric chamber			15.58
Submarine Allowance	Perform duties on a submarine	475	935	30.52
Exceptional Hazard Allowance	Required to perform disposal procedures on known or suspected explosives or extremely hazardous materials			[c]
Special Operations Allowance	Perform command or general support duties for special operations	741	888	22.00
	Perform operational specialist support duties for special operations	1,355	1,621	48.00
	Perform assaulter duties for special operations	2,154	2,503	71.00
Special Operations Assaulter Allowance	Perform assaulter duties for special operations	1,486	3,920	76.22
Submarine Crewing Allowance	Crew or are required for readiness-to-crew submarines	402	402	

Source: [16].

[a] The Rescue Specialist Allowance Rate (Casual) is the sum of the amounts that the member would have been entitled to receive under Paratroop Allowance (Casual), Aircrew Allowance (Casual), and Diving Allowance (Casual).

[b] The Diving Experimental Saturation Allowance rate ranges from $40.09 to $95.39 per day based on the depth of the dive.

[c] The Exceptional Hazard Allowance rate is $190 per incident involving an "extremely hazardous chemical," or $366 per incident involving an "explosive substance," "improvised explosive device," or "primed charge."

The amount a CAF member earns (within the range of monthly rates) is determined by experience level. Specifically, monthly rates depend on the number of months of eligible service a member has accumulated during his or her career in relation to the allowance in question. Members are awarded "credit points" for experience (one credit point for each month in which the member has completed a minimum of nine consecutive full days of eligible service). Usually, it takes 216 credit points (equivalent to 18 years performing the activity or being exposed to the condition) to reach the highest monthly rates [10].

These environmental allowances are essentially equivalent to the various types of special and incentive pays in the US military. In general, environmental allowances in the Canadian military are much less than the salary provided as part of compensation, although there are rare special cases (e.g., Special Operations Allowance for those with assaulter duties) where allowances can make up a larger percentage of total compensation. For example, for Canadian NCMs and GSOs, the basic salary of a sergeant or a mid-level second lieutenant (who both earn around C$6,000 a month) eligible for Land Duty or Sea Duty Allowance would be increased by 5 to 14 percent (depending on experience level) because of the allowance [9-10, 101].

Special allowances

Special allowances in the CAF compensate members for a number of different situations. The most important of these allowances are the Post Living Differential (PLD), already discussed, and the Recruitment Allowance (RA).

Recruitment allowance. RA is paid in one or more lump sums to eligible applicants enrolling in understrength military occupations. NCMs are eligible for an allowance of C$10,000 or $20,000 if they hold an education or credential that is relevant to an understrength occupation. Officers can earn an RA of C$40,000 if they have an engineering or science degree related to an understrength occupation. In the medical field, pharmacy officers are eligible for an RA of C$25,000 to C$50,000, licensed dental officers can earn C$25,000, and licensed medical officers are eligible for RAs in the range of C$40,000 to $225,000 [9-10].

Other types of allowances. There are a number of other allowances paid out under a variety of circumstances. Some of them include [10]:

- *Allowance - Loss of Operational Allowances (ALOA)* are paid monthly to CAF members to replace allowances related to Special Duty Area or Special Duty Operation (SDA or SDO) that were lost as a result of becoming ill or injured.
- *Maternity and Parental Allowances (MATA/PATA)* are paid to CAF members to supplement their Employment Insurance (or Quebec Parental Insurance Plan) benefits while they are on maternity or parental leave. MATA/PATA pays about 90 percent of the amount of pay and allowances to which the member would ordinarily be entitled.

- *Civilian Dress Assistance Allowance (CDAA)* is paid monthly to CAF members (at the rate of C$103 to C$137) required to wear civilian clothing on a continuous basis for at least 70 percent of the member's normal working hours when performing that duty.
- *Payments to Dependents of Missing or Deceased Personnel***.** A number of payments are made to the families or estates of CAF members who are killed or missing while serving. These include a Death Gratuity, which is a function of basic pay, and several allowances that convert unused leave into a cash payment that is also a function of basic pay.

Australia

In addition to the service allowance, there is a range of salary-related allowances based on an ADF member's work, location, qualifications and other criteria. These allowances are taxable, except for members serving in overseas combat operations.

Work-related allowances

Among the numerous work-related allowances for performing specific military duties are the following [15]:

- **Allowances to compensate for special demands** of military diving, clearance diving, flying, maritime service (serving at sea), instructing recruits, paratrooper duty, special forces service, submarine escape training/underwater ascents, and working with unpredictable explosive devices
- **Sustainability allowances** – payments to provide incentives to return to sea duty, for special forces members to take postings outside of their parent unit, or to encourage members to join and continue to serve in the submarine workforce
- **Allowances for medical and dental officers**, including the Army Dental Officer professional development scheme, medical residency payments (additional salary for working as a resident medical officer at a civilian hospital), or refresher training for former medical or dental officers
- **Instructor allowances** for fields involving adventurous training or arduous conditions
- **Trainee allowance and trainee's dependent allowance** to make up for the special demands of trainee life and to support the member's dependents while training

Additional allowances are available, such as Airfield Defence Guards annual proficiency bonus, boarding party allowance (for boarding a foreign target vessel), higher duties allowance (for members who are directed to perform duties in a vacant higher level positions), Officer Aviation remuneration structure allowance (seniority-based allowance for an identified

Officer Aviation member of the Permanent Air Force), and additional benefits/allowances for star-based officers.

Location-related allowances

Location-related allowances are not awarded to all members, but are offered under specific circumstances. These allowances include the following [14-15]:

- **Remote locations.** Members stationed in the ADF district, Port Wakefield, or Scherger receive an allowance for serving in remote locations in Australia. These allowances are intended to make up for the isolation, harsh climate, and high cost of living associated with these locations.
- **Antarctic allowance** for being posted in Antarctica.
- **Field allowance.** Members may receive a field allowance if they have to live and work in uncomfortable conditions in the field while on duty. These conditions include infrequent contact with home and working long and/or irregular hours with limited leisure time.

Critical skills bonuses

ADF members may receive bonuses if they serve in the permanent forces or as full-time reservists and have completed an initial period of service (three years of continuous, full-time service). Bonuses are awarded for the following "critical skills" [15]:

- Medical and dental officers and Medical Officers professional development
- Air Force—High Readiness Reserve
- Army—High Readiness Reserve, 1st Recruit Training Battalion recruit instructors, and targeted rank and employment categories
- Navy—Certain members in the Submarine division, Electronics Technical (junior sailor), Marine Technical and Electronics Technical (sailor) and individuals critical to Navy capability

MSBS retention benefit

After 15 years of continuous eligible service, servicemembers may receive the Military Superannuation and Benefits Scheme (MSBS) retention benefit. This payment, equivalent to one year's salary, serves as an incentive to stay in the military until the completion of 20 years of service. To receive the benefit, officers must have obtained the rank of major and enlisted members the rank of sergeant. Members may receive a pro-rata amount if they can't complete the last five years of service or are promoted to major or sergeant between 15 and 20 years of service. The payment is taxed as if it were salary. Members may take the benefit in cash or as "salary sacrifice," paying it into an approved retirement (superannuation) fund [15].

Appendix D: Sources

Compensation preferences

We reviewed military manpower and academic research on individual compensation preferences (for both military and civilian personnel). We consulted numerous sources, including previous CNA studies, and sources archived in the Defense Technical Information Center (DTIC), academic databases (EBSCOHost, ProQuest, JSTOR, and LexisNexis Academic), and Google Scholar. Our sources included academic research from a wide variety of disciplines, drawing from labor economics, human resource management, psychology, and organizational sciences, and using a range of methodologies, including surveys and focus groups, and statistical analysis.

Civilian compensation systems

To learn about civilian compensation structures, we held discussions with subject matter experts (SMEs) from the following sectors:

- Federal civilian agencies (5)
- Law enforcement, large state agencies (2)
- Private sector: Human resources consulting firms (3)
- Nonprofit and church consulting firms (3)

In addition to SME discussions, we gathered information about compensation structures from academic publications, news articles, research surveys and reports, and online government documentation. In some instances, we discovered information about government systems through articles published by private websites and news sources. When possible, we located and referenced regulations, codes, and laws from official government websites and publications to verify the claims made by nongovernment sources. Some additional literature related to compensation structures, both public and private, was provided by SMEs. Where relevant, we cite these sources in the paper.

Data from the Current Population Survey was retrieved from the Integrated Public Use Microdata Series (IPUMS). These data were used to create figures about employment over the past eight years. Examples of COLA and LQA amounts were calculated from tables posted by the US Department of State. When applicable, the websites hosting these tables are cited.

Foreign military compensation systems

Our review of foreign military compensation practices relied on the cooperation of the three foreign militaries we studied. We conducted phone conversations and/or multiple email exchanges with individuals in each of the three militaries, who directed our questions to other members of their organizations when necessary. We also relied on policy documents and briefing materials provided to us.

Tables

Abbreviations

A$	Australian dollars
ADF	Australian Defence Force
AFPRB	Armed Forces Pay Review Body (UK)
ALOA	Allowance – Loss of Operational Allowances
BAH	basic allowance for housing
BAS	basic allowance for subsistence
BRS	Blended Retirement System
C$	Canadian dollars
CAAS	Combined Accommodation Assessment System
CAF	Canadian Armed Forces
CDAA	Civilian Dress Assistance Allowance
CEB	Corporate Executive Board
CFSA	Canadian Forces Superannuation Act
CFTEP	Canadian Forces Trade Evaluation Plan
CIVMAR	civil service mariner
CoL	cost of living
COLA	Cost-of-Living Adjustment
CONUS	continental United States
CPI	consumer price index
DOD	Department of Defense
DTIC	Defense Technical Information Center
ECI	employment cost index
EX	PS Executive Category
FHTB	Forces Help to Buy
FS	Foreign Service
FWS	Federal Wage System
GAO	General Accounting Office (before July 7, 2004)
GAO	Government Accountability Office (since July 7, 2004)
GS	General Schedule
GSO	General Service Officer (Canada)
IPUMS	Integrated Public Use Microdata Series
LEO	Law Enforcement Organization
LQA	Living Quarters Allowance
MATA/PATA	Maternity and Parental Allowances

MOS	military occupational specialty
MSBS	Military Superannuation and Benefits Scheme
MSC	Military Sealift Command
MWO	master warrant officer (Canada)
NCM	non-commissioned member (Canada)
NDAA	National Defense Authorization Act
OCP	Overseas Comparability Pay
OHA	Overseas Housing Allowance
OPM	Office of Personnel Management
PLD	Post Living Differential
POC	point of contact
PPO	Principal Personnel Officer
PS	Public Service of Canada
QRMC	Quadrennial Review of Military Compensation
QSI	quality step increase
RA	rent allowance
RMC	regular military compensation
RRP	Recruitment and Retention Payment
SDA	Special Duty Area
SDO	Special Duty Operation
SME	subject matter expert
SRB	Selective Reenlistment Bonus
SSB	Special Separation Benefit
SSS	single-salary system
TPLD	Transitional Post Living Differential
TSMA	temporary separate maintenance allowance
TSP	Thrift Savings Plan
VSI	Voluntary Separation Incentive
WO	warrant officer
YMPE	yearly maximum pensionable earnings
YOS	years of service

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BETH J. ASCH, MICHAEL G. MATTOCK, PATRICIA K. TONG

Analysis of a Time-in-Grade Pay Table for Military Personnel and Policy Alternatives

Analysis of a Time-in-Grade Pay Table for Military Personnel and Policy Alternatives

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Preface

Federal law mandates that every four years the Secretary of Defense conduct an assessment of the military compensation system, resulting in a Quadrennial Review of Military Compensation (QRMC). In response to a request articulated in Section 603 of the Senate Armed Services Committee version of the National Defense Authorization Act of 2019, the 13th QRMC is providing an assessment of the effects of a time-in-grade pay table for military personnel, particularly on readiness. A time-in-grade pay table would set pay based on pay grade and years of service within a grade, in contrast to the current time-in-service pay table, which sets pay based on pay grade and years of service in the military. While interest in a time-in-grade pay table is not new, and in fact it was assessed by past commissions, including the 10th QRMC, interest in it has been renewed because of efforts at the congressional level and within the services to more flexibly manage military personnel to attract, retain, and promote better performers. The primary means by which military personnel are financially rewarded for superior performance is through faster promotion, so a time-in-grade pay table may increase performance by providing a permanent reward to those who are promoted faster. The current time-in-service pay table provides only temporary financial rewards to those who are promoted faster.

The 13th QRMC asked the RAND Corporation to assist in its assessment of a time-in-grade pay table. This report describes the results of these analyses. It should be of interest to those concerned about the setting of military pay and its effects on readiness.

The research was sponsored by the 13th QRMC and conducted within the Forces and Resources Policy Center of the RAND National Security Research Division (NSRD), which operates the RAND National Defense Research Institute (NDRI), a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the Unified Combatant Commands, the Navy, the Marine Corps, the defense agencies, and the defense intelligence enterprise.

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Summary

The U.S. Department of Defense's (DoD's) Thirteenth Quadrennial Review of Military Compensation (13th QRMC) was mandated by Congress to provide an assessment of a time-in-grade (TIG) basic pay table as a replacement for the current time-in-service (TIS) basic pay table. This report summarizes analysis conducted in support of this requirement. Observers as well as past commissions have argued that a TIG pay table would provide stronger incentives for superior performance and better facilitate the lateral entry of personnel with civilian acquired skills, two outcomes that would align with the services' and Congress's objective of improving military personnel talent management.

Each cell of the current TIS basic pay table indicates members' pay based on their pay grade and years of service (YOS) or longevity in the military. Under a TIG pay table, basic pay would be based on pay grade and years in that grade. Given that faster promotion is the primary means by which the services financially reward superior performance, a disadvantage of a TIS pay table is that the financial reward to faster promotion is temporary and only lasts until the rest of the member's cohort is promoted as well. In contrast, a TIG pay table would provide a permanent financial reward to faster promotion, and past studies and commissions have argued that a TIG would thereby increase military personnel performance. Another advantage of a TIG pay table, as argued by its proponents, is that it could improve the pay and therefore the competitiveness of the military to lateral entrants relative to the current TIS pay table.

Research Questions and Approach

To support the 13th QRMC, we developed a TIG pay table building and extending the TIG pay table developed by the 10th QRMC and 2006 Defense Advisory Committee on Military Compensation (DACMC). As with these earlier studies, the TIG pay table we developed sought to keep basic pay over a military career unchanged for those who receive due-course promotions and experience average promotion times. Given this TIG pay table, we then sought to address the following research questions:

1. How would the TIG pay table affect military pay over a military career?
2. Would the TIG pay table better facilitate lateral entry?
3. How would the TIG pay table affect retention, personnel performance, and cost?
4. What would be the cost to DoD to transition to the TIG pay table if DoD sought to hold member harmless in terms of experiencing no pay reductions in the first year of the transition?

5. Can the advantages of the TIG pay table be achieved by reforming the current TIS pay table and/or adopting other pay or personnel policies?

Our approach involved building on and extending the work of past studies and commissions and making use of more-recent data and modeling capabilities, such as RAND's dynamic retention model (DRM). First, we computed how basic pay would change over the course of a career for enlisted members and commissioned officers for those promoted faster or slower than those receiving due-course promotions, as well as for lateral entrants, warrant officers, and officers with prior enlisted service.

Second, we extended the mathematical structure of the DRM to include promotion and estimated the model for enlisted personnel and officers in each service. We then developed DRM simulation capability to allow the simulation of the retention, cost, and performance effects of the TIG pay table we developed versus the TIS pay table. Our DRM simulations assume that promotion speed depends on performance, which in turn, depends on innate ability and effort. We do not observe ability or effort. Instead, we treat effort and ability as unitless indices, and then we make assumptions about how ability and effort affect promotion speed. We also make assumptions about the distribution of ability among entrants, how ability affects external opportunities, and the disutility of increased effort. These assumed parameters are calibrated or chosen so that we can replicate the observed retention profile of enlisted members and officers within each service. We also conducted sensitivity analyses and found that our main conclusions, discussed below, were unchanged qualitatively under alternative assumptions. Because we were more successful in incorporating innate ability than effort into the model, our reporting of results focuses on ability. To report results on ability, we first compute each member's simulated percentile in the ability distribution (e.g., the 50th percentile would represent the mean) and then report the overall ability of the force in terms of the mean ability percentile. To assess the extent to which the TIG improves the selective retention of higher-ability personnel in higher grades, we also report the average ability percentile of higher-grade versus lower-grade personnel.

Third, we estimate the extent to which members' basic pay would increase or decrease in the transition to the TIG pay table and the cost to DoD of providing "save pay" so as to hold members harmless in the first year of the transition. Fourth, we examine whether the advantages of the TIG pay table could be fully achieved by retaining the current TIS pay table and adopting two alternative policies: (1) constructive credit for performance, which would give service members who are promoted faster than their peers a permanent one year of service increment in the pay table for the purpose of computing basic pay, and (2) credential pay, a pay based on skills, knowledge, education, or training credentials. Finally, because critics of the TIG pay table have argued that it would create inequitable pay differences owing to differences in promotion speed unrelated to performance but related to differences in promotion opportunity (supply and demand factors), we investigate the extent to which the TIG pay table provides increased incentives for performance, even after accounting for differences in promotion opportunity.

Findings and Conclusions Regarding the Advantages and Disadvantages of the Time-in-Grade Pay Table

Consistent with the findings of past commissions, we find that the TIG pay table that we developed would provide a permanent financial reward for early promotion, thereby providing greater incentives for performance for both enlisted personnel and commissioned officers. In simulations of basic pay for enlisted personnel, we find that the discounted present value of basic pay is 11.3 percent rather than 5.5 percent higher for those promoted earlier under the TIG versus the TIS pay table and that the discounted present value of retired pay is 22.8 percent rather than 14.3 percent higher. Furthermore, the pay advantage of the TIG pay table for those promoted faster remains, even when we control for factors unrelated to performance, such as supply and demand factors that can alter promotion opportunities at a point in time. Also consistent with past commission findings, a second advantage of the TIG pay table is that it provides higher entry pay than the TIS pay table to lateral entrants.

Unlike past commissions, we also provide estimates of the retention, cost, and performance effects of the TIG pay table. DRM simulations indicate that the TIG pay table would be a more efficient approach to setting basic pay. We show simulation results in Table S.1 using the Army enlisted force as an example. Results for the other services are qualitatively similar.[1]

We find that the average ability percentile across the force increases under the TIG pay table from 47.3 to 48.9. Furthermore, ability sorting improves under the TIG pay table, meaning the TIG pay table is more successful at inducing higher-ability personnel to stay and seek advancement to the upper grades. In particular, under the TIS pay table, the average ability

Table S.1
Army Enlisted Summary Statistics of Retention, Performance, and Cost

Army Enlisted Personnel	TIS Pay Table	TIG Pay Table	TIG Pay Table with 0.375% Across-the-Board Pay Cut
Average ability percentile			
E-5	42.8	43.6	43.7
E-9	66.0	76.9	76.8
Overall	47.3	48.9	48.9
Retention: percentage change in force size	0.0	1.5	0.0
Cost per members (2019 dollars)	$64,324	$64,173	$63,634

SOURCE: Authors' computations.

NOTES: The table shows simulated effects on ability, retention, and cost using the DRM parameter estimates for Army enlisted personnel. The first column shows simulations under the current TIS pay table, the second shows simulations under a proposed TIG pay table and the third shows, for demonstration purposes, the effects of an across-the-board pay reduction that would achieve the same overall retention under the TIG as the TIS pay table. Ability is a unitless measure with which we calibrate the parameters of the distribution of the ability distribution. The table shows the average percentile of the distribution for the force overall and at the grades of E-5 and E-8. Costs include active duty basic pay and allowances and retirement accrual costs.

[1] Our analysis covers enlisted personnel and commissioned officers in the Army, Navy, Marine Corps, and Air Force. We exclude U.S. Coast Guard personnel because the Defense Manpower Data Center data we used exclude these personnel.

percentile of an E-9 is 66.0 compared with 42.8 for an E-5, an increase of 54.2 percent. This effect is stronger under the TIG pay table; the average ability percentile increases 76.3 percent (from 43.6 to 76.9). This result occurs because better performers are more likely to be promoted and retained under the TIG pay table. We find similar results for enlisted personnel in the other services. The table also shows that retention improves by 1.5 percent—the higher retention of better performance more than offsets the lower retention of poorer performers. Although the force becomes larger, cost per member decreases from $64,324 to $64,173.

To show the increased efficiency of the TIG pay table, we simulate, for demonstration purposes, the effects of an across-the-board pay reduction that would achieve about the same overall retention under the TIG as the TIS pay table. We find that a 0.375 percent pay cut would achieve a force of the same size. The key result is that personnel cost per member is even lower, $63,634 versus $64,324, while average ability and ability sorting are improved. Stated differently, the TIG pay table is more efficient because it can achieve about the same retention as the TIS pay table, at less cost per member, and with improved performance.

Another advantage of the TIG pay table is that it can provide stronger retention incentives for occupations and career fields that experience shortfalls as a result of demand and supply factors. For example, when the economy improves and retention falls, promotion opportunities improve in occupations that experience the greatest shortfalls. The improved promotion opportunities act as a self-correcting mechanism by inducing higher retention (or lessening the impact of declining retention) and attracting more personnel to occupations experiencing retention issues. Because the TIG magnifies the financial effects of differences in promotion speed, this self-correcting mechanism is stronger under a TIG pay table. As we discuss below in the context of the disadvantages of the TIG pay table, much but not all of the difference in promotion speed is attributable to these supply and demand factors.

Disadvantages of the Time-in-Grade Pay Table

The TIG pay table is not without disadvantages. The major disadvantage is that the transition would be costly to DoD and would be disruptive to a significant fraction of the force. We estimate that about one-third of the active force (32.1 percent) would experience a basic pay reduction in the transition to the TIG pay table, with an average reduction in basic pay of 6 percent among those who would experience a pay reduction. If DoD were to adopt save pay to hold members harmless, we estimate that, in the first year, the cost would be $1.39 billion, in 2018 dollars. To put this figure in context, the 2018 appropriation for active component military personnel was about $115.9 billion (DoD, 2019).[2] The $1.39 billion figure does not include the cost of providing financial education to the force and "socializing" the change to smooth the transition.

Another challenge with establishing the TIG pay table is that pay for warrant officers and commissioned officers who transition out of the enlisted force could decrease, creating a pay inversion for these personnel. The inversion arises because members promoted from the enlisted force to either the warrant officer or commissioned officer force often have widely different amounts of prior enlisted service. Another reason for the inversion is that the TIG pay table for warrant officers is designed for those without prior enlisted service, so pay decreases for those who become warrant officers with prior enlisted service. This disadvantage of the

[2] This figure excludes Medicare-Retiree Health Care Contributions.

TIG pay table could be addressed by allowing the services to flexibly set the starting grade for those with prior enlisted service. For example, allowing warrant officers with prior enlisted service to transition to warrant officer status at the grade of W-2 or W-3 could address the pay inversion.

Another disadvantage of a TIG pay table noted in the past is that differences in promotion speed can reflect factors other than differences in individual performance, such as differences in promotion opportunities due to supply and demand factors. For example, if the economy improves, retention falls, thereby increasing promotion opportunities for those in the lower grades. We find evidence to indicate that a relatively large share of the variation in promotion is attributable to factors such as supply and demand factors that are unrelated to merit. Further, the TIG pay table would exacerbate the pay differences that result from the variation in promotion. But these other factors do not explain all of the differences in promotion speed. To the extent that the remaining differences in pay, after controlling for these other factors, represent the financial incentive for performance, we find that the remaining differences are still larger under the TIG than the TIS pay table. The implication is that while the criticism has merit, it still the case that the TIG pay table provides a stronger financial incentive for performance.

Could the Advantages of the Time-in-Grade Pay Table Be Fully Achieved with a Time-in-Service Pay Table?

The answer to this question is yes for some advantages of the TIG pay table, but in terms of the major advantages of the TIG pay table—the increased efficiency and performance of the force—the answer is no, though with some changes in policy, a TIS pay table might be able to come close.

An advantage of the TIG pay table is that it would allow pay to be more competitively set for lateral entrants. We find that an identical result could be achieved under a TIS pay table, if Congress changed the current definition of constructive credit to give the services the opportunity to offer not just a higher entry grade but also a higher longevity entry point. For example, a lateral entrant could be permitted to enter as an O-3 with 10 YOS.

We also find that redefining constructive credit to provide YOS credit for performance is a policy that can broadly replicate the higher basic pay found under the TIG pay table. Our DRM simulations indicate that constructive credit for performance would also be an improvement over the TIS pay table (in the absence of constructive credit for performance) in terms of efficiency, at least in terms of ability sorting. But enlisted and officer retention, average ability, and ability sorting would not improve as much as predicted under the TIG pay table. In other words, the simulations indicate that constructive credit is an improvement over the current TIS pay table but would be less efficient than the TIG pay table.

We also examined whether credential pay is a policy that could provide performance incentives under a TIS pay table and found that credential pay is not designed to be a pay-for-performance program that rewards superior performance and reduces pay for those who fall short. Thus, it would not be an effective substitute to the TIG pay table in terms of increasing performance incentives.

Closing Thoughts

The TIG pay table would better support service and congressional efforts to improve talent management. But transitioning to the TIG pay table would involve costs, not the least of which is the disruption to the force regarding a fundamental feature of their service—namely, how they are paid. Although constructive credit for performance could achieve some of the advantages of the TIG pay table, simulations suggest that it would not be quite as efficient or performance-enhancing as the TIG pay table. One approach to implementing the TIG pay table while minimizing risk is to do so on an experimental basis as the TIG demonstration project. Doing so would enable DoD to fully assess the full array of transition costs, permit the development of effective financial education, and allow further assessment of the retention, cost, and performance effects of the TIG pay table.

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Abbreviations

ADSO	active duty service obligation
DACMC	Defense Advisory Committee on Military Compensation
DLPT	Defense Language Proficiency Test
DMDC	Defense Manpower Data Center
DoD	U.S. Department of Defense
DOPMA	Defense Officer Personnel Management Act
DPV	discounted present value
DRM	dynamic retention model
FLPB	Foreign Language Proficiency Bonus
NDAA	National Defense Authorization Act
PCMC	President's Commission on Military Compensation
QRMC	Quadrennial Review of Military Compensation
RMC	Regular Military Compensation
TIG	time in grade
TIS	time in service
WEX	work experience file
YOS	years of service

CHAPTER ONE

Introduction

Section 603 of the Senate Armed Services Committee (SASC) version of the National Defense Authorization Act (NDAA) of 2019 requested that the U.S. Department of Defense (DoD) submit a report on setting a time-in-grade (TIG) pay table for military personnel, as a replacement for the current time-in-service (TIS) basic pay table. It also requested an assessment of the effects of a TIG pay table on readiness. Every four years, DoD conducts a Quadrennial Review of Military Compensation (QRMC). Because the work of the 13th QRMC was just being launched at the time of the Senate Armed Services Committee request, the analysis to support the DoD response to the congressional request was folded into the mandate of the 13th QRMC. The 13th QRMC requested that RAND support its effort and provide analyses of a TIG pay system for military personnel.

Basic pay is the foundation of military compensation, making up about 60 percent of Regular Military Compensation (RMC), the military's rough equivalent of a civilian salary (Asch, Hosek, and Martin, 2002).[1] Every service member on active duty is entitled to basic pay, given by a TIS pay table in which the amount of pay depends on the member's pay grade and length of service. The structure of the current pay table was created just after World War II, and while the pay table has changed over time—for example enlisted pay grades were added in 1958, and the pay table was extended to 40 years of service (YOS) in 2007—the table's basic structure, and the fact that pay is based on rank and YOS, has remained unchanged.

An alternative approach to setting the pay table is to base the amount of pay on rank and steps in grade within a grade, otherwise known as time in grade. The federal general schedule pay table is an example of a TIG system. The pay of federal employees is based on their grade, e.g., GS-9, and their pay step within a grade. Importantly, years of experience is not used for computing the amount of pay. For military personnel, a TIG pay table would base monthly basic pay on rank and years served within a given grade.

The issue of whether a TIG pay table is preferred over a TIS pay table is related to the question of whether military's promotion system sufficiently rewards personnel who perform better and whether the promotion system embeds strong enough incentives for performance. The services primarily reward performance through the promotion system, whereby those who have demonstrated superior performance are rewarded by being promoted faster than their peers. When service members are promoted earlier than their peers, they move up a grade and receive the higher pay associated with that grade, thereby experiencing a pay advantage over those who receive a due-course promotion. Under a TIS pay table, that pay advantage disap-

[1] RMC consists of basic pay, the basic allowance for housing, the basic allowance for subsistence, and the tax advantage from receiving allowances tax-free.

pears once the peers receive their promotion. For example, an E-5 who is promoted to E-6 at 5 YOS rather than at 6 YOS receives the pay of an E-6 with 5 YOS. But, once the early promotee's peers are promoted at 6 YOS, both the early promotee and their peers receive the same pay, namely that of an E-6 with 6 YOS.

In contrast, under a TIG pay table, the pay advantage of the early promotee would be permanent. Thus, the financial reward for better performance and faster promotion would be greater under a TIG table. A TIG table would also allow the services to offer higher pay to lateral entrants, meaning individuals with relevant civilian experience who enter the military at a higher pay grade. Under a TIS pay table, a lateral entrant would enter at a higher grade but at the lowest YOS cell in the pay table. Under a TIG pay table, a service member's pay is not constrained by their lack of YOS.

While interest in a TIG table for military personnel is not new, interest in it has been renewed because of efforts at the congressional level and within the services to more flexibly manage military personnel to attract, retain, and promote better performers. The 2019 NDAA included reforms to the 1980 Defense Officer Personnel Management Act (DOPMA) that authorize the services to grant "constructive credit" for education and for work experience, thereby allowing individuals to enter service at a rank as high as an O-6 (colonel or Navy captain). The reforms also allow the services to suspend "up-or-out" requirements for some types of officers so that officers are granted more opportunities for promotion to a higher grade. The 2019 NDAA also allows better-performing officers to be placed higher on promotion lists than their peers, changing the traditional seniority-based system.

Each of the services is also focusing on improved talent management. For example, the Army created the Army Talent Management Task Force. Among its initiatives is a pilot program that allows officers and units to participate in a marketplace and submit preferences for each other. It also includes brevet or temporary officer promotions for critical shortage areas, as well as promotions for enlisted noncommissioned officers that are based on performance and not just on their seniority and rank relative to peers. While these efforts and legislative changes focus on personnel management rather than compensation, the adequacy of military compensation in supporting these efforts must also be considered. In particular, as stated in Senate Armed Services Committee testimony by former Under Secretary of Defense for Personnel and Readiness David Chu, a TIG pay approach might better support new authorities granted by Congress (Chu, 2018).

Research Questions and Approach

To support the 13th QRMC's assessment of the TIG pay table approach, we developed a TIG pay table, building on past studies and commissions, as described below. Given this TIG table, we then sought to address the following research questions:

1. How would the TIG pay table affect military pay over a career?
2. Would the TIG pay table better facilitate lateral entry of personnel with relevant civilian experience?
3. How would the TIG pay table affect retention, personnel performance, and cost?
4. How much would it cost DoD to transition to the TIG pay table if DoD sought to hold members harmless in terms of experiencing no pay reductions in the first year of the transition?

5. Can the advantages of the TIG pay table be achieved by reforming the current TIS pay table and/or adopting other pay or personnel policies?

To address the first two questions, we used the TIG pay table we developed and assessed how pay would change over the career of enlisted members and commissioned officers for those promoted faster or slower than those receiving due-course promotions. We also computed pay over a career for warrant officers with no prior service, for enlisted members who transition to warrant or commissioned officer status, and lateral entrants.

Addressing the third question requires a modeling capability that can address "what if" questions about how retention and cost would change under as-yet-untried changes to the structure of military compensation. The capability needs to be based on a solid theory of retention decisionmaking over a service member's career, empirically grounded in data on actual retention behavior of service members over a long period of time, and it needs a simulation capability that allows us to assess major compensation reforms without relying on the existence of prior experience with such reforms. RAND's dynamic retention model (DRM) provides such a capability. The model is a stochastic dynamic programming model of the individual's decision to stay or leave active duty and, if a member leaves, the decision to participate or not in the reserves. The model has several rich and realistic features. It's a lifecycle model in which retention decisions are based on forward-looking behavior that depends on current and future military and civilian compensation. It allows for uncertainty in future periods and recognizes that people may change their mind in the future as they get more information about the military and their external opportunities. It also recognizes that individuals differ in their preferences for service in the active or reserve components. Furthermore, the model is formulated in terms of the parameters that underlie the retention and reserve participation decision processes rather than on the average response of the population of members to a particular compensation policy. As a structural model, it is well suited to permit assessments of alternative compensation systems that have yet to be tried.

To address the third question, we extended RAND's DRM capability to permit assessment of the retention, cost, and performance effects of the TIG table versus the TIS pay table. This task required that we extend the mathematical structure of the model and develop appropriate computer code to incorporate grade in the estimation and simulation capabilities for enlisted personnel and officers in each service. We estimate the model using longitudinal data on individual service members in each service that track their careers from entry, as far back as 1990, to the present. Once estimated, we then used the model estimates to simulate the retention, cost, and performance implications of the TIG pay table.

We address the fourth question by using Defense Manpower Data Center (DMDC) data on current time in grade and time in service for all active duty military personnel as of January 2019 to assess the extent to which pay would be lower for personnel during a transition to the TIG pay table and the cost of restoring pay to pre-transition levels for a year.

For the fifth question, we use the DRM capability to simulate alternative pay and personnel policies that might be implemented under a TIS pay table, such as constructive credit for performance. In addition, we review the literature on the feasibility of using credential pay—a pay based on skills, knowledge, education, or training credentials—to increase performance incentives under the current TIS pay table.

Our approach builds on and extends past analyses of the feasibility and desirability of the TIG table. To better highlight the ways in which we extend these past efforts, we first

briefly review the findings of previous commissions and study groups. A summary of these past efforts in provided in Table 1.1.

Previous Commission and Study Group Findings[2]

The Hook Commission developed the modern-day TIS pay table in 1948. In doing so, it considered the performance incentives associated with longevity increases and the appropriate structure for embedding these incentives. In particular:

> Increases for length of service should provide a stimulus to do better work but should cease after a reasonable period of time so that a lower level of responsibility will not receive the pay of a higher level and thus remove the incentive of striving for promotion. (Advisory Commission on Service Pay, 1948, p. 2)

But, ultimately, the Hook Commission fell short of recommending a TIG table over a TIS one.

The 1957 Defense Advisory Committee on Professional and Technical Compensation agreed with the Hook Commission about the need to properly structure longevity increases. It expressed concern about pay inversions in the pay table whereby the pay of personnel in lower grades exceeded the pay of personnel in higher grades, and stated that the "longevity pay system actually rewards, in many cases, the type of men who have little ambition to achieve higher responsibility" (p. 48). The committee called for a new pay table that would replace longevity increases with within-grade merit step increases, i.e., a type of TIG pay table. The purpose would be to eliminate the pay inversions and to encourage meritorious performance. It also recommended that "save pay" be used in the transition so that members would not see a reduction in pay, but stated that members with many years in a given grade may find "his pay frozen at its present level until he qualifies for promotion" (p. 48). As succinctly put by the committee, "In the future, there should be no additional monetary recognition for the professional laggard."

The first QRMC in 1967 disagreed with the 1957 committee. It found that "[Longevity] is the proper basis for in-grade salary increments . . ." and that in-grade increases should reward the growth in productivity associated with greater experience and "long and faithful service, especially for those who, through no fault of their own, face limited promotion prospects" (p. 79). The QRMC argued that a TIS table is more appropriate for two reasons. First, it concluded that most differences in promotion times reflected differences in promotion opportunity rather than differences in individual merit. This conclusion was based on tabulations that showed that the average time in service at each grade varied across service, rather than analysis that decomposed promotion timing to the portion attributable to promotion opportunity versus individual factors. Second, the first QRMC concluded that the military's "in-at-the-bottom, up-through-the-ranks" personnel management approach meant that experience over a career, rather than within a particular grade, was a more important contributor

[2] Several past studies have reviewed the literature on a TIG versus TIS pay table approach. These include studies by the Congressional Budget Office (1995), the Defense Advisory Committee on Military Compensation (2006), and the 10th QRMC (DoD, 2008).

Table 1.1
Overview of Past Commissions and Study Groups That Have Examined a Time-in-Grade Pay Table

Commission	Report Date	Supported TIG Pay Table?
Hook Commission	1948	No
Defense Advisory Committee on Professional and Technical Compensation	1957	Yes
First QRMC	1967	No
President's Commission on Military Compensation	1978	Yes
7th QRMC	1992	No
Defense Advisory Committee on Military Compensation	2006	Yes
10th QRMC	2008	No

SOURCES: Congressional Budget Office (1995), DACMC (2006), and the 10th QRMC (DoD, 2008).

to an individual's military productivity. Thus, it recommended that the longevity structure be retained as the basis for in-grade salary increases.

The 1978 President's Commission on Military Compensation (PCMC) argued that outstanding performance should receive a greater reward than is provided by the current system and that a TIG pay table offers such recognition without having to fundamentally change the promotion process. The PCMC also stated that increasing pay differentiation for outstanding personnel would also help retain these individuals. The PCMC did not recommend a specific TIG table but provided two guiding design principles. It should

- provide for rapid pay increases during the early years in grade, with a leveling out in later years
- allow for overlap with adjacent pay grades to ensure that the retention of individuals with no promotion potential but nevertheless have value in their current grade.

Like the 1st QRMC, the 7th QRMC in 1992 also rejected the TIG approach. It also raised the question of whether the relevant work experience that is considered in the determination of pay should be an entire military career or time spent in a particular pay grade. It argued that it should be an entire military career. Further, the 7th QRMC found that there are significant differences in promotion timing among skills in the same service and across services, resulting in pay differences among these skills and services. To the extent that these differences are due to supply differences, e.g., retention differences across skills and services, the resulting pay differences may be desirable because they create a self-adjusting pay mechanism to address retention issues. This self-adjusting mechanism works under both a TIS and TIG pay table, though the boost in retention incentives would be larger under a TIG pay table because pay differences associated with promotion would be larger. Nonetheless, these pay differences would be perceived as inequitable because they are not due to differences in performance. The 7th QRMC recommended that adjustments be made to the TIS pay table to offer greater rewards for performance, such as increasing pay raises associated with increases in rank relative to time in service.

The Defense Advisory Committee on Military Compensation (DACMC) was chartered to identify approaches to balance military pay and benefits to sustain the recruitment and retention of high-quality people. Among the topics it considered was pay for performance. Like earlier study groups, the DACMC report in 2006 recommended that performance incentives for early promotion be increased by moving to a TIG pay table. Unlike previous study groups, except for the 1957 Defense Advisory Committee on Professional and Technical Compensation, the DACMC provided an example of a TIG basic pay table, based on the 2005 current TIS table. Furthermore, it showed that under the example, pay differences would be greater over a career for those promoted earlier than for those who received due-course promotions. The DACMC was also the first to recognize that a TIG pay table would be more attractive to individuals with prior service or those who are lateral entrants with specialized skills. The DACMC noted that a TIG pay table could cause pay inversions for enlisted members who transition to warrant officer of commissioned officer, but also noted that the services could transition these members to a higher officer grade. It also discussed the need to ensure that no member sees a nominal decrease in their pay during the transition period from a TIS pay table to a TIG table and explained that this could be avoided through a "save pay" provision. The DACMC estimated that a transitional save pay provision would cost about $1.1 billion (in 2005 dollars).

The 10th QRMC (2008) expanded on the DACMC study, though, unlike the DACMC, the 10th QRMC did not recommend a TIG pay table. The 10th QRMC further developed the TIG pay table example from the DACMC, basing it on the 2007 TIS pay table. Other developments included extending the table through 14 YOS within a grade (versus 9 in the DACMC example), though the 10th QRMC curtailed TIG pay increases at the lower pay grades for both officers and enlisted members. It also addressed potential pay inversions for personnel in grades O-1E to O-3E and for warrant officers.[3] Like the DACMC, the 10th QRMC showed that the pay premium over a career is larger under a TIG table than under a TIS table for those promoted faster, but it also expressed concern about a TIG pay table. As with previous study groups, the 10th QRMC was concerned that promotion speed does not always reflect merit but could reflect supply and demand conditions. The DACMC (2006) also noted this concern but stated that the concern is also relevant for the TIS pay table, so "the criticism is a matter of degree, not kind" (p. 46).

The 10th QRMC also discussed the variation in compensation that currently exists among members entering the warrant officer ranks, making it difficult to devise an entry level pay rate for warrant officers under a TIG pay table. For example, a TIG pay table that sought to maintain the pay of more-senior enlisted personnel who become warrant officers would result in substantial pay raises for warrant officers without military experience. The 10th QRMC also argued that a TIG pay table would result in a major overhaul of the current pay table to improve the compensation of the small percentage of the force that is promoted early. The 10th QRMC dismissed the argument that, although relatively few service members would have a change in compensation under a TIG pay table, the incentive effects of the improved compensation could be force-wide.

An additional concern raised by the 10th QRMC is that a TIG pay table would result in different retired pay amounts for personnel who served the same amount of total service and

[3] The grades O-1E to O-3E are for enlisted members or warrant officers who become commissioned officers. The 10th QRMC addressed the potential pay inversion as these members transitioned from the grade of O-3E to O-4.

achieved the same final grade. A counterargument, one rejected by the 10th QRMC, is that this difference in retired pay is part of the overall performance incentive provided to members who are promoted early and so can be viewed as a desirable feature of the TIG pay system.

While the 10th QRMC did not support adoption of a TIG pay table, it did support the conclusion of the DACMC about the need to embed stronger incentives for performance. For that reason, it made two recommendations.

First, it recommended that the TIS calculation under the current pay table be adjusted through a policy of "constructive credit." Under this policy, the services could credit members with extra YOS, i.e., grant constructive credit, for the purpose of computing their basic pay (but not their retired pay). Fast promotees could be awarded credit for an additional year of service, allowing the member to "move up" a cell within the pay table, relative to peers. Such constructive credit could provide a permanent pay differential to those promoted early. The 10th QRMC argued that this approach would also work for lateral entrants by giving YOS credit to those with prior service or relevant civilian experience. Constructive credit already exists as part of DoD personnel policy, but under current authority lateral entrants may enter a service at a higher grade, but only at the lowest TIS pay cell within that grade. Under the 10th QRMC proposal, entrants could be placed not only at a higher grade but at a higher TIS pay cell for that grade.

Second, the 10th QRMC recommended that the services explore other pay for performance incentives, including credential pay and performance-based bonuses. Credential pay would reward members who receive certification in critical skills. Performance-based bonuses could be a new type of special and incentive pay. Alternatively, the services could introduce a performance element into existing bonuses, such as tying reenlistment bonuses to performance.

Table 1.2 summarizes the main advantages and disadvantages of a TIG pay table approach identified in these past efforts as well as approaches that could be used under the current TIS pay table approach to increase incentives for performance.

How This Study Builds on and Extends Past Efforts

Our project builds on these earlier studies, especially the DACMC and the 10th QRMC. First, to develop a TIG table for the 13th QRMC, we started with the TIG pay table developed by the 10th QRMC and updated it using more recent data on average promotion time to each grade, and we addressed some pay inversions in the 10th QRMC whereby pay declined with grade or with promotion. Second, we considered how pay varies over a career for fast versus due-course promotees under a TIG versus a TIS pay table, not only for enlisted personnel and commissioned officers, but also for lateral entrants, warrant officers, and enlisted personnel who transition to commissioned officer or warrant officer status. Third, while past study groups hypothesized how a TIG pay table would affect retention and performance, no prior study provided estimates of these effects. Our project extends the DRM to provide an empirically based assessment of the retention, performance, and cost effects of a TIG versus a TIS pay table. Also, unlike prior efforts, this study also provides estimates of the retention, performance, and cost effects of alternative policies under a TIS pay table approach that might replicate the advantages of a TIG pay table, such as performance-based bonuses. In short, this study provides additional and new evidence on the effects of a TIG pay table.

Table 1.2
Summary of Commission and Study Group Findings

Advantages of a TIG Pay Table	Disadvantages of a TIG Pay Table	Policies to Implement Under a TIS Pay Table
• Provides permanent financial reward for faster promotion, thereby increasing performance incentives across the force and strengthening the self-correcting retention response of changes in promotion speed owing to supply-and-demand factors • Increases retention incentives for better performers • Better facilitates competitive compensation for lateral entrants	• Results in inequitable pay differences over a career and differences in retired pay for members who have different promotion speeds owing to differences in promotion opportunity (supply and demand factors) and not individual merit • Does not recognize the importance of experience in determining pay in an organization where most members enter at the bottom and rise through the ranks • Does not handle well the pay for warrant officers and could result in pay inversions for enlisted members who become either warrant or commissioned officers • Results in transition costs ("save pay") so as to hold nominal pay constant in the transition	• Constructive credit • Proficiency pay • Performance-based bonuses

SOURCES: Congressional Budget Office (1995), DACMC (2006), and the 10th QRMC (DoD, 2008).

Organization of This Report

This report provides a summary of our analysis and findings. In the next chapter, we discuss how we developed a TIG pay table based on the earlier work of the DACMC and 10th QRMC. We also present computations of pay at promotion and over a career under the TIG versus the TIS pay table. We present our extension of the DRM in Chapter Three. We show the updated mathematical structure, model estimates, and the fits of the models relative to the observed data, and we describe the development of the simulation capability. The simulations involve incorporating parameters related to performance and specifically member's innate ability and their work effort. We discuss how we incorporate these parameters and the assumptions we make based on past studies. In Chapter Four, we show TIG versus TIS simulation results for the steady state and specifically the DRM estimates of how the TIG pay table would affect steady-state retention, performance, and cost for enlisted personnel and commissioned officers in each service. In Chapter Five, we show estimates of the extent to which service members might experience a pay reduction during the transition to the TIG pay table regime and provides estimates of the cost of a "save pay" policy for the first year. In Chapter Six, we consider policies that could be implemented under the current TIS pay table that might replicate the advantages of the TIG pay table. In particular, we show DRM estimates of pay policies to increase performance incentives under the current TIS pay table approach and review the available literature on credential pay. In Chapter Seven, we show the extent to which promotion timing reflects factors other than performance, using recent data on promotion timing across the services. This analysis investigates whether the evidence supports one of the critiques of the TIG table: that the TIG pay table exacerbates the pay differences associated with promotion when promotion is driven mostly by non-performance-related factors, such as supply and

demand conditions. In Chapter Eight, we summarize our results and discuss the merits and drawbacks of the TIG pay table in light of the new analysis provided by this project.

CHAPTER TWO

A Time-in-Grade Pay Table and Estimates of Basic Pay over a Career

We developed a TIG pay table for the 13th QRMC, building on the sample table produced for the 10th QRMC.[1] We updated the 10th QRMC TIG table in several ways. First, we based the updated TIG table on the January 2018 basic pay (TIS) table, shown in Table A.1 in Appendix A. Second, like the 10th QRMC, we imputed pay for certain cells in the TIG table to prevent pay decreases or inversions when members are promoted and to ensure that members receive a pay increase over the first five years in a given grade.[2] Third, we used data on average times to promotion for 2013–2018 to develop the updated TIG pay table, a more recent period that the early to mid-2000s used by the 10th QRMC to create its TIG pay table. As shown in Table 2.1, promotion times between 2013 and 2018 differed somewhat from those used by the 10th QRMC.

Table 2.1
Years of Service at Promotion to Grade

Grade	10th QMRC	Average 2013–2018	Grade	10th QMRC	Average 2013–2018	Grade	10th QMRC	Average 2013–2018
E-9	22	22	O-10	34	32	W-5	25	20
E-8	20	18	O-9	30	30	W-4	21	14
E-7	14	13	O-8	30	28	W-3	18	9
E-6	8	8	O-7	26	25	W-2	11	5
E-5	4	4	O-6	20	20	W-1		
E-4	1	2	O-5	16	14			
E-3	0	1	O-4	9	9			
E-2	0	0	O-3	4	3			
E-1			O-2	1	1			
			O-1					

SOURCE: DMDC tabulations.

[1] The 10th QRMC analysis was performed and summarized in Hogan and Mackin (2008), and the discussion of the 10th QRMC's analysis discussed in this chapter draws heavily from the Hogan and Mackin report.

[2] The imputations were made by taking the average of pay in the neighboring cells. For example, to impute pay for a member with five years in a given grade, we took the average of pay for those with four years and those with six years. Note that the cells that are imputed for the updated TIG table are not identical to the ones imputed by the 10th QRMC.

Table 2.2 shows the updated TIG pay table built for the 13th QRMC. The cells in which pay was imputed are highlighted in yellow. The first column, called "Entry YOS," shows the YOS in the TIS pay table that defines pay at entry to a given grade. For example, the pay of an E-6 with 0 YOS in the TIG pay table is equivalent to the pay of an E-6 with 6 YOS in the TIS pay table. As shown in Table 2.1, the average time to promotion to E-6 between 2013 and 2018 was 6 years. Because the TIG table was built using the average promotion times that have prevailed under the TIS pay table between 2013 and 2018, by design, basic pay over a career under the TIG pay table is nearly identical to that under the TIS pay table, as shown in Figure 2.1 for enlisted personnel and officers. The use of average promotion times or "due-course" promotions implies that pay over a career is the same under the TIS and TIG pay tables for members receiving due-course promotions. It is important to note that the estimates presented in this chapter and in subsequent chapters are specific to the TIG pay table we developed.

In the remainder of this chapter, we show computations of pay at promotion and over a career under the TIG versus TIS pay tables. Example computations are made for the following groups:

- members with differences in promotion timing
- warrant officers with prior enlisted service
- commissioned officers with prior enlisted service
- lateral entrants.

Effects on Pay of Time in Grade for Members with Differing Promotion Times

The key advantage of a TIG pay table over a TIS one is that it potentially provides a greater financial reward for early promotion and a greater financial disadvantage for later promotion. As discussed in Chapter One, a member who is promoted one year earlier compared with an on-time due-course promotion results in a higher rate of pay that is permanent under a TIG pay table but only for one year under a TIS pay table. Consequently, a TIG pay table provides greater incentives for performance, given that fast promotion is the primary means by which the military rewards better performance.

Figure 2.2 shows simulations of monthly basic pay over a career under the TIS pay table (left panel) versus the TIG pay table (right panel) for enlisted members who are promoted faster, slower, or average to E-5 and E-6. At a given YOS, the difference in basic pay for fast versus due-course or slow promotees reflects the financial reward to faster promotion. Under the TIS pay table (left), those promoted faster (green line) receive higher pay for a year or two but the higher rate is temporary because those promoted on time (blue line) eventually catch up. In contrast, under the TIG, the higher pay rate for fast promotes is permanent, and those receiving due-course promotions do not catch up. Consequently, basic pay over a career is higher for those promoted faster, and lower for those promoted more slowly, under the TIG versus the TIS pay table.

Figure 2.3 shows similar simulations for officers who are promoted early versus on-time to O-4. Officers differ from enlisted personnel in that they are considered for promotion by entry-year group and are either promoted or not promoted at specific YOS points. For example, promotion from O-3 to O-4 usually occurs at around the 10th year. By contrast, enlisted per-

Table 2.2
Proposed Time-in-Grade Monthly Basic Pay Table for January 2018 (0–10 Years in Grade)

Entry YOS	Grade	Years in Grade 0	1	2	3	4	5	6	7	8	9	10
Commissioned Officers												
28	0-10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,,800.10	15,800.10	15,800.10	15,800.10
26	0-9	15,800.10	15,800.10	15,800.10	15800.10	15,800.10	15,800.10	15,800.10	15800.10	15,800.10	15,800.10	15,800.10
24	0-8	14,268.30	14,268.30	14,625.60	14,625.60	14,625.60	14,625.60	14,991.00	14,991.00	14,991.00	14,991.00	14,991.00
22	0-7	12,591.90	12,656.40	12,656.40	12,656.40	12,656.40	12,909.60	12,909.60	12,909.60	12,909.60	12,909.60	12,909.60
19	0-6	10,295.70	10,295.70	10,431.15	10,566.60	10,703.85	10,841.10	11,372.40	11,372.40	11,372.40	11,372.40	11,599.80
14	0-5	8,022.30	8,275.95	8,529.60	8,650.05	8,770.50	8,770.50	9,009.30	9,009.30	9,280.20	9,280.20	9,280.20
9	0-4	6,601.20	7,052.70	7,228.20	7,403.70	7,525.65	7,647.60	7,647.60	7,788.00	77,88.00	7,869.30	7,869.30
3	0-3	5,069.70	5,527.80	5,660.40	5,793.00	5,938.20	6,083.40	6,083.40	6,271.20	6,271.20	6,580.20	6,580.20
1	0-2	3,580.50	4,077.90	4,696.20	4,854.90	4,905.00	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10
0	0-1	3,107.70	3,171.30	3,234.90	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20
Commissioned Officers with over 4 Years of Active Duty Service as an Enlisted Member or Warrant Officer												
10	O-3E	6,271.20	6,315.10	6,359.30	6,403.82	6,435.84	6,451.93	6,468.02	6,484.19	6,500.36	6,516.61	6,532.86
8	O-2E	5,112.60	5,245.80	5,379.00	5,481.90	5,584.80	5,584.80	5,738.10	5,738.10	5,738.10	5,738.10	5,738.10
6	O-1E	4,175.40	4,252.65	4,329.90	4,408.80	4,487.70	4,487.70	4,642.80	4,642.80	4,854.90	4,854.90	4,854.90
Warrant Officers												
20	W-5	7,614.60	7,807.65	8,000.70	8,144.55	8,288.40	8,288.40	8,606.70	8,606.70	8,606.70	8,606.70	9,037.80
14	W-4	6,172.50	6,313.35	6,454.20	6,569.55	6,684.90	6,684.90	6,909.60	6,909.60	7,239.90	7,239.90	7,511.10
9	W-3	4,815.30	5,174.10	5,258.70	5,343.30	5,441.10	5538.90	5,538.90	5739.90	5,739.90	6,102.30	6,102.30
5	W-2	3,957.60	4,182.30	4,356.60	4,530.90	4,617.30	4,703.70	4,703.70	4,,873.80	4,873.80	5082.00	5,082.00
0	W-1	3,037.50	3,201.00	3,364.50	3,452.40	3,638.10	3,638.10	3,857.70	3,857.70	4,181.70	4,181.70	4,332.60
Enlisted Members												
22	E-9	6,306.60	6,306.60	6,431.40	6,556.20	6,747.60	6,939.00	6,939.00	6,939.00	7,285.50	7,285.50	7,285.50
18	E-8	5,099.70	5,168.55	5,237.40	5,354.55	5,471.70	5,471.70	5,601.90	5,601.90	5,921.70	5,921.70	5,921.70
13	E-7	4,186.80	4,368.90	4,431.00	4,493.10	4,559.10	4625.10	4,625.10	4,676.10	4,676.10	4,848.30	4,848.30
6	E-6	3,453.60	3,508.65	3,563.70	3,670.20	3,776.70	3,776.70	3,841.50	3,841.50	3,888.90	3,888.90	3,944.10
3	E-5	2,733.30	2,733.30	2,829.30	2,925.30	3,025.50	3,125.70	3,290.70	3,290.70	3,310.50	3,310.50	3,310.50
2	E-4	2,248.50	2,370.30	2,490.60	2,490.60	2,543.55	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50
1	E-3	1,931.10	2,052.30	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2176.80	2,176.80
0	E-2	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30
0	E-1	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30
0	E-1<4	1,514.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Authors' calculations.

NOTE: Yellow highlighted cells are values that are not derived from the TIS monthly basic pay table (Table 2.1) but are imputed, as described in the main text.

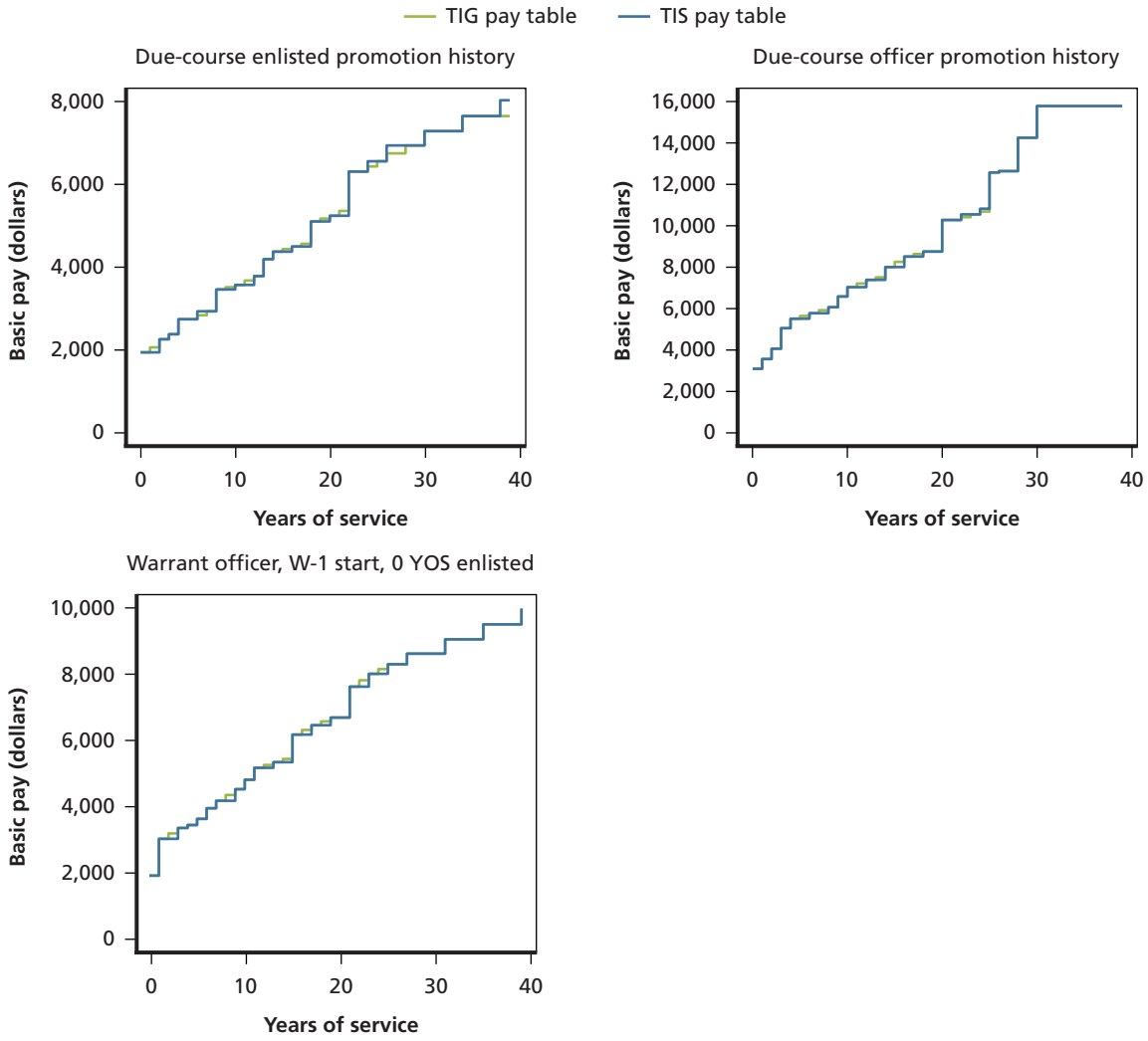
Table 2.2—continued
Proposed Time-in-Grade Monthly Basic Pay Table for January 2018 (11–20 Years in Grade)

Entry		Years in Grade									
YOS	Grade	11	12	13	14	15	16	17	18	19	20
Commissioned Officers											
28	0-10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10
26	0-9	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10
24	0-8	14,991.00	14,991.00	14,991.00	14,991.00	14,991.00	14,991.00	14,991.00	14,991.00	14,991.00	14,991.00
22	0-7	12,909.60	12,909.60	12,,909.60	12,909.60	12,909.60	12,909.60	12,909.60	12,909.60	12,909.60	12,909.60
19	0-6	11,599.80	11,599.80	11599.80	11,599.80	11,599.80	11,599.80	11,599.80	11,599.80	11,599.80	11,599.80
14	0-5	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20
9	0-4	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30
3	0-3	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60
1	0-2	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10
0	0-1	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20
Commissioned Officers with over 4 Years of Active Duty Service as an Enlisted Member or Warrant Officer											
10	O-3E	6,532.86	6,532.86	6532.86	6,532.86	6,532.86	6,532.86	6,532.86	6,532.86	6,532.86	6,532.86
8	O-2E	5,738.10	5,738.10	5,,738.10	5,738.10	5738.10	5,738.10	5738.10	5,738.10	5,738.10	5,738.10
6	O-1E	4,854.90	4854.90	4,854.90	4,854.90	4854.90	4,854.90	4,,854.90	4,854.90	4,854.90	4,854.90
Warrant Officers											
20	W-5	9,037.80	9,037.80	9,037.80	9,489.00	9,489.00	9,489.00	9489.00	9,964.20	9,964.20	9,964.20
14	W-4	7,511.10	7,820.70	7,820.70	7,820.70	7,820.70	7,976.70	7,,976.70	7,976.70	7,976.70	7,976.70
9	W-3	6,346.80	6,346.80	6,492.90	6,492.90	6,648.30	6,648.30	6,860.10	6,860.10	6,860.10	6,860.10
5	W-2	5,244.60	5,244.60	5,391.90	5,391.90	5,568.30	5,568.30	5,684.10	5,684.10	5,775.90	5,775.90
0	W-1	4,332.60	4,543.80	4,543.80	4,751.70	4,751.70	4,915.50	4,915.50	5,065.80	5,065.80	5,248.80
Enlisted Members											
22	E-9	7,285.50	7,650.00	7,650.00	7,650.00	7,650.00	8,033.10	8,033.10	8,033.10	8,033.10	8,033.10
18	E-8	5,921.70	6,040.50	6,040.50	6,040.50	6,040.50	6,040.50	6,040.50	6040.50	6,040.50	6,040.50
13	E-7	4,940.40	4,940.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40
6	E-6	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10
3	E-5	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50
2	E-4	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50
1	E-3	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80
0	E-2	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30
0	E-1	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30
0	E-1<4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Authors' calculations.

NOTE: Yellow highlighted cells are values that are not derived from the TIS monthly basic pay table (Table 2.1) but are imputed, as described in the main text.

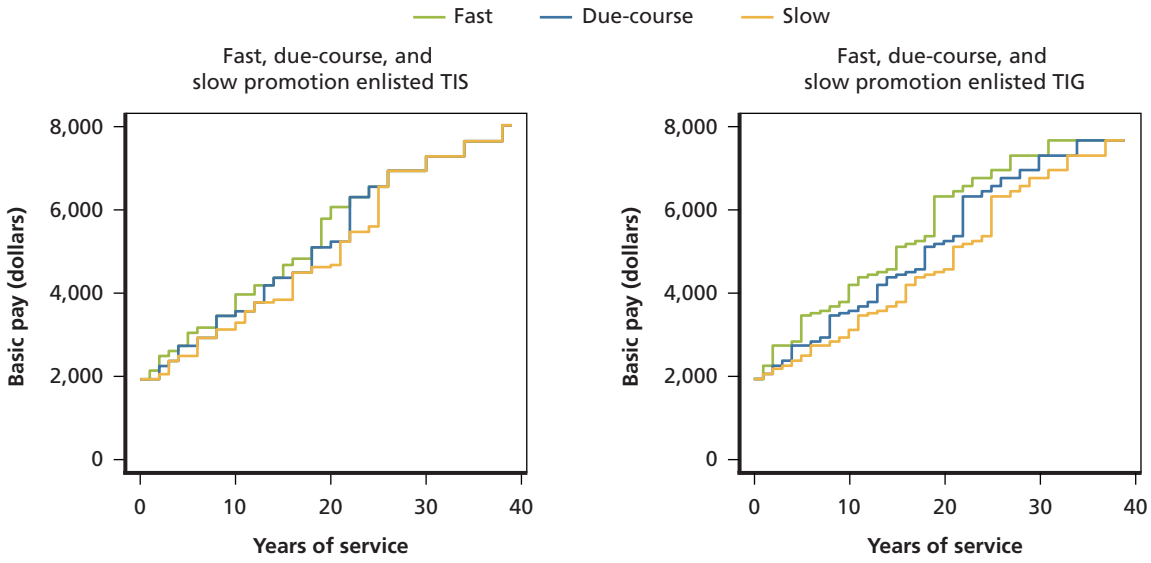
Figure 2.1
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables with Due-Course Promotion Histories, Enlisted Personnel (top left), Commissioned Officers (right), Warrant Officers (bottom left)



SOURCE: Authors' computations.
NOTE: The figure for warrant officers on the bottom left shows the pay profile for a member with no prior enlisted service who starts at grade W-1.

sonnel may be considered for promotion every year over a wide YOS interval. Because of this difference, we do not show pay over a career for slow promotion to O-4, just due-course versus one year faster. Pay over a career for an officer who is promoted faster than their year group is higher under the TIG pay table. To more clearly see the difference, we show in Figure 2.4 pay over a career for a fast-promoting officer under the TIG versus the TIS pay table. Pay is higher under the TIG pay table especially in the mid-career, but the difference in pay is not large. In large part, this relatively small difference reflects the structure of the officer pay table. As discussed in Asch (2019a), the officer pay table is relatively compressed in terms of differences in basic pay across grades. The construction of the TIG pay table for officers is built on the current officer pay table and so also reflects this compression. Thus, the main conclusion

Figure 2.2
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables for Fast- Versus Slow-Promoting Enlisted Personnel



SOURCE: Authors' computations.

Figure 2.3
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables for Fast- Versus Due-Course-Promoting Officers

SOURCE: Authors' computations.

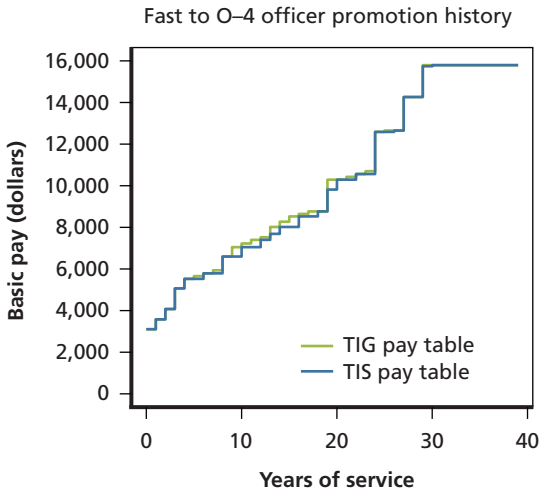
is that while pay is higher under the TIG table for an officer who is promoted faster, they pay advantage is not large. Figures 2.3 and 2.4 show results for fast promotion to O-4, and a similar result is found for fast promotion to O-5 (not shown).

Effects on Pay of Time in Grade for Members in Fast- Versus Slow-Promoting Occupations

A disadvantage of the TIG pay table discussed in past studies is that promotion timing differences, and therefore pay differences across services or across occupations within a service, may be a result of supply and demand conditions that are beyond the control of a given service member and not a result of differences in individual performance. While these differences occur under both a TIS and TIG pay table, the differences are magnified under the TIG pay table. The extent to which these differences vary across occupations within a service or across services is explored in Chapter Seven when we discuss the merits and drawbacks of the TIG pay system. Here, we illustrate the implications for pay over a career of differences in promotion timing across occupations within a given service.

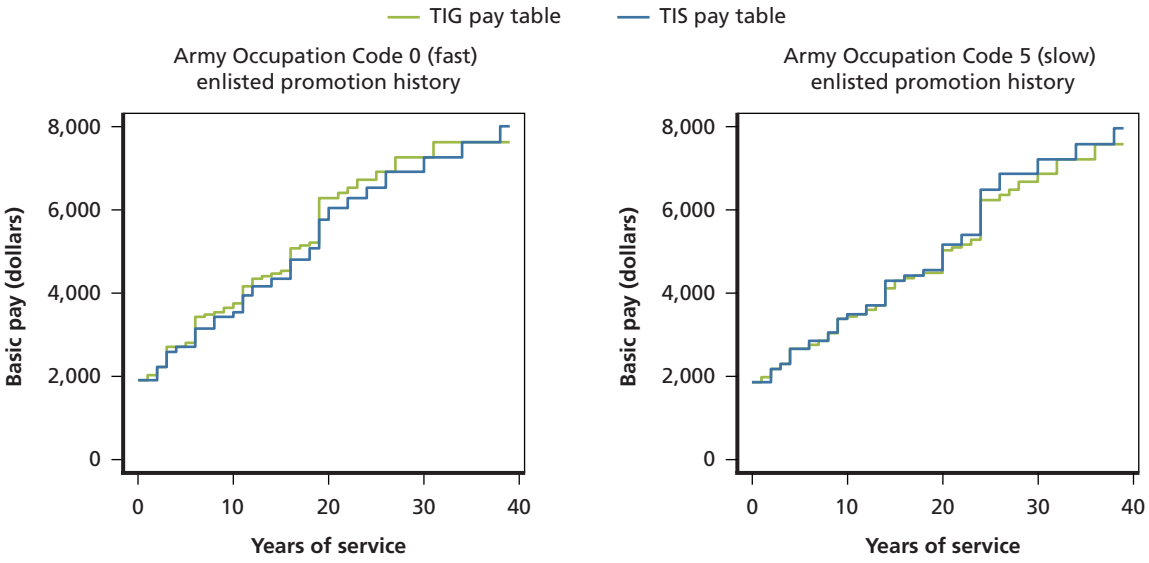
Figure 2.5 shows basic pay over a career under the TIG versus the TIS pay table for slow- versus fast-promoting occupations. Occupations within DoD Occupation Code 7, Craftsmen, promote about one year slower than average to E-5 and E-6, whereas those within DoD Occupation 0, Infantry, Gun Crews, and Seamanship Specialists, promote about one year faster than average to E-5 and about two years faster than average to E-6 based on DMDC tabulations. The left panel of Figure 2.5 shows that basic pay is higher over a career under the TIG pay table versus the TIS pay table for those in DoD Occupation Code 0 (the faster-promoting occupation). Similarly, the right panel shows that basic pay over a career is lower under the TIG pay table for the slower-promoting occupation (DoD Occupation Code 7). The implication is that the TIG pay table provides a greater financial reward over a career for those in fast-promoting occupations and provides less of a reward for those in slow-promoting occupations than the TIS pay table.

Figure 2.4
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables for Fast-Promoting Officers



SOURCE: Authors' computations.

Figure 2.5
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables for Fast- Versus Slow-Promoting Enlisted Occupations (DoD Occupation Codes 0 Versus 7)



SOURCE: Authors' computations.

To assess the magnitude of the differences in Figure 2.5, we compute the discounted present value (DPV) of basic pay over a career in Table 2.3. Because the military retired pay formula is based on the highest-three YOS (typically YOS 18–20 for someone retiring at YOS 20), faster or slower promotion will affect the "high-3" computation of basic pay and thus the monthly retired pay annuity. Thus, differences in basic pay over a career can result in differences in retired pay, and so we show computations of the DPV of retired pay over a lifetime under the TIG versus the TIS pay table for fast- versus slow-promoting occupations shown in in Figure 2.4. The computation of retired pay assumes retirement at YOS 20. For the computations shown in Table 2.3, we use a retired pay multiplier of 2.5 percent, as under the legacy military retirement system.[3] Guided by estimates from past studies, we use a personal discount rate of 10 percent for the DPV computations.[4]

Faster-promoting occupations result in a higher DPV of basic pay under both the TIG and TIS pay table, but the difference is greater under the TIG table, 11.3 percent versus 5.5 percent. The differences in basic pay for fast- verses slow-promoting occupations translate into differences in the high-3 computation and, hence, the DPV of retired pay. As shown in the table, the differences are magnified under the TIG pay table, 22.8 percent versus 14.3 percent under the TIS pay table.[5]

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[3] Members entering service beginning 2018 are under the Blended Retirement System (BRS), in which the retired pay multiplier is 2.0 percent. Members with at most 12 YOS as of December 31, 2017, had the opportunity to opt into the BRS during calendar year 2018. The BRS includes three elements: a retirement annuity, a defined contribution plan, and continuation pay. Differences in basic pay associated with the TIG pay table could affect all three elements. The legacy military retirement was the system in effect prior to the introduction of the BRS.

[4] These estimates are discussed in past RAND documents, such as in Asch, Hosek, and Mattock, 2014, Appendix E.

[5] These relative differences also carry through under the BRS. While the absolute difference between the DPV of the monthly retirement pay annuity for fast- and slow-promoting occupations would be 20 percent smaller under the BRS

Table 2.3
Discounted Present Value of Enlisted Basic Pay and Retired Pay for Fast- and Slow-Promoting Occupations (2018 dollars)

Enlisted Personnel	TIS Pay Table	TIG Pay Table
Basic Pay		
Fast-promoting occupation (DoD Occupation Code 0)	$386,700	$404,400
Slow-promoting occupation (DoD Occupation Code 7)	$366,600	$363,300
Difference	5.5%	11.3%
Retired Pay		
Fast-promoting occupation (DoD Occupation Code 0)	$314,300	$334,300
Slow-promoting occupation (DoD Occupation Code 7)	$244,900	$272,200
Difference	14.3%	22.8%

SOURCE: Authors' computations.

NOTE: DoD Occupation 0 is Infantry, Gun Crews, and Seamanship Specialists, and DoD Occupation Code 7 is Craftsmen. Computations assume a 30-year military career and use a 10 percent personal discount rate. Retired pay computation is based on the legacy (pre-2018) military retirement formula equal to 2.5% of the highest-three years of basic pay times YOS and assumes an expected lifespan until age 85.

Warrant Officers with Prior Service

As noted by the 10th QRMC, warrant officers and commissioned officers with prior enlisted service present difficulties from a pay perspective in the current TIS pay table and greater difficulties in a TIG pay table. The difficulty is that members promoted from the enlisted force to either the warrant officer or commissioned officer force often have widely different amounts of prior enlisted service. This can result in a pay inversion or pay reduction at the time of transition to the officer corps for enlisted members. In this section, we focus on warrant officers, and we discuss commissioned officers in the next section.

Table 2.4 shows the grade and YOS eligibility requirements for warrant officers, by service. (For completeness, the table includes the Air Force, although the Air Force does not currently have a warrant officer program.) Except for Army aviators, warrant officers require prior enlisted service. The minimum YOS and grade requirements vary across service. For technical Army specialties (non-aviator), warrant officers must be at least an E-5 and have between 4 and 6 YOS. In contrast, Marine Corps warrant officers in nontechnical specialties require at least 16 YOS in the Marine Corps or 23 YOS in the Navy. Navy warrant officers must be at least an E-7 (or promotable as an E-6) with at least 12 YOS. As shown in the final column, the Navy allows more-senior enlisted personnel who become warrant officers to enter the warrant officer

(due to the BRS retired pay multiplier being 20 percent smaller), the relative difference would remain the same as that shown for the legacy retirement system, 22.8 percent under the TIG pay table versus 14.3 percent under a TIS pay table.

Table 2.4
Warrant Officer Grade and Years-of-Service Eligibility Requirements

Service	Career Fields	Minimum Enlisted Grade	Minimum YOS	Notes
Army	Technical	E-5	4–6 YOS	
	153A (aviators)	No prior service	Not applicable	
Marine Corps	Technical	E-5	8 YOS in USMC or 16 YOS in Navy	
	Nontechnical	E-7	16 YOS in USMC or 23 YOS in Navy	
Air Force	No Warrant Officer Program			
Navy	All	E-7 or E-6 (promotable)	12 YOS	Enter as W-2
Coast Guard	All	E-6	8 YOS with at least 4 in USCG	

SOURCES: Navy Personnel Command (undated), U.S. Marine Corps (2019), U.S. Army Recruiting Command (undated), U.S. Coast Guard (2017).

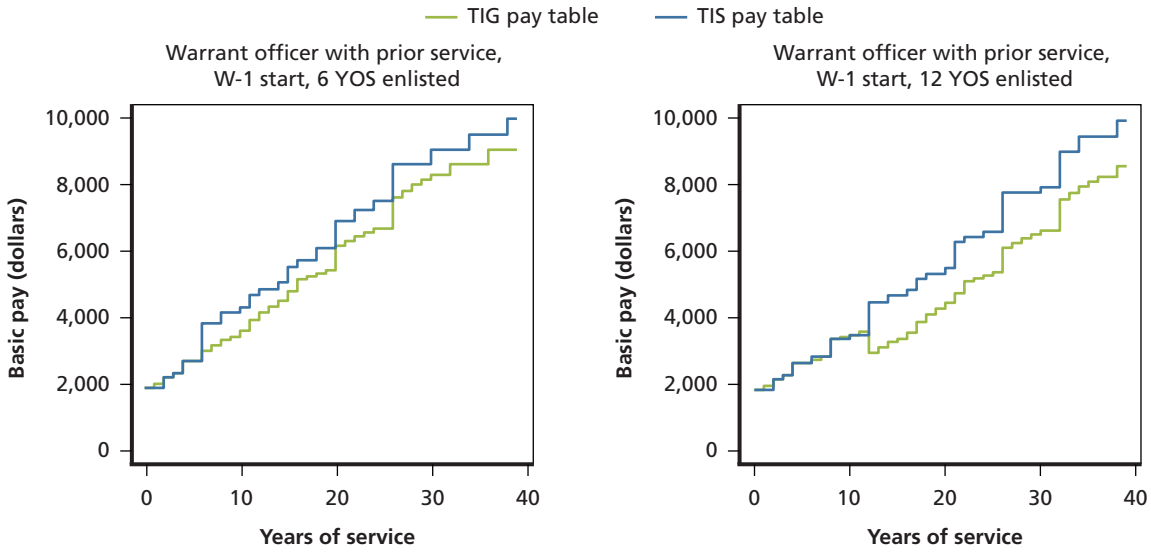
corps at the grade of W-2. This policy addresses the possibility of pay inversion whereby more senior enlisted personnel who become warrant officers may receive a pay cut.

Following the 10th QRMC, we developed the TIG pay table in Table 2.3 for warrant officers with entry grade points associated with a non-prior service warrant officer career, relevant only to Army aviators. As shown in the lower left panel of Figure 2.1, warrant officers with no prior service would have the same basic pay profile over a career under the TIG as under the TIS pay table, assuming these warrant officers received due-course promotions that are the same as the average promotion times between 2013 and 2018. However, a drawback of this TIG pay table design of warrant officers is that basic pay under the TIG pay table would be lower than under the TIS pay table for warrant officers with prior enlisted service. This is shown in Figure 2.6, in which basic pay over a career is shown under the TIG versus the TIS pay table for a member who transitions to warrant officers status after either 6 years or 12 years as an enlisted member (left and right panels, respectively). In the years prior to promotion to warrant officer, the figure shows basic pay during the enlisted portion of members' careers. By design, those receiving due-course (enlisted) promotions receive the same basic pay over the career under both the TIS and TIG tables, so the green and blue lines overlap in the figures. After promotion to warrant officer, pay is lower under the TIG pay table. In the case of those with 12 YOS as an enlisted member, pay is not only lower under the TIG pay table than under the TIS table, but for those under the TIG pay table, pay falls at the transition point to warrant officer status under the TIG pay table (but not the TIS table), as seen by the reduction in pay at 12 YOS relative to pay at 11 YOS in the right-hand panel.

Pay is lower under the TIG versus the TIS table for two reasons. First, the warrant officer TIG table was designed for those with no prior enlisted service. Second, unlike the TIS pay table, the TIG table does not account for YOS differences at the time of promotion to warrant officer. Put differently, the TIS pay table is distinctly more advantageous than the TIG table in ensuring that members who transition to warrant officer do not receive a pay cut.

One way to address the lower pay under the TIG pay table relative to the TIS table is to move the entry grade points in the TIG table to make them more senior. As discussed by the Hogan et al. (2008), the disadvantage of this approach is that pay for warrant officers without

Figure 2.6
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables with Due-Course Promotion Histories for Warrant Officers with 6 or 12 Prior YOS as Enlisted



SOURCE: Authors' computations.

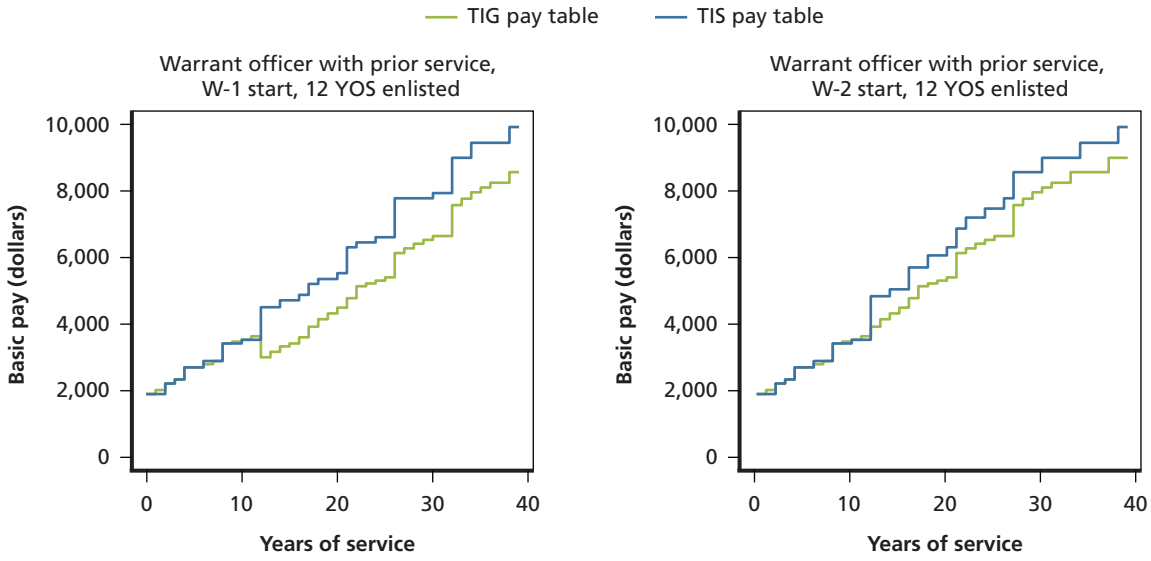
prior enlisted service would be substantially higher under the TIG relative to the TIS pay table. Another way is to allow warrant officers with substantial amounts of prior enlisted service to transition to warrant officer status at a grade higher than W-1. This is consistent with the Navy approach of allowing warrant officers to enter as a W-2.

Figure 2.7 shows basic pay over a career under the TIG pay table for warrant officers who transition at 12 YOS and are paid as a W-1 (left panel) versus as a W-2 (right panel) at the transition point. (To facilitate the comparison, the left panel in Figure 2.6 replicates the right panel from Figure 2.5.) While these warrant officers would still receive lower pay under the TIG than the TIS pay table, they would no longer receive a pay cut at the point of transition under the TIG table. That is, pay at YOS 12 would exceed pay at YOS 11 under the TIG pay table. Figure 2.8 shows that paying these members as a W-3 at promotion to warrant officer would go a long way toward closing the gap in basic pay under the TIG versus the TIS pay table. In short, reductions in pay for senior enlisted members who become warrant officers under the TIG pay table could addressed by allowing entry at grades above W-1.

Commissioned Officers with Prior Enlisted Service

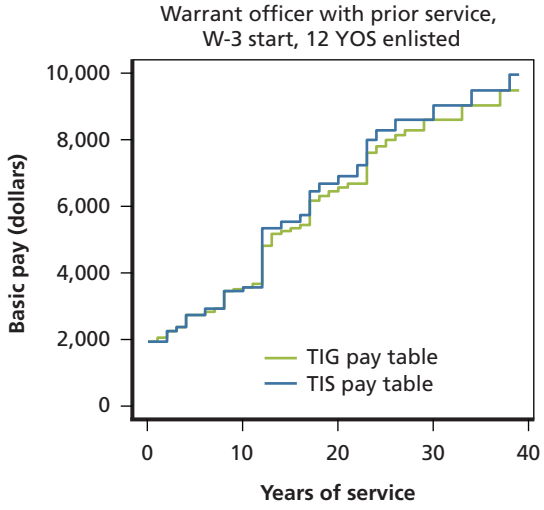
As with warrant officers, members promoted from the enlisted force to the commissioned officer force can have differing amounts of prior enlisted service. The TIS pay table has the advantage that it accounts for YOS at promotion. Furthermore, officers commissioning with at least 4 years of prior enlisted service begin their officer career in the grades of O-1E, O-2E, and O-3E in the TIS pay table. Pay in these grades is higher than pay for O-1 to O-3, i.e., officers with no prior enlisted service. An important consideration in the design of the pay table for these officers is that they do not experience a pay cut as they transition from O-3E to O-4.

Figure 2.7
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables with Due-Course Promotion Histories for Warrant Officers 12 Prior YOS as Enlisted, Entering as W-2



SOURCE: Authors' computations.

Figure 2.8
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables with Due-Course Promotion Histories for Warrant Officers 12 Prior YOS as Enlisted, Entering as W-3



SOURCE: Authors' computations.

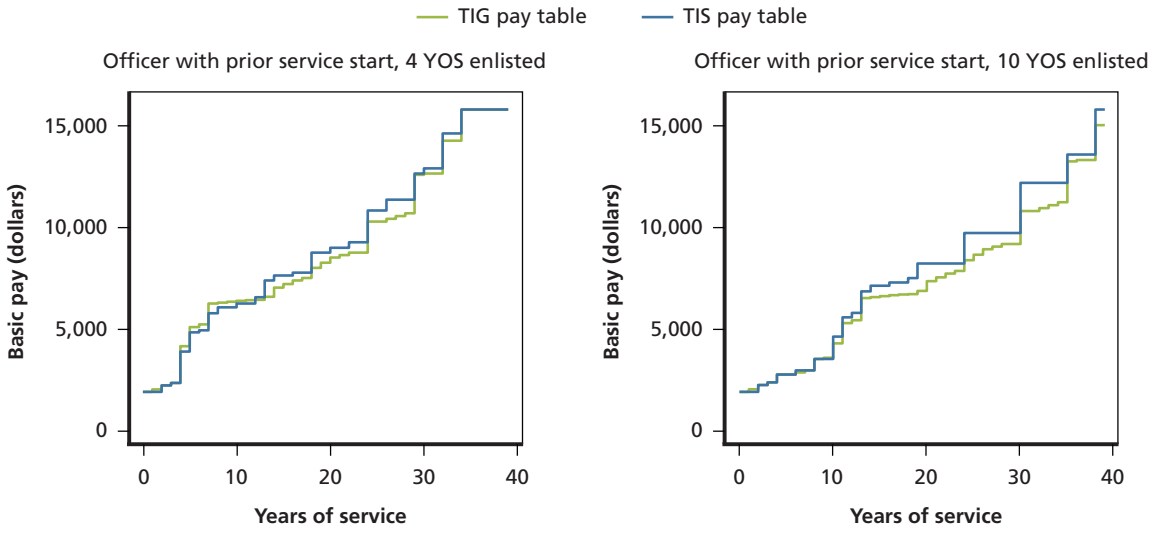
Because the TIS table accounts for YOS, it has the advantage that it is designed to provide a pay increment, and not a pay cut, to those promoted to O-4 from the grade of O-3E. But, the TIG table does not recognize the greater seniority of these commissioned officers and so they may experience a pay cut at the O-4 promotion point.

The design of the TIG pay table in Table 2.2 also includes grades O-1E, O-2E, and O-3E. To address the pay inversion issue that can arise at the O-4 promotion point, the design

ensures that pay of an O-3E is always less than the pay of an O-4 while still increasing pay with more time in grade for those in the grade of O-3E. As shown by the highlighted cells for O-3E in Table 2.2, the pay for O-3E is imputed beyond 0 years in grade. The advantage of this design is that officers commissioned with prior enlisted service experience a pay increase at promotion from O-3E to O-4. A disadvantage is that these members experience slower pay growth as an O-3E than they would under a TIS pay table (a table that can directly recognize their greater experience).

Figure 2.9 shows basic pay growth over a career for members commissioned with 4 YOS as enlisted (left panel) or with 10 YOS at enlisted (right panel) under the TIG pay table design of Table 2.2. For officers commissioned with 4 YOS as an enlisted member (left panel), the first 4 YOS in Figure 2.9 reflect pay as an enlisted. At YOS 4, pay increases as the member transitions to the grade of O-1E. Because the pay of O-1E in the TIG table assumes entry at YOS 6, basic pay increases more under the TIG than the TIS pay table, i.e., the green line is above the blue line in the left panel of the figure. As an O-3E, beginning at YOS 8, pay increases are relatively flat. Pay increases are less flat once the member begins as an O-4 (at YOS 16 in the left panel), but pay growth is a bit slower until YOS 30 under the TIG than under the TIS table. We see a similar pattern for those commissioning after 10 YOS. These officers reach O-3E after 14 YOS and O-4 after 19 YOS. The structuring of O-3E pay to prevent pay inversion results in slower pay growth through YOS 40.

Figure 2.9
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables for Commissioned Officers 4 Prior YOS (left) and 10 Prior YOS (right)



SOURCE: Authors' computations.

Lateral Entry

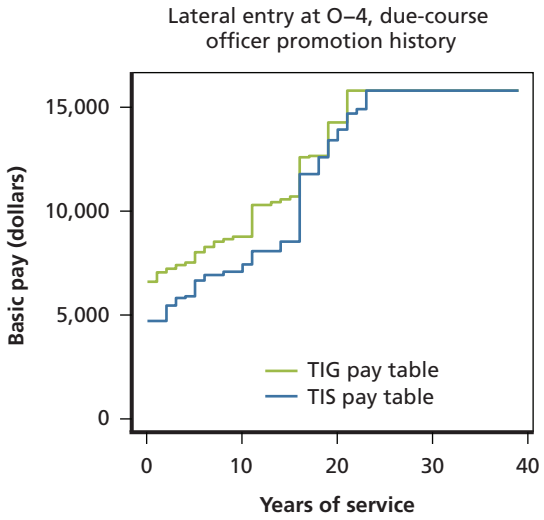
A major perceived advantage of a TIG pay table is that it can more easily facilitate the offering of higher pay to lateral entrants. As discussed in Chapter One, DOPMA reform included in the NDAA 2019 authorized the services to grant "constructive credit" for education as well

as for work experience, thereby allowing individuals to enter service at a rank as high as an O-6 (colonel or Navy captain). To illustrate the advantage of the TIG pay table for facilitating lateral entry, we consider lateral entry as an O-4, consistent with the NDAA 2019 reforms. Figure 2.10 shows the simulation of basic pay over an officer career for individuals who enter military service as an O-4.

We find that pay is higher for lateral entrants under the TIG pay table. The reason is that lateral entrants receive the pay of an O-4 with 9 YOS, the entry YOS point for an O-4 (see Table 2.2) in the TIG table, rather than with 0 YOS, as would be the case under the TIS pay table.

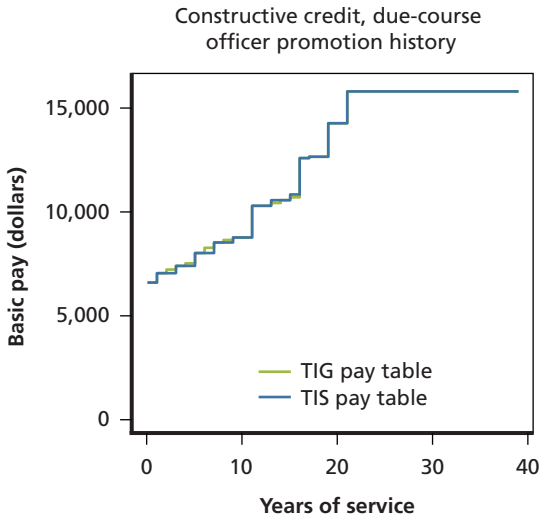
That said, higher pay could also be offered under a TIS pay table if the definition of constructive credit were broadened to allow individuals to enter the military at both higher grades *and* YOS. Figure 2.11 shows the basic pay profile for O-4 lateral entrants under the TIS pay table, whereby individuals would receive constructive credit of 9 YOS. That is, at entry, these individuals would receive the pay of an O-4 with 9 YOS. The figure shows that the TIG pay table is no longer more advantageous in terms of providing higher pay to lateral entrants. In fact, pay is virtually identical under the TIG versus the TIS pay table. In Chapter Four, we return to the topic of policies that could be implemented under the current TIS pay table that might replicate the advantages of a TIG pay table.

Figure 2.10
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Table for Lateral Entrant as an O-4



SOURCE: Authors' computations.

Figure 2.11
Simulated Monthly Basic Pay over a Career, Time-in-Grade with Constructive Credit Versus Time-in-Service Pay Table for Lateral Entrant as an O-4



SOURCE: Authors' computations.

Summary

In this chapter, we developed a TIG pay table, extending the work of the 10th QRMC and the DACMC. The entry points or anchor points are critical inputs to the development of the pay table, and we used more recent promotion timing data than were used by the 10th QRMC. We simulated basic pay profiles over a career for enlisted personnel, warrant officers, and commissioned officers, and found that those who receive due-course promotions, or promotions that are exactly the same as the anchor points, receive the same pay over their career under the TIG as the TIS pay table. By providing a permanent pay increment or decrement to those promoted faster or slower, our simulations show that the TIG pay table shows more pay variability, and therefore greater incentives for performance, than the TIS pay table, insofar as promotion speed reflects performance.

A challenge with establishing the TIG pay table is the pay for warrant officers and commissioned officers who transition out of the enlisted force; the difficulty is that members promoted from the enlisted force often have widely different amounts of prior enlisted service. Another difficulty is that the warrant officer TIG pay table is designed for those without prior enlisted service. One way to address the lower pay under the TIG pay table relative to the TIS table is to move the entry grade points in the TIG table to make them more senior. The disadvantage of this approach is that pay for warrant officers without prior enlisted service would be substantially higher under the TIG relative to the TIS pay table.

Another way is to allow warrant officers with substantial amounts of prior enlisted service to transition to warrant officer status at a grade higher than W-1. A similar strategy could be used for commissioned officers. Finally, we found that the TIG pay table provides higher entry pay than the TIS pay table to lateral entrants. On the other hand, a similar result could be achieved under a TIS pay table if constructive credit were redefined so that entrants could receive pay at not only a higher grade but also a higher length of longevity.

CHAPTER THREE

Extending the Dynamic Retention Model to Analyze the Effect of a Time-in-Grade Pay Table

This chapter covers how we extended the DRM so that we can simulate the effect of a TIG pay table on retention, performance, and personnel costs. Performance is measured in terms of promotion speed relative to peers, where we consider two factors that can affect performance, ability, and effort supply. By *ability*, we mean characteristics of individual members that increase or decrease their promotion speed relative to their peers; these can include innate cognitive intelligence and other characteristics that lead to success, such as ability to work well in teams, ability to work in a hierarchical organizational structure, and resilience to changes such as frequent moves and new assignments. By *effort supply*, or simply *effort*, we refer to how hard and effectively members work in terms of achieving tasks that lead to faster promotion. In the simulations, we seek to provide estimates of the effect of the TIG pay table on overall retention, retention of individuals with higher innate ability, and the average ability and the level of effort exerted by individual members. As much of this chapter consists of technical material, readers whose main interest is in the policy analysis of the TIG pay table may wish to skip to the next chapter.

We first discuss how we extended the mathematical structure of the DRM to account for promotion. Explicitly modeling promotion is critical to being able to model a TIG pay table, because under this type of pay table compensation depends both on grade and the time since the last promotion. Previous versions of the DRM, with a few exceptions, modeled the military wage as being a function of YOS and did not explicitly model the promotion process. Given the expanded mathematical structure, we estimate the DRM parameters for enlisted personnel and officers in each service using DMDC data that track individual service members from entry in 1990 and 1991 through their active and reserve military career until 2016. We can then use the parameter estimates to simulate the effects of untried policies, such as the TIG pay table. Next, we discuss how we conduct these simulations. In particular, we discuss how we used the DRM mathematical structure, which is based on a TIS pay table and on historical career data for service members serving under a TIS pay table, to simulate the effect of implementing a TIG pay table. After that, we discuss how we extended the DRM to simulate how the different pay tables might affect the retention of members of differing levels of ability, where we assume that higher-ability members are promoted faster than their peers. Then we examine how the DRM can be extended to examine the effects of differing pay tables on the amount of effort an individual chooses to exert, when we assume that individuals who exert more effort will be promoted faster than their peers who exert less effort. We conclude the chapter with a short summary.

Extending the DRM Mathematical Structure to Account for Promotion

The DRM is a model of the service member's decision, made each year, to stay in or leave the active component and, for those who leave, to choose whether to participate in a reserve component and, if participating, whether to continue as a reservist. These decisions are structured as a dynamic program in which the individual seeks to choose the best career path, but the path is subject to uncertainty. The model is formulated in terms of parameters that are estimated with longitudinal data on retention in the active component and participation in the reserve component, and these data are then used to see how well the estimated model fits observed retention. We use the estimated parameters in policy simulations.

We have described the DRM in earlier documents in which we have estimated a DRM for officers and for enlisted personnel in each service and for selected communities, such as Air Force pilots and military mental health care providers (Asch et al., 2008; Mattock et al., 2016; Hosek et al., 2017). This chapter presents an overview of the DRM, describing the extension of the model to cover promotion for both enlisted and officers. The description presented in this chapter draws heavily on Asch et al. (2018).

In the DRM, a set of parameters underlies the individual member's retention decisions, and a goal of our analysis is to use individual-level data on active retention and reserve participation to estimate the parameters for both enlisted personnel and officers for all four services. We discuss the data we use in more detail later in this chapter, but, in short, we use the DMDC's Work Experience File (WEX) to track individual careers from 1990 to 2016.

Model Overview

In the behavioral model underlying the DRM, in each period the individual can choose to continue on active duty, leave the military to hold a job as a civilian, or leave the military to join a reserve component and hold a job as a civilian. The individual bases their decision on which alternative has the maximum value. The model assumes that an individual begins their military career in an active component.

Individuals are assumed to differ in their preferences for serving in the military. Each individual is assumed to have given, unobserved, preferences for active and reserve service, and these preferences do not change. The individual member, officer or enlisted, has knowledge of military pay and retirement benefits, as well as civilian compensation. In each period there are random shocks associated with each of the alternatives, and the shocks affect the value of the alternative. As shown next, the model explicitly accounts for individual preferences and military and civilian compensation, and, in this context, shocks represent current-period conditions that affect the value of being on active duty, being in the selected reserve while also being a civilian worker (or *reserve*, for short), or being a civilian worker and not in the reserve (*civilian* for short). Examples of what may contribute to a shock are a good assignment; a dangerous mission; an excellent leader; inadequate training or equipment for the tasks at hand; a strong or weak civilian job market; an opportunity for on-the-job training or promotion; the choice of location; a change in marital status, dependency status, or health status; the prospect of deployment or deployment itself; or a change in school tuition rates. These factors may affect the relative payoff of being in an active component, being in a reserve component, or being a civilian. The individual is assumed to know the distributions that generate the shocks, as well as the shock realizations in the current period but not in future periods.

Depending on the alternative chosen, the individual receives the pay associated with serving in an active component, working as a civilian, or serving in a reserve component while also working as a civilian. In addition, the individual receives the intrinsic monetary equivalent of the preference for serving in an active component or serving in a reserve component. These values are assumed to be relative to that of working as a civilian, which is set at 0.

In considering each alternative, the individual takes into account their current state and type. *State* is defined by whether the member is active, reserve, or civilian and by the individual's active YOS, reserve YOS, total years since first joining the military, pay grade, and random shocks.

Type refers to the level of the individual's preferences for active and reserve service. The individual recognizes that today's choice affects military and civilian compensation in future periods. Although the individual does not know when future military promotions will occur, they do know the promotion policy and can form an expectation of military pay in future periods. Further, the individual does not know what the realizations of the random shocks will be in future periods. The expected value of the shock in each state is 0. Depending on the values of the shocks in a future period, any of the alternatives—active, reserve, or civilian—might be the best at the time. Once a future period has been reached and the shocks are realized, the individual can reoptimize (i.e., choose the alternative with the maximum value at that time). The possibility of reoptimizing is a key feature of dynamic programming models that distinguishes them from other dynamic models. In the current period, with future realizations unknown, the best the individual can do is to estimate the expected value of the best choice in the next period, i.e., the expected value of the maximum. Logically, this will also be true in the next period, and the one after it, and so forth, so the model is forward-looking and rationally handles future uncertainty. Moreover, the model presumes that the individual can reoptimize in each future period, depending on the state and shocks in that period. Thus, today's decision takes into account the possibility of future career changes and assumes that future decisions will also be optimizing.

Mathematical Formulation

We denote the value of staying in the active component at time t as

$$V^S\left(k_t\right) = V^A(k_t) + \varepsilon_t^A,$$

where k_t is defined as

$$k_t = k_t\left(ay_t, ry_t, t, g_t\right),$$

or the vector of number of active years (ay_t) at time t, the number of reserve years (ry_t), total years since initial enlistment or accession, and grade (g_t). $V^A(k_t)$ is the nonstochastic value of the active alternative, and ε_t^A is a random shock.

The value of leaving at time t is

$$V^L\left(k_t\right) = \max\left[V^R\left(k_t\right) + \omega_t^R, V^C\left(k_t\right) + \omega_t^C\right] + \varepsilon_t^L,$$

where the member can choose between reserve (R) and civilian (C). *Civilian* means working at a nonmilitary job, and *reserve* means participating in a reserve component and working at a nonmilitary job. The value of reserve is given by $V^R(k_t)+\omega_t^R$ where k_t is defined above, while value of civilian is given by $V^C(k_t)+\omega_t^C$. We model the reserve/civilian choice as a nest and assume that the stochastic terms follow an extreme value type I distribution, which leads to a nested logit specification in the estimation phase of this structural model.[1] The within-nest shocks to the reserve/civilian choice are given by ω_t^R and ω_t^C, and the nest-level shock is given by ε_t^L.

We allow a common shock for the reserve and civilian nest, ε_t^L, since an individual in the reserves also holds a civilian job, as well as shock terms specific to the reserve and civilian states, ω_t^R and ω_t^C. The individual is assumed to know the distributions that generate the shocks and the shock realizations in the current period but not in future periods. The distributions are assumed to be constant over time, and the shocks are uncorrelated within and between periods. Once a future year is reached, and the shocks are realized, the individual can reoptimize, i.e., choose the alternative with the maximum value at that time. But in the current period, the future realizations are not known, so the individual assesses the future period by taking the expected value of the maximum, i.e., the expected value of civilian conditional on it being superior to that of reserve times the probability of that occurring, plus the expected value of reserve conditional on it being superior to civilian times the probability of that occurring. For instance, depending on the shocks and the compensation, there is some chance that $V^S(k_t)$ will be greater than $V^L(k_t)$, in which case $V^S(k_t)$ would be the maximum, and vice versa, and the individual makes an assessment of the expected value of the maximum, $\text{Emax}(V^S(k_t),V^L(k_t))$.

The extreme value distribution, denoted *EV*, has location parameter a and scale parameter b; the mean is $a + b\phi$, and the variance is $\pi^2b^2/6$, where ϕ is Euler's gamma (~0.577). As we derived in past studies (Asch et al., 2008; Mattock et al., 2016), this implies

$$\begin{aligned}
\varepsilon_t^{Leave} &\sim EV\left[-\phi\sqrt{\lambda^2+\tau^2},\sqrt{\lambda^2+\tau^2}\right]\\
\omega_t^R &\sim EV\left[-\phi\lambda,\lambda\right]\\
\omega_t^C &\sim EV\left[-\phi\lambda,\lambda\right]\\
\omega_t^L &\sim EV\left[-\phi\tau,\tau\right],
\end{aligned}$$

where λ is the common scale parameter of the distributions of ω_t^R and ω_t^C, and τ is the scale parameter of the distribution of ε_t^L. In the nested structure of the model, leavers face a common shock for the "leave" nest, ε_t^L, as well as shocks for the reserve and civilian alternatives within the nest, ω_t^R and ω_t^C, which all together produce a leave shock distributed as extreme value type I, with location parameter $-\phi\sqrt{\lambda^2+\tau^2}$ and scale parameter $\sqrt{\lambda^2+\tau^2}$. The logit model requires that the scale parameters of the leave and stay shocks be equal, so we parameterize the model such that the stay scale parameter, which we denote κ, has the same value as the leave scale parameter, i.e., $\kappa=\sqrt{\lambda^2+\tau^2}$.

[1] See Train, 2009, for a discussion of the logit and nested logit specifications.

The values of the alternatives $V^A(k_t)$, $V^R(k_t)$, and $V^C(k_t)$ depend on the current pay for serving in an active component or working as a civilian, $W^A(k_t)$ or $W^C(k_t)$. The members' active pay is based on total years of active service, ay_t, as well as their grade, g_t.

Our model includes promotion. The model assumes that the timing and probability of promotion at each grade is the same across all officers and is the same across all enlisted. Variation in the timing and probability of promotion for an individual member is captured by the shock term. Promotion to a given grade occurs at a given number of YOS, but the probability of promotion differs by grade. Also, the probability of promotion is assumed to be invariant to policy change. Not being promoted decreases the value of continuing in the military and operates to decrease retention. Officers or enlisted members that are promoted can look ahead to future promotion gates, and their value of staying is higher than that of members that are not promoted.

The possibility of re-optimizing in future periods distinguishes dynamic programming models from other dynamic models. Re-optimization means that the individual can choose the best alternative in a period when its conditions have been realized, i.e., when the shocks are known. As mentioned, future realizations are unknown in the current period, and the best the individual can do is estimate the expected value of the best choice in the next period, i.e., the expected value of the maximum. This will also be true in the following period, and the one after it, and so forth, so the model is forward-looking and rationally handles future uncertainty. Thus, today's decision takes into account the possibility of future changes of state and assumes that future decisions will also be optimizing.

To be more specific, in developing a mathematical expression for the value of the value function $V^A(k_t)$, the DRM considers all possible future pathways, recognizing that each pathway depends on each probability of promotion to the next grade and year of service when promotion can occur. Thus, the DRM views an officer or enlisted member with a particular k_t as reasoning forward to identify the full set of possible future paths of staying or leaving. Then, the member reasons backward starting from the final stay/leave decision year, called year T.

For each possible k_T, the model assumes that the member considers whether to stay or leave. From the perspective of an earlier year t, the member's current year, there is no reason to commit to a decision at T, and in fact it would be short-sighted to do so, because the member would not be able to base the decision on information that will be revealed when T arrives, i.e., when the shocks in T are realized. Instead, the member at t develops a decision rule about whether to stay or leave at T, and that rule is to stay if the value of doing so is higher than the value of leaving, otherwise to leave. The service member can—in the context of the model—compute the expected value of making that optimal decision. Reasoning backward, this expression enters into the expression for the optimal stay/leave decision at $T-1$ and so on back year by year to t.

At t, the value of continuing in the military for a member at grade g (now shown as a superscript) is

$$V^S\left(k_t\right) = V^A(k_t) + \varepsilon_t^A = \gamma^A + W_t^{Ag} + \beta EMax\left(V^A(k_{t+1}) + \varepsilon_{t+1}^A, V^L(k_{t+1}) + \varepsilon_{t+1}^L\right) + \varepsilon_t^A,$$

where γ^A is the individual's taste for active duty, W_t^{Ag} is active duty pay, β is the personal discount factor, the ε terms are random shocks, and the operator *Emax* finds the expected value

of the maximum of the terms $V^A\left(k_{t+1}\right)+\varepsilon_{t+1}^A$ and $V^L(k_{t+1})+\varepsilon_{t+1}^L$. Each of these terms has a nonrandom term and a random term.

Consider shocks that have an extreme value distribution with a mode of 0 and a scale of kappa: $\varepsilon \sim \text{EV}[0,\kappa]$. With an extreme value shock, the quantity $a + \varepsilon$ is distributed as EV[a,κ]. The mean of this distribution equals the scale factor times Euler's gamma plus the mode: $\phi\kappa + a$, where $\phi \approx 0.577$. If the mode is transformed by subtracting $\phi\kappa$, then $a - \phi\kappa + \varepsilon$ is distributed as EV[$a - \phi\kappa$,κ] with a mean of a. (This transformation is equivalent to assuming that the shocks are distributed as EV[$-\phi\kappa$,κ], that is, that the shocks have mean 0 and scale kappa.) Also, if two quantities V^m and V^n have the form $a + \varepsilon$ and we subtract $\phi\kappa$ from each, their maximum has an extreme value distribution, namely,

$$Max\left(V^m,V^n\right) \sim EV\left[\kappa \ln\left(e^{V^m/\kappa}+e^{V^n/\kappa}\right)-\phi\kappa,\kappa\right].$$

The mean of this distribution is

$$\kappa \ln\left(e^{V^m/\kappa}+e^{V^n/\kappa}\right).$$

The mean is literally the expected value of the maximum. This result implies that

$$EMax\left(V^A\left(k_{t+1}\right)+\varepsilon_{t+1}^A,V^L\left(k_{t+1}\right)+\varepsilon_{t+1}^L\right)=k\ln\left(e^{V^A(k_{t+1})/\kappa}+e^{V^L(k_{t+1})/\kappa}\right).$$

To introduce promotion, we replace V^A with its expected value, where p is the probability of promotion:

$$V^A = p_{t+1}^{g+1}V^{A(g+1)}+\left(1-p_{t+1}^{g+1}\right)V^{Ag}.$$

In those YOS where no promotion occurs (that is, in those YOS when promotion is not possible), the probability of promotion is zero. In years where promotion might occur (i.e., in those YOS when promotion is possible), the probability of promotion is assigned a value relevant for the grade. In general, not all eligible individuals get promoted, particularly in the senior grades; as a result, the probability of promotion is typically strictly less than 1.

For simplicity, we assume that civilian pay only depends on YOS (or years since initial active enlistment or accession, if the individual has left active service). If the member is a reservist, they earn the civilian wage plus reserve pay, $W^C(k_t) + W^R(k_t)$. As with active pay, reserve pay depends on total years, including prior active years as well as, of course, reserve years.

The tastes for active and reserve duty, γ^A and γ^R, represent the individual's perceived net advantage of holding an active or reserve position, relative to the civilian state. Other things

equal, a higher taste for active or reserve service increases retention. The tastes are assumed to be constant over time but vary across individuals. Also, tastes for active and reserve service are not observed but are assumed to follow a bivariate normal distribution among active component entrants.

The nonstochastic (in the current period) values of the reserve choice and civilian choice can be written as

$$V^R\left(k_t\right) = \gamma_r + W^C\left(k_t\right) + W^R\left(k_t\right) + \beta E\left[\max\left[V^R\left(k_{t+1}\right) + \omega_r, V^C\left(k_{t+1}\right) + \omega_c\right]\right]$$

$$V^C\left(k_t\right) = W^C\left(k_t\right) + R\left(k_t\right) + \beta E\left[\max\left[V^R\left(k_{t+1}\right) + \omega_r, V^C\left(k_{t+1}\right) + \omega_c\right]\right],$$

where $R(k_t)$ in the civilian equation is the value of any active or reserve military retirement benefit for which the individual is eligible. The 2016 NDAA created a new military retirement system, known as the Blended Retirement System. Because our data cover retention decisions of personnel under the legacy retirement system, we use the formula for the legacy system for the purpose of our analysis given by

$$R\left(k_t\right) = 2.5\% \times ay_t \times W^A\left(k_t\right)$$

for the active retirement system where, in this formula, $W^A(k_t)$ is the highest three years of basic pay and is computed based on total active years, ay_t. For a member with 30 YOS, the multiplier 2.5% × ay_t is 75 percent, while it is 100 percent for a member with 40 YOS. (After 2007, the 75 percent cap on the multiplier was lifted, thereby permitting additional YOS beyond 30 to contribute to retired pay.)

The model has two switching costs, which enter the relevant value function as additive terms. *Switching cost* refers to a de facto cost reflecting the presence of constraints or barriers affecting the movement from particular states and periods to other states, relative to the movement that would otherwise have been expected from the expressions shown above for the values of staying and of leaving. Switching costs are not actually paid by the individual but, as estimated in the model, are a monetary representation of the constraints or barriers affecting the transition from one state to another at a given time. Further, a switching cost can be either negative or positive. A negative value implies a loss to the individual when changing from the current status to an alternative status, while a positive value implies a gain, or incentive, for the change. The first switching cost is a cost of leaving the active component before an officer or an enlisted member's active duty service obligation (ADSO) is completed, or an enlisted member's initial term of service is completed. This switching cost enters the value functions $V^R(k_t)$ and $V^C(k_t)$. The estimates, shown later, indicate that the switching cost has a negative value for all services, possibly reflecting the perceived cost of breaching the service contract. The second switching cost is a cost of switching into the reserve from the civilian state, and enters the value function $V^R(k_t)$. This cost could represent difficulty in finding a reserve position in a desired geographic location or an adverse impact on one's civilian job, e.g., from not being available to work on certain weekends or for two weeks in the summer or being subject to reserve call-up. Its estimated value is negative across all services.

Estimation Methodology

To estimate the DRM, we use the mathematical structure of the model together with assumptions on the distributions of tastes across members and the shock distributions. This allows us to derive expressions for the transition probabilities, given one's state, which are then used to compose an expression for the likelihood of each individual's years of active retention and reserve participation. Importantly, each transition probability is itself a function of the underlying parameters of the DRM. These are the parameters of the taste distribution, the shock distributions, the switching costs, and the discount factor. The estimation routine finds parameter values that maximize the likelihood.

The transition probability is the probability in a given period of choosing a particular alternative, i.e., active, reserve or civilian, given one's state. Because we assume that the model is first-order Markov,[2] that the shocks have extreme value distributions, and that the shocks are uncorrelated from year to year, we can derive closed-form expressions for each transition probability. For example, as Train (2009) shows, the probability of choosing to stay active at time t, given that the member is already in the active component, is given by the logistic form

$$\Pr\left(V^S > V^L\right) = \frac{e^{\frac{V^A}{\kappa}}}{e^{\frac{V^A}{\kappa}} + \left(e^{\frac{V^R}{\lambda}} + e^{\frac{V^C}{\lambda}}\right)^{\frac{\lambda}{\kappa}}}.$$

We omit the state vector k_t in each expression for clarity. We can also obtain expressions for the probability of leaving the active component and, having left, the probabilities of entering, or staying in, the reserve component in each subsequent year. To relate the DRM to one-period discrete choice models, we note that in a given period and for a given state and individual taste, the individual's value functions for staying and leaving have the same form as those of a random utility model (RUM). Similarly, for those who have left active duty, the choices of whether to enter the reserves or to remain in the reserves are also based on a RUM. More broadly, the reserve choice is nested in the choice to leave active duty, and the model has a nested logit form. (See Train [2009] for further discussion.) Of course, the DRM differs from a traditional RUM because the explanatory variables are value functions, not simple variables such as age and education, and the value functions are recursive.

The transition probabilities in different periods are independent and can be multiplied together to obtain the probability of any given individual's career profile of active, reserve, and civilian states that we observe in the data. Multiplying the career profile probabilities together gives an expression for the sample likelihood that we use to estimate the model parameters for using maximum likelihood methods.[3] Optimization is done using the Broyden-Fletcher-Goldfarb-Shanno (BFGS) algorithm, a standard hill-climbing method. We compute standard

[2] A first-order Markov assumption is that the probability of an event at time $t + 1$ only depends on the state at time t.

[3] This approach bears some resemblance to a (highly restricted) mixed logit model.

errors of the estimates using numerical differentiation of the likelihood function and taking the square root of the absolute value of the diagonal of the inverse of the Hessian matrix. To judge goodness of fit, we use parameter estimates to simulate retention profiles for synthetic individuals (characterized by tastes drawn from the taste distribution) who are subject to shocks (drawn from the shock distributions), then aggregate the individual profiles to obtain a force-level retention curve and compare it with the retention curve computed from actual data.

We estimate the following model parameters:

- the mean and standard deviation of tastes for active and reserve service relative to civilian opportunities, (e.g., μ_a, μ_r, σ_a, and σ_r)
- a common scale parameter of the distributions of ω_t^R and ω_t^C, λ, and a scale parameter of the distribution of ε_t^L, or t
- a switching cost incurred if the individual leaves active duty before completing the active duty service obligation or first term
- a switching cost incurred if the individual moves from "civilian" to "reserve."

In past DRM analyses, we also estimate a personal discount factor (see Asch, Hosek, and Mattock, 2014). We fixed the personal discount factor in this study because we found that the model fits were better and parameter estimates were more reasonable relative to our expectations based on past research.[4] We set the personal discount factor for officers equal to 0.94 and for enlisted personnel to 0.88, which are the values we have typically estimated for officers and enlisted in earlier work.

Once we have parameter estimates for a well-fitting model, we can use the logic of the model and the estimated parameters to simulate the active component cumulative probability of retention to each YOS in the steady state for a given policy environment, such as a change to the retired pay cap. By *steady state*, we mean when all members have spent their entire careers under the policy environment being considered. The simulation output includes a graph of the active component retention profile for officers and enlisted personnel by YOS. We can also produce graphs of reserve component participation and provide computations of costs, though we do not do so here. We show model fit by simulating the steady-state retention profile in the current policy environment and comparing it with the retention profile observed in the data.

Data

DMDC's WEX data contain person-specific longitudinal records of active and reserve service. WEX data begin with service members in the active or reserve component on or after September 30, 1990. Our analysis files include active component entrants in 1990 and 1991, who are followed through 2016, providing up to 26 years of data for the 1990 cohort and up to 25 years of data for the 1991 cohort. In constructing the officer samples, we exclude medical personnel and members of the legal and chaplain corps because their career patterns differ markedly from those of the rest of the officer corps, suggesting that analysis of retention for these personnel needs to be conducted separately. We also excluded officers with prior enlisted

[4] The personal discount factor equals $1/(1 + r)$ where r is the personal discount rate. For example, a personal discount factor of 0.88 corresponds to a discount rate r of 13.6 percent.

service. Because the WEX does not include U.S. Coast Guard personnel, our analysis excludes this service.

Another key source of data is information on civilian and military pay. For civilian pay opportunities for enlisted personnel, we used the 2007 median wage for full-time male workers with associate's degrees. For officers, we use the 2007 80th percentile of basic pay for full-time male workers with a master's degree in management occupations for civilian pay. The data are from the U.S. Census Bureau. Civilian work experience is defined as the sum of active years, reserve years, and civilian years since age 22, but here pay does not vary by other factors, such as years since leaving active duty. We used 2007 military pay tables. Military pay increases are typically across-the-board, with the structure of pay by grade and year of service remaining the same.[5] Therefore, we did not expect our results to be sensitive to the choice of year. Annual military pay for active members is represented by RMC for FY 2007, equal to the sum of basic pay, basic allowance for subsistence, basic allowance for housing, and the federal tax saved because the allowances are not taxed. Data on RMC and basic pay by grade and YOS are from the *Selected Military Compensation Tables*, also known as the Green Book (Office of the Under Secretary of Defense for Personnel and Readiness, Directorate of Compensation, 1980–2018). Reserve component members are paid differently from active component members, although the same pay tables are used. The method for computing reserve component annual pay is described in Asch, Mattock, and Hosek (2017). Military retirement benefits are related to the basic pay table, and we use the basic pay tables for 2007 for this computation.

We also required data on enlisted and officer promotion rates and promotion timing to each grade. Officer promotion rates were drawn from those used in Asch and Warner (1994), and promotion rates for enlisted and promotion timing data for both officers and enlisted were based on computations of average time in service at promotion by grade and service, for FY 1993 to 2008, from DMDC. We chose these years because sought promotion times that would be relevant to the 1990–1991 accession.

Model Estimates and Model Fits for Officers

Tables 3.1 and 3.2 show the estimated parameters and standard errors for the retention model of officers. To make the numerical optimization easier, we did not estimate most of the parameters directly but instead estimated the logarithm of the absolute value of each parameter, except for the taste correlation, for which we estimated the inverse hyperbolic tangent of the parameter. All of the parameters are statistically significant in the Navy and Air Force models, and all but the between-nest scale parameter are significant in the Army and Marine Corps models. To recover the parameter estimates, we transformed the estimates. Table 3.3 shows the transformed parameter estimates for each service. The estimates are denominated in thousands of 2007 dollars, except for the assumed discount rate and the taste correlation.

[5] An exception was the structural adjustment to the basic pay table in FY 2000, which gave larger increases to mid-career personnel who had reached their pay grades relatively quickly (after fewer YOS). A second exception was the expansion of the basic allowance for housing, which increased in real value from FY 2000 to FY 2005. The costing analysis is in 2018 dollars.

Table 3.1
Parameter Estimates and Standard Errors: Army and Navy Officers

	Army		Navy	
	Estimate	Standard Error	Estimate	Standard Error
Log(Scale Parameter, Nest = τ)	–1.36	33.83	5.20	0.04
Log(Scale Parameter, Alternatives within Nest = λ)	4.69	0.03	3.40	0.06
Log(–1*Mean Active Taste = μ_a)	3.19	0.04	3.00	0.05
Log(–1*Mean Reserve Taste = μ_r)	5.63	0.05	4.01	0.05
Log(SD Active Taste = σ_a)	3.76	0.04	3.87	0.05
Log(SD Reserve Taste = σ_r)	5.26	0.05	3.88	0.06
Atanh(Taste Correlation = ρ)	0.67	0.02	0.94	0.01
Log(–1*Switch Cost: Leave Active <ADSO)	4.81	0.03	5.20	0.04
Log(–1*Switch Cost: Switch from Civilian to Reserve)	6.05	0.03	4.90	0.05
Personal Discount Factor β (Assumed)	0.94	N/A	0.94	N/A
–1*Log Likelihood	24,141		32,139	
N	5,318		6,445	

SOURCE: Parameter estimates from cohorts of personnel entering active duty as officers in 1990–1991.

NOTES: The scale parameter κ governs the shocks to the value functions for staying and for the reserve-versus-civilian nest and equals $\sqrt{\lambda^2 + \tau^2}$. The means and standard deviations of tastes for active and reserve service relative to civilian opportunities are estimated, as are the costs associated with leaving active duty before completing ADSO and switching from civilian status to participating in the reserves. The personal discount factor was assumed to be 0.94 in these models.

Table 3.2
Parameter Estimates and Standard Errors: Air Force and Marine Corps Officers

	Air Force		Marine Corps	
	Estimate	Standard Error	Estimate	Standard Error
Log(Scale Parameter, Nest = τ)	4.79	0.09	1.02	3.49
Log(Scale Parameter, Alternatives within Nest = λ)	3.96	0.35	4.37	0.05
Log(–1*Mean Active Taste = μ_a)	2.92	0.07	2.65	0.07
Log(–1*Mean Reserve Taste = μ_r)	6.20	0.53	4.93	0.08
Log(SD Active Taste = σ_a)	3.24	0.09	3.16	0.07
Log(SD Reserve Taste = σ_r)	5.78	0.55	4.51	0.08
Atanh(Taste Correlation = ρ)	0.45	0.01	0.56	0.04
Log(–1*Switch Cost: Leave Active <ADSO)	4.73	0.06	4.89	0.05
Log(–1*Switch Cost: Switch from Civilian to Reserve)	5.52	0.34	5.63	0.05
Personal Discount Factor β (Assumed)	0.94	N/A	0.94	N/A
–1*Log Likelihood	8,871		9,086	
N	2,339		1,757	

SOURCE: Parameter estimates from cohorts of personnel entering active duty as officers in 1990–1991.

NOTES: The scale parameter κ governs the shocks to the value functions for staying and for the reserve-versus-civilian nest and equals $\sqrt{\lambda^2 + \tau^2}$. The means and standard deviations of tastes for active and reserve service relative to civilian opportunities are estimated, as are the costs associated with leaving active duty before completing ADSO and switching from civilian status to participating in the reserves. The personal discount factor was assumed to be 0.94 in these models.

Table 3.3
Transformed Parameter Estimates: Officers

	Army	Navy	Air Force	Marine Corps
Scale Parameter, Nest = τ	0.26	181.83	120.73	2.78
Scale Parameter, Alternatives within Nest = λ	109.15	29.96	52.67	78.68
Mean Active Taste = μ_a	–24.30	–20.06	–18.51	–14.14
Mean Reserve Taste = μ_r	–279.98	–55.37	–490.71	–138.94
SD Active Taste = σ_a	42.89	47.77	25.50	23.53
SD Reserve Taste = σ_r	191.57	48.66	324.13	90.75
Taste Correlation = ρ	0.58	0.74	0.42	0.51
Switch Cost: Leave Active < ADSO	–122.34	–180.42	–113.49	–133.39
Switch Cost: Switch from Civilian to Reserve	–425.02	–133.41	–248.92	–277.81
Personal Discount Factor β (Assumed)	0.94	0.94	0.94	0.94

NOTE: Transformed parameters are denominated in thousands of 2007 dollars, with the exception of the taste correlation and personal discount factor. Definitions of variables are provided in the Table 3.1 notes.

The remaining paragraphs of this section are devoted to a service-by-service narrative exploring the meaning of the parameter estimates; readers more interested in how well the model fits the data may wish to skip to the next subsection, on model fit.

We found that mean active taste is negative for the Army and equal to –$24,300. A negative value is consistent with past studies estimating the mean active taste among military officers and suggests that the military must offer relatively high pay to compensate for the requirements of service on active duty relative to not being in the military. For the Navy, the point of estimate of mean active taste is negative but smaller in absolute value than for the Army, equal to –$20,060. The mean active taste is also smaller in absolute value for both the Air Force and Marine Corps, at –$18,510 and –$14,140, respectively. All estimates of mean active taste are statistically significantly different from zero.

Mean taste for reserve duty is negative: –$279,980 for Army officers, –$55,370 for Navy officers, –$490,710 for Air Force officers, and –$138,940 for Marine Corps officers. As for the variance in tastes, we found that the standard deviation of active-duty taste is larger for the Army and the Navy, at $42,890 for Army officers and $47,770 for Navy officers, while the standard deviation of active-duty taste is smaller for Air Force and Marine Corps officers, at $25,500 and $23,530 respectively. The standard deviation of reserve taste is largest for the Air Force at $324,130, followed by the Army at $191,570, the Marine Corps at $90,750, and the Navy at $48,660.

The estimated scale parameter for the between-nest shock in the Navy model is much larger than the means and standard deviations of tastes, while the within-nest shock is of the same order of magnitude. These scale parameters provide information on the standard deviation of the common random shock for the reserve/civilian nest, as well as the within civilian/reserve nest shocks. The model nests the reserve and civilian alternatives because most reservists also hold a civilian job; hence, a shock to civilian is also likely to be felt by reserve. The scale parameter for the active and reserve/civilian shock is $\sqrt{\lambda^2 + \tau^2}$, while the within civilian/reserve nest shock is λ. We estimate λ to be $29,960 and τ to be $181,830 for the Navy. These estimates imply that the scale parameter for the total shock, κ, is $184,278. The relative magnitudes of the scale parameters suggest that movement between the active nest and the reserve/

civilian nest is largely driven by random shocks rather than by diverse tastes among Navy members (i.e., taste heterogeneity), while the movement between civilian and reserve statuses are equally driven by diverse tastes and random shocks.

For the Air Force, we found that the between-nest shock τ is larger than the mean and standard deviation of active taste, but smaller in absolute value than the mean and standard deviation of reserve taste. We estimated a τ of \$120,730, about six times the absolute value of the active mean taste of –\$18,510 and about five times the standard deviation of the active taste of \$25,500. However, the estimated value of τ is about one-fourth of the absolute value of the reserve mean taste at –\$490,710 and about one-third of the standard deviation of reserve taste, \$324.13. The within-nest shock λ is estimated to be \$52,670, which, like the estimate for τ, places it between the absolute values of the estimates for the mean and standard deviation of active taste and the mean and standard deviation of reserve taste. The relative sizes of these parameters suggest that movement between the active nest and the reserve/civilian nest are driven by a combination of both members' individual tastes and random shocks.

For the Army, we found that τ is small and not statistically significantly different from zero, so that the scale parameter for the active and reserve/civilian shock is essentially reduced to λ. We estimated a λ of \$109,150, approximately four times the estimated mean active taste of –\$24,300, and about half the value of the (absolute value of the) estimated mean reserve taste of –\$191,570, implying that tastes, as well as shocks, play a role in explaining shifts into and out of active, reserve, and civilian statuses for the Army.

Similarly, for the Marine Corps we found that we found that τ is small and not statistically significantly different from zero. As a result, the scale parameter for the active and reserve/civilian shock is essentially reduced to λ. The estimated value of λ is \$78,680, significantly larger than the mean and standard deviation of active taste at –\$14,140 and \$23,530, respectively, and smaller than the mean and standard deviation of reserve taste at –\$138,940 and \$90,750, respectively.

The switching costs for leaving active-duty early, before completing ADSO, are –\$122,340 for Army officers, –\$180,420 for Navy officers, –\$113,490 for Air Force officers, and –\$133,390 for Marine Corps officers. The cost of switching to a reserve component after being a civilian is –\$425,020 for Army officers, –\$248,920 for Navy officers, –\$113,490 for Air Force officers, and –\$277,810 for Marine Corps officers. These high costs may reflect the difficulty of finding an available reserve position or an implicit cost to one's civilian career and lifestyle.

Model Fit for Officers

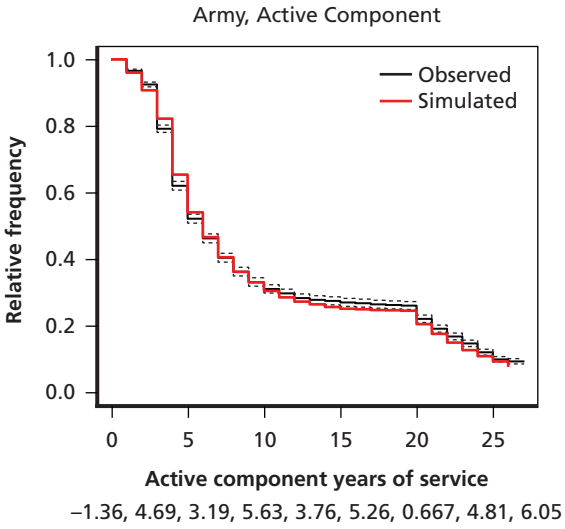
To assess model fit, we used the parameter estimates to simulate the behavior of 10,000 synthetic service members represented by tastes drawn from the active/reserve taste distribution and subject to shocks drawn from a shock distribution with a scale parameter equal to the estimated value. Given active and reserve tastes, current-period shock values, knowledge of the expected pay and promotion environment in the military and the civilian world, and knowledge of the shock scale parameter, each synthetic individual, behaving as a dynamic-program decisionmaker, makes a stay-or-leave decision in each YOS in the active component. This generates a career length of service in the active component. After leaving active service, the individual becomes a civilian and makes a yearly decision regarding reserve participation. If the individual is not in the reserves, the decision is whether to participate; if the individual is in the reserves, the decision is whether to continue to participate. These decisions generate

information about reserve participation by year for the years after active component service. We obtained the predicted active component retention profile by adding together these simulated active component retention profiles across a large number of simulated individuals, and we similarly combined individual reserve participation profiles to obtain the predicted reserve participation profile for the population of simulated individuals. The predicted profiles are plotted against the actual profiles to assess goodness of fit.

Figures 3.1 through 3.4 show the model fit graphs for the active component for each of the four services. The red lines are simulated cumulative retention, and the black lines are retention observed in the data. The figures show the Kaplan-Meier survival curves, and the dotted lines show the 95 percent confidence intervals for the Kaplan-Meier estimates for the observed data. The horizontal axis counts years since the individual was observed beginning active service. The vertical axis shows the cumulative probability of retention on active duty until that year. For example, at entry, YOS is 0 and the fraction of personnel retained is 1, and the fraction of the force retained falls over an active career as officers leave active duty. The solid black line shows the actual retention of individuals in our cohorts, and the red line shows the predicted retention. The numbers beneath the x-axis correspond to the model parameters shown in Tables 3.1 or 3.2 and help to ensure that a given figure matches a particular set of estimates. We assess goodness of model fit by visual inspection, that is, in terms of how well the black and red lines coincide.

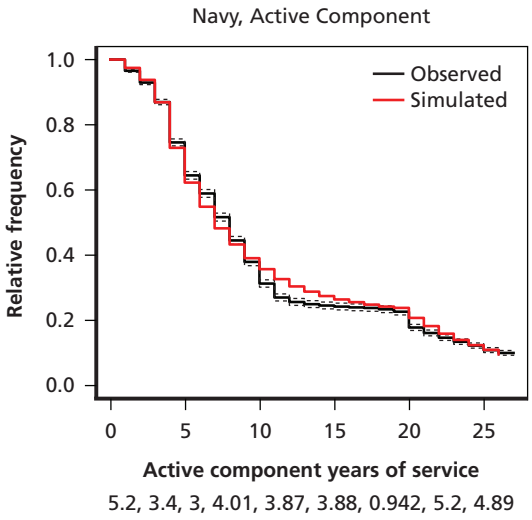
Visual inspection reveals that model fit for the active component is good for the Army, Air Force, and Marine Corps, and that the model captures the general sweep of Navy retention. In all cases, the simulated retention line lies close to the observed retention line and reflects the pattern of retention seen in the data with attrition first being high, then slowing after mid-career as vesting in the defined-benefit retirement approaches, and then falling quickly once the vesting point is reached.

Figure 3.1
Model Fit Results: Army Officers



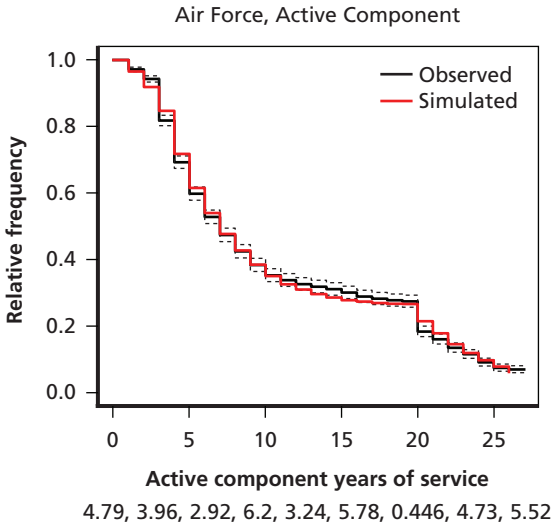
SOURCE: Authors' computations, DMDC WEX files.
NOTE: The numbers beneath the x-axis correspond to the model parameters shown in Table 3.1.

Figure 3.2
Model Fit Results: Navy Officers



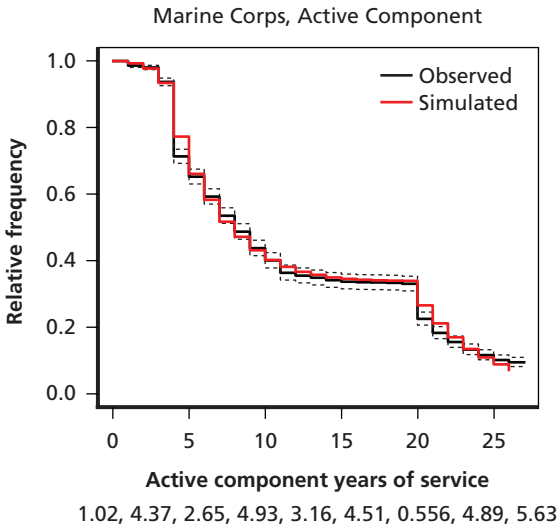
SOURCE: Authors' computations, DMDC WEX files.
NOTE: The numbers beneath the x-axis correspond to the model parameters shown in Table 3.1.

Figure 3.3
Model Fit Results: Air Force Officers



SOURCE: Authors' computations, DMDC WEX files.
NOTE: The numbers beneath the x-axis correspond to the model parameters shown in Table 3.2.

Figure 3.4
Model Fit Results: Marine Corps Officers



SOURCE: Authors' computations, DMDC WEX files.
NOTE: The numbers beneath the x-axis correspond to the model parameters shown in Table 3.2.

Model Estimates and Model Fits for Enlisted Personnel

Tables 3.4 and 3.5 show the estimated parameters and standard errors for the enlisted DRM for the Army and Navy and Air Force and Marine Corps, respectively. As with the officer models, to make the numerical optimization easier, we did not estimate most of the parameters directly but instead estimated the logarithm of the absolute value of each parameter, except for the taste correlation, for which we estimated the inverse hyperbolic tangent of the parameter. All but the between-nest scale parameters τ are statistically significant in the models. To recover the parameter estimates, we transformed the estimates. Table 3.6 shows the transformed parameter estimates for each service. The estimates are denominated in thousands of 2007 dollars, except for the assumed discount rate and the taste correlation.

The remaining paragraphs of this subsection are devoted to a service-by-service narrative exploring the meaning of the parameter estimates; readers more interested in how well the model fits the data may wish to skip to next sub-section on model fit.

We found that mean active tastes are negative and equal to –$13,720, –$17,970, –$12,740, and –$44,650 for the Army, Navy, Air Force, and Marine Corps, respectively. The negative values are consistent with past studies and suggest that the military must pay a relatively high wage to compensate for the rigors of military life and retain enlisted members. All estimates of mean active taste are statistically different from zero.

The mean reserve tastes are also negative and are equal to –$24,100, –$26,580, –$165,070, and –$1,665,980 for the Army, Navy, Air Force, and Marine Corps, respectively. As for the variance in tastes, we found that the standard deviation of active-duty taste is largest for the Marine Corps at $28,100, while the standard deviation of active-duty taste is smaller for Army, Navy, and Air Force enlisted members, at $3,010, $6,880, and $7,590 respectively. Similarly, the standard deviation of reserve taste is largest for the Marine Corps at $1,113,030, followed by the Air Force at $109,510, the Army at $13,450, and the Navy at $13,150.

Table 3.4
Parameter Estimates and Standard Errors: Army and Navy Enlisted

	Army		Navy	
	Estimate	Standard Error	Estimate	Standard Error
Log(Scale Parameter, Nest = τ)	2.91	0.06	2.94	0.05
Log(Scale Parameter, Alternatives within Nest = λ)	2.39	0.11	1.70	0.10
Log(–1*Mean Active Taste = μ_a)	2.62	0.02	2.89	0.04
Log(–1*Mean Reserve Taste = μ_r)	3.18	0.10	3.28	0.10
Log(SD Active Taste = σ_a)	1.10	0.20	1.93	0.11
Log(SD Reserve Taste = σ_r)	2.60	0.12	2.58	0.12
Atanh(Taste Correlation = ρ)	0.68	0.03	0.26	0.02
Log(–1*Switch Cost: Leave Active <ADSO)	2.68	0.06	2.82	0.07
Log(–1*Switch Cost: Switch from Civilian to Reserve)	3.87	0.11	3.13	0.10
Personal Discount Factor β (Assumed)	0.88	N/A	0.88	N/A
–1*Log Likelihood	24,712		16,184	
N	5,540		4,863	

SOURCE: Parameter estimates from cohorts of enlisted personnel entering active duty in 1990–1991.

NOTES: The scale parameter κ governs the shocks to the value functions for staying and for the reserve versus-civilian nest and equals $\sqrt{\lambda^2 + \tau^2}$. The means and standard deviations of tastes for active and reserve service relative to civilian opportunities are estimated, as are the costs associated with leaving active duty before completing ADSO and switching from civilian status to participating in the reserves. The personal discount factor was assumed to be 0.88 in these models. Army and Navy models were estimated using a 5% random sample of the data.

Table 3.5
Parameter Estimates and Standard Errors: Air Force and Marine Corps Enlisted

	Air Force		Marine Corps	
	Estimate	Standard Error	Estimate	Standard Error
Log(Scale Parameter, Nest = τ)	0.23	4.04	0.41	8.45
Log(Scale Parameter, Alternatives within Nest = λ)	3.19	0.05	2.98	0.07
Log(–1*Mean Active Taste = μ_a)	2.54	0.03	3.80	0.04
Log(–1*Mean Reserve Taste = μ_r)	5.11	0.15	7.42	0.24
Log(SD Active Taste = σ_a)	2.03	0.10	3.34	0.06
Log(SD Reserve Taste = σ_r)	4.70	0.15	7.01	0.24
Atanh(Taste Correlation = ρ)	0.49	0.01	0.43	0.00
Log(–1*Switch Cost: Leave Active <ADSO)	2.98	0.06	4.13	0.05
Log(–1*Switch Cost: Switch from Civilian to Reserve)	4.80	0.05	4.28	0.08
Personal Discount Factor β (Assumed)	0.88	N/A	0.88	N/A
–1*Log Likelihood	10,313		11,251	
N	2,576		4,442	

SOURCE: Parameter estimates from cohorts of enlisted personnel entering active duty in 1990–1991.

NOTES: The scale parameter κ governs the shocks to the value functions for staying and for the reserve-versus-civilian nest and equals $\sqrt{\lambda^2 + \tau^2}$. The means and standard deviations of tastes for active and reserve service relative to civilian opportunities are estimated, as are the costs associated with leaving active duty before completing ADSO, and switching from civilian status to participating in the reserves. The personal discount factor was assumed to be 0.88 in these models. Air Force and Marine Corps models were estimated using a 5% and 10% random sample of the data, respectively.

Table 3.6
Transformed Parameter Estimates: Enlisted

	Army	Navy	Air Force	Marine Corps
Scale Parameter, Nest = τ	18.36	18.87	1.26	1.51
Scale Parameter, Alternatives within Nest = λ	10.95	5.45	24.38	19.70
Mean Active Taste = μ_a	–13.72	–17.97	–12.74	–44.65
Mean Reserve Taste = μ_r	–24.10	–26.58	–165.07	–1,665.98
SD Active Taste = σ_a	3.01	6.88	7.59	28.10
SD Reserve Taste = σ_b	13.45	13.15	109.51	1,113.03
Taste Correlation = ρ	0.59	0.25	0.46	0.40
Switch Cost: Leave Active < ADSO	–14.61	–16.73	–19.77	–62.16
Switch Cost: Switch from Civilian to Reserve	–48.12	–22.82	–122.11	–72.31
Personal Discount Factor β (Assumed)	0.88	0.88	0.88	0.88

NOTE: Transformed parameters are denominated in thousands of 2007 dollars, with the exception of the taste correlation and personal discount factor. Definitions of variables are provided in the Table 3.4 notes.

The estimated scale parameters for the between-nest shock in the Army and Navy are $18,360 and $18,870 respectively and are similar in size to the absolute value of the mean active and reserve taste parameters, while within-nest shock parameters for the Army and Navy at $10,950 and $5,450 are smaller than the absolute value of the mean taste parameters. The size of these scale parameters suggest that movement between the active nest and the reserve/civilian nest tends to be driven both by shocks and differences in tastes among enlisted members, while movement between civilian and reserve status tends to be driven more by taste. In the models for the Air Force and Marine Corps, the estimated scale parameter for the between-nest shock is much smaller than the means and standard deviations of tastes, at $1,260 and $1,510, respectively, and in both cases is not significantly different from zero, while the within-nest shock, at $24,380, and $19,700, is of the same order of magnitude as the absolute values of the active taste parameters, and uniformly smaller than the absolute values of the reserve taste parameters. The relative magnitudes of the scale parameters suggest that movement between the active nest and the reserve/civilian nest is equally driven by random shocks and diverse tastes among enlisted members, while the movement between civilian and reserve statuses tend to be more driven by taste than by random shocks.

The switching costs for leaving active-duty early, before completing the first term, are –$14,610 for Army enlisted members, –$16,730 for Navy enlisted members, –$19,770 for Air Force enlisted members, and –$62,160 for Marine Corps enlisted members. The cost of switching to a reserve component after being a civilian is –$48,120 for Army enlisted members, –$22,820 for Navy enlisted members, –$122,110 for Air Force enlisted members, and –$72,310 for Marine Corps enlisted members. These high costs may reflect the difficulty of finding an available reserve position within traveling distance of where the former active member has settled down.

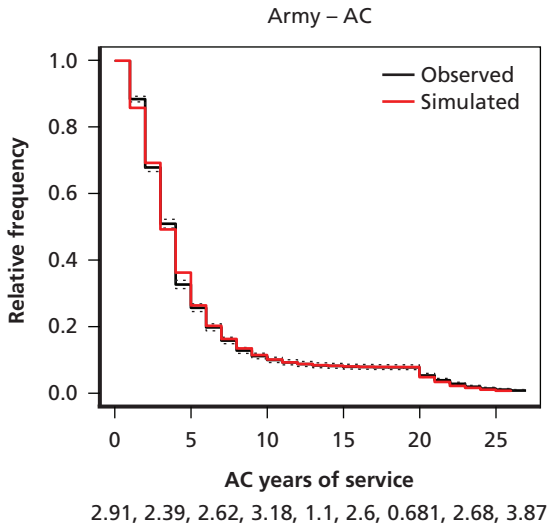
Model Fit for Enlisted

Similar to the models of officer retention behavior, to assess model fit, we used the parameter estimates to simulate the behavior of synthetic personnel represented by tastes drawn from the active/reserve taste distribution and subject to shocks drawn from a shock distribution

with a scale parameter equal to the estimated value. Figures 3.5 through 3.8 show the model fit graphs for the active component for each of the four services. The red lines are simulated cumulative retention, and the black lines are retention observed in the data. The figures show the Kaplan-Meier survival curves, and the dotted lines show the 95 percent confidence intervals for the Kaplan-Meier estimates for the observed data.

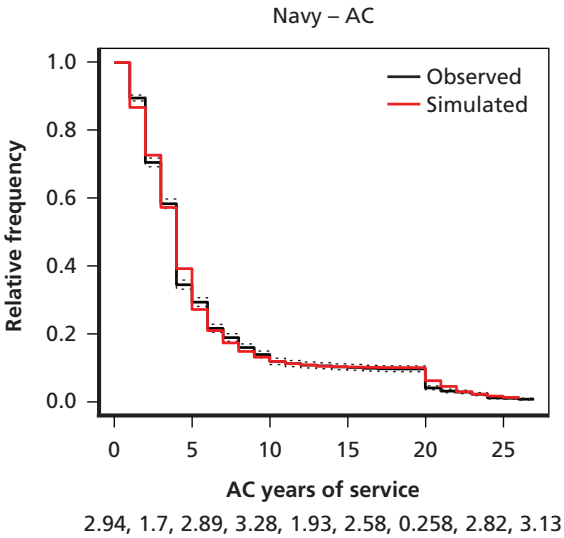
The horizontal axis counts years since the individual was observed beginning active service. The vertical axis shows the cumulative probability of retention on active duty until that

Figure 3.5
Model Fit Results: Army Enlisted



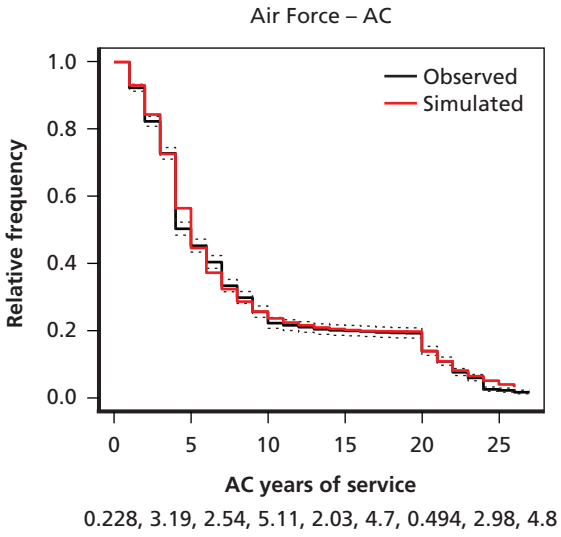
SOURCE: Authors' computations, DMDC WEX files.

Figure 3.6
Model Fit Results: Navy Enlisted



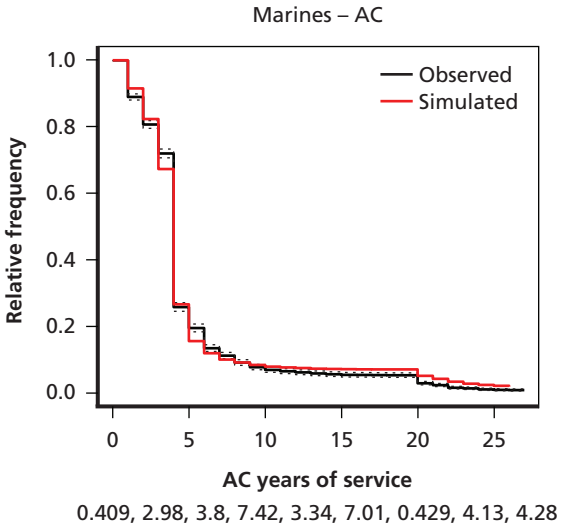
SOURCE: Authors' computations, DMDC WEX files.

Figure 3.7
Model Fit Results: Air Force Enlisted



SOURCE: Authors' computations, DMDC WEX files.

Figure 3.8
Model Fit Results: Marine Corps Enlisted



SOURCE: Authors' computations, DMDC WEX files.

year. The solid black line shows the actual retention of individuals in our cohorts, and the red line shows the predicted retention.

Visual inspection shows that the model fit for the active component is good for the Army, Navy, and Air Force, and that the model slightly over-predicts retention for the Marine Corps beyond YOS 10. In all cases the simulated retention line lies close to the observed retention line and reflects the pattern of retention seen in the data with attrition first being high, then slowing after mid-career as vesting in the defined-benefit retirement approaches, and then falling quickly once the vesting point is reached.

Simulation and Extension of the DRM to Model a Time-in-Grade Pay Table

To simulate the effect on retention of changing to a TIG pay table, we need to extend the DRM in two ways: (1) adapt the model to track time in grade, i.e., the number of YOS since a member was last promoted, and (2) ensure that military pay in the model is based on TIG rather than TIS.

The DRM was estimated using data on the behavior of officer and enlisted members under a TIS pay table, where the compensation an individual received was a function of their grade and YOS, which could conceptually be written as

$$W_t^{Ag} = W\left(ay_t, g_t\right).$$

Under a TIG pay table, the compensation a member receives is a function of their grade and the number of YOS since they were promoted to that grade. If we let py_t be the number of YOS since a member was last promoted, then we can write their wage as

$$W_t^{Ag} = W\left(py_t, g_t\right).$$

If we change the definition of k_t by adding py_t as follows

$$k_t = k_t\left(ay_t, ry_t, t, g_t, py_t\right),$$

then the rest of the mathematical expressions we developed earlier in this chapter still follow through. As a result, we can use the parameters estimated with the historical career data and TIS pay table to simulate the retention effects of replacing the TIS pay table with the TIG pay table. We also simulate the effects on performance and cost. We discuss how we incorporate performance in the next section. With respect to cost, we compute the total personnel cost per member of the simulated force produced under the TIS versus TIG pay table. Our estimates of personnel costs include the cost of basic pay, allowances, and the retirement accrual costs associated with the legacy military retirement system.

Incorporating Performance into the Dynamic Retention Model Simulation Capability

A major impetus for considering a TIG pay table is that it increases the incentives for performance, as discussed in Chapter Two. We incorporate performance into analysis by focusing on two aspects of individual service members that can affect their performance in the military: innate ability and how hard they work. This focus on the inputs of performance on the part of the member is consistent with two of the key objectives of the military compensation system related to individual performance: (1) to motivate personnel to work hard and effectively and

(2) to induce higher-ability personnel to stay and seek advancement to more-senior grades where it is likely that ability has a bigger impact than in the lower ranks.[6]

Asch and Warner were the first to incorporate ability and effort supply into a dynamic retention model, and they used the model to assess the retention, performance, and cost effects of alternative retirement reform proposals, as well as policies to restructure the military pay table (Asch and Warner, 1994a, 1994b, 2001). In particular, in their model, higher-ability personnel and those who exert more effort are promoted faster and have higher promotion probabilities, but higher-ability personnel also have better external opportunities, and expending effort involves a cost or disutility to the member (under the assumption that individuals would prefer to exert less effort for the same amount of financial benefit or return to effort). For higher-ability personnel, compensation policy can affect the financial returns to exerting more effort and the financial benefits to staying. Asch and Warner used their DRM to provide simulations of how compensation reforms affected overall retention, the retention of higher-ability personnel, ability sorting into higher grades, average effort supply, and personnel cost.

The Asch and Warner simulations were based on a calibrated model in which key parameters, such as the mean and standard deviation of taste for service, were assumed so as to replicate the observed retention profile. In contrast, the parameters of the DRM used in this study are estimated, not calibrated. We build on the Asch and Warner modeling of ability and effort and incorporate their approach into our DRM simulation capability to evaluate the TIS versus a TIG pay table. Ideally, we would consider both effort and ability simultaneously as factors affecting promotion probabilities, an approach taken by Asch and Warner. But we found that we were better able to incorporate ability and effort by considering them separately, as we'll discuss in more detail below. In the rest of this section, we first discuss how we incorporate ability and then effort.

Ability

We can use the structure of the DRM along with the estimated parameters and assumptions about how innate ability affects the speed of promotion to examine how selective the TIG and TIS pay tables are on ability. To incorporate ability into the DRM, we make assumptions about the following:

1. the extent to which ability differs among military entrants[7]
2. the extent to which ability affects promotion speed[8]
3. the effect of ability on external civilian opportunities.

We discuss each of these in turn.

---

[6] The objectives of the military compensation are listed in DoD (2018) and have been articulated by past QRMCs and the DACMC.

[7] We assume that the distribution of ability at entry is fixed and the same under a TIS and TIG pay table. Because we do not consider the effects of a TIG pay table on recruiting in this study, we do not consider the possibility that a TIG pay table might be more attractive to higher-ability recruits, thereby shifting the mean of the ability distribution. The implication is that a TIG pay table could have a greater effect on ability of the force than what we consider in this analysis.

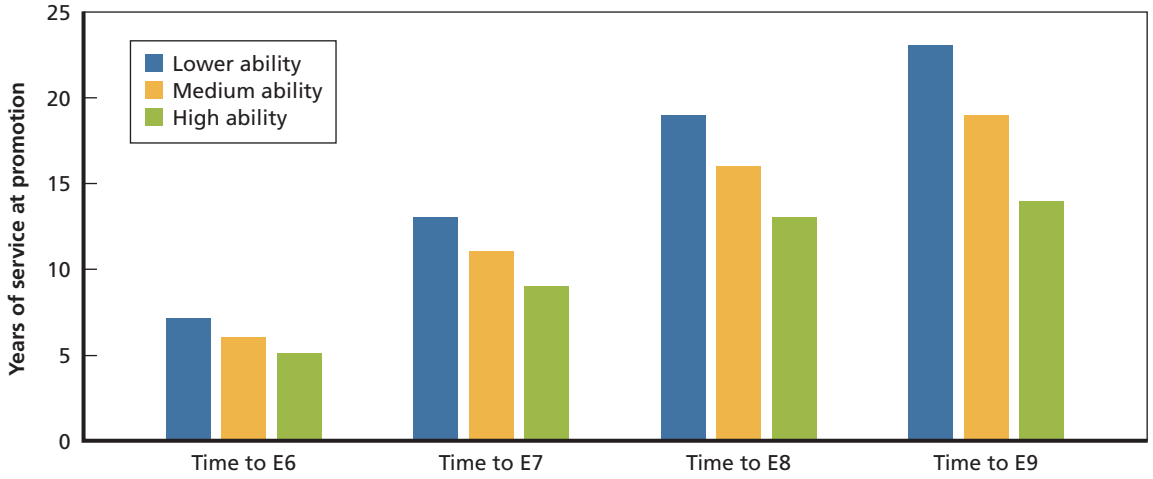
[8] The model only considers individual attributes in promotion timing/probability, so it does not allow for the possibility of the ability distribution skewing higher under TIG resulting in slowing down the promotion of individuals who might have been promoted early under TIS.

First, we assume that any given individual has a fixed level of ability at entry, drawn from a normal distribution and rounded to the nearest integer. The standard deviation of the distribution indicates the extent to which ability differs among military entrants. Regarding rounding, individuals with ability drawn from a normal distribution with mean 0 and standard deviation 0.5 (and then rounded) would typically have values of ability of –1, 0, or 1. We assume a different mean and standard deviation for each service and for enlisted personnel and for officers within that service. The values of the mean and standard deviation for each distribution we use in our simulations are calibrated to replicate the steady-state retention profiles of enlisted personnel and officers under the baseline TIS pay table, given the other two assumptions we make.

Second, we assume that higher-ability personnel are promoted faster. We implement this concept by subtracting the (rounded) draw from the normal distribution for a given individual from the TIS between promotions. This increase in promotion speed is modeled to start happening between E-5 and E-6 for enlisted members and between O-3 and O-4 for officers. Thus, an enlisted member with an innate ability of 1 would be one year faster than average to E-6, two years faster to E-7, and so on. An officer with an innate ability of 1 would be one year faster to O-4, two years faster to O-5, and so on. Consequently, the effect of ability on promotion speed to the more senior grades is larger than for the more junior grades because the effects on promotion timing are cumulative. Figure 3.9 shows how years to promotion to E-6 to E-9 vary with ability for Army enlisted personnel, and Figure 3.10 shows how years to promotion to O-4 to O-7 vary with ability for Army officers. Results will differ for the other services insofar as the assumed parameters of the ability distribution differ. As mentioned in the previous paragraph, the assumed parameters are calibrated so as to best fit the retention profile for that service and grade category.

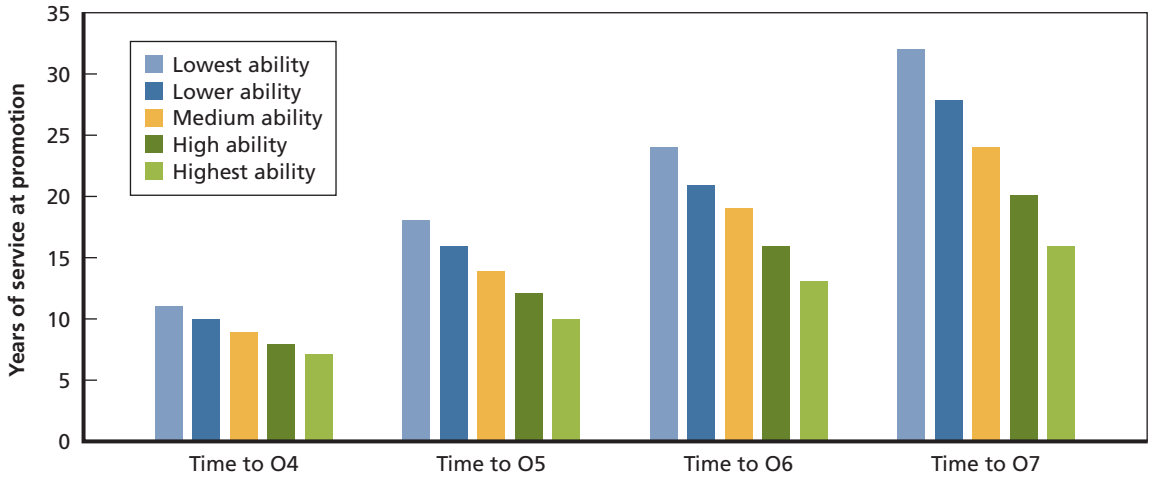
Third, we assume that higher-ability members also have better external opportunities. We model this by multiplying the civilian opportunity wage by 1 plus 0.1 times the ability distribution standard deviation times the individual's ability draw, or $(1 + 1 \times \sigma_a)$ where σ_a is the standard deviation of the draw. This has the effect of increasing the civilian opportunity

Figure 3.9
Years to Promotion by Ability Level, Army Enlisted Personnel



SOURCE: Authors' computations.

Figure 3.10
Years to Promotion by Ability Level, Army Officers



SOURCE: Authors' computations.

wage for high-ability individuals and decreasing the civilian opportunity wage for low-ability individuals. For example, an individual with innate ability of 1 drawn from a normal distribution with mean 0 and standard deviation 0.5 would have an opportunity wage that is 5 percent greater than that of the average individual, while an individual with innate ability –1 would face a civilian opportunity wage that is 5 percent less.

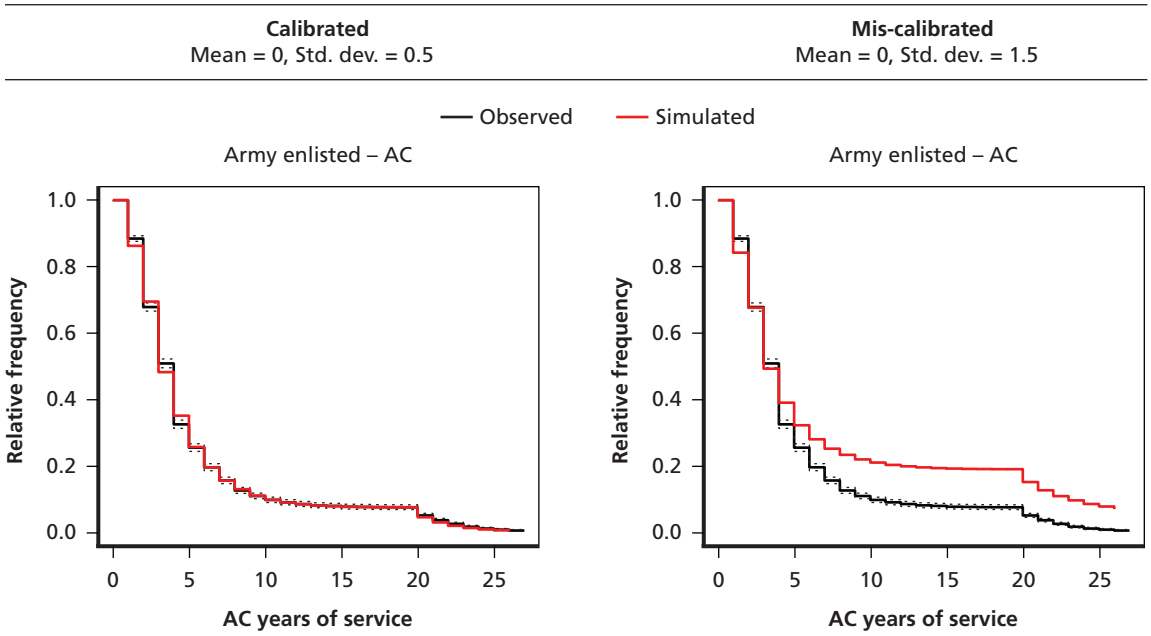
We illustrate how we calibrate the mean and standard deviation of the normal distribution to fit the observed retention profile in Figure 3.11 for Army enlisted personnel. In the process of calibration, we systematically varied the mean and standard deviation within the TIS DRM and chose the mean and standard deviation that most closely replicated the historically observed retention, as indicated by the Kaplan-Meier curve. The right panel shows the observed retention profile versus the simulated retention profile when we mis-calibrate the mean and standard deviation to equal 0 and 1.5, respectively. The simulated retention profile is too high relative to the observed profile. We chose a standard deviation of 0.5 instead resulting in a good fit, as shown in the left panel.

The three assumptions we make regarding how ability enters the model could affect our simulation results and in particular the effects of the TIG pay table on retention, ability sorting and cost. Consequently, our presentation of the results in Chapter Four includes sensitivity analyses in which we vary these three underlying assumptions regarding ability.

Modeling Effort

In addition to native ability, a member's promotion performance can depend on the amount of effort they exert. The main idea is that, other things held constant, the more effort a member exerts, the more likely they will be promoted. The structure of the model allows us to derive the optimal amount of effort an individual would exert given assumptions about how effort affects the probability of an individual being promoted, and assumptions about the disutility of effort.

Figure 3.11
Calibrating the Parameters of the Ability Distribution, Army Enlisted Personnel



SOURCE: Authors' computations.

Following Asch and Warner (1994), we add disutility of effort to the value function in the DRM presented above. The individual's problem is to choose the level of effort to exert in the current period to maximize their utility:

$$\max_{e_t} V^A(k_t) - Z(e_t).$$

To simplify notation, we define $\bar{V}^A(k_t)$ to be the value of staying in the active component net the disutility of effort, like so:

$$\bar{V}^A(k_t) \equiv V^A(k_t) - Z(e_t).$$

The first-order condition for the optimal level of effort is

$$\frac{\partial \bar{V}^A(k_t)}{\partial e_t} = \beta \Pr\left(\bar{V}^S(k_{t+1}) > V^L(k_{t+1})\right)\left(\bar{V}^{A(g+1)}(k_{t+1}) - \bar{V}^{Ag}(k_{t+1})\right)\frac{\partial p_{t+1}^{g+1}}{\partial e_t} - Z'(e_t) \equiv 0.$$

or

$$\Pr\left(\bar{V}^S(k_{t+1}) > V^L(k_{t+1})\right)\beta\left(\bar{V}^{A(g+1)}(k_{t+1}) - \bar{V}^{Ag}(k_{t+1})\right)\frac{\partial p_{t+1}^{g+1}}{\partial e_t} \equiv Z'(e_t).$$

The interpretation of this expression is that the product of the probability of staying in the next period, the discounted difference of the value of being active and promoted and the value being active and not promoted, and the marginal effect of effort on the probability of promotion equals the marginal disutility of effort. Or, to put it more simply, the expected marginal return to effort equals the marginal disutility of effort.

If we make some assumptions regarding the functional form of the disutility of effort function and the probability of promotion as a function of effort, we can solve for optimal effort at time *t*. Similar to Asch and Warner, we let the disutility of effort be

$$Z\left(e_t\right)=\frac{\eta_0}{2}e_t^2$$

and let the probability of promotion be

$$p_{t+1}^{g+1}=\mu^{g+1}\overline{p}_{t+1}^{g+1}e_t,$$

where μ^{g+1} is a parameter that captures the relationship between effort and the probability of promotion for a given individual and $\overline{p}_{t+1}^{g+1}$ is the average promotion probability to grade $g+1$ at time $t+1$. We can rewrite the first-order condition as[9]

$$\beta\Pr\left(\overline{V}^S\left(k_{t+1}\right)>V^L\left(k_{t+1}\right)\right)\left(\overline{V}^{A(g+1)}\left(k_{t+1}\right)-\overline{V}^{Ag}\left(k_{t+1}\right)\right)\mu^{g+1}\overline{p}_{t+1}^{g+1}-\eta_0 e_t\equiv 0$$

and solve for e_t as:

$$e_t=\frac{\beta\Pr\left(\overline{V}^S\left(k_{t+1}\right)>V^L\left(k_{t+1}\right)\right)\left(\overline{V}^{A(g+1)}\left(k_{t+1}\right)-\overline{V}^{Ag}\left(k_{t+1}\right)\right)\mu^{g+1}\overline{p}_{t+1}^{g+1}}{\eta_0}.$$

Given assumptions for the values of the parameters η_0, μ^{g+1}, and $\overline{p}_{t+1}^{g+1}$, along with our DRM parameter estimates, we can solve for e_t and then simulate how the average level of effort among service members differs under TIS pay table versus the TIG pay table.

Modeling the Effect of Effort in Multiple Periods to Promote to the Next Grade

In the formulation above, the individual has some probability of being promoted in each period *t*, and the probability of promotion is dependent on effort in the immediately preceding period. In our model, as we described earlier in the chapter, we assume that the probability of promotion to a given grade occurs at a given number of YOS but that the probability of promotion differs by grade. That is, in our model promotion occurs at a given point in time for a particular grade. An implication of this approach to modeling promotion is that individual's promotion chances may depend on effort over multiple periods. We accommodate this feature

[9] The derivation of this expression requires several steps. Appendix B shows these steps.

by changing the assumed form of the probability of promotion function. Instead of the probability being dependent on effort in a single period as follows:

$$p_{t+1}^{g+1} = \mu^{g+1} \overline{p}_{t+1}^{g+1} e_t$$

it can depend on effort in multiple periods, as in this example:

$$p_{t+1}^{g+1} = \mu^{g+1} \overline{p}_{t+1}^{g+1} \sum_{i=t-k}^{t} e_i .$$

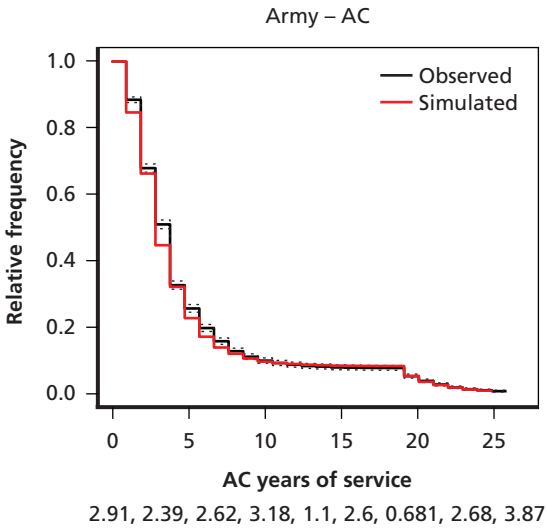
The expressions for e_{t-1}, e_{t-2}, etc., take on a similar form to the expression for e_t. For example, the expression for e_{t-1} is

$$e_{t-1} = \frac{\beta^2 \Pr\left(\overline{V}^A(k_t) > V^L(k_t)\right) \Pr\left(\overline{V}^S(k_{t+1}) > V^L(k_{t+1})\right) \left(\overline{V}^{A(g+1)}(k_{t+1}) - \overline{V}^{Ag}(k_{t+1})\right) \mu^{g+1} \overline{p}_{t+1}^{g+1}}{\eta_0}.$$

Note that the values of $V^A(k_t)$ and $V^A(k_{t+1})$ depend on the value of e_t, e_{t+1}, e_{t+2}, and so on, so we cannot compute the value of e_{t-1} without knowing all the future levels of effort, as well as any past levels of effort associated with the same promotion point e_{t-1} is associated with. In general, if a promotion point probability depends on multiple years of effort, we need to solve for all the levels of effort associated with a promotion point simultaneously. So in our simulations we use an iterative procedure to solve for a set of levels of effort that are stationary; that is, we start off with a guess of the optimal level of effort in each period, and then solve for the optimal level of effort in each period given that all others are fixed, update the levels of effort, and iterate until the computed levels of effort cease to change. We solve for the levels of effort associated with the senior-most promotion point first, then the levels of effort associated with the next-most-senior promotion point, and so on until we work our way backward to the initial promotion point.

Solving for the optimal effort supply decision in each YOS for each member in our simulations is a nontrivial task. In the model, these decisions depend on only two parameters: the disutility of effort parameter and the relationship between promotion and effort. As with the ability parameters, we calibrated the effort-related parameters so as to replicate the cumulative retention profile. Figure 3.12 shows the fit for the Army enlisted model after calibrating the effort-related parameters where we ignore ability in the model. The simulated profile broadly tracks the observed profile, but the fit is not as good as the one in which we calibrate only the ability parameter, as shown in Figure 3.10. Consequently, in our presentation of results related to the effects of the TIG pay table on effort in the next chapter, we only show results for Army enlisted personnel and consider our results as exploratory.

Figure 3.12
Calibrating the Parameters of the Effort Decision, Army Enlisted Personnel



SOURCE: Authors' computations.

Summary

The DRM is a model with a relatively simple structure, but despite the simple structure it can support a rich variety of analyses. In this chapter, we extended it to model the promotion process and presented new estimates and model fits for enlisted personnel and officers for each service. We also extended the simulation capability to permit analysis of the TIG pay table and incorporated ability and the effort supply decision.

CHAPTER FOUR

Simulated Effects of a Time-in-Grade Pay Table on Retention, Performance, and Cost

This chapter presents the simulation results on the steady-state effect of a TIG versus a TIS pay table on retention over a career, performance and cost. Performance is measured in terms of promotion speed relative to peers, where we consider two factors that can affect performance: ability and effort supply. By *ability*, we mean characteristics of individual members that increase or decrease their promotion speed relative to their peers and can include innate cognitive intelligence as well as other characteristics that lead to success, such as ability to work well in teams and work in a hierarchical organizational structure and resilience to changes such as frequent moves and new assignments. By *effort supply*, or simply *effort*, we refer to how hard and effectively members work in terms of achieving tasks that lead to faster promotion. In terms of simulation, ideally, we would consider both ability and effort simultaneously as factors affecting promotion speed. As explained in more detail in Chapter Three, we consider them separately and incorporate ability into the DRM by making assumptions about

1. the extent to which ability differs among military entrants
2. the extent to which ability affects promotion speed
3. the effect of ability on external civilian opportunities.

We also conduct sensitivity analyses to assess how sensitive our results are with respect to these three assumptions. With regard to effort, we assume in the DRM that a member's promotion performance can depend on the amount of effort they exert. The main idea is that, other things held constant, the more effort a member exerts, the more likely they will be promoted. The structure of the model allows us to derive the optimal amount of effort an individual would exert given assumptions about how effort affects the probability of an individual being promoted, and assumptions about the disutility of effort. As might be expected, the optimal amount of effort is the level where the expected marginal return to effort equals the marginal disutility of effort. In this chapter, we first show the results related to ability and then to effort supply, with the latter analysis being more exploratory. In addition, we present simulated results of the effect of a TIG versus a TIS pay table on retention and cost. However, before presenting our simulation results, we first posit the results we might expect conceptually.

Conceptual Framework: How the Time-in-Grade Versus Time-in-Service Pay Table Might Affect Retention, Performance, and Effort Supply

Chapter Two showed that the TIG pay table provides a permanent reward and therefore greater lifetime compensation associated with faster promotion. To the extent that better performers are promoted more quickly, we would expect, conceptually, that the TIG table would have the following effects on retention, performance, and cost of the force:

- *Increased retention incentives for better performers, and reduced retention incentives for poorer performers:* The overall effect on retention is unclear and depends on the strength of the retention effects of better versus worse performers. If those who perform better have a stronger retention effect, we would expect overall retention to increase. Otherwise, we would expect it to decrease. If they are completely offsetting, we would expect overall retention to change little or not at all.
- *Increased average performance as measured by ability, across the force:* If higher-ability personnel are more likely to stay in service and lower-ability personnel are less likely to stay, we would expect average performance across the force to increase.
- *Ambiguous personnel cost per member:* If better performers are a larger share of the force, and compensation is higher for better performers under the TIG pay table, personnel costs per member will be higher under the TIG table. Cost per member would also increase if the force becomes more experienced under the TIG pay table. This could occur if the higher retention of better performers more than offset the lower retention of poorer performers. On the other hand, if the force becomes less experienced under the TIG table, cost per member could decrease or stay the same.[1]
- *Increased performance, on average, among those in higher grades:* To the extent that better performers are more likely to be promoted and retained, we would expect the average performance of those promoted and, therefore, in higher grades, to be greater under the TIG pay table.

In the case of ability as a metric of performance, we can also posit how the TIS versus a TIG pay table might affect the sorting of higher-ability personnel to higher grades. As discussed in prior research (Asch and Warner, 1994a, 2001; Asch, 2019b), an important function of the military compensation system as a human resource tool is to induce higher-ability personnel to stay in service and seek advancement to the upper grades. This is important because in a hierarchical organization such as the military, with virtually no lateral entry, the productivity of those in the upper ranks has spillover effects, either positive or negative, on the productivity of those in lower ranks. Given the hypothesis listed that we can expect increased performance on average among those in higher grades, we would expect the TIG to induce greater ability sorting, i.e., even higher ability on average in the upper grades than might exist under the current pay table.

[1] When measuring costs per member, we hold total strength constant, thereby allowing us to focus on how changes in the experience mix of the force under the TIG pay table affects cost. However, by holding strength constant, we ignore the possibility that a more experienced and higher-ability force under the TIG pay table might allow the services to reduce strength. That is, they might be able to achieve the same level of readiness with a smaller force. As a result, total compensation costs could fall. We explore this point further when we conduct sensitivity analysis later in this chapter.

The next subsection shows simulation results of the effects on retention, ability, and cost of the TIG versus the TIS pay table. We then show results where performance is measured in terms of effort supply.

Simulated Effects on Retention and Ability Sorting of the Time-in-Grade Versus a Time-in-Service Pay Table

Figures 4.1 and 4.2 show simulated cumulative retention profiles under the TIS versus a TIG pay table for enlisted personnel and officers, by service, respectively.[2] The black and red lines are the simulated retention profiles under the TIS table and TIG table, respectively.[3] For enlisted personnel, we find that retention increases under the TIG table in each service primarily in the mid-career, though the Marine Corps shows the smallest increase. This implies that the positive effect of retention for those who are promoted faster more than offsets the negative effect on those who are promoted slower under the TIG table. For officers, we find almost no effect or a small negative effect across the services, implying that the positive and negative effects are about equal, with the negative effect stronger in some cases.

To quantify the retention effects, Table 4.1 and 4.2 show summary statistics of the effects of the TIG table relative to the TIS table, by service, for enlisted personnel and officers, respectively. With respect to retention, the tables show the percentage change in overall force size that we simulate under the TIG table compared with the TIS table. For enlisted personnel, the increase in force size ranges from 0.4 percent for the Marine Corps to 1.5 percent for the Army. For officers, the change in force size varied from –0.2 percent for the Army to 0.7 percent for the Marine Corps. The smaller effects for officers than enlisted could be due to the smaller effects of the TIG versus the TIS pay table for fast-promoting officers, due to the compression of the pay table discussed in the previous chapter in the context of Figures 2.3 and 2.4. An additional explanation is higher retention rates among officers than enlisted personnel, reflecting a relatively higher taste for service among officers than enlisted personnel. When taste or the persistent nonmonetary aspects for service is perceived as higher, personnel are relatively less responsive to changes in the monetary changes associated with staying in the military.
The tables also show personnel costs per member in terms of basic pay and allowances and retirement accrual costs under a TIG versus the TIS pay table. In general, we find that the change in cost per member is relatively small, at most a 1 percentage point change, and is negative, except for Air Force officers.

The tables also summarize the simulated effects of the TIG table on performance as measured by ability percentile. We assume a normal distribution of ability at entry with mean 0. In percentile terms, the mean would be the 50th percentile of the distribution. We simulate

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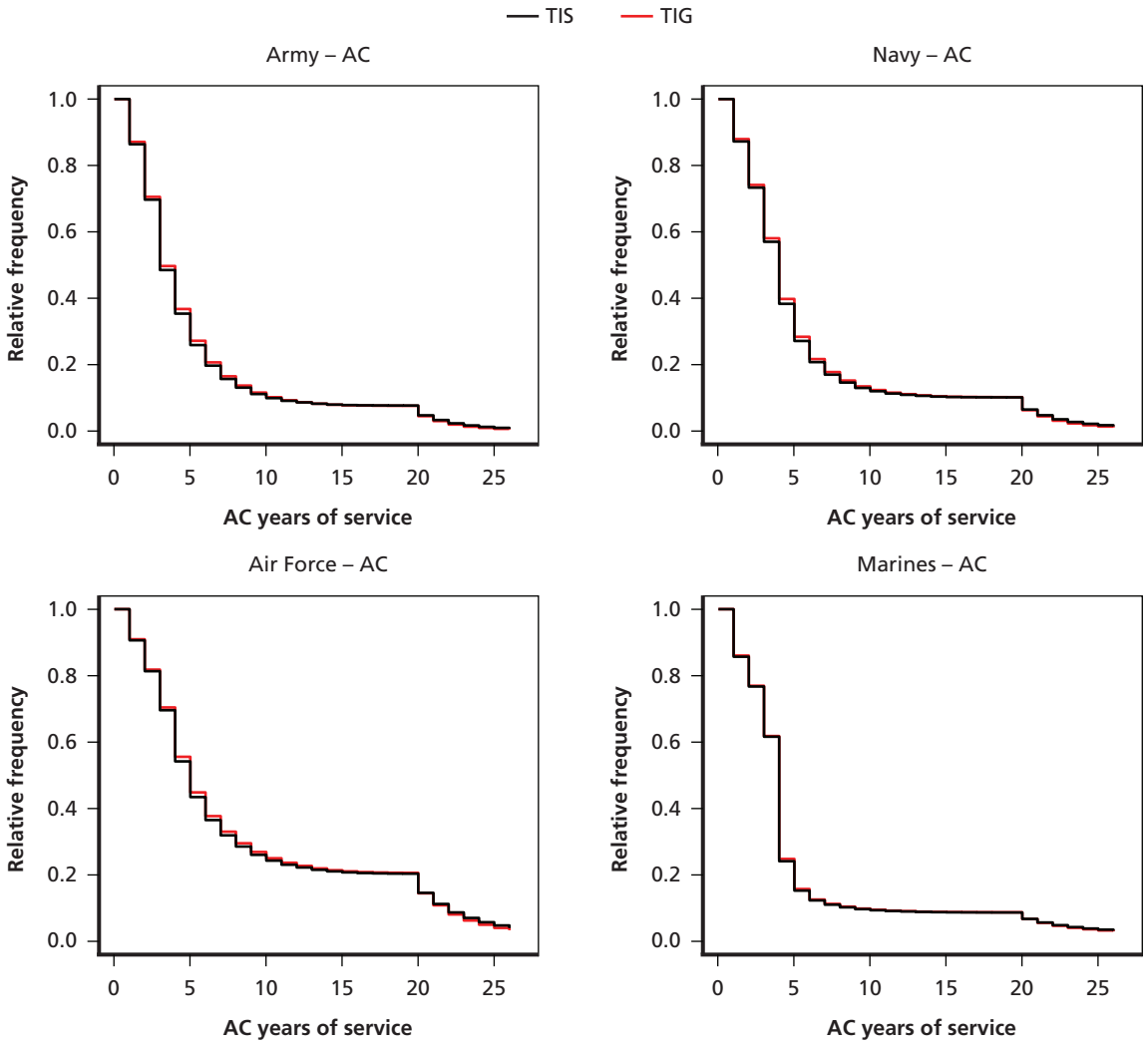
[2] As a reminder, we consider ability and effort supply separately. Figures 4.1 and 4.2 show results incorporating ability, but not effort.

[3] A brief note on interpreting the figures for readers who may have skipped Chapter Three, or who may wish to refresh their memory: The horizontal axis counts years since the individual was observed beginning active service. The vertical axis shows the cumulative probability of retention on active duty until that year. For example, at entry, YOS is 0 and the fraction of personnel retained is 1, and the fraction of the force retained falls over an active career as members leave active duty. The solid black line shows the actual retention of individuals in our cohorts, and the red line shows the predicted retention.

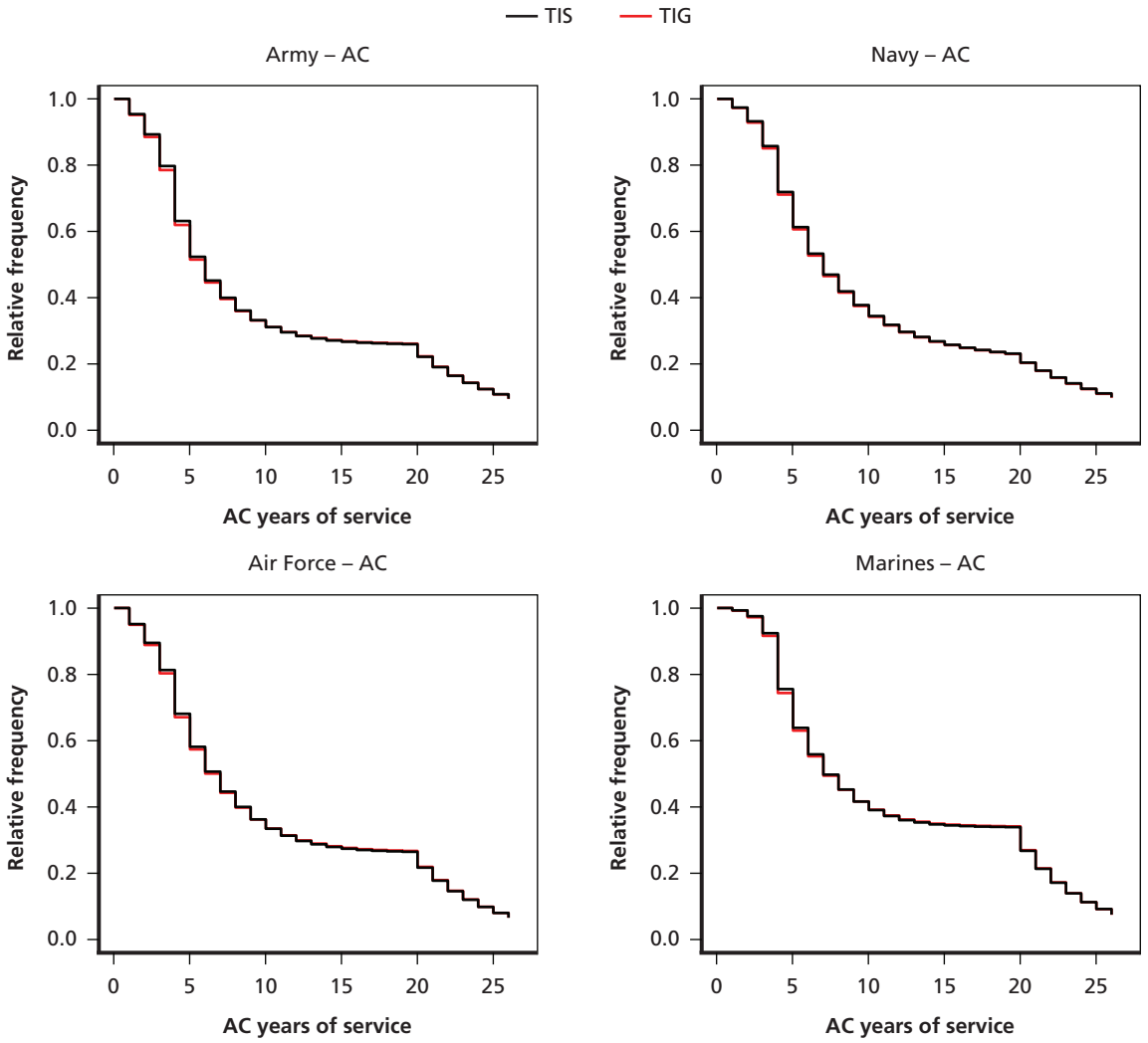
Figure 4.1
Enlisted Retention Under Time-in-Grade and Time-in-Service Pay Tables



retention and compute the average ability percentile across the force retained and the average ability percentile at each grade. The tables show the average ability percentile across the force for each service, for enlisted personnel and officers, respectively, as well as average ability of personnel in E-5 and E-9 for enlisted and O-4 and O-7 for officers. The latter statistics indicate the extent of ability sorting: the retention and promotion of higher-ability personnel to the upper grades.

For enlisted personnel, we find that the average ability percentile across the force increases under the TIG pay table, but by less than 5 percent for any given service. For example, under the TIS pay table, the average ability percentile for Army enlisted personnel is 48.1, compared with 49.7 under the TIG pay table, an increase of 3.4 percent. We find no change for the Marine Corps, equal to 50.3 under both the TIG and TIS pay tables. The relatively small change of less than 5 percent for any service is not entirely unexpected, given past research (Asch, Romley, and Totten, 2005) on the retention and overall quality of the enlisted force using AFQT as the metric of personnel quality. In particular, research has found that the

Figure 4.2
Officer Retention Under Time-in-Grade and Time-in-Service Pay Tables



effects of better external opportunities for higher-quality enlisted personnel are generally offset by their better internal opportunities; the net result is that the quality of those who stay is not much different than the quality of those who leave. The main conclusion from this research is that the military's (TIS-based) compensation system is not strongly pro-selective on personnel quality. The simulations suggest that the TIG pay table also demonstrates relatively weak pro-selection, but importantly the pro-selection effect is nonetheless larger under the TIG than the TIS pay table for enlisted personnel.

We also find that both the TIS and TIG pay tables induce ability sorting for enlisted personnel, with the TIG pay table producing a strong effect. For example, the average ability percentile of an E-9 in the Army is 66.0, compared with 42.8 for an E-5 under the TIS pay table, an increase of 54.2 percent. In other words, enlisted personnel in the Army and in the other services promote and retain higher-ability personnel, resulting in higher average ability among those in the upper ranks under the current TIS pay table. It is notable that this result is consistent with earlier research using other metrics of personnel quality, such as AFQT, that

Table 4.1
Enlisted Summary Statistics by Service on Retention, Ability Sorting, and Cost

Enlisted Personnel	TIS Pay Table	TIG Pay Table
Army		
Average ability percentile		
E-5	42.8	43.6
E-9	66.0	76.9
Overall	47.3	48.9
Retention: percentage change in force size	0.0	1.5
Cost per member (2019 dollars)	$64,324	$64,173
Navy		
Average ability percentile		
E-5	44.4	44.8
E-9	69.5	76.6
Overall	48.6	49.5
Retention: percentage change in force size	0.0	1.3
Cost per member (2019 dollars)	$66,770	$66,582
Marine Corps		
Average ability percentile		
E-5	46.0	45.9
E-9	72.6	74.6
Overall	50.3	50.3
Retention: percentage change in force size	0.0	0.4
Cost per member (2019 dollars)	$65,105	$64,994
Air Force		
Average ability percentile		
E-5	43.0	43.4
E-9	65.8	71.4
Overall	47.1	48.1
Retention: percentage change in force size	0.0	1.2
Cost per member (2019 dollars)	$73,518	$73,244

SOURCE: Authors' computations.
NOTE: Costs include active duty basic pay and allowances and retirement accrual costs.

Table 4.2
Officer Summary Statistics by Service on Retention, Ability Sorting, and Cost

Officers	TIS Pay Table	TIG Pay Table
Army		
Average ability percentile		
O-3	31.1	31.3
O-7	72.6	75.7
Overall	36.6	37.3
Retention: percentage change in force size	0.0	–0.2
Cost per member (2019 dollars)	$123,989	$122,876
Navy		
Average ability percentile		
O-3	34.6	34.8
O-7	77.1	79.1
Overall	39.7	40.4
Retention: percentage change in force size	0.0	–0.3
Cost per member (2019 dollars)	$120,528	$119,331
Marine Corps		
Average ability percentile		
O-3	30.8	31.0
O-7	72.1	76.3
Overall	35.3	36.3
Retention: percentage change in force size	0.0	0.7
Cost per member (2019 dollars)	$127,814	$127,054
Air Force		
Average ability percentile		
O-3	31.0	31.1
O-7	74.9	77.0
Overall	36.1	36.9
Retention: percentage change in force size	0.0	0.1
Cost per member (2019 dollars)	$124,322	$123,401

SOURCE: Authors' computations.

NOTE: Costs include active duty basic pay and allowances and retirement accrual costs.

shows that the average quality of those in the upper enlisted ranks exceeds that in the lower ranks (Asch, Romley, and Totten, 2005). The key result, however, is that this effect is stronger under the TIG pay table. In particular, we find that the average ability percentile increases 76.3 percent (from 43.6 to 76.9) for the Army under the TIG pay table. This result occurs because better performers are more likely to be promoted and retained under the TIG pay table. We find similar results for enlisted personnel in the other services.

For officers, Table 4.2 shows that the average overall ability percentile is also higher under the TIG pay table than the TIS pay table. As with enlisted personnel, the percentage change is less than 5 percent for any given service. For example, for the Army, the average increases from 36.6 to 37.3, an increase of 1.9 percent. We also find improved ability sorting under the TIG pay table for officers. While the simulations show the average ability percentile is higher among O-7s than O-3s for any given service under both the TIS and TIG pay tables, the difference is greater under the TIG pay table, though the amount varies across the services.

Efficiency

A key result of our simulations for enlisted personnel above is that retention increases under the TIG pay table versus the TIS pay table, with virtually no change in cost per member. This result implies that the TIG pay table is more efficient—more readiness is produced by the TIG pay table for the same cost. An additional implication is that about the same retention could be achieved under the TIG pay table with less cost. We illustrate this implication in Table 4.3 using Army enlisted personnel as an example and consider as an example a 0.375 percent pay cut as a means of reducing force size. We show that a 0.375 percent across-the-board pay cut under the TIG pay table would lead to force size equivalent to force size under the TIS pay table. Although force size is the same, cost per member is lower, $63,634 versus $64,173. Furthermore, the TIG pay table, even with an across-the-board pay cut, still results in stronger ability sorting than the TIS pay table. The results imply that the TIG pay table would enable DoD to achieve existing readiness objectives related to retention and increase ability sorting at the same cost per member.

Table 4.3
Army Enlisted Summary Statistics with 0.375 Percent Across-the-Board Pay Cut Under the Time-in-Grade Pay Table

Army Enlisted Personnel	TIS Pay Table	TIG Pay Table	TIG Pay Table with 0.375% Across-the-Board Pay Cut
Average ability percentile			
E-5	42.8	43.6	43.7
E-9	66.0	76.9	76.8
Overall	47.3	48.9	48.9
Retention: percentage change in force size	0.0	1.5	0.0
Cost (2019 dollars)	$64,324	$64,173	$63,634

SOURCE: Authors' computations.

NOTE: Costs include active duty basic pay and allowances and retirement accrual costs.

Sensitivity Analyses

As we discussed in Chapter Three, we make three assumptions about ability to incorporate it into our DRM simulations:

1. the effect of ability on promotion timing
2. the effect of ability on external opportunities
3. the extent to which ability varies among military entrants.

The specific assumptions we make are ones that allow us to replicate the steady-state retention profiles of enlisted personnel and officers in each service under the TIS pay table.

This subsection shows sensitivity analyses to assess the extent to which our main conclusions about the retention, performance, and cost effects of the TIG pay table change under alternative assumptions. We conduct sensitivity analysis in which we vary each of these assumptions using our DRM model for Army enlisted personnel. In particular, we consider the following three sensitivity analyses:

1. Increase the responsiveness of external opportunities to differences in ability. In the main analysis, we assume that external civilian basic pay are proportionate to the standard deviation of ability according to the formula where is the standard deviation of the ability distribution. In the sensitivity analyses, we assume a formula of .
2. Reduce the responsiveness of promotion speed to differences in ability. In the main analysis, we assume that promotion time to E-6 and above varies in proportion to ability by one year. In our sensitivity analyses, we assume that promotion time to E7 and above varies in proportion to ability by one year.
3. Reduce the variation in ability among entrants. As discussed in Chapter Three, for enlisted personnel, we assume a standard deviation of the ability distribution of 0.5. For the sensitivity analyses, we reduce it to 0.25.

We report the results of these sensitivity analyses in Table 4.4. Specifically, the table shows summary statistics for Army enlisted personnel under the TIS and TIG pay tables for each of the three analyses. Our results remain qualitatively the same under each of the three analyses. In particular, as in the main analyses, we find that retention increases under the TIG pay table relative to the TIS pay table. Furthermore, we find that cost per member falls slightly across the three analyses, by less than 1 percent, similar to the main analysis. We also find that it is still the case that ability sorting improves under the TIG pay table. Finally, we find that the overall quality of the force increases in each case.

Exploratory Analysis: Simulated Effects on Effort Supply of the Time-in-Grade Versus Time-in-Service Pay Table

Separate from ability, we also simulated the retention, cost, and performance effects of the TIG pay table when performance is measured in terms of effort supply. As we explained in Chapter Three, we assume parameters of the effort supply decision such that we can replicate the observed retention profile under the TIS pay table. The assumed parameters are the disutility of effort parameter and the parameter representing the relationship between effort and promo-

Table 4.4
Army Enlisted Summary Statistics: Sensitivity Analyses

	1. Increase the Effect of Ability on External Opportunities		2. Reduce the Effect of Ability on Promotion Timing		3. Reduce Variability in Ability Among Entrants	
Army Enlisted Personnel	TIS Pay Table	TIG Pay Table	TIS Pay Table	TIG Pay Table	TIS Pay Table	TIG Pay Table
Average ability percentile						
E-5	35.9	36.7	44.4	44.7	41.4	41.9
E-9	48.3	60.5	54.1	62.3	54.4	62.6
Overall	40.9	42.3	45.6	46.3	43.7	44.6
Retention: percentage change in force size	0.0	0.6	0.0	1.0	0.0	1.0
Cost (2019 dollars)	$65,385	$64,786	$64,576	$64,117	$64,107	$63,779

SOURCE: Authors' computations.

NOTE: Costs include active duty basic pay and allowances and retirement accrual costs.

tion to each grade. As we showed in the earlier chapter, we were moderately successful in replicating the observed retention profile. Consequently, our simulation results regarding effort supply should be considered more suggestive than the results shown above, where performance is measured in terms of ability.

Table 4.5 shows summary statistics for Army enlisted personnel. As a reminder, the level of effort directly influences the probability of promotion; however, this effort does not come without cost to the individual, because the associated disutility in a period is assumed to go up as the square of the level of effort in that period. We compute the optimal level of effort for all individuals in every time period they are retained and look at the average level of effort over the force to gauge the effect of the different pay tables on effort. The key result is that average effort across the force increases under the TIG pay table relative to the TIS pay table, 0.97 versus 0.89, or an overall increase in effort supply of 9 percent. As hypothesized above, given that the financial rewards to promotion are greater under the TIG pay table, the financial incentives to increasing effort supply are higher, insofar as better performers are promoted faster. Muting this effect is the disutility associated with increased effort. Overall, we find that average effort across the force is higher under the TIG versus the TIS pay table in the Army enlisted personnel example. We also find that overall force size increases by 4.4 percent, while the cost per member increases by only 0.6 percent. The TIG pay table increases retention and performance, when performance is measured in terms of effort supply.

Summary

The key result of the simulations shown this chapter is that the TIG pay table would be a more efficient approach to setting basic pay. For enlisted personnel, we find that simulated retention in the steady state would increase under the TIG pay table, while personnel costs per member would be generally fall, albeit by at most 1 percent. For officers, retention in the steady state as well as cost per member would change little (either positive or negative). On the other hand,

Table 4.5
Army Enlisted Summary Statistics Using Effort as the Metric of Performance

Army Enlisted Personnel	TIS Pay Table	TIG Pay Table
Average effort	0.89	0.97
Retention: percentage change in force size	0.0	4.4
Cost (2019 dollars)	$65,631	$66,019

SOURCE: Authors' computations.

NOTE: Costs include active duty basic pay and allowances and retirement accrual costs.

the simulations indicate that performance would increase overall across the force and in the upper grades relative to the lower grades. We demonstrated, using the Army enlisted force as an example, that greater performance could be achieved at less cost and for the same retention under the TIG table relative to the TIS pay table. We also conducted sensitivity analyses in which we altered the underlying assumptions of our simulations with respect to ability, and we found that the results generally remain unchanged.

CHAPTER FIVE

Transition Costs and Save Pay

The previous chapter focused on steady-state effects when all members have spent an entire career under the TIG pay table. But, another area of concern is the effect of the TIG pay table during the transition period. Commissions as early as the 1957 Defense Advisory Committee on Professional and Technical Compensation raised the concern that members would see a reduction in pay during the transition from the TIS to the TIG pay table. Like later commissions, including the DACMC, the 1957 commission recommended "save pay," a policy that would prevent members from receiving lower compensation than before the change. In the case of the Defense Advisory Committee on Professional and Technical Compensation, it specifically recommended that pay be frozen at its present level until the member qualifies for promotion. In this chapter, we consider the transition effects of the TIG pay table from the standpoint of the effects on members' basic pay before and after the transition. First, we estimate the share of active duty members that would experience either a pay increase or decrease in the first year of the TIG basic pay policy and the extent of the pay increase or decrease. We then estimate the first-year cost of a save pay policy that would ensure members would receive at least the same amount of basic pay under the TIG pay table as they did under the TIS pay table.

Transition Effects on Member Pay

Reductions or increases in basic pay for a given member can occur after the transition to the TIG pay table because of the way the TIG table is constructed. As we described in Chapter Two, anchor points or entry YOS for the construction of the TIG pay table were chosen based on average promotion times observed between FY 2013 and 2018. For example, the entry YOS for E-6 is 6, meaning that basic pay in the TIG pay table for a member recently promoted to E-6 with 0 time in grade is equivalent to that of an E-6 with 6 YOS in the TIS pay table. An implication of the choice of entry YOS anchor points is that basic pay may be higher or lower for a given member in the year of transition to the TIG pay table if the member's promotion timing to a given grade deviates from the assumed entry YOS for that grade. As we'll discuss more in Chapter Seven, promotion times for individual service members can vary considerably from the averages shown in Table 2.1. Consequently, promotion times do differ from the entry YOS anchor points used to construct the TIG pay table.

For example, an E-6 with 12 YOS and 6 years in grade as an E-6 at the time of transition would receive the same pay after the transition to the TIG pay table as before the transition. The reason is that this E-6 was promoted to E-6 at 6 YOS (12 – 6 years) which is the same

YOS as we assume for the entry YOS anchor point. Consequently, the pay of this member is the same in both the TIS and TIG pay table.

But, instead, if the E-6 with 12 YOS had, say, 2 years in grade at the time of transition, the member's monthly basic pay would decrease in the transition year, from $3,776.70, the pay of an E-6 with 12 YOS in the TIS pay table to $3,453.60, the pay of an E-6 with 2 years in grade. The reason is that this E-6 was promoted to E-6 at 10 YOS (12-2 years), or at a YOS that is greater than the assumed entry YOS to E-6. Similarly, if the E-6 with 12 YOS had, say 7 years in grade, the member's monthly basic pay would increase instead, from $3,046.20 to $3,776.70. The reason is that the member's years of service at promotion to E-6 (12-7) were less than the assumed entry YOS anchor point of 6 for an E-6.

We investigated the extent to which members on active duty would experience an increase or decrease in pay using DMDC active duty master file data for all active duty members in service in January 2019 together with the 2018 TIS basic pay and associated TIG pay table in Table 2.2. The DMDC data provided information on the time in current grade, time in grade and YOS at promotion, and YOS for each member on active duty. Table 5.1 shows tabulations of the percent of personnel who would receive the same basic pay in the year of transition, lower pay in the TIG pay table, or higher pay in the TIG pay table for enlisted personnel, commissioned officers, warrant officers, and officers transitioning from enlisted service in grades O-1E to O-3E. Across all active duty personnel, 45.7 percent would receive the same basic pay, about one-third (32.1 percent) would experience a pay reduction as a result of the transition to the TIG pay table, and 22.3 percent would experience a pay increase.

The percentages differ by grade category. Nearly all warrant officers (91.6 percent) would experience a pay reduction, while about half (or 53.2 percent) of commissioned officers would experience a pay reduction in the transition to the TIG pay table. On the other hand, the majority of enlisted personnel who became officers and are in pay grades O-1E to O-3E would experience a pay increase. In the case of enlisted personnel, about one quarter (27.1 percent) would experience a pay reduction.

Table 5.1 also shows that among the 32.1 percent of members who would experience a pay reduction, the reduction in basic pay would average 6 percent. The extent of the reduction

Table 5.1
Extent of the Change in Basic Pay in the Year of Transition to the Time-in-Grade Pay Table from a Time-in-Service Pay Table

	Percentage of Members			Given Pay is Lower in TIG Table
	Same	Lower in TIG Table	Higher in TIG Table	Average Percentage Difference in Basic Pay
Enlisted	50.2	27.1	22.7	–5.2%
Commissioned officers	29.3	53.2	17.5	–6.6%
O-1E to O-3E	2.6	44.2	53.2	–8.5%
Warrant officers	3.1	91.6	5.4	–15.0%
All	45.7	32.1	22.3	–6.0%

SOURCE: Authors' computations.

NOTE: Tabulations based on the 2018 TIS and TIG pay tables (see Tables 2.2 and A.1) and DMDC data on active duty members in January 2019.

varies with grade category. Basic pay would decrease for 91.6 percent of warrant officers, and the average reduction in monthly basic pay would be 15.0 percent. The average reduction for enlisted personnel would be 5.2 percent and commissioned officers would be 6.6 percent; it would be 8.5 percent for those in the grades of O-1E to O-3E.

In short, based on the promotion histories of members on active duty in January 2019, we find that a sizable segment of the force would experience a reduction in pay at the time of transition. Furthermore, the reduction for these members is sizable; the last time basic pay changed by more than 6 percent in any given year (in absolute value) was in 1986 (DoD, 2018).

Save Pay

Save pay refers to a policy that "saves" an individual's rate of pay in situations in which a change in position or other policy causes an individual to be entitled to a lower rate of pay than before the change (DoD, Under Secretary of Defense [Comptroller], 2017; Office of Personnel Management, undated). Save pay is a policy that is already being used by DoD for both uniformed and civil service personnel. In the case of military personnel, enlisted personnel who accept an appointment as an officer and face a reduction in pay as a result of that transition can receive save pay in the form of the pay that they would have received in their last enlisted grade. Similarly, warrant officers who transition to commissioned officers can receive the pay they would have received in their last warrant officer grade or the pay in their last enlisted grade if they had previously been enlisted members (DoD, Under Secretary of Defense [Comptroller], 2017).

The DACMC and 10th QRMC estimated that the first-year cost of a save pay transition provision that held members "harmless" in terms of basic pay would be about $1.1 billion based on the 2005 pay table.[1] In 2018 dollars, this figure would be $1.43 billion. The 10th QRMC also considered a different save pay option instead of the "hold members harmless" provision. The alternative would ensure that there were no nominal reductions in the level of basic pay. If the transition to the TIG pay table occurred at the same time as the annual military pay raise, then part of the cost of the transition could be "covered" by the cost of the annual pay raise. Furthermore, if the post-transition basic pay under the TIG pay table also allowed for any pay raise associated with promotion occurring in the first year, then save pay costs would be further reduced, since part of the cost of the transition could also be "covered" by the cost associated with promotion-related pay raises. Under this save pay approach, the 10th QRMC estimated that the cost would be about $354 million rather than $1.1 billion, or about a third of the cost.

Following the "hold members harmless" approach, we estimated the first-year cost of save pay using the January 2019 data on the active force. Table 5.2 shows the results. We find that the first-year transition-cost across the active force would be $1.39 billion in 2018 dollars. Most of the cost is associated with the enlisted force ($0.61 billion). The $1.39 billion figure is very close to the $1.43 billion estimated by the Hogan and Mackin (2008) for the 10th QRMC, in 2018 dollars. To put the $1.39 billion figure in context, the 2018 appropriation for active component military personnel was about $115.9 billion (DoD, 2019).[2]

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[1] The 10th QRMC approach is assessed and discussed in Hogan and Mackin (2008).

[2] This figure excludes Medicare-Retiree Health Care Contributions.

Table 5.2
Cost of Save Pay in the Year of Transition to the Time-in-Grade Pay Table from a Time-in-Service Pay Table (2018 dollars, billions)

	Cost (billions of dollars)
Enlisted	0.61
Commissioned officers	0.54
O-1E to O-3E	0.07
Warrant officers	0.17
All	1.39

SOURCE: Authors' computations.

NOTE: Tabulations based on the 2018 TIS and TIG pay tables (see Tables 2.2 and A.1) and DMDC data on active duty members in January 2019.

We do not estimate save pay costs under an approach that holds pay at nominal levels like the 10th QRMC did. But, as a rough order of a magnitude, if we use the 10th QRMC estimate that cost would be about a third, we would estimate a cost of about $460 million.

Summary

To the extent that the promotion times of service members vary from the average promotion times that were used to construct the TIG pay table, service members will experience an increase or decrease in their monthly basic pay at the time of transition to the TIG pay table from the TIS table. Based on the number of YOS and promotion history of active duty personnel in service in January 2019, we estimate that about one-third would experience a basic pay reduction, or 32.1 percent. We estimate that 45.7 percent would receive the same basic pay and 22.3 percent would experience a pay increase. We estimate that the average reduction would be 6 percent among those who would experience a reduction in pay at the time of the transition. If DoD adopts a policy to hold members harmless in terms of the level of basic pay by offering save pay, we estimate that in the first year, the cost of this save pay policy would be $1.39 billion in 2018 dollars, with most of the cost being attributed to save pay for enlisted personnel.

CHAPTER SIX

Two Alternative Performance-Based Policies Under a Time-in-Service Pay Table

The 13th QRMC requested that RAND investigate alternative approaches to reward better performance other than a TIG pay table that could be implemented under the current TIS pay table. Specifically, it requested an exploration of two concepts: constructive credit for performance and credential pay or pay to members who earn a specific skill credential. While DoD already has a constructive credit policy, it is not currently structured to reward superior performance of military members already in service. DoD also has credential pay, called skill incentive pay in Section 353 of Title 37 of the U.S. Code. Under this section, the services have the authority to offer skill incentive pay, a monthly amount that can be paid to service members who serve in a career field or skill designated as critical by the service secretary. However, skill incentive pay is not structured to be a pay-for-performance mechanism. We summarize our analysis and findings of these two concepts in this chapter.

Constructive Credit for Faster Promotion

Constructive credit, as currently implemented by DoD, rewards service members for advanced education, training, or experience earned prior to entering the military. The policy gives YOS credit for these activities, thereby allowing these individuals to enter service at a higher starting grade and, consequently, at higher military basic pay than they would in the absence of constructive credit. The use of constructive credit is limited to occupations in the medical field, legal field, and chaplains, though, for a short period from 2014 to 2018, constructive credit could also be applied to those with a background in cyber. As discussed in previous chapters, as a result of expanded constructive credit authority included in the 2019 NDAA, officers can enter service at a grade as high as O-6.

Current policy regarding constructive credit focuses on providing higher entry pay for lateral entrants than they would receive if they entered as an O-1. In Chapter Two, we noted that under the TIG pay table, lateral entrants would receive higher pay than under the TIS pay table because in the latter case, entrants would still enter with 0 YOS. We also showed that if the concept of constructive credit were expanded to also give service members YOS credit in the pay table, pay under the TIS pay table could be equivalent to pay under the TIS pay table for lateral entrants. Thus, it is possible to achieve the same pay outcome under the TIS pay table for lateral entrants.

In this chapter, we consider a further expansion of the definition of constructive credit that would give YOS credit in the pay table for better performance. In particular, we consider a

policy that would give personnel who are promoted faster than their peers a permanent 1 YOS leg up in the pay table for the purpose of computing basic pay. The purpose of the policy would be to provide a permanent reward for fast promotion, something that is missing under the TIS pay table. Note, however, that constructive credit for performance would affect longevity for the purpose of computing a member's basic pay, but not for the purpose of retirement eligibility for computing retired pay.

For example, suppose a member is promoted to O-4 one year ahead of their peers, say at YOS 10 rather than YOS 11 like the rest of peer group. Under current policy, this member would receive the pay of an O-4 with 10 YOS, while this member's peers would receive the pay of an O-3 with 10 YOS. One year later, when the rest of the peer group is promoted, both the fast promote and the on-time promotes would receive the pay of an O-4 with 11 YOS. But, under an expanded definition of constructive credit that rewarded faster promotion, the member who was promoted faster would receive the pay of an O-4 with 11 YOS, and the member's on-time peers would receive the pay of an O-3 with 10 YOS. One year later, the fast promote would receive the pay of an O-4 with 12 YOS, and the member's on-time peers would receive the pay of an O-4 with 11 YOS. Thus, the constructive credit policy provides a permanent reward to the fast promotee who, in our example, is promoted one year ahead of their peers.

Effects of Constructive Credit for Performance on Basic Pay over a Career

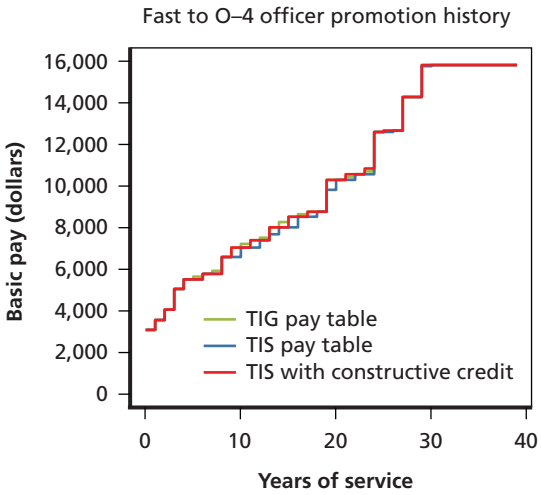
We illustrate how constructive credit for performance would affect basic pay over a career by considering the effects on enlisted personnel and officers. Figure 6.1 replicates Figure 2.4 by showing a comparison of pay over a career for an officer under the TIG versus the TIS pay table for an officer promoted a year early to O-4. In addition, Figure 6.1 shows pay over a career for an O-4 who is given constructive credit for performance. Similarly, Figure 6.2 replicates the left panel of Figure 2.5 by showing a comparison of pay over a career for a fast-promoting enlisted occupation (DoD Occupation Code 0) under the TIG versus the TIS pay table. As mentioned in Chapter Two, occupations within DoD Occupation Code 0, Infantry, Gun Crews, and Seamanship Specialists, promote about one year faster to E-5 and E-6. Figure 6.2 also shows pay over a career for an enlisted member who receives constructive credit for performance. The pay profile under constructive credit is shown by the red line in the two figures.

We find that the basic pay profiles for fast promoters under the TIS pay table are higher with constructive credit than without constructive credit. That is, the red line is above the blue line for the TIS pay table without constructive credit. Furthermore, the higher pay profile under the TIS pay table with constructive credit is nearly identical to the TIG pay profile. The implication of this analysis is that constructive credit for performance is a policy that can broadly replicate the higher pay found under the TIG pay table.

Simulations of the Effects of Constructive Credit on Retention, Cost, and Ability

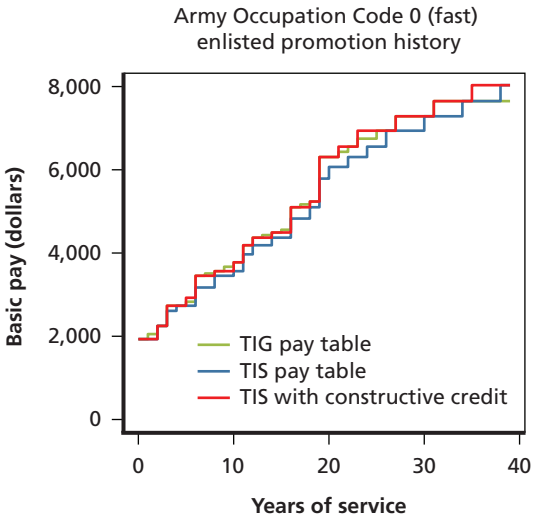
We next investigate whether constructive credit for performance can also broadly replicate the stronger incentives for performance and the increased efficiency of achieving retention and performance outcomes, as we found under the TIS pay table using Army personnel as an example. Figure 6.3 replicates results from Figure 4.1 for Army enlisted personnel and Figure 4.2 for Army officers but also shows simulated retention profiles under the TIS pay table with constructive credit for performance. Similarly, Table 6.1 replicates results from Tables 4.1 for

Figure 6.1
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables Versus Time-in-Service Pay Table with Constructive Credit for Fast-Promoting Officers



SOURCE: Authors' computations.

Figure 6.2
Simulated Monthly Basic Pay over a Career, Time-in-Grade Versus Time-in-Service Pay Tables Versus Time-in-Service Pay Table with Constructive Credit for Fast-Promoting Enlisted Occupation (DoD Occupation Code 0)

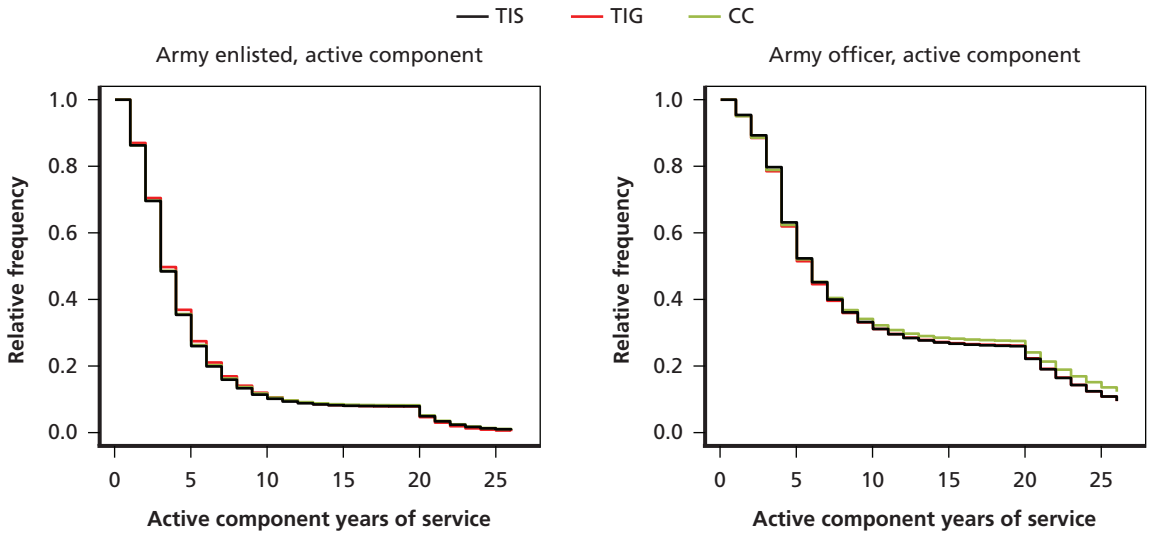


SOURCE: Authors' computations.

Army enlisted personnel and Table 4.2 for Army officers but also shows results under the TIS pay table with constructive credit for performance.

We find that, relative to retention under the TIS pay table, retention for Army enlisted personnel improves more under the TIG pay table than under a TIS pay table with constructive credit. As shown in Figure 6.1, the red line representing retention under the TIG pay table is higher in the mid-career while the green line representing retention under a TIS pay table

Figure 6.3
Army Enlisted and Officer Retention Under Time-in-Grade Versus Time-in-Service Pay Tables Versus Time-in-Service Pay Table with Constructive Credit



SOURCE: Authors' computations.
NOTE: CC in the legend refers to a TIS pay table with constructive credit for performance.

with constructive credit is slightly higher than retention under the TIG pay table for years beyond 10 YOS. As shown in Table 6.1, force size increases by 1.2 percent under a TIS pay table with constructive credit compared with 1.5 percent under the TIG pay table.

For Army officers, retention is higher under a TIS pay table with constructive credit than under either the TIS pay table alone or the TIG pay table, particularly later in the officer career as shown in the right panel of Figure 6.3. As shown in Table 6.1, the officer force size increases by 1 percent, compared with –0.2 percent under the TIG pay table.

Table 6.1 shows simulation results pertaining to the retention of higher-ability personnel and cost per member. For Army enlisted personnel, the average ability percentile increases under a TIS pay table with constructive credit relative to the TIS pay table without constructive credit, from 47.3 to 48.3, but does not increase as much as under the TIG pay table (48.9). Similarly, constructive credit for performance results in improved ability sorting relative to a TIS pay table without constructive credit with the average ability percentile for an E-9 increasing from 66.0 to 73.2. But the increase is not as large as under the TIG pay table, where the average ability percentile for an E-9 increases to 76.9 For Army officers, the average ability percentile is also lower, albeit slightly, under constructive credit versus the TIG pay table, though, as with enlisted personnel, it is higher than under a TIS pay table without constructive credit. On the other hand, ability sorting in terms of the difference between the average ability percentile of O-7 versus an O-3 is improved relative to both the TIS and TIG pay tables. However, this improvement is attributable to lower average ability of O-3s and not to higher ability of O-7s compared with either the TIG or TIS pay table, so the overall result cannot be viewed as a positive overall. In short, for both enlisted personnel and officers, average ability and ability sorting improve under a TIS pay table with constructive credit but not as much as under the TIG pay table.

Table 6.1
Army Enlisted and Officer Summary Statistics Under a Time-in-Service Pay Table with Constructive Credit

	TIS Pay Table	TIG Pay Table	TIS Pay Table with Constructive Credit
Army Enlisted Personnel			
Average ability percentile			
E-5	42.8	43.6	43.4
E-9	66.0	76.9	73.2
Overall	47.3	48.9	48.3
Retention: percentage change in force size	0.0	1.5	1.2
Cost (2019 dollars)	$64,324	$64,173	$64,748
Army Officers			
Average ability percentile			
O-3	31.1	31.3	28.1
O-7	72.6	75.7	75.8
Overall	36.6	37.3	37.1
Retention: percentage change in force size	0.0	−0.2	1.0
Cost (2019 dollars)	$123,989	$122,876	$124,503

SOURCE: Authors' computations.

NOTE: Costs include active duty basic pay and allowances and retirement accrual costs.

The results for enlisted personnel in Table 6.1 also show that constructive credit is less efficient than the TIG pay table. Cost per member is lower under a TIG pay table, $64,173 versus $64,748, and constructive credit improves retention by less, 1.2 percent versus 1.5 percent; improves average ability by less, 48.3 versus 48.9; and results in less ability sorting. That said, constructive credit is an improvement over the TIS pay table in terms of efficiency, at least in terms of ability sorting (Table 6.2). We find that constructive credit with a slight pay cut of 0.18 percent would result in the same retention and cost per member as a TIS pay table without constructive credit, but average ability across the force and among E-9s would be greater with constructive credit.

Skill-Based or Credential Pay

Credential pay refers to additional monthly compensation that a military service member could receive for holding a specific educational or training credential. Our investigation of credential focused on whether it could provide incentives for performance similar to what could be provided by the TIG pay table. Our approach involved reviewing the available academic and defense manpower literature on credential pay. We summarize our review of the literature in this subsection. We first review the different names and definitions used to describe credential pay in the literature and discuss the relevance to our investigation of the literature that focuses

Table 6.2
Army Enlisted Summary Statistics Under a Time-in-Service Pay Table with Constructive Credit and a 0.18 Percent Across-the-Board Pay Cut

Army Enlisted Personnel	TIS Pay Table	TIG Pay Table	TIS Pay Table with Constructive Credit	TIS Pay Table with Constructive Credit and 0.18 Percent Pay Cut
Average ability percentile				
E-5	42.8	43.6	43.4	43.4
E-9	66.0	76.9	73.2	73.1
Overall	47.3	48.9	48.3	48.4
Retention: percentage change in force size	0.0	1.5	1.2	0.0
Cost (2019 dollars)	$64,324	$64,173	$64,748	$64,318

SOURCE: Authors' computations.

NOTE: Costs include active duty basic pay and allowances and retirement accrual costs.

on the private sector. Next, we review the defense manpower literature including the report by Davis and Horowitz (2008) prepared for the 10th QRMC, which also considered credential pay as a performance-based pay alternative to a TIG pay table. We conclude with a summary of the advantages and disadvantages of credential pay based on our literature review.

Alternative Credential Pay Definitions and the Relevancy of the Nondefense Manpower Literature

Credential pay in the academic literature is also alternatively known as proficiency pay, certification pay, skill-based pay, skill pay, and knowledge-based pay, though the typical name used is skill-based pay. Under all of these definitions, the key concept is that pay is based on the skills an employee possesses. In the literature that focuses on the nonmilitary population, researchers frame credential or skill-based pay as an alternative pay setting approach that is based on job classification or the tasks and responsibilities associated with a given job. For example, Gupta, Jenkins, and Curington (1986) define skill-based pay as a compensation system that bases salaries and wage rates not on particular job classifications but on the skills and competencies an employee possesses. As described by Ledford and Heneman (2011, p. 1), "skill-based pay is a person-based system, because it is based on the characteristics of the person rather than the job. In more common job-based pay systems, pay is based on the job, which employees are entitled to receive even if they are not proficient in their position." An example of a job-based pay system is the General Schedule system for federal employees. General Schedule pay rates are based on job classifications. While the hiring and promotion of employees to different jobs may be based on the employees' skills and experiences, the General Schedule pay rate offered to an employee entering a given job is not higher if the employee possesses more skills. Papers that have evaluated skill-based pay rather than jobs-based pay using private or public sector data include Parent and Weber (1994), Guthrie (2000), Murray and Gerhart (1998), Luthans and Fox (1989), Mitra, Gupta, and Shaw (2011), and Lockey, Graham, and Zhou (2017).

The definition of skill-pay or credential pay differs in the military context. In the military, skill pay is a bonus or additional pay that is provided in addition to basic pay for demonstrated proficiencies. Ledford and Heneman (2011) note that the skill-based pay used in the

military is unique and almost unknown outside the military. Because of the uniqueness of the military, the applicability of the nondefense manpower literature is limited, and we focused the rest of our review of the literature on military-related studies. Before summarizing the four studies we identified, we first provide an overview of the history of skill pay and proficiency pay in the military.

History of the Use of Proficiency Pay in Military

Between 1958 and 1985, the military services had authority to offer proficiency pay to qualified members (Davis and Horowitz, 2008; Hosek and Asch, 2002). The purpose of proficiency pay was to induce the retention of enlisted personnel who were required to perform "extremely demanding duties or duties demanding an unusual degree of responsibility" and to induce "qualified personnel to volunteer for such duties" (DoD, 1996, p. 477). Proficiency pay resulted from deliberations of the Defense Advisory Committee on Professional and Technical Compensation. In 1957, it recommended a change in the pay structure that would allow the promotion of a member to a higher pay grade without promotion to a higher rank. According to Hosek and Asch (2002), the intent of the committee was to create a pay for members who were specifically proficient in a given skill.

The Uniformed Services Pay Act of 1958 permitted the service secretaries to "choose such a proficiency pay grade" method "designated as . . . specially proficient in a military skill" (DoD, 1996, p. 477). It also permitted the service secretaries to alternatively pay a flat rate of up to $150 per month as proficiency pay. They chose the latter method and never used the proficiency pay grade method. Three types of proficiency pay were established: shortage specialty proficiency pay, special duty assignment proficiency pay, and superior performance proficiency pay. Shortage specialty proficiency pay was displaced by the selective reenlistment bonus in 1975 and phased out rapidly. By 1977, only 7,000 people were receiving shortage specialty pay, compared with 135,000 in 1975 (Hosek and Asch, 2002). In 1982, the shortage specialty pay program was absorbed into the special duty assignment pay program. Superior performance pay was authorized until 1976 and then terminated. According to Davis and Horowitz (2008), this pay failed largely because it was unpopular; singling out members for extra pay was unpleasant for defense managers. Special duty assignment proficiency pay was paid to personnel performing such voluntary duties as recruiters, drill instructors, or reenlistment noncommissioned officers. In 1985, new proficiency pay authority limited such pay to special duty assignments (the word *proficiency* was dropped).

Of the three pays, only superior performance proficiency pay is closely related to the intent of the 1957 Defense Advisory Committee on Professional and Technical Compensation. In practice, proficiency pay focused on increasing retention in specialties with shortages—a role taken over by the selective reenlistment bonus program. Proficiency pay for arduous assignment was also not related to a member's skill proficiency, and, not surprisingly, the special duty assignment pay program eliminated the term *proficiency*. In any case, the proficiency pay program, as ultimately used by the services between 1958 and 1985, did not provide a payment that intended to help the services create and preserve a stock of a particular skill.

In response the 2006 DACMC and the 10th QRMC, in 2008 Congress consolidated the 65 categories of special and incentive pays into eight general categories and gave DoD ten years to implement the consolidation. One of these broad categories is called "Skill Incentive-Proficiency Pay," mentioned as "skill incentive pay" above and created in 2016, according to the U.S. Government Accountability Office (2017). Special duty assignment pay was transi-

tioned to 37 U.S.C. Section 352, "Assignment Pay or Special Duty Pay." the authority to pay special duty assignment pay under the old code (37 U.S.C. section 307) expired on January 27, 2018.

Since 2009, 37 U.S.C. Section 353 has defined "skill incentive pay or proficiency bonus." Section 353(a) defines skill incentive pay. The service secretaries may pay a monthly skill incentive pay to a member of a regular or reserve component of the uniformed services who is entitled to basic pay and who serves in a career field or skill designated by the service secretary. The maximum amount cannot exceed $1,000 per month. The amount can be prorated if an individual is not eligible for the entire month. Certification is required annually. A member can't be paid more than one pay under this section in any month for the same period of service and skill or be paid hazardous duty pay for the same period and for the same skill.

Section 353(b) defines skill proficiency bonus: The service secretaries may pay a proficiency bonus to a member of a regular or reserve component who is entitled to basic pay and is determined to have and maintains certified proficiency in a designated skill deemed critical by the service secretary or is in training to acquire proficiency in a critical foreign language or expertise in a foreign cultural studies or a related skill designated as critical. The bonus may be paid in lump sum at the beginning of the proficiency period or in periodic installments. The amount may not exceed $12,000 for each 12-month period. Military Foreign Language Skill Proficiency Bonuses is an example of a skill proficiency bonus.

Finally, although not explicitly considered proficiency pay, the services offer reenlistment bonuses that are targeted to specific occupations and, in some cases, to specific skill areas within an occupation. These areas can represent an advanced skill that is not held by all members in the occupation. For example, an Army combat medic who reenlists and also has an additional skill identifier indicating the individual is a nationally registered flight paramedic might receive a higher reenlistment bonus than other combat medics. Furthermore, in some services, these higher bonuses are not necessarily contingent on performing the duty or serving in a billet requiring the skill. Consequently, reenlistment bonuses can also serve as a type of proficiency pay.

Summary of Findings from Four Military-Related Studies of Credential Pay

We identified four studies that have assessed credential pay in the military context. The first, Mackin et al. (2007), examines the relationship between the payment of Foreign Language Proficiency Pay (FLPP)[1] between 1995 and 2005 and the probability that an eligible enlisted member becomes or remains qualified in a critical foreign language, using data on enlisted personnel in each service. The second study, Dierdorff and Surface (2008), has a similar focus and examines the effect of offering a bonus on foreign language skill acquisition among special operation soldiers in the Army. The third is the study commissioned by the 10th QRMC, Davis and Horowitz (2008), that provided a discussion of the advantages and disadvantages of credential pay, also within the context of acting as an alternative to a TIG pay table to provide incentives for performance. The final study, Hosek and Asch (2002), provided an assessment of skill-pay at the request of the U.S. Air Force.

[1] The special pay for foreign language proficiency changed over time in terms of eligibility, dollar amounts, and even the name of the pay. Prior to 2006, the special pay was called Foreign Language Proficiency Pay (FLPP) and was called the Foreign Language Proficiency Bonus (FLPB) after that. A major difference between FLPP and FLPB is that pay levels for FLPB are considerably higher than FLPP. A history of these pays is provided in Mackin et al. (2007).

Mackin et al. (2007)

Individuals receiving military-sponsored language training are required to have their skills assessed and certified initially following training and then recertified on an annual basis. These individuals can then qualify for FLPP. Using a regression framework, Mackin et al. (2007) estimated the relationship between the payment of FLPP and likelihood an eligible enlisted member is qualified in a foreign language for which FLPP is offered. Mackin et al. found that FLPP expected payments have a positive and statistically significant effect on the probability that the eligible individual is qualified, meaning that higher levels of FLPP payments translate to higher numbers of qualified (proficient) personnel with the estimated effects largest for the Army and the Air Force. For example, in the case of the Army, a 10 percent increase in monthly FLPP payments would be associated with a qualification probability by about 3.3 percent.

Dierdorff and Surface (2008)

Individuals receiving military-sponsored language training are required to have their skills assessed and certified initially following training and then recertified on an annual basis. These individuals can qualify for the Foreign Language Proficiency Bonus (FLPB). Dierdorff and Surface (2008) used five years of data, from 1998 to 2005, on U.S. Army Special Operations Forces soldiers. The data focused on their receipt of the FLPB and their subsequent Defense Language Proficiency Test (DLPT) scores to examine the effect on FLPB on subsequent skill acquisition and maintenance. At the time of the study, FLPB was a monthly amount that ranged from $100 to $200 per month depending on demonstrated skill proficiency.

Dierdorff and Surface found that the FLPB is positively related to individual skill change and maintenance. They also found that the frequency with which skill-based pay is received and the total amount is positively associated with skill development and maintenance.

Davis and Horowitz (2008)

In support of the 10th QRMC, Davis and Horowitz provided a discussion of the potential benefits and drawbacks of credential pay. They also presented an assessment of the concept using criteria developed by the DACMC. Davis and Horowitz defined credential pay as extra money service members can receive every month that they hold a specific credential. The pay is independent of their current billet and the source of the credential. Some of the pays DoD offers are like credential pay, namely flight pay for aviators. That is, aviators receive the pay even if they are not in billets requiring them to fly.

Davis and Horowitz identified three major advantages of credential pay. First, it would increase secondary skills among service members. These are skills that are not the members' primary responsibility but may still be useful to the services. Examples provided by Davis and Horowitz include language proficiency (for those not required to have language proficiency), medical first responders, physical fitness, and process improvement. Second, it would decrease training costs by enabling the military services to leverage civilian training in skills that are not specific to the military. Finally, it would provide greater reliability than incentive pays that are based on billet assignment or profession-based pays. In the case of incentive pays, active members can be ordered to a new billet or even a new profession where the pay is not offered. Because they are less reliable, these pays provide less incentive.

The study discussed issues that the authors felt would need to be addressed when implementing credential pay and their proposed solutions to some of them:

- *Individuals with multiple credentials:* If credentials are nested, members should receive pay only for the highest cost credential. If credentials are complementary, member should receive both pays. If credentials are so dissimilar that member could not use both in the same job either in the military or outside of it, then the service need not pay for both. Member should get paid for the more valuable skill.
- *Reservists:* Reservist eligibility may need to be more restricted than for active duty personnel because reservists cannot be ordered into a new assignment in which the credential can be used. This is because reservists have more discretion in choosing their units. For reservists, it may be necessary to tie some credential pays to member's profession or billet.
- *Syncing with other incentives:* The services would need to make sure members who also receive other special and incentive pays were not overcompensated.
- *Changes to the military rank structure:* The rank structure may need to change if the services require the accession of personnel who are already highly skilled.
- *Oscillating rates:* If credential pay rates are set too high, they could attract more people than needed, so the services would need to lower rates. But this would cause fewer people to earn the credential, leading the services to raise rates again, creating an oscillating pattern that would make planning difficult and causes the services to never have the targeted number of credentialed people.

Davis and Horowitz also considered whether credential pay met the objectives for military compensation developed by the 2006 DACMC. They found that credential pay met the majority of these objectives. They argued that it would support force management by allowing the services to improve retention for personnel in high-demand skills. It would support personnel management flexibility by putting decisions about credential pay into the hands of the services, thereby allowing them to adapt faster to changing circumstances. They argued that it would also support simplification if credential pay replaced some of the pays already used by the services. It would also work for both active and reserve personnel, thereby supporting an integrative personnel management approach to the different components. They also argued that credential pay would be efficient in increasing the services' ability to leverage skills acquitted external to the military. It would also promote efficiency if rates were market-based, so that rates were higher for those with skills in greater demand. Furthermore, if the rates were market-based, it would support the objective that military compensation be consistent with individual choice and volunteerism. Finally, they argued that credential pay would be fair insofar as DoD would honor promises made regarding paying for skill acquisition. To the extent that credential pay would vary across personnel, Davis and Horowitz argued that this is no different from other special and incentive pays, such as selective reenlistment bonuses, that vary across military personnel.

Hosek and Asch (2002)

The Air Force asked RAND to consider ways to strengthen the compensation system for Air Force personnel, focusing specifically on skill pay versus capability pay. Skill pay is pay for designated skills, whereas capability pay is pay based on individual capability, especially current and prospective future leadership potential. To learn about what role these pays might play, Hosek and Asch (2002) reviewed the Air Force's manpower situation, examined data on the

level and compensation of military compensation, and considered the advantages and disadvantages of skill pay and capability pay.

Skill pay would emphasize skill. Hosek and Asch argued that the key rationale for skill pay is to protect a valuable stock of current and future human capital when replacing that stock is costly and time-consuming. It would be necessary to define the term *skills* and to establish a program to maintain skills and certify that they have been maintained. Skill pay would help conserve the stock of designated skills that are valuable for military capability and that might be costly and time-consuming to replace. These skills might also be in high demand in the private sector. Compared with bonuses, Hosek and Asch argue that skill pay would have the advantage of being more stable. Bonuses, in contrast, are intended to prevent or address shortages in the flow of personnel currently needed to meet manning requirements in certain specialties. Special pays for aviators and physicians exemplify skill pay from the standpoint of this study.

Hosek and Asch state that skill pay could enable the Air Force to give explicit recognition to the differing external market opportunities available to personnel in various skill areas. It could also provide a means of explicitly rewarding and providing incentives for acquiring and maintaining skills that are essential for military readiness and difficult or costly to replace. Skill pay could be paid to those with a given skill even if they are not using that skill in their current assignment. The rationale for this approach would be that it would enable the Air Force to prevent the loss of critical skills and to maintain a ready inventory of the skills in case of loss of that skill or unexpected demand for it in the future. Though it provides some advantages to the Air Force, Hosek and Asch conclude that skill pay is not designed to be a pay-for-performance incentive.

Discussion

The three studies above predate the authorization for skill-incentive pay and proficiency bonus in 37 U.S.C. section 353. Arguably, the language in the authorization reflects some this prior analysis. For example, skill-incentive pay allows the services to offer a pay for a skill that is not tied to a billet or duty assignment. Consequently, members with the requisite proficiency can receive the pay even if they are not currently performing the duty. Skill-incentive pay or credential pay as discussed in past work can help the services meet the requirements for or to ensure an inventory of personnel with needed skills. It enables the services to pay for expertise that could exist in the civilian sector or be developed in the military by raising pay for marketable skills. It also provides more pay stability to the extent that the pay does not turn on or off as members are rotated in and out of duties requiring the skill.

However, from the standpoint of providing pay-for-performance incentives, credential pay falls short. To the extent that increased skill increases performance, skill pay provides an incentive for greater performance. But credential pay is designed to reward skill and not changes in performance and would not increase or decrease when performance is superior or falls short. Consequently, credential pay would not be a means of replacing a TIG pay table as a mechanism for increasing performance incentives.

Summary

The 13th QRMC requested that RAND assess constructive credit for performance and credential pay as alternatives to a TIG pay table in terms of providing increased performance incentives under the current TIS pay table. This chapter summarized our analysis and findings.

We find that the basic pay profiles for fast promoters under the TIS pay table with constructive credit are similar to those under the TIG pay table. Consequently, the profiles are higher with than without constructive credit. The implication of this analysis is that constructive credit for performance is a policy that can broadly replicate the higher pay found under the TIG pay table. Using the DRM estimates for Army enlisted personnel and officers, our simulations indicate that enlisted and officer retention, average ability, and ability sorting would also improve, but not as much as they would under the TIG pay table. That said, the simulations indicate that constructive credit is less efficient than the TIG pay table, meaning the Army could achieve a given force size and improved performance at less cost with the TIG pay table over the TIS pay table. On the other hand, constructive credit is an improvement over the TIS pay table in terms of efficiency, at least in terms of ability sorting. The implication is that constructive credit for performance would be an improvement over current policy, but not as great an improvement as is predicted to occur under the TIG pay table.

Regarding credential pay, we find that skill-incentive pay and the proficiency bonus authorized under section 353 of Title 37 of the U.S. Code beginning in 2016 is designed to provide higher pay to members with critical skills or career fields. Research on the foreign language proficiency bonus indicates that bonuses are positively associated with greater skill proficiency. Nonetheless, skill-incentive pay credential pay is not designed to be a pay-for-performance program that rewards superior performance and reduces pay for those who fall short. Thus, it would not be an effective substitute to the TIG pay table in terms of increasing performance incentives.

CHAPTER SEVEN

Variation in Time to Promotion and Its Impact on Basic Pay

One of the disadvantages of a TIG pay table discussed by previous commissions and studies, and as summarized in Table 2.1, is the concern that a TIG pay table could result in more inequitable differences in pay to the extent that promotion speed differs across personnel because of factors beyond the control of individual members. These previous studies have argued that if promotion speed varies primarily because of supply and demand factors that cause promotion opportunities to vary across personnel and not because of differences in performance, then a TIG pay table would exacerbate pay differences unrelated to performance. That said, past commissions have also argued that this feature of a TIG pay table also has an advantage. The change in promotion opportunities due to changes in retention self-corrects by creating an offsetting retention and recruiting effect. By magnifying the pay differences associated with promotion, this self-correcting effect is stronger under a TIG pay table.

In this chapter, we consider empirical evidence regarding the role of supply and demand factors in promotion speed, focusing on enlisted personnel, for whom promotion speeds are more apt to vary over time and across personnel. First, we examine the extent of the variation in time to promotion within each service and across entry cohorts within a service, focusing on time to promotion to E-4 and E-5. These promotions are the first competitive ones, since promotions to E-2 and E-3 are nearly automatic if members satisfy TIG and training requirements. That is, these promotions are the first opportunity for promotions to respond to differences in performance. Second, we investigate the extent to which the observed variation in time to promotion affects basic pay trajectories over time, under the TIS versus the TIG pay table.

These first two steps are similar in spirit to the analysis in Chapter Two where we examine basic pay over a career for fast versus slow promoters under the TIS versus the TIG pay table. The difference here is that we show more-detailed results about variations in time to promotion across the services, and then focus in on the implications for basic pay trajectories in the early career versus the entire career. Importantly, these first two steps provide context for the third and fourth steps which are unique to this chapter.

Third, we estimate the extent to which variations in time to promotion are attributable to factors outside the individuals' control, such as supply and demand factors. As we show below, our results suggest that, in general, supply and demand factors explain the largest share of variation in enlisted time to promotion among the covariates tested. Finally, to better understand the extent to which variation in pay is reduced when we account for the variation explained by the supply and demand factors, we redo our calculations of the basic pay trajectories under the TIS versus the TIG pay table. We conclude the chapter with a discussion of the implications of these results.

Data

The analysis in this chapter uses data from DMDC's active duty master and pay files. The active duty master file contains an inventory of all individuals on active duty, and the active duty pay file contains monthly pay and compensation data at the individual service member level. We use data on enlisted service members spanning October 2000 through September 2018 who enter active duty between FY2001-FY2013. Entrants in each FY are called entry cohorts or cohorts in our description below.

The sample of enlisted service members are restricted to those without prior enlisted service and who enter active duty as an E-1.[1] Time to promotion is calculated based on when an enlisted member changes pay grade in the active duty pay file, and presented in months from entry to promotion. Thus, time to promotion in this analysis is measured in terms of months of service until promotion, and not months in a given grade until promotion to the next grade. Unless otherwise noted, time to promotion to E-5 is restricted to the FY 2001–FY 2010 cohorts to ensure that service members are observed for enough years to witness an E-5 promotion.

Variation can be defined in different ways. For the purposes of this analysis, we measure variation in time to promotion as the difference between time to promotion for those in the 10th percentile and 90th percentile of the distribution of time to promotion (i.e., those in the 10th percentile are promoted faster than those in the 90th percentile). By taking the difference between these two percentiles, we can approximate how much time to promotion, and by implication basic pay, differs between those who are promoted the fastest versus those who are promoted the slowest, while excluding outliers (i.e., those with extreme values of time to promotion).

Variation in Time to Promotion Across the Services

To examine variation in time to promotion, we calculated the 10th, 25th, 50th, 75th, and 90th percentiles of time to promotion by cohort for each service. Table 7.1 presents the median time to E-4 and E-5 by service, demonstrating that time to promotion varies across the services. Army enlisted service members are promoted the fastest, with a median time to E-4 of 24 months and a median time to E-5 of 46 months. Marine Corps and Navy enlisted service

Table 7.1
Median Time to Promotion, by Service (months)

Service	Median Time to E-4	Median Time to E-5
Army	24	46
Air Force	30	60
Marine Corps	32	51
Navy	32	52

SOURCE: Authors' calculations.

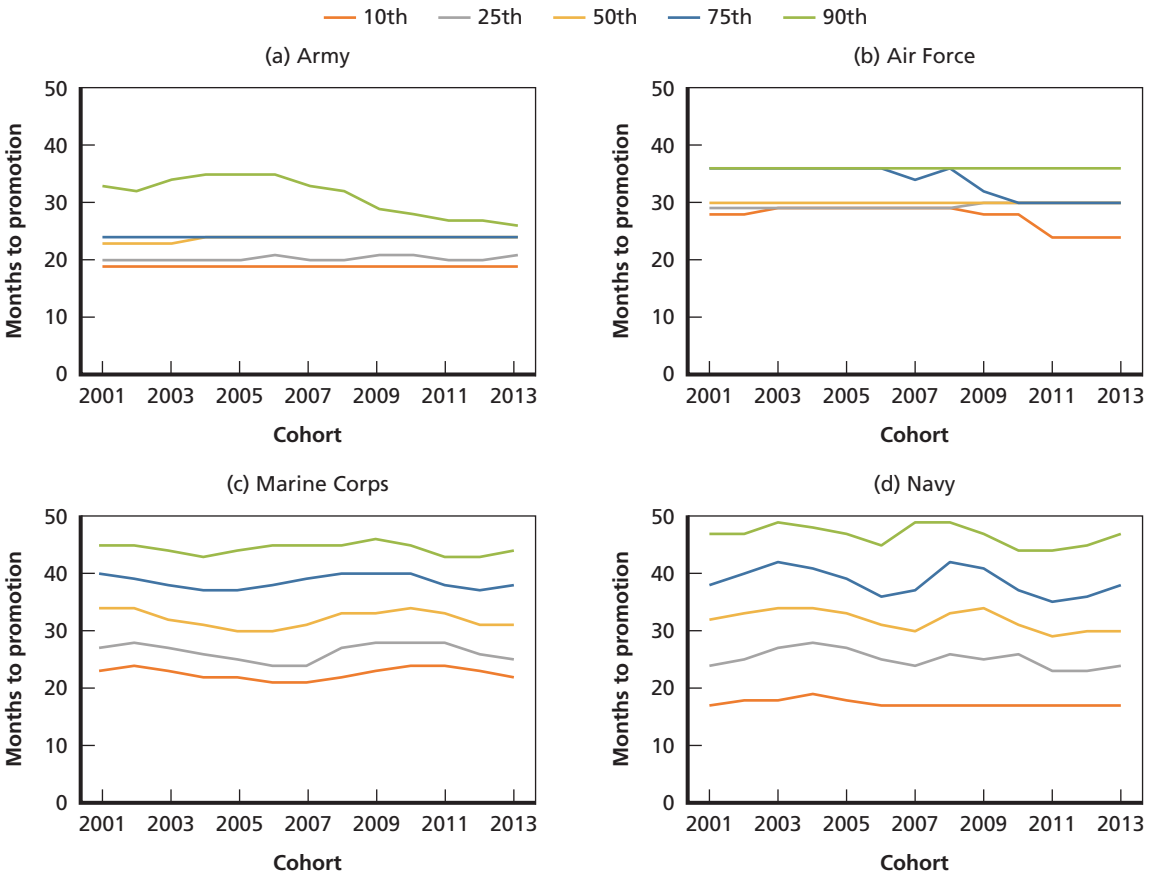
[1] Within each service, we excluded service members in occupations with small sample size, namely, service members with three-digit DoD occupation codes that have 50 or fewer observations in any given cohort were dropped.

members experience the longest median time to E-4, 32 months, while Air Force enlisted service members experience the longest median time to E-5, 60 months.

We also find that the variation in time to promotion can differ by cohort, as shown in Figures 7.1 and 7.2 for time to E-4 and to E-5, respectively. In Figure 7.1, variation in time to E-4, i.e., the vertical distance between the 10th (orange line) and 90th percentile (green line) decreases by cohort among Army enlisted and increases by cohort among Air Force enlisted. In addition, unlike the figures for the Marine Corps and Navy, some of the percentiles of time to E-4 for the Army and Air Force are flat, suggesting that there may be rules in place or standard practices that are common across personnel in all occupations that dictate when these enlisted service members are promoted to E-4.

To empirically investigate this further, we plot Kaplan-Meier survival curves that show the probability of being promoted in a specific month of service, conditional on surviving to that month (e.g., the probability that someone is promoted in month 24 conditional on serving on active duty through month 24).[2] The survival curves in Figure 7.3 indeed show that there

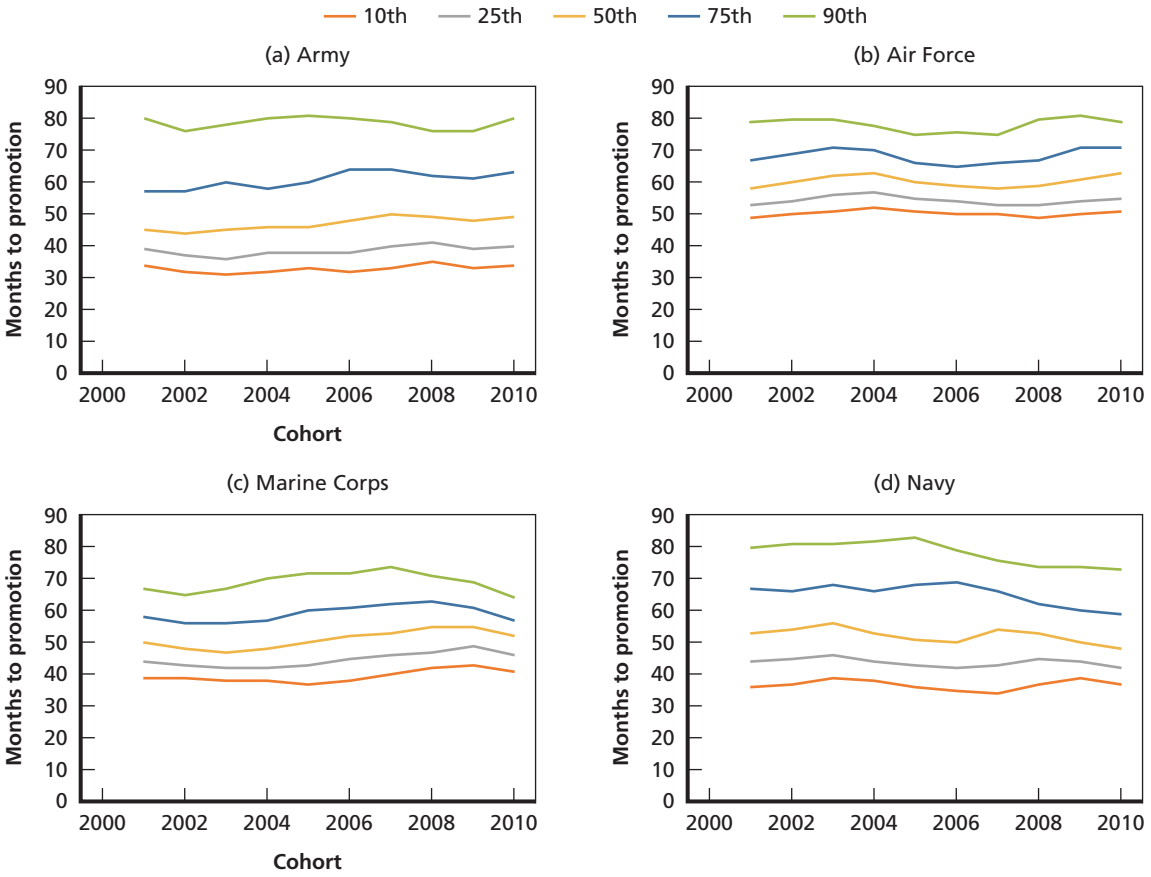
Figure 7.1
Variation in Time to E-4, by Cohort and Service



SOURCE: Authors' calculations.

[2] Technically, we calculate the Kaplan Meier survival probabilities to estimate the fraction of service members who "survive" in pay grades E-1 through E-3 before being promoted to E-4, and the figures plot 1 minus these probabilities.

Figure 7.2
Variation in Time to E-5, by Cohort and Service

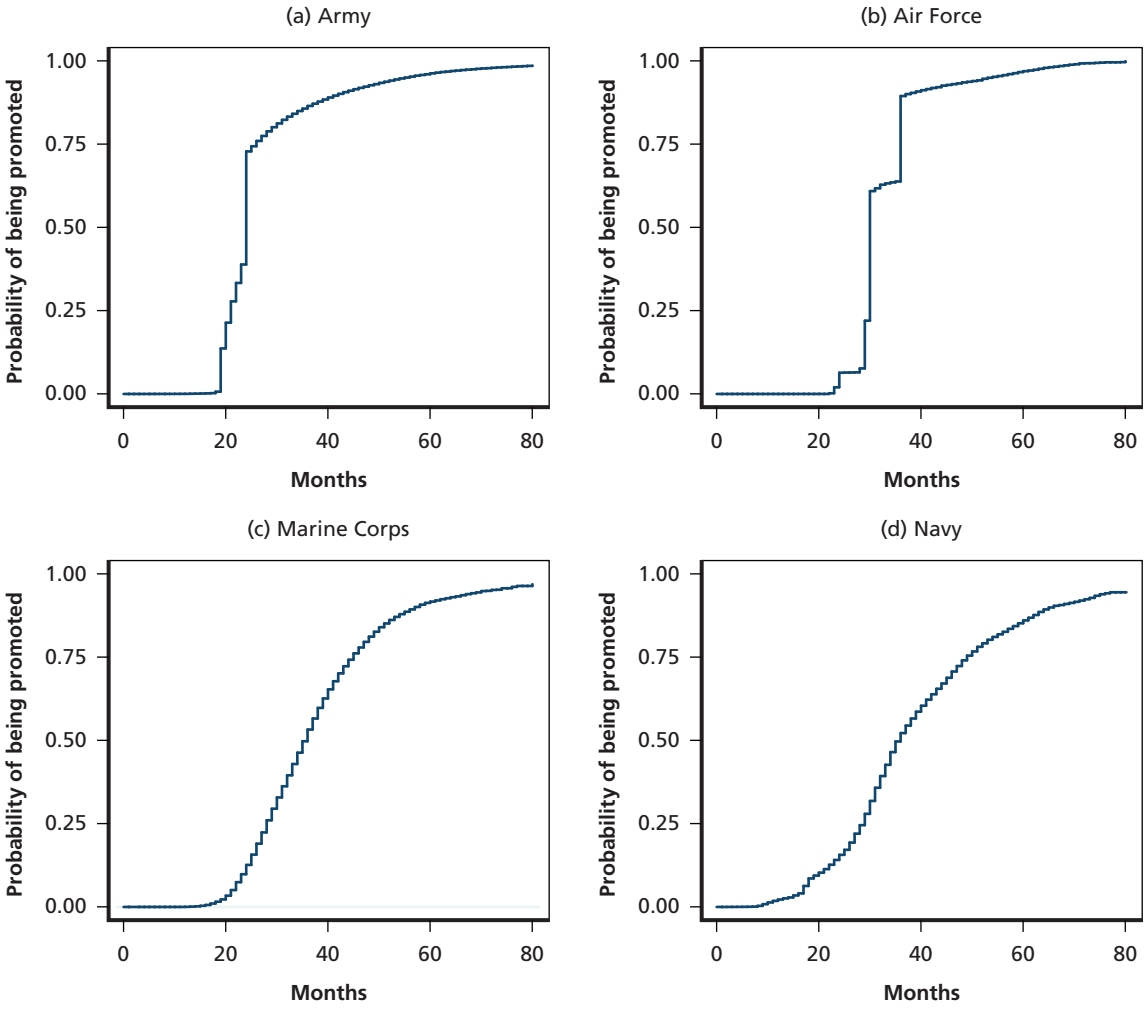


SOURCE: Authors' calculations.

are jumps in the probability of promotion to E-4 at specific months among the Army and Air Force, whereas the curves for the Marine Corps and Navy are generally smooth over time. This suggests that there are certain months when large proportions of enlisted Army and Air Force are promoted. For Army enlisted, there are large increases in the probability of promotion to E-4 between 19 and 24 months. For Air Force enlisted, there are large increases in the probability of promotion to E-4 at 29, 30, and 36 months.

Variation in time to E-4 is roughly constant across cohorts for Marine Corps and Navy enlisted service members, and the variation for these two services is greater than those for Army enlisted and Air Force enlisted. In contrast, Figure 7.2 shows that the Army had the greatest variation in time to E-5, followed by the Navy. Furthermore, variation in time to E-5 was relatively stable across cohorts for both Army and Air Force enlisted service members, with the vertical distance between the 10th and 90th percentiles being roughly the same when comparing time to promotion between the 2001 and 2010 cohorts. For Marine Corps and Navy enlisted service members, variation in time to E-5 decreased for recent cohorts. In particular, for the Marine Corps, variation in time to E-5 decreased between the 2007 and 2010 cohorts, with the difference between the 10th and 90th percentiles reducing from 34 months

Figure 7.3
Kaplan-Meier Survival Curves for the Probability of Being Promoted to E-4, by Service



SOURCE: Authors' calculations.

to 23 months. For the Navy, the difference between the 10th and 90th percentiles decreased from 47 months for the 2005 to 36 months for the 2010 cohort.

These results suggest that enlisted time to promotion varies across the services. As we illustrate in the next section, this variation can cause the impact of the TIG pay table on pay trajectories to vary across the services as well.

The Effect of Variation in Time to Promotion on Variation in Basic Pay

To understand how variation in time to promotion impacts pay, we estimate basic pay trajectories under both the current TIS pay table and TIG pay table. We use the January 2020 enlisted pay table (DoD Defense Finance and Accounting Service, 2020) to calculate basic pay under the TIS pay table and use Table 2.2 to calculate basic pay under the TIG pay table.

Because this analysis is meant to be illustrative, we make simplifying assumptions and restrict the sample to service members who are promoted within certain timeframes.

When estimating how variation in time to E-4 affects pay, we restrict the sample to service members with at least 6 YOS who were promoted within 6 years. Thus, individuals with at least 6 YOS who were not promoted within 6 YOS were excluded. We then calculate the 10th and 90th percentile of time to E-4 for each service and estimate pay for the first 6 YOS twice, once assuming that time to E-4 equals to the 10th percentile and once assuming that time to E-4 equals the 90th percentile. The trajectories are calculated assuming the median time to E-2 and median time to E-3 among those in the 10th and 90th percentiles, respectively. Because a large share of these service members were also promoted to E-5 during the first 6 years,[3] we account for E-5 promotions in the basic pay trajectories by estimating a weighted average of pay where the weights are equal to the proportion of service members promoted to E-5 within 6 years and the median time to E-5 for the 10th and 90th percentile of time to E-4 are applied, respectively.

To estimate how variation in time to E-5 affects pay, the sample is restricted to service members with at least 8 YOS who were promoted to E-5 within 8 years. Similar to the E-4 analysis, we then calculate the 10th and 90th percentile of time to E-5 for each service and estimate pay for the first 8 YOS under both the current TIS table and the TIG pay table. The trajectories are estimated using the median times to E-2, E-3, and E-4 for service members in the 10th and 90th percentile of time to E-5.[4]

Table 7.2 shows the 10th and 90th percentiles of time to E-4 and E-5 for the subsamples used for this portion of the analysis. Similar to before, we find that the difference between months to promotion between the 10th and 90th percentiles of time to E-4 are greatest for

Table 7.2
Months to Promotion from Entry for Subsamples

	Army	Air Force	Marine Corps	Navy
Months to E-4				
10th percentile	19	24	21	17
90th percentile	35	36	44	48
Difference	16	12	23	31
Months to E-5				
10th percentile	34	51	41	39
90th percentile	80	79	72	81
Difference	46	28	31	42

SOURCE: Authors' calculations.

[3] Among enlisted service members promoted to E-4 within 6 years, 63 percent of Army service members, 73 percent of Air Force service members, 87 percent of Marine Corps service members, and 71 percent of Navy service members were promoted to E-5.

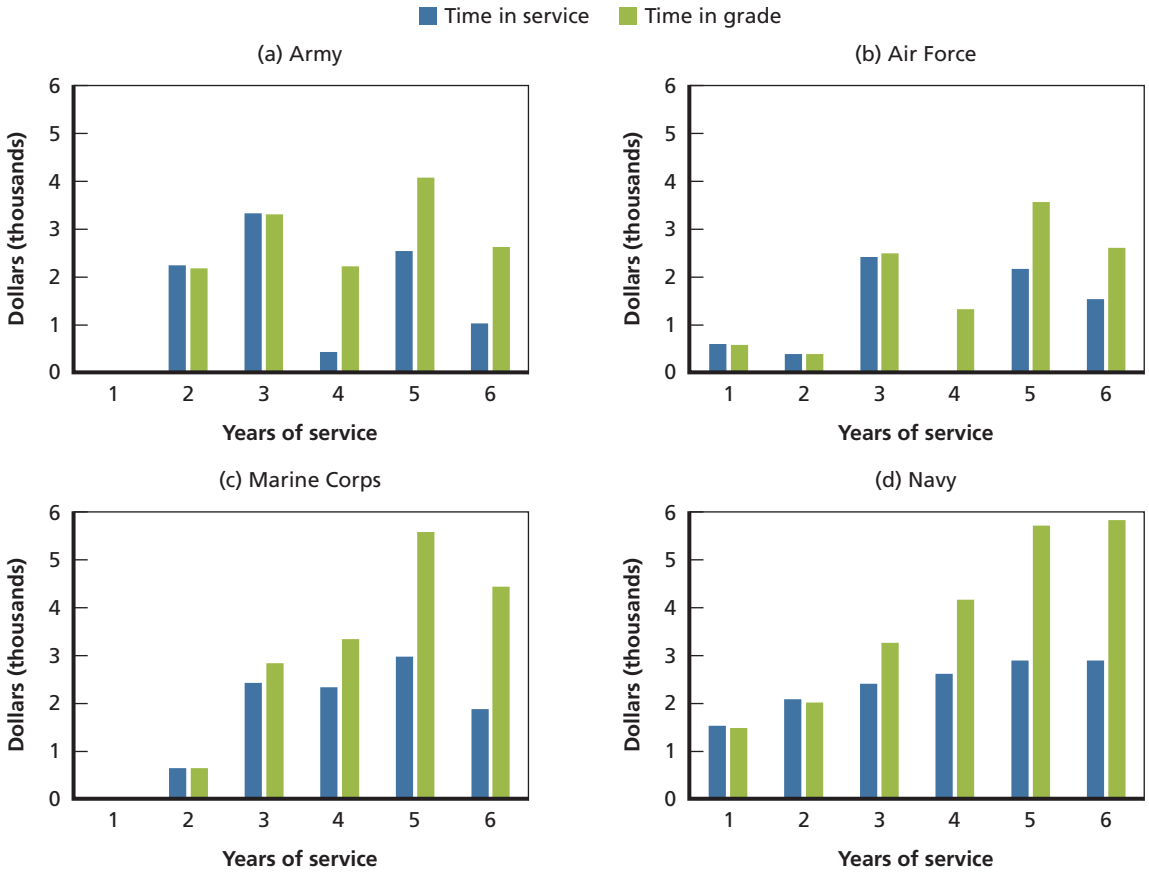
[4] We do not account for promotion to E-6 when calculating the basic pay trajectories for the those in the 10th and 90th percentiles of time to E-5 since a minority of service members are promoted within the first 8 years.

service members in the Marine Corps and Navy, while the difference between the 10th and 90th percentiles of time to E-5 are greatest for service members in the Army and Navy.

Figure 7.4 presents the estimated annual differences in basic pay between those in the 10th percentile and those in the 90th percentile of time to E-4 under both pay tables. Under the TIS pay table, the differences in basic pay between the 10th and 90th percentiles of time to E-4 (blue bars) vary by YOS. In general, those who are promoted faster (i.e., in the 10th percentile of time to E-4) temporarily have greater pay than those who are promoted slower (i.e., in the 90th percentile of time to E-4 under the TIS pay table).

For example, panel (a) of Figure 7.4 shows that the difference in basic pay for Army personnel falls in the 4th and 6th YOS when those in the 90th percentile of time to E-4 are promoted to E-4 and E-5, respectively. A broadly similar pattern is seen for the Marine Corps and Air Force. But for Navy personnel, basic pay for those in the 10th percentile of time to E-4 is greater than pay for those in the 90th percentile for all YOS under the TIS pay table. By the time those Navy personnel in the 90th percentile are promoted to E-4, a large fraction of those in the 10th percentile are promoted to E-5. In other words, Navy enlisted service members who are promoted in the 90th percentile of time to E-4 are not able to catch up pay wise to those who are promoted in the 10th percentile. In contrast to the results for the TIS pay table, basic pay differences between the 10th and 90th percentile of time to E-4 under the TIG pay table

Figure 7.4
Basic Pay Differences Between the 10th and 90th Percentile of Time to E-4, by Service



generally remain once those in the 10th percentile are promoted to E-4 (orange bars), or the declines at YOS 4 and 6 are not as great as they are under the TIS pay table. The maximum annual differences across the services are $3,300 (Army, YOS 3) under the TIS pay table and $5,800 (Navy, YOS 6) under the TIG pay table.

The differences in pay gaps across the services between the 10th and 90th percentiles of time to E-4 shown in Figure 7.4 are driven by the differences in variation in time to promotion across the services. Air Force enlisted members experience the smallest variation in pay, and Navy members experience the greatest variation. Taking the total difference across the first 6 years, this amounts to a difference in pay ranging from $7,093 among Air Force enlisted personnel to $14,426 among Navy enlisted under the TIS pay table (Table 7.3). Compared with the TIS pay table, these differences in pay are much larger under the TIG pay table with the TIG pay differences equaling at least 1.5 times of those under the TIS pay table. These results are consistent with our findings in Chapter Two where we find that basic pay is higher over a career under the TIG pay table.

Figure 7.5 shows results similar to those in Figure 7.4, for time to E-5. Similar to the results in Figure 7.4 and the results shown in Chapter Two, the pay differences are larger under the TIG pay table than under the TIS pay table. In addition, the annual differences in basic pay between members in the 10th versus the 90th percentile of time to E-5 are eliminated under the TIS pay table once members in the 90th percentile are promoted to E-5, as shown by the blue bars disappearing at YOS 8 for Army, Air Force, and Navy enlisted and disappearing at YOS 7 for Marine Corps enlisted personnel. The maximum annual difference in pay under the TIS pay table is about $3,000 for Army, Air Force, and Marine Corps enlisted service members and about $3,400 for the Navy. Under the TIG pay table, the maximum annual differences in pay between service members in the 10th and 90th percentile of time to E-5 are larger at about $4,700 for the Army, $3,500 for the Air Force, $5,600 for the Marine Corps, and $6,100 for the Navy.

Table 7.4 shows that the total differences in basic pay across the first 8 YOS vary across the services. In particular, under the TIS table, the total difference in pay between members in the 10th and 90th percentile of time to E-5 varies from $8,091 for the Air Force up to $16,841 for the Navy, with the Navy difference being over twice as large as that for the Air Force.

The variation in total pay differences across the services is even greater under the TIG pay table. They range from $12,077 for the Air Force to $31,928 for the Navy (or over 2.6 times the difference for the Air Force). Moving from the TIS pay table to the TIG pay table would increase the pay difference between members in the 10th and 90th percentile of time to E-5, with the difference ranging from 1.5 to 2.2 times the difference under the TIS pay table. We note that although Army enlisted members have greater variation in time to E-5 than do

Table 7.3
Total Difference over Six Years in Pay Between 10th and 90th Percentile of Time to E-4

Pay Table	Army	Air Force	Marine Corps	Navy
TIS	$9,539	$7,093	$10,239	$14,426
TIG	$14,409	$10,908	$16,802	$22,481
TIG/TIS	1.5	1.5	1.6	1.6

SOURCE: Authors' calculations.

Figure 7.5
Basic Pay Differences Between the 10th and 90th Percentile of Time to E-5

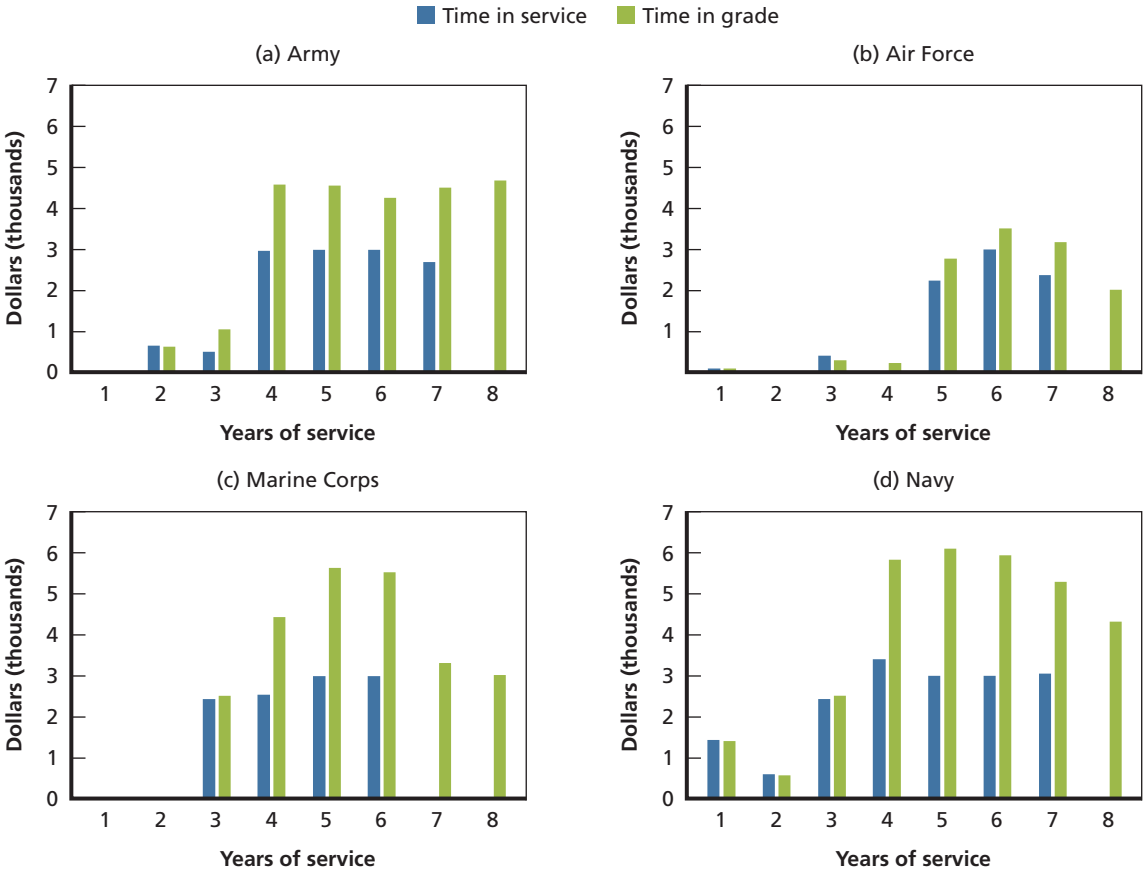


Table 7.4
Total Difference in Pay Between 10th and 90th Percentile of Time to E-5

Pay Table	Army	Air Force	Marine Corps	Navy
Years in service	$12,767	$8,091	$10,909	$16,841
Time in grade	$24,273	$12,077	$24,392	$31,928
Time in grade/years in service	1.9	1.5	2.2	1.9

SOURCE: Authors' calculations.

Navy members, as shown in Figure 7.2, Navy members have a greater variation in the median promotion times to E-2 through E-4 between those in the 10th and 90th percentiles of time to E-5. This explains why differences in pay are larger in Table 7.4 among Navy than Army personnel.

The basic pay trajectories and estimated pay differences between those at the top and bottom of the distributions of time to promotion show that, broadly speaking, greater variation in time to promotion leads to greater variation in pay. Furthermore, because the variation in time to promotion is different across the services, variation in pay is also different across the

services. Moving from the TIS pay table to the TIG pay table causes there to be greater variation in pay within a service and across services.

The Extent to Which Variations in Time to Promotion Are Attributable to Observed Factors

Several past commissions rejected the TIG pay table approach because they argued that it would result in inequitable pay differences for members who have different promotion speeds owing to differences in promotion opportunity (supply and demand factors) and not individual merit. In this section, we investigate the extent to which occupation, cohort entry year, or calendar year—that is, factors other than those specific to individuals such as performance—drive variations in time to promotion. We use occupation to capture variation in time to promotion attributable to occupation. As shown in Appendix C, promotion times can vary substantially across occupation within a given service because of different training times and promotion requirements across occupations. Cohort year might explain variation in time to promotion if promotion opportunities varied depending on when individuals enter active duty. Finally, we include the calendar year of promotion to capture factors related to supply and demand conditions at the time of promotion. For example, a robust economy could improve promotion opportunities for those who stay in service, thereby reducing promotion time.

To estimate how much variation in time to promotion is explained by each of these three factors, we use a Cox Proportional Hazards model, a model that accounts for attrition out of the sample if an enlisted member leaves active duty. We then estimate the survival R-squared (Royston, 2006), a measurement of the proportion of variation explained by observable factors similar to the standard R-squared for linear regression models. The model is estimated separately for each service and for each of the three sets of observable factors. We show the R-squared for each of these estimated survival models for time to E-4 and time to E-5 in Tables 7.5 and 7.6, respectively.

In general, calendar year of promotion explains the largest share of variation in time to promotion to E-4 and to E-5, compared with occupation and cohort. In particular, the calendar year promotion dummies in the models explain between 13.1 percent and 47.5 percent of the variation in time to E-4 and between 3.7 percent to 25.1 percent of variation in time to E-5. The one exception is the Navy, where the largest share of variation in time to E-5 is explained by occupation dummy variables (16.8 percent) followed by calendar year promotion dummy variables (14.5 percent). The implication of this analysis is that promotion opportunities in the calendar year of promotion, driven by supply and demand factors, explains more of the variation in promotion times than the other two factors we considered.

To provide more insight on the extent to which variation in time to promotion is explained by when promotions occur, we examine how much variation remains in time to promotion after we account for calendar year of promotion. The remaining variation is of particular interest because it captures factors other than when promotions occur, including individual-specific factors, such as merit.

Our approach involves assessing the extent to which the variation in time to E-4 and time to E-5 is reduced when using predicted times to promotion that account for supply and demand factors as captured by calendar dummies of promotion. For this analysis, we use a negative binomial regression model to estimate the relationship between time to promotion

Table 7.5
Survival R-Squared for Time to E-4

Covariate	Army	Air Force	Marine Corps	Navy
Occupation dummies	0.001	0.007	0.062	0.107
Cohort dummies	0.002	0.004	0.009	0.008
Calendar year promotion dummies	0.284	0.131	0.450	0.475

SOURCE: Authors' calculations.

Table 7.6
Survival R-Squared for Time to E-5

Covariate	Army	Air Force	Marine Corps	Navy
Occupation dummies	0.043	0.004	0.054	0.168
Cohort dummies	0.017	0.009	0.037	0.010
Calendar year promotion dummies	0.141	0.037	0.251	0.145

SOURCE: Authors' calculations.

and calendar year promotion dummies. We then predict time to promotion at the 10th and the 90th percentiles using the regression estimates. If calendar year of promotion fully explains differences in time to promotion, with no remaining differences attributable to other factors, such as individual merit, we would expect no difference between promotion time at the 10th and the 90th percentile. In other words, there would be no remaining variation—everyone would have the same promotion time once we account for supply and demand factors as captured by the calendar dummies. On the other hand, if calendar year of promotion explained only a small amount of the difference in promotion time at the 10th versus the 90th percentile, so that most of the variation were due to other factors, such as individual merit, the remaining portion would be large relative to the observed difference. Thus, we assess the extent of the remaining variation by comparing it to the observed variation. Table 7.7 summarizes our results.

We find that the variation in time to E-4 and time to E-5, as measured by the difference in promotion time at the 10th and 90th percentile, is substantially smaller than the observed differences when using predicted times to promotion that account for calendar year of promotion. For example, the observed difference in time to promotion to E-4 for the Army is 16 months but the differences in predicted times is 4 months. Thus, after accounting for promotion opportunities at the time of promotion, little difference in promotion time is observed. Put differently, other factors including individual merit explain relatively little of the variation in promotion time to E-4 and E-5, regardless of service.

Table 7.7
Variation in Observed and Predicted Months to E-4 and E-5

Percentile of Months to E-4	Army		Air Force		Marine Corps		Navy	
	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted
Months to E-4								
10th percentile	19	22	24	30	21	31	17	31
90th percentile	35	26	36	31	44	33	48	35
Difference	16	4	12	1	23	2	31	4
Months to E-5								
10th percentile	34	50	51	61	41	51	39	55
90th percentile	80	57	79	65	72	59	81	61
Difference	46	7	28	4	31	8	42	6

SOURCE: Authors' calculations.

Implications for Differences in Basic Pay Under the Time-in-Service Versus the Time-in-Grade Pay Table

Tables 7.3 and 7.4 showed observed differences in basic pay between those promoted to E-4 and E-5, respectively, at the 10th versus the 90th percentile under the TIS versus the TIG pay table. In this section, we show the corresponding predicted differences in basic pay, but after controlling for supply and demand factors as measured by calendar year of promotion. The regression models for this analysis are estimated separately for time to E-4 and time to E-5 and separately for each service using the same samples employed to create the earlier basic pay trajectories. This allows us to directly compare our results with those shown in Tables 7.3 and 7.4. As before, we estimate basic pay trajectories both under the TIS and TIG pay table. The results are reported in Tables 7.8 and 7.9 for time to E-4 and to E-5, respectively.

Because there is less variation in predicted time to promotion, the total differences in basic pay between the 10th and 90th percentiles of predicted time to E-4 and predicted time to E-5 are much smaller than their observed counterparts. For example, in Table 7.8, the observed difference in total basic pay for those with promotion times to E-4 at the 10th versus the 90th percentile is $9,539 for the Army under the TIS pay table. This figure reduces to $2,991 when we account for calendar year. Similarly, the figures fall from $14,409 to $4,692 under the TIG pay table. In both cases, the predicted difference is about one-third of the observed difference. For the other services, the predicted difference is even less, as shown in Table 7.8, and as low as 0.05 for the Air Force. We find similar results for time to E-5, shown in Table 7.9.

An implication of the smaller differences in total differences in basic pay using predicted times to promotion is that the amount of the financial incentive for superior performance that remains after accounting for supply and demand factors is relatively small. But the other finding, of particular relevance to the advantages of the TIG pay table, is that the predicted differences are larger under the TIG pay table than the TIS pay table. In other words, if the remaining difference in pay is the incentive for superior performance, that incentive is larger under the TIG pay table, and in some cases, the incentive is considerably larger. For example, in Table 7.9, the pay difference when using the predicted time to E-5 for the Army is almost

Table 7.8
Total Difference in Basic Pay Between the 10th and 90th Percentile of Time to E-4, Observed Versus Predicted

Pay Table	Observed Versus Predicted Promotion	Army	Air Force	Marine Corps	Navy
TIS	Observed	$9,539	$7,093	$10,239	$14,426
TIS	Predicted	$2,991	$383	$2,250	$1,740
TIS: predicted/observed		0.31	0.05	0.22	0.12
TIG	Observed	$14,409	$10,908	$16,802	$22,481
TIG	Predicted	$4,692	$583	$4,103	$1,907
TIG: predicted/observed		0.33	0.05	0.24	0.08

SOURCE: Authors' calculations.

Table 7.9
Total Difference in Basic Pay Between the 10th and 90th Percentile of Time to E-5, Observed Versus Predicted

Pay Table	Description	Army	Air Force	Marine Corps	Navy
TIS	Observed	$12,767	$8,091	$10,909	$16,841
TIS	Predicted	$2,170	$996	$1,992	$2,299
TIS: predicted/observed		0.17	0.12	0.18	0.14
TIG	Observed	$24,273	$12,077	$24,392	$31,928
TIG	Predicted	$5,957	$1,836	$4,805	$4,991
TIG: predicted/observed		0.25	0.15	0.20	0.16

SOURCE: Authors' calculations.

three times higher under the TIG pay table ($5,957) than under the TIS pay table ($2,170). We find broadly similar results, albeit not always as large, for the other services.

Summary

Relative to the TIS pay table, the TIG pay table creates more variation in pay with the extent of variation differing among the services. When testing which observable factors explain variation in time to promotion, we find that promotion opportunities or supply and demand factors, as proxied by calendar year promotion dummy variables, explain the highest share of variation in time to promotion. We predicted time to promotion, accounting for these calendar year effects, and found that variation in time to promotion and, consequently, variation in pay are greatly reduced under both the TIS pay table and the TIG pay table. On the other hand, the remaining variation in pay, the variation that is explained by factors other than calendar year effects, including individual merit, is larger under the TIG than the TIS pay table.

Thus, our results indicate that the conclusions are more nuanced than those drawn by the critics of the TIG pay table. Consistent with the concerns of the critics, we find evidence to

indicate that a relatively large share of the variation in promotion is attributable to factors such as supply and demand factors that are unrelated to merit. Further, the TIG pay table would exacerbate the pay differences that result from the variation in promotion. That said, these larger pay differences mean that the TIG pay table would improve the self-correcting retention mechanism that occurs as a result of changes in supply and demand factors, an advantage of a TIG pay table. Furthermore, the remaining differences in pay, representing the financial incentive for performance, are still larger under the TIG than the TIS pay table. This latter finding indicates that the advantage of the TIG pay table, though smaller, still remains, even after accounting for the sizable effects on promotion speed of supply and demand factors.

CHAPTER EIGHT

Discussion and Conclusions

The question motivating this study is whether a TIG pay table would better support the increased focus by the services and Congress on improved talent management and military personnel performance. While interest and consideration of the advantages and disadvantages of a TIG pay table are not new, the 13th QRMC requested that RAND reexamine the merits and drawbacks of a TIG pay table, making use of more-recent data and modeling capabilities such as the DRM. In this chapter. we draw together the findings from the previous chapters to summarize this new evidence regarding the advantages and disadvantages of a TIG pay table using the estimates derived from the specific TIG pay table that we developed for this study. We also review our findings regarding whether the advantages could also be achieved under a TIS pay table with an alteration of current policy and conclude with some final thoughts.

Advantages of The Time-in-Grade Pay Table

The first major advantage of the TIG pay table over the TIS pay table is that the TIG pay table gives a permanent financial reward for early promotion, thereby providing greater incentives for performance, given that fast promotion is the primary means by which the military rewards better performance. Our simulations of basic pay over a career show this to be the case for enlisted personnel and commissioned officers. For example, in simulations of basic pay for enlisted personnel, we find that the discounted present value of basic pay is 11.3 percent rather than 5.5 percent higher for those promoted earlier under the TIG versus the TIS pay table, and the discounted present value of retired pay is 22.8 percent higher, compared with 14.3 percent. Furthermore, the pay advantage of the TIG pay table for those promoted faster remains, even when we control for factors unrelated to performance, such as supply and demand factors that can alter promotion opportunities at a point in time. We find similar results for the other services.

A second advantage is that the TIG pay table provides higher entry pay than the TIS pay table to lateral entrants, thereby increasing the competitiveness of military compensation to individuals with critical civilian-acquired skills, such as cyber skills. These results are consistent with findings of past studies and commissions.

Third, the TIG pay table would be a more efficient approach to setting basic pay. We demonstrate the increased efficiency by making use of the expanded DRM capability we created for this project. The expanded capability allows us to simulate the retention, cost, and performance effects of alternative compensation policies. Because we do not observe ability directly, we parameterize ability so that promotion speed is related to ability, and we calibrate

the parameters so that we can replicate the steady-state retention profile of personnel under the TIS pay table. Using the Army enlisted force as an example, we find that greater performance in terms of average ability could be achieved at less cost and for the same retention under the TIG table relative to the TIS pay table. Furthermore, under the TIG pay table, the retention of better performers increases, so the average ability of those in top grades increases relative to ability in the lower grades. Put differently, the Army in our example could achieve the same retention for less cost and achieve a higher-performing force under the TIG pay table.

Finally, if promotions are subject to supply and demand factors, the TIG pay table increases the extent to which promotions help improve retention when these factors change. For example, when the economy improves and retention falls, promotion opportunities improve in occupations that experience the greatest shortfalls. The improved promotion opportunities act as a self-correcting mechanism by inducing higher retention (or lessening the impact of declining retention) and attracting more personnel to occupations experiencing retention issues. Because the TIG magnifies the financial effects of differences in promotion speed, this self-correcting mechanism is stronger under a TIG pay table. As we discuss below in the context of the disadvantages of the TIG pay table, much of the difference in promotion speed is attributable to these supply and demand factors.

Disadvantages of The Time-in-Grade Pay Table

The major disadvantage of the TIG pay table is that the transition would be costly to DoD and would be disruptive to a significant fraction of the force. Examining the YOS and promotion history of active duty personnel in service in January 2019, we estimate that about one-third (32.1 percent) would experience a basic pay reduction in the transition to the TIG pay table, with an average reduction of 6 percent among those who would experience a pay reduction. If DoD adopts a policy to hold members harmless in terms of the level of basic pay by offering save pay, we estimate that in the first year, the cost of this save pay policy would be $1.39 billion in 2018 dollars, with most of the cost attributable to save pay for enlisted personnel. This cost does not include the cost of providing financial education to the force and "socializing" the change to smooth the transition. As discussed by the 10th QRMC and Hogan and Mackin (2008), Congress and DoD could adopt policies to reduce the save pay cost, such as implementing it in conjunction with the annual across-the-board pay rate.

Another challenge with establishing the TIG pay table is the pay for warrant officers and commissioned officers who transition out of the enlisted force could decrease, creating a pay inversion for these personnel. The difficulty is that members promoted from the enlisted force to either the warrant officer or commissioned officer force often have widely different amounts of prior enlisted service. Another difficulty is that the warrant officer TIG pay table is designed for those without prior enlisted service, so pay potentially decreases for those who become warrant officers with prior enlisted service. This disadvantage of the TIG pay table could be addressed by allowing the services to flexibly set the starting grade for those with prior enlisted service. For example, allowing warrant officers with prior enlisted service to transition to warrant officers status at the grade of W-2 or W-3 could address the pay inversion.

Another disadvantage of the TIG pay table is that differences in promotion speed can reflect factors other than differences in individual performance. Although promotion speed is the primary means by which the military rewards better performance financially, promotion

speed can differ because of differences in promotion opportunities that arise because of supply and demand factors, as mentioned above. While this self-correcting mechanism is stronger in a TIG pay table, and thus an advantage of the TIG pay table, a critique of the TIG pay table is that the differences in promotion speed would result in more inequitable differences in pay to the extent that promotion speed differs across personnel because of factors beyond their control. Consistent with the concerns of the critics, we find evidence to indicate that a relatively large share of the variation in promotion is attributable to factors such as supply and demand factors that are unrelated to merit. Further, the TIG pay table would exacerbate the pay differences that result from the variation in promotion. But these other factors do not explain all of the differences in promotion speed. To the extent that the remaining differences in pay, after controlling for these other factors, represent the financial incentives for performance, we find that the remaining differences are still larger under the TIG than the TIS pay table. The implication is that while the criticism has merit, it still the case that the TIG pay table provides a stronger financial incentive for performance.

Could the Advantages of the Time-in-Grade Pay Table Be Fully Achieved with a Time-in-Service Pay Table?

The answer to this question is yes for some advantages of the TIG pay table, but in terms of the major advantages of the TIG pay table—the increased efficiency and performance of the force—the answer is no, though, with some changes in policy, a TIS pay table might be able to come close.

As mentioned, an advantage of the TIG pay table is that it would allow pay to be more competitively set for lateral entrants. We find that an identical result could be achieved under a TIS pay table, if Congress changed the current definition of constructive credit to give the services the opportunity to offer not just a higher entry grade but also a higher longevity entry point. For example, a lateral entrant could be permitted to enter as an O-3 with 10 YOS rather than 1 YOS.

We also investigated the further expansion of the definition of constructive credit so that it would give YOS credit in the pay table for better performance. In particular, personnel who are promoted faster than their peers would receive a permanent 1 YOS leg up in the TIS pay table for the purpose of computing basic pay. The purpose of the policy would be to provide a permanent reward for fast promotion, something that is missing under the TIS pay table. Note, however, that this definition would not affect the definition of YOS for the purposes of retirement eligibility or computing retired pay.

We find that constructive credit for performance is a policy that can broadly replicate the higher basic pay found under the TIG pay table. That is, the basic pay profiles for those promoted early under a TIS pay table would be similar to those under the TIG pay table if these individuals received constructive credit for performance. Using the DRM estimates for Army enlisted personnel and officers, our simulations indicate that constructive credit for performance would be an improvement over the TIS pay table by itself in terms of efficiency, at least in terms of ability sorting. But enlisted and officer retention, average ability, and ability sorting would not improve as much as predicted under the TIG pay table. In other words, the simulations indicate that constructive credit is an improvement over the current TIS pay table but would be less efficient than the TIG pay table.

As an additional point, we examined whether credential pay is a policy that could provide performance incentives under a TIS pay table. We find that credential pay is not designed to be a pay-for-performance program that rewards superior performance and reduces pay for those who fall short. Thus, it would not be an effective substitute to the TIG pay table in terms of increasing performance incentives.

Closing Thoughts

Our analysis indicates that the TIG pay table has distinct advantages, especially in terms of supporting service and congressional efforts to improve talent management. But transitioning to the TIG pay table would involve costs, not the least of which is the disruption to the force regarding a fundamental feature of their service—namely how they are paid. While alternative policies, such as constructive credit for performance could achieve some of the advantages of the TIG pay table, simulations suggest that they would not be quite as efficient or performance-enhancing as the TIG pay table. One approach to implementing the TIG pay table while minimizing risk is to do so on an experimental basis. For example, the federal civil service has created "excepted service" for some communities of federal personnel, such as the cyber workforce, and created demonstration projects. In both cases, personnel are paid under a schedule other than the General Schedule. A DoD TIG demonstration project would enable DoD to further assess the retention, cost, and performance effects of the TIG pay table in a "real" setting, as well as gauge the buy-in on the part of the services and members, especially those whose performance is superior, and fully assess the full array of transition costs including the cost of financial education. Should DoD move in this direction, an important first step would be to design such a demonstration project, including the data collection process to ensure rigorous evaluation of the demonstration project.

APPENDIX A

Time-in-Service Pay Table for January 2018

Table A.1 shows the basic pay table for January 2018.

Table A.1
January 2018 Monthly Basic Pay (Time-in-Service) Table (0–20 Years in Grade)

	Years in Grade											
Grade	Under 2	2	3	4	6	8	10	12	14	16	18	20
Commissioned Officers												
0-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15,800.10
0-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14,696.40
0-8	10,398.60	10,739.40	10,965.60	11,028.60	11,310.90	11,781.90	11,891.40	12,339.00	12,467.40	12,852.90	13,410.90	13,925.10
0-7	8,640.60	9,041.70	9,227.70	9,375.30	9,642.60	9,906.90	10,212.30	10,516.80	10,822.20	11,781.90	12,591.90	12,591.90
0-6	6,552.30	7,198.50	7,671.00	7,671.00	7,700.40	8,030.40	8,073.90	8,073.90	8,532.60	9,343.80	9,819.90	10,295.70
0-5	5,462.40	6,153.60	6,579.00	6,659.40	6,925.50	7,084.20	7,434.00	7,690.80	8,022.30	8,529.60	8,770.50	9,009.30
0-4	4,713.00	5,455.50	5,820.00	5,900.70	6,238.50	6,601.20	7,052.70	7,403.70	7,647.60	7,788.00	7,869.30	7,869.30
0-3	4,143.90	4,697.10	5,069.70	5,527.80	5,793.00	6,083.40	6,271.20	6,580.20	6,741.60	6,741.60	6,741.60	6,741.60
0-2	3,580.50	4,077.90	4,696.20	4,854.90	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10
0-1	3,107.70	3,234.90	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20
Commissioned Officers with over 4 Years of Active Duty Service as an Enlisted Member or Warrant Officer												
O-3E	0.00	0.00	0.00	5,527.80	5,793.00	6,083.40	6,271.20	6,580.20	6,840.90	6,990.90	7,194.60	7,194.60
O-2E	0.00	0.00	0.00	4,854.90	4,955.10	5,112.60	5,379.00	5,584.80	5,738.10	5,738.10	5,738.10	5,738.10
O-1E	0.00	0.00	0.00	3,910.20	4,175.40	4,329.90	4,487.70	4,642.80	4,854.90	4,854.90	4,854.90	4,854.90
Warrant Officers												
W-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7,614.60
W-4	4,282.50	4,606.50	4,738.50	4,868.70	5,092.80	5,314.50	5,539.20	5,876.40	6,172.50	6,454.20	6,684.90	6,909.60
W-3	3,910.80	4,073.70	4,240.80	4,296.00	4,470.60	4,815.30	5,174.10	5,343.30	5,538.90	5,739.90	6,102.30	6,346.80
W-2	3,460.50	3,787.80	3,888.60	3,957.60	4,182.30	4,530.90	4,703.70	4,873.80	5,082.00	5,244.60	5,391.90	5,568.30
W-1	3,037.50	3,364.50	3,452.40	3,638.10	3,857.70	4,181.70	4,332.60	4,543.80	4,751.70	4,915.50	5,065.80	5,248.80
Enlisted Members												
E-9	0.00	0.00	0.00	0.00	0.00	0.00	5,173.80	5,290.80	5,439.00	5,612.40	5,788.20	6,068.70
E-8	0.00	0.00	0.00	0.00	0.00	4,235.40	4,422.60	4,538.70	4,677.30	4,828.20	5,099.70	5,237.40
E-7	2,944.20	3,213.30	3,336.60	3,499.20	3,626.70	3,845.10	3,968.40	4,186.80	4,368.90	4,493.10	4,625.10	4,676.10
E-6	2,546.40	2,802.30	2,925.90	3,046.20	3,171.60	3,453.60	3,563.70	3,776.70	3,841.50	3,888.90	3,944.10	3,944.10
E-5	2,332.80	2,490.00	2,610.30	2,733.30	2,925.30	3,125.70	3,290.70	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50
E-4	2,139.00	2,248.50	2,370.30	2,490.60	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50
E-3	1,931.10	2,052.30	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80
E-2	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30
E-1>4	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30
E-1<4	1,514.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Office of Secretary of Defense, Directorate of Compensation.

Table A.1—continued
January 2018 Monthly Basic Pay (Time-in-Service) Table (22–40 Years in Grade)

	Years in Grade									
Grade	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**
Commissioned Officers										
0-10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10
0-9	14,908.80	15,214.50	15,747.60	15,747.60	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10	15,800.10
0-8	14,268.30	14,268.30	14,268.30	14,268.30	14,625.60	14,625.60	14,991.00	14,991.00	14,991.00	14,991.00
0-7	12,591.90	12,591.90	12,656.40	12,656.40	12,909.60	12,909.60	12,909.60	12,909.60	12,909.60	12,909.60
0-6	10,566.60	10,841.10	11,372.40	11,372.40	11,599.80	11,599.80	11,599.80	11,599.80	11,599.80	11,599.80
0-5	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20	9,280.20
0-4	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30	7,869.30
0-3	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60	6,741.60
0-2	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10	4,955.10
0-1	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20	3,910.20
Commissioned Officers with over 4 Years of Active Duty Service as an Enlisted Member or Warrant Officer										
O-3E	7,194.60	7,194.60	7,194.60	7,194.60	7,194.60	7,194.60	7,194.60	7,194.60	7,194.60	7,194.60
O-2E	5,738.10	5,738.10	5,738.10	5,738.10	5,738.10	5,738.10	5,738.10	5,738.10	5,738.10	5,738.10
O-1E	4,854.90	4,854.90	4,854.90	4,854.90	4,854.90	4,854.90	4,854.90	4,854.90	4,854.90	4,854.90
Warrant Officers										
W-5	8,000.70	8,288.40	8,606.70	8,606.70	9,037.80	9,037.80	9,489.00	9,489.00	9,964.20	9,964.20
W-4	7,239.90	7,511.10	7,820.70	7,820.70	7,976.70	7,976.70	7,976.70	7,976.70	7,976.70	7,976.70
W-3	6,492.90	6,648.30	6,860.10	6,860.10	6,860.10	6,860.10	6,860.10	6,860.10	6,860.10	6,860.10
W-2	5,684.10	5,775.90	5,775.90	5,775.90	5,775.90	5,775.90	5,775.90	5,775.90	5,775.90	5,775.90
W-1	5,248.80	5,248.80	5,248.80	5,248.80	5,248.80	5,248.80	5,248.80	5,248.80	5,248.80	5,248.80
Enlisted Members										
E-9	6,306.60	6,556.20	6,939.00	6,939.00	7,285.50	7,285.50	7,650.00	7,650.00	8,033.10	8,033.10
E-8	5,471.70	5,601.90	5,921.70	5,921.70	6,040.50	6,040.50	6,040.50	6,040.50	6,040.50	6,040.50
E-7	4,848.30	4,940.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40	5,291.40
E-6	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10	3,944.10
E-5	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50	3,310.50
E-4	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50	2,596.50
E-3	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80	2,176.80
E-2	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30	1,836.30
E-1>4	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30	1,638.30
E-1<4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Office of Secretary of Defense, Directorate of Compensation.

APPENDIX B

Derivation of the First-Order Conditions for Optimal Effort

In this appendix, we go through the details of the derivation of the first-order condition we presented at the end of Chapter Three.

The individual's problem is, given that they are in the active component, to choose a level of effort e_t to maximize their utility:

$$\max_{e_t} V^A(k_t) - Z(e_t).$$

To simplify notation, we define the value function $\bar{V}^A(k_t)$ to be the value of staying in the active component net the disutility of effort, like so:

$$\bar{V}^A(k_t) \equiv V^A(k_t) - Z(e_t).$$

Our goal in the following derivations is to show how effort connects to the expected value of the individual's value function by affecting the probability of promotion. We do this by deriving the first-order condition and then examining the resulting expression.

We can rewrite the maximand by expanding the expression for $\bar{V}^A(k_t)$:

$$\bar{V}^A(k_t) = \gamma^A + W_t^{Ag} + \beta EMax\left(\bar{V}^A(k_{t+1}) + \varepsilon_{t+1}^A, V^L(k_{t+1}) + \varepsilon_{t+1}^L\right) - Z(e_t).$$

Then, taking the derivative with respect to e_t, we get:

$$\frac{\partial \bar{V}^A(k_t)}{\partial e_t} = \beta \frac{\partial EMax\left(\bar{V}^A(k_{t+1}) + \varepsilon_{t+1}^A, V^L(k_{t+1}) + \varepsilon_{t+1}^L\right)}{\partial e_t} - Z'(e_t).$$

This expression can be simplified by observing that we have a closed-form solution for *EMax*(. . .):

$$EMax\left(\bar{V}^A\left(k_{t+1}\right)+\varepsilon_{t+1}^A, V^L\left(k_{t+1}\right)+\varepsilon_{t+1}^L\right)=\kappa\ln\left(e^{\frac{\bar{V}^A\left(k_{t+1}\right)}{\kappa}}+\left(e^{\frac{V^R\left(k_{t+1}\right)}{\lambda}}+e^{\frac{V^C\left(k_{t+1}\right)}{\lambda}}\right)^{\frac{\lambda}{\kappa}}\right).$$

Taking the derivatives of both sides, we get:

$$\frac{\partial EMax\left(\bar{V}^A\left(k_{t+1}\right)+\varepsilon_{t+1}^A, V^L\left(k_{t+1}\right)+\varepsilon_{t+1}^L\right)}{\partial e_t}=\frac{e^{\frac{\bar{V}^A\left(k_{t+1}\right)}{\kappa}}}{e^{\frac{\bar{V}^A\left(k_{t+1}\right)}{\kappa}}+\left(e^{\frac{V^R\left(k_{t+1}\right)}{\lambda}}+e^{\frac{V^C\left(k_{t+1}\right)}{\lambda}}\right)^{\frac{\lambda}{\kappa}}}\frac{\partial\bar{V}^A(k_{t+1})}{\partial e_t},$$

which further simplifies to:

$$\frac{\partial EMax\left(\bar{V}^A\left(k_{t+1}\right)+\varepsilon_{t+1}^A, V^L\left(k_{t+1}\right)+\varepsilon_{t+1}^L\right)}{\partial e_t}=\Pr\left(\bar{V}^S\left(k_{t+1}\right)>V^L\left(k_{t+1}\right)\right)\frac{\partial\bar{V}^A\left(k_{t+1}\right)}{\partial e_t},$$

where

$$\bar{V}^S(k_{t+1})=\bar{V}^A(k_{t+1})+\varepsilon_{t+1}^A.$$

Substituting back into our original expression, we get the following first-order condition:

$$\frac{\partial\bar{V}^A\left(k_t\right)}{\partial e_t}=\beta\Pr\left(\bar{V}^S\left(k_{t+1}\right)>V^L\left(k_{t+1}\right)\right)\frac{\partial\bar{V}^A\left(k_{t+1}\right)}{\partial e_t}-Z'\left(e_t\right)\equiv 0.$$

We can simplify this expression further by substituting for $\bar{V}^A\left(k_{t+1}\right)$:

$$\bar{V}^A\left(k_{t+1}\right)=p_{t+1}^{g+1}\bar{V}^{A(g+1)}\left(k_{t+1}\right)+\left(1-p_{t+1}^{g+1}\right)\bar{V}^{Ag}\left(k_{t+1}\right).$$

By assumption, the probability of promotion p_{t+1}^{g+1} depends on e_t. Taking the derivative, we get:

$$\frac{\partial \bar{V}^A\left(k_{t+1}\right)}{\partial e_t} = \frac{\partial \bar{V}^A\left(k_{t+1}\right)}{\partial p_{t+1}^{g+1}} \frac{\partial p_{t+1}^{g+1}}{\partial e_t} = \left(\bar{V}^{A(g+1)}\left(k_{t+1}\right) - \bar{V}^{Ag}\left(k_{t+1}\right)\right) \frac{\partial p_{t+1}^{g+1}}{\partial e_t}.$$

Finally, substituting back into the original expression, we get:

$$\frac{\partial \bar{V}^A\left(k_t\right)}{\partial e_t} = \beta \Pr\left(\bar{V}^S\left(k_{t+1}\right) > V^L\left(k_{t+1}\right)\right)\left(\bar{V}^{A(g+1)}\left(k_{t+1}\right) - \bar{V}^{Ag}\left(k_{t+1}\right)\right) \frac{\partial p_{t+1}^{g+1}}{\partial e_t} - Z'\left(e_t\right) \equiv 0.$$

Setting the expression equal to 0 and rearranging terms, we get the first-order condition shown above:

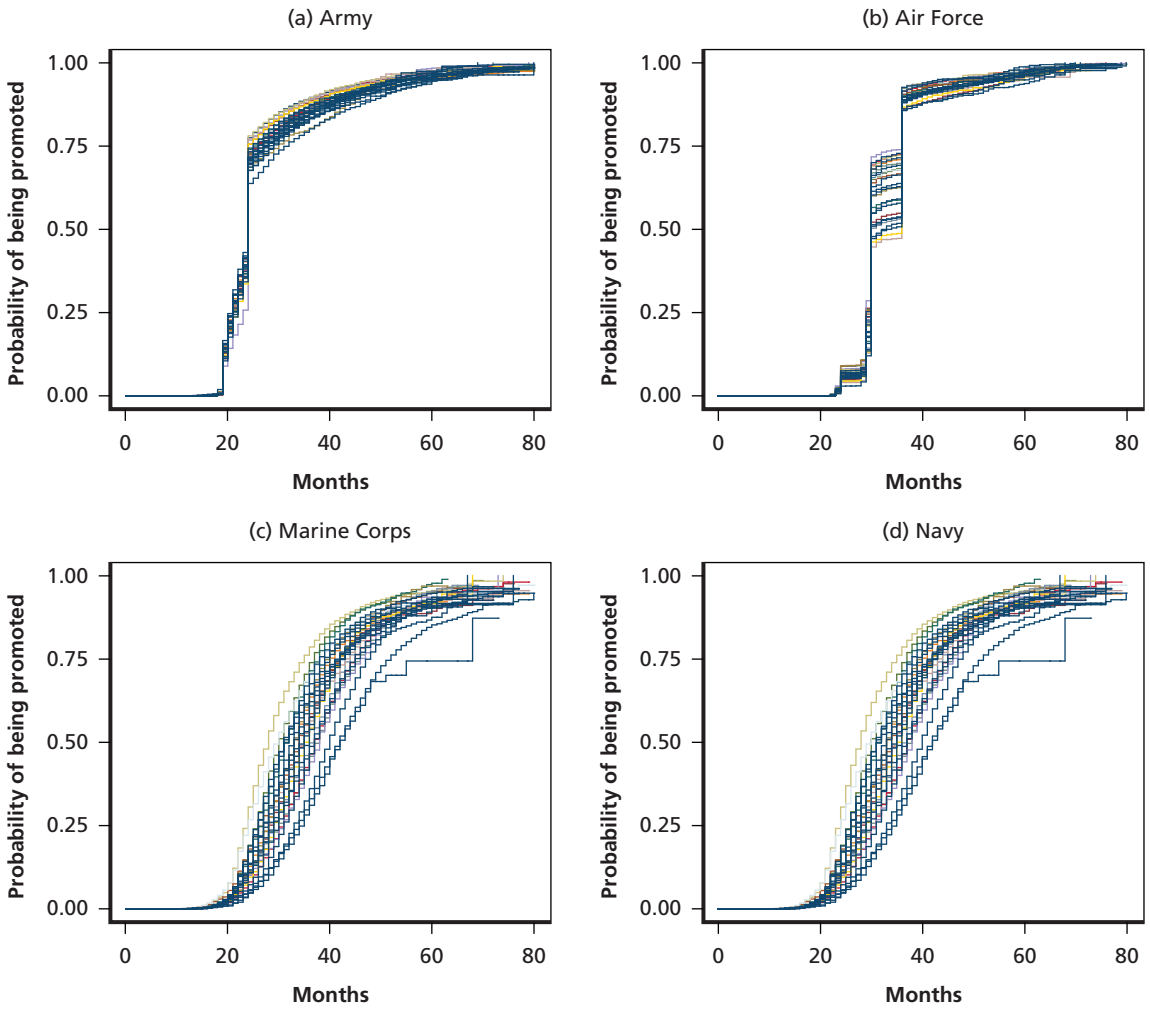
$$\Pr\left(\bar{V}^S\left(k_{t+1}\right) > V^L\left(k_{t+1}\right)\right)\beta\left(\bar{V}^{A(g+1)}\left(k_{t+1}\right) - \bar{V}^{Ag}\left(k_{t+1}\right)\right) \frac{\partial p_{t+1}^{g+1}}{\partial e_t} \equiv Z'\left(e_t\right).$$

APPENDIX C

Probability of Being Promoted, by Service and Occupation

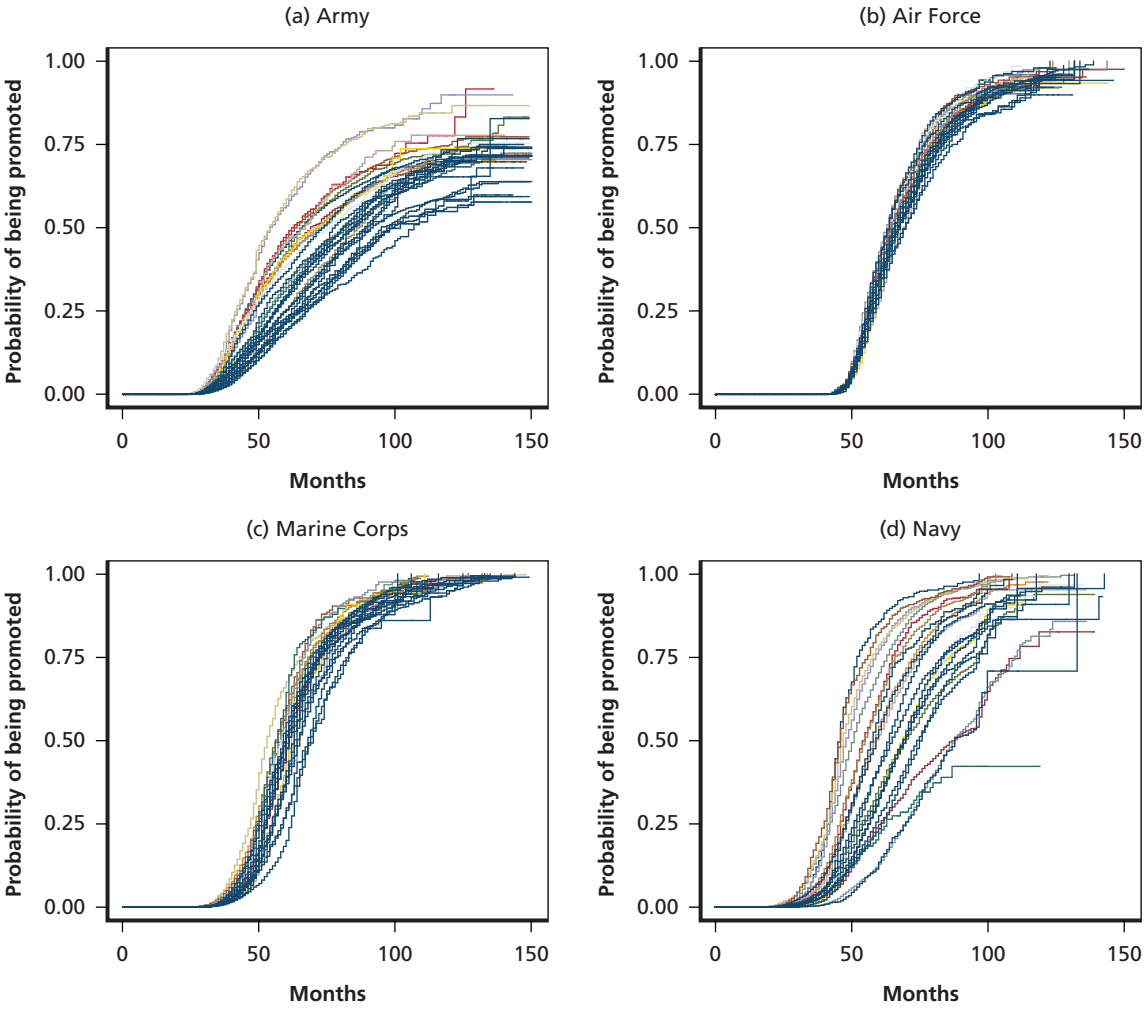
Figures C.1 and C.2 contain Kaplan-Meier survival curves that show the probability of being promoted to E-4 and E-5, respectively, in a specific month of service, conditional on surviving to that month by service and occupation. The separate survival curves in each subfigure represent different occupations within each service.

Figure C.1
Kaplan-Meier Survival Curves for the Probability of Being Promoted to E-4, by Service and Occupation



SOURCE: Authors' calculations.

Figure C.2
Kaplan-Meier Survival Curves for the Probability of Being Promoted to E-5, by Service and Occupation



SOURCE: Authors' calculations.

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Every four years, the U.S. Department of Defense (DoD) commissions a review of the military compensation system. In support of the Thirteenth Quadrennial Review of Military Compensation, begun in 2018, the authors of this report assess the advantages and drawbacks of using a table based on time in grade, rather than time in service, to set military pay. The primary means by which military personnel are financially rewarded for superior performance is through faster promotion, so a time-in-grade (TIG) pay table may increase performance by providing a permanent reward to those who are promoted faster. The current time-in-service (TIS) pay table provides only temporary financial rewards to those who are promoted faster. A TIG table would also provide higher entry pay to lateral entrants who enter the military at higher ranks but with no prior military experience.

Drawing on the work of past studies and using more recent data and modeling capabilities, the authors (1) simulate how basic pay would change under a TIG table over the course of a career for a variety of groups of service members, (2) simulate the retention, cost, and performance effects of the TIG table, (3) estimate the costs to service members and to DoD of transitioning to a TIG table, and (4) assess whether the benefits of a TIG table could be achieved by using alternative policies under the current TIS table.

The authors' analysis shows that better performers would be more likely to be promoted and retained under a TIG table, and that a TIG table could achieve about the same retention as the TIS table, at less cost per member and with improved performance. The principal disadvantage is that transitioning to a TIG table would be costly to DoD and disruptive to a significant fraction of the force: Almost one-third of the active force would experience a reduction in basic pay, and if DoD were to adopt "save pay" to hold members harmless, it would cost $1.39 billion, in 2018 dollars, in the first year. Expanding the services' ability to grant constructive credit—whereby services members who are promoted faster are credited with extra years of service for the purpose of the TIS table—could achieve some, but not all, of the advantages of a TIG table.

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