Military and Civilian Compensation: How Do They Compare?

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Executive summary

Background

Every 4 years, the Department of Defense (DOD) conducts a review of military compensation. Among its objectives, DOD wants to evaluate whether military compensation is provided in the amounts and types of payments that ensure that servicemembers are adequately rewarded and that DOD budgets are efficiently and effectively spent. In addition, DOD must compete with private-sector firms and other government organizations for qualified personnel. Compensation is an important tool for meeting this competition.

Consequently, a thorough comparison of military and civilian compensation will help DOD evaluate and set pay to help meet its strategic objectives. The purpose of this study, one in a series that informs the 11th Quadrennial Review of Military Compensation (QRMC), is to directly compare active duty military and civilian compensation.

Approach and findings

Traditionally, researchers and DOD have compared Regular Military Compensation (RMC) and civilian wages. In the first section of this study, we continue this tradition by analyzing the trend in RMC over the decade of the 2000s versus the wages of equivalent civilians for enlisted personnel and officers. We also look at 2009 data on how RMC compares with civilian wages over the first 20 years of service for enlisted, senior enlisted, and officers.

The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

In the second section of this study, we estimate the values to servicemembers of two noncash benefits—the military health care benefit and the Federal Insurance Contributions Act (FICA) tax advantage—relative to what equivalent civilians receive. Neither of these benefits is part of RMC, but both are received by all servicemembers. For this reason, understanding the value of these benefits provides greater context to the compensation comparisons presented in the paper.

RMC

RMC is a useful metric for comparing military and civilian compensation. Its strength is in analyzing trends because it is generally not vulnerable to the ups and downs of the national economy (as are continuation bonuses) or to variations and changes in the supply of various skill sets and changes in technology (as, for example, special pays for foreign language skills or hazardous duty are). In addition, its components are available in some form for all servicemembers. Finally, it has been around in some form since the early 1980s, and so it is likely to be well understood among servicemembers.

We estimate average RMC for enlisted personnel in 2009 at $50,747 and for officers at $94,735. These amounts corresponded to about the 90th percentile of wages for enlisted equivalent civilians and to about the 83rd percentile of wages for officer equivalent civilian wages. RMC has trended up over the last decade, both in real value[1] and in terms of the corresponding percentile of civilian wages.[2] In 2001, for example, *real* average RMC for enlisted personnel was about $42,110, corresponding to the 84th percentile of wages for equivalent civilians. For officers in 2001, *real* average RMC was about $86,843 and corresponded to the 80th percentile of wages for equivalent civilians. Conversely, we found that real wages have been flat or have even fallen for civilians at all education levels.

So, why has RMC grown relative to civilian wages in the decade? The largest components of RMC—Basic Pay (BP) and Basic Allowance for Housing (BAH)—both grew at rates faster than the growth of civilian wages by design. By acts of Congress, BP rose at the Employment Cost Index (ECI), which is the Bureau of Labor Statistics (BLS) estimate of national civilian wage growth, plus 1/2 point from 2000 to 2009.

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1. We present all estimates of military and civilian compensation throughout this report in real (2009) dollars.
2. The corresponding percentile of RMC is the point at which a certain proportion of the civilian population makes less than that value.

DOD raised real BAH by over 40 percent for enlisted and about 27 percent for officers from 2001 to 2009. This was in response to their goal to reduce service-member out-of-pocket housing expense to zero at the median of home rental prices in each military housing area. The outcome of these policies has been that RMC grew from the 84th to the 90th percentile of civilian wages for enlisted and grew from roughly the 79th to the 83rd percentile of civilian wages for officers.

Health care benefit and FICA tax advantage

Most civilians receive some kind of employer health care benefit, as do all service-members. However, of the more than 80 percent of full-time workers who do receive an employer-paid health care benefit, a large majority still pay a substantial share of health insurance premiums and/or cost of medical treatments, whereas servicemembers and their families receive all their medical care at no cost. We estimate that the average full-time enlisted equivalent civilian worker pays between $3,000 and $7,000 per year out of pocket for health insurance and medical care, depending on their family size. Officer equivalent civilians pay between $2,000 and $4,800 per year. Note that the real value of these expenses has grown by 60 to 75 percent over the decade, far faster than the rise in civilian wages or even the rise in RMC. These are costs that all servicemembers avoid; therefore, they are a valuable portion of their total compensation package.

All servicemembers also receive a FICA tax advantage that accrues because BAH and BAS are not subject to this tax. The calculation of this advantage factors in both the FICA tax that is avoided and the value of future Social Security benefits that are foregone. Using actuarial estimates of 1.9 to 2.5 percent expected return on the Social Security tax, and 10 to 12.5 percent personal discount rate for officers and enlisted, respectively, we estimated the expected, discounted *net* values of the FICA tax advantage to be around $2,042 per year for enlisted and $1,922 per year for officers.

Conclusion

These numbers do not, by themselves, determine whether military pay is too high or too low. Other factors, such as recruitment and retention, risk of war, the expected level of personnel tempo, and the desired quality level of military personnel, must also be considered when determining whether military pay levels are adequate.

While we do not directly address all of the potential factors here, our method provides a way to contextualize compensation so that decision-makers can decide how much and in what form DOD should pay its servicemembers.

Introduction

Background

Title 37 of the United States Code (U.S.C.) requires that every 4 years the President direct a complete review of the principles and concepts of the compensation system for members of the uniformed services.[3] The President has designated the Secretary of Defense as the executive agent for the 11th Quadrennial Review of Military Compensation (QRMC).

Like past reviews, the 11th QRMC is made up of multiple studies that examine various topics, including pay incentives for critical career fields, hostile fire and combat payments, and benefits available to wounded warriors [1]. CNA's part of the QRMC is to address how active duty military compensation compares with that of equivalent civilians.

Regular Military Compensation (RMC)

DOD has a long tradition of comparing RMC[4] and civilian compensation. In 1962, the Gorham Commission established the concept of RMC as a "rough yardstick to be used in comparing the compensation of members of the uniformed services to the compensation of civilian-sector employees." While the definitions of the four components of RMC have seen multiple transitions since then, for almost 50 years, DOD and military researchers have compared RMC with the average wages of equivalent civilians [2, 3, 4, and 5].

RMC is often chosen as an appropriate metric for a couple of reasons. First, because it has been around for so many decades, and because it is published annually by DOD [6], it is familiar to most servicemembers—something akin to the gross income or salaries of military personnel.[5]

Second, all servicemembers are eligible for all four components of RMC, either in cash or in-kind [4, 5, 6, and 7]. Reenlistment and continuation bonuses are typically available only to servicemembers in high demand job communities. Special and incentive pays are given to servicemembers for specific types of skills, duties, or geographic locations.

Third, as a comparison metric, RMC is relatively stable over time and across paygrades and years of service and, therefore, lends itself to trend analysis. RMC

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3. U.S.C., Title 37, Chapter 19, and Section 1008(b).

4. RMC consists of military Basic Pay (BP), the military Basic Allowances for Housing (BAH) and Subsistence (BAS), plus the federal income tax advantage that accrues because BAH and BAS are not taxed.

5. For a brief history of RMC, see Appendix A.

is not as vulnerable to the ups and downs of the state of the U.S. economy, as are, for example, reenlistment and continuation bonuses. Nor is RMC vulnerable to the variations of the skills sets and quality levels of the labor market, as special and incentive pays can be.

Other factors of compensation

In addition to the comparisons that are made using RMC, there is value in understanding the role that other factors of compensation play. The other factors we examine are as follows.

First, servicemembers receive additional pay in the form of higher BAH when they have dependents. To determine if this influences comparisons of military and civilian pay, we separate servicemembers with and without dependents and analyze the RMC of each group against the median wages of equivalent civilian groups.

Second, for various reasons, some servicemembers are not eligible for BAH or BAS. For most of this analysis, we assume that the value of the military housing benefit is equal to BAH and BAS. But, we discuss the ongoing conversation and DOD's policies regarding the value of onbase housing and meals relative to BAH and BAS.

Third, we examine the value of two in-kind benefits that are received by all servicemembers and can be considered a generally expected part of compensation: the health care benefit and the FICA tax advantage.

Organization of this paper

In the first section, we conduct an empirical analysis of how RMC compares with civilian wages. It has three subsections: (1) our method for constructing the comparison groups so we're comparing like persons, (2) our method for estimating RMC and civilian wages using the available data, and (3) empirical results of the comparisons.

In the second section, we explore the role that other factors of compensation play. This is also in three parts: (1) a formal model of comparing military and civilian compensation, (2) our methods for estimating the value of the military and civilian health care benefit and the FICA tax advantage, and (3) empirical results of these estimates.

In the final section, we summarize and put into context the findings of our analysis.

Empirical analysis of RMC and civilian wages

RMC is the traditional metric used in comparisons of military and civilian compensation because all servicemembers are eligible to receive the four components of RMC: (1) Basic Pay (BP), (2) Basic Allowance for Housing (BAH), (3) Basic Allowance for Subsistence (BAS), and (4) the federal income tax advantage (TA) because BAH and BAS are not taxed as income [2, 3, 5, 7, and 8].

In this section, we describe a critical first step to ensure that military and civilian comparison groups are matched as closely as possible. We need to compare equivalent individuals in similar jobs. For practical purposes, this would ensure that the job-related characteristics, technical skills, and job experience are roughly the same. As a result, we could infer that both compensation levels and standards of living of the people in the comparable groups should be roughly the same. If we find that compensation isn't the same, we can explore the differences.

In view of that, we begin by describing our process of constructing military and civilian comparison groups. We divide civilians into groups based on their level of education to proxy the civilian equivalent of enlisted personnel and officers. We weight civilian populations by age to correspond to the experience profiles of military personnel.

We describe the methods we use to estimate the components of military and civilian compensation. RMC is a straightforward calculation by paygrade (PG), year of service (YOS), and family status (with or without dependents). For civilians, we use data from the 2001–2009 Current Population Surveys (CPS) to estimate median wages for full-time workers, by age and education level.[6]

Next, we show the results of the empirical findings, comparing military and civilian compensation (a) over the first 20 years of service in 2009 and (b) by trend in military compensation relative to civilian wages from 2001 to 2009.

Finally, we summarize the empirical analysis and discuss the inferences from our findings.

Comparable military and civilian groups

There are three broad characteristics of servicemembers and civilians that we use to make the groups comparable.

First, we proxy the level of technical skills of civilians with their education levels. We then compare the wages of civilians with high school diplomas, those with some

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6. We include in civilian wages all hourly pay, salaries, overtime pay, tips, and bonuses. Servicemembers also receive bonuses, however they serve a different set of purposes than bonuses in the civilian sector.

college, and those with 2-year degrees with RMC for enlisted personnel. We compare the wages of civilians with Bachelor's degrees and those with Master's degrees and higher with RMC for officers.

Second, we use YOS as the proxy for military experience and civilian age as a proxy for civilian experience. Since job experience begins at different ages for civilians, depending on their level of education, we use the civilian age, minus the normative number of years of education for whatever degree they have, minus 7 (the oldest year most children are in the first grade) as the proxy for civilian workforce experience.

Third, because the military is the primary, full-time job for servicemembers, we consider only full-time, full-year civilian workers, and we calculate wages only from their main job and not other sources of income, such as from a second job.

We discuss each of these in detail.
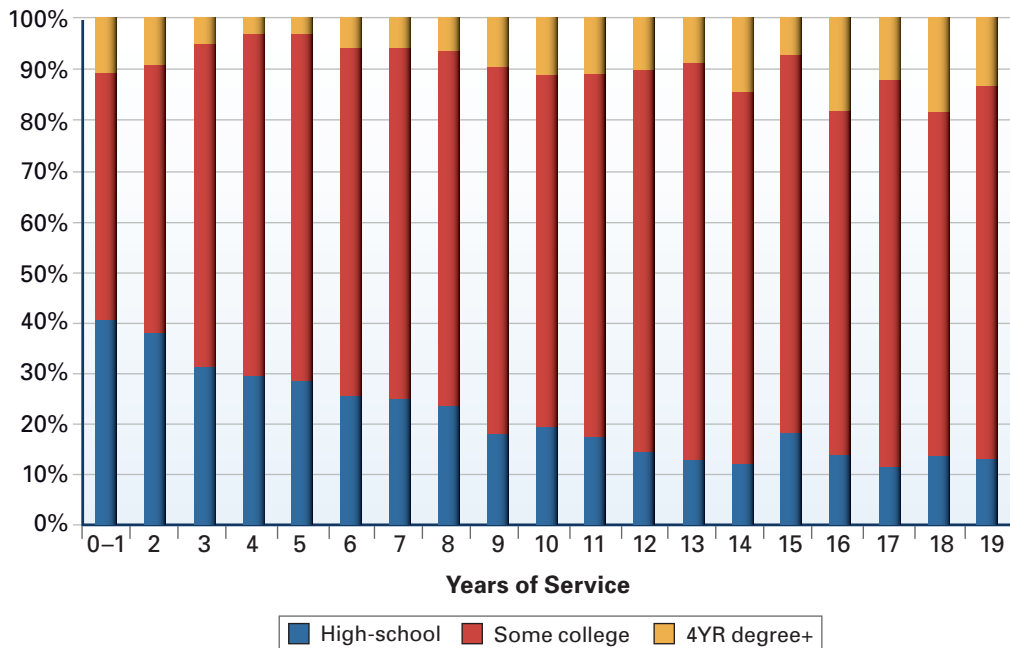
Education levels

Ideally, we would like to compare individual military occupations with equivalent civilian jobs, but it is impractical in this study for two reasons. First, our focus is on DOD overall. To do an accurate comparison would require looking at many or all military occupations in all services.[7] Second, a large number of military occupations have no civilian equivalent. For example, Army and Marine Corps infantry or Navy antisubmarine warfare specialists are occupations that would be difficult to compare in the civilian workforce.

Nonetheless, to properly compare compensation, we need to match servicemembers and equivalent civilians by some proxy for technical skills. Traditionally, DOD and the military services have used education bands to represent civilian equivalents to military enlisted and officer personnel. The reasoning is twofold.

First, while there is not much information on higher education levels of military personnel, we know a few things. In general, officers need at least a Bachelor's degree to qualify for the officer corps, and officers often obtain higher education (Master's level or higher) in order to receive promotions. For enlisted, we have data from the 2006 Status of Forces survey (see figure 1), which show that the vast majority of new recruits have a high school diploma or some college.[8] Further, we see that the proportions of enlisted who receive some college and college degrees rise with YOS.

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7. References [9 and 10] compared military compensation with civilian wages for medical personnel.

8. As we see in the chart, a small proportion of enlisted personnel have 4-year degrees. The fact that the proportion shrinks in the first 5 YOS suggests that only a few with Bachelor's degrees reenlist in the first term. The growth in the proportions after 5 YOS shows that some enlisted personnel are finding the time to get their degrees while in the service.

a. Source: Status of Forces Survey–Active, 2006.

Figure 1. Education levels of enlisted personnel by YOS[a]

Unfortunately, the data do not give us information about 2-year degrees.

The second reason is simpler to explain. Military training itself is considered by many to be equivalent to some college-level training.

For these reasons, we chose to follow the traditional route and use education levels as a proxy for enlisted and officer equivalence. Using the information in the CPS data, we separate civilians by education level, assuming that those with a high school diploma, some college, or a 2-year (Associate) degree are equivalent to military enlisted personnel, and that those with a 4-year degree (B.A.) or a graduate-level degree (M.A. or higher) are equivalent to military officers.

YOS/age/experience profiles

Comparing servicemembers and civilians who have roughly the same level of job experience is the next step. The data highlight two important differences.[9]

First, the age/experience profile is different for civilians and servicemembers. For example, the age/experience profile of enlisted equivalent civilian workers is much older than enlisted either with or without dependents. The median age of full-time

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9. For a more detailed analysis of these age/experience profiles for servicemembers and civilians, see figures 21–24 in Appendix B.

enlisted equivalent civilian workers is about 36. For enlisted servicemembers without dependents, the median YOS is roughly 3, implying a median age of about 22. For servicemembers with dependents, the median YOS is about 8, implying a median age of about 27.

In addition to the differences in median age, the relative proportions of servicemembers at each YOS get smaller as YOS gets larger. This is because servicemembers leave but do not enter at high YOS. Among civilians, however, we see that the proportions get *larger* with age, until they reach about the middle forties. This is because, rather than leaving the workforce as they get older, civilians are more likely to enter full-time work.

Because servicemembers are younger than equivalent civilians (by age/experience), unweighted estimates of average wages would overstate the value of civilian compensation relative to military compensation. Therefore, for both enlisted and officers, we use a weighting algorithm on civilian data to simulate the military's experience profile in our estimates of median civilian wages. Essentially, we estimate the median civilian wage at each age. Then we calculate a weighted average of these values, where weighting is designed to make the civilian age profile look like the military profile. Also, we use separate weighting algorithms for calculating comparable wages for singles and those with dependents.

We use civilian age minus estimated normative years of education, minus 7 as a proxy for work experience—equivalent to military YOS.[10] Others have studied this proxy [11 and 12] and have commented on its relative strengths and weaknesses. The primary concern is that, since experience in the civilian sector is subject to labor mobility—moving in and out of the labor market or from one job to the next[11]—the age minus education proxy can overestimate actual work experience.

Another concern is that wages are subject to individual choice of hours worked, which changes with age itself. This is why civilian wages tend to decline for people in their late forties and early fifties—a result of declining hours worked rather than directly declining wages. However, since most servicemembers will have separated before that age, we're not as concerned about this effect on our study of wage comparisons in the first 20 YOS.

Another important consideration in forming the comparison groups is that the gender profiles of military personnel and civilian populations are not the same.

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10. This assumes that civilians are in first grade at age 7, finish high school at 19, and achieve a 2-year degree at 21 or a 4-year degree at 23.

11. Moving from one job to another, even within similar occupations, can slow the building of actual job experience to the extent that there are firm-specific tasks that take time to learn.

Nearly half (48 percent) of full-time civilian workers are women, while about 15 percent of servicemembers are women. To compensate for the difference, we weight the civilian data by military profiles of gender and age/experience to provide equivalency to the military.[12]

Estimating RMC and civilian compensation from the data

Here we describe how we use the data to estimate the dollar amounts of military and civilian compensation. In the first part, we describe RMC and how we estimated the components of RMC. In the second part, we describe how we estimated the wages for equivalent civilians, specifying the assumptions we used for each of the civilian groups we defined earlier.

RMC

Regular Military Compensation is the base point from which we begin the analysis of military compensation. Using the data that we describe below, we estimate the average RMC for each servicemember and aggregate to calculate average RMC by YOS and the overall weighted average of RMC for enlisted and officers for 2001 through 2009.

Here we define each component of RMC and how we constructed RMC estimates with the data. Total RMC is equal to:

$$RMC = BP + BAH + BAS + TA \, ,$$

where:

BP = Basic Pay is the largest component of military compensation and is based entirely on a servicemember's PG and YOS.

BAH = Basic Allowance for Housing, the second largest component of RMC. It is a function of PG and whether the servicemember has dependents. BAH varies by military housing area (MHA) of the servicemember's unit. We assume that the value of the housing benefit is equal to BAH for all servicemembers. Because the personnel data do not have a specific MHA for many servicemembers who do not collect BAH,

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12. In the 9th QRMC, military compensation was compared with wages of *male* civilians [13]. The logic was that, while civilian women entered and left the workforce more often than civilian men, military women gained experience at the same rate as military men. As a result, experience profiles of military women resembled those of civilian men more than civilian women.

We argue that a major objective of compensation comparisons is to reveal civilian wage opportunities of military personnel. So, while it's true that military men and women gain experience at the same rate, military women nonetheless face the civilian opportunities of other civilian women, not those of civilian men. In any case, the male-female weighting is 85:15 and doesn't have a large effect on our overall results.

we used DOD's average of BAH in the United States for each paygrade, with and without dependents.

BAS = Basic Allowance for Subsistence, a cash allowance for subsistence that is based only on whether the servicemember is officer or enlisted.

TA = the federal income tax advantage, which is based on the amount a service-member receives in BAH and BAS and his or her federal income tax rate. It is the total value of the tax savings that servicemembers receive because their BAH and BAS are not taxed. To estimate each servicemember's federal income tax advantage, we needed the marginal tax rate for each servicemember's gross wage, which is BP + BAH + BAS. We use family size from personnel records, and tax rates from 2001 through 2009.[13]

Civilian wages

We use data from the Current Population Survey of the U.S. Bureau of Labor Statistics from 2001 through 2009 to estimate the median wages of full-time civil-ians. The CPS gives a representative sample of the civilian workforce from which we can make reasonable comparisons with military servicemembers. The CPS has information about work status, age, and education levels, which allows us to form groups of civilians that are comparable with military personnel. It also contains data on wages, bonuses, and employer provision of health care coverage, from which we estimate earnings from work.

We look at civilians who are equivalent as defined by the criteria discussed earlier. For civilian wages, we show the *median* rather than the mean average (as we did for military compensation) because civilian wages are skewed, which causes the mean average to be biased higher than the distribution's actual central tendency.[14]

Military wages are not skewed, because no servicemembers receive an inordi-nately high wage based on RMC. As a result, the mean and median are roughly the same. However, because military promotions occur at relatively consistent YOS, the trajectory of RMC is somewhat discontinuous over a 20 year career. So, in our calculations of RMC, we use the mean average, which makes a smoother trajectory of observations than the median, yet without biasing the results.

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13. Federal tax rates, by family type and income level from 2001 to 2009, were compiled by www.taxfounda-tion.org using IRS tax schedules.

14. The distribution of civilian wages is skewed as a result of a small proportion of the population who make very high wages.

Results of empirical analysis of RMC

Previously, we discussed how we defined our comparison groups and how we estimated military and civilian wages. Here, we use this information to show how military and civilian wages compare, considering both enlisted personnel and officers. We show these comparisons from two perspectives: by YOS over the first 20 YOS (i.e., a *career perspective*[15]) and over the 2001–2009 period in a *trend perspective*.[16]

Within each of these two perspectives, we describe and illustrate comparisons of compensation in the traditional method of comparing RMC with wages for all enlisted equivalent and all officer equivalent civilians.

Empirical analysis: career perspective (2009)

Enlisted and enlisted equivalent civilians: career analysis

Average annual RMC for enlisted personnel in 2009 ranged from around $37,000 in the first YOS to about $75,000 in the 20th year. For equivalent civilians, median wages ranged from $20,000 per year for high school graduates in the beginning of their work life to about $50,000 annually for those with 2-year degrees and around 18 to 20 years of work experience.

In figure 2, we show the 2009 career trajectories of RMC for enlisted personnel and the median wages for each of the three groups of equivalent civilians: those with 2-year degrees (AAs), those with some college, and those with high school (HS) diplomas.[17]

For enlisted servicemembers, RMC is larger than median wages for all three groups of enlisted equivalent civilians by a range of 44 percent higher than equivalent civilians with 2-year degrees, and upwards to 87 percent higher than those with high school diplomas. We also see that after about 15 or so years of experience, civilian wages begin to either flatten or rise at a less steep rate. Conversely, RMC continues to rise linearly with experience, expanding a positive pay gap late into the 20-year military career.

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15. We use 20 years because that is the point at which servicemembers become eligible for the military retirement. Comparisons of compensation are different for members past 20 YOS since they can stay and receive military pay or retire and receive civilian wages plus a pension.

16. Congressional legislation has required that military Basic Pay grow at a rate that is faster than the growth of average civilian wages from 2000 to 2009. In addition, servicemembers have received large raises in the military housing benefit in response to a DOD decision to grow BAH until servicemembers have zero out-of-pocket expenses at the median of local home rental prices for equivalent civilians.

17. We show civilian wages separately for each of the three education groups, rather than postulate an algorithm in which the average education level rises over years of experience. We do this because no available data accurately show education levels possessed by military personnel in a way that accounts for the training received while in the military.
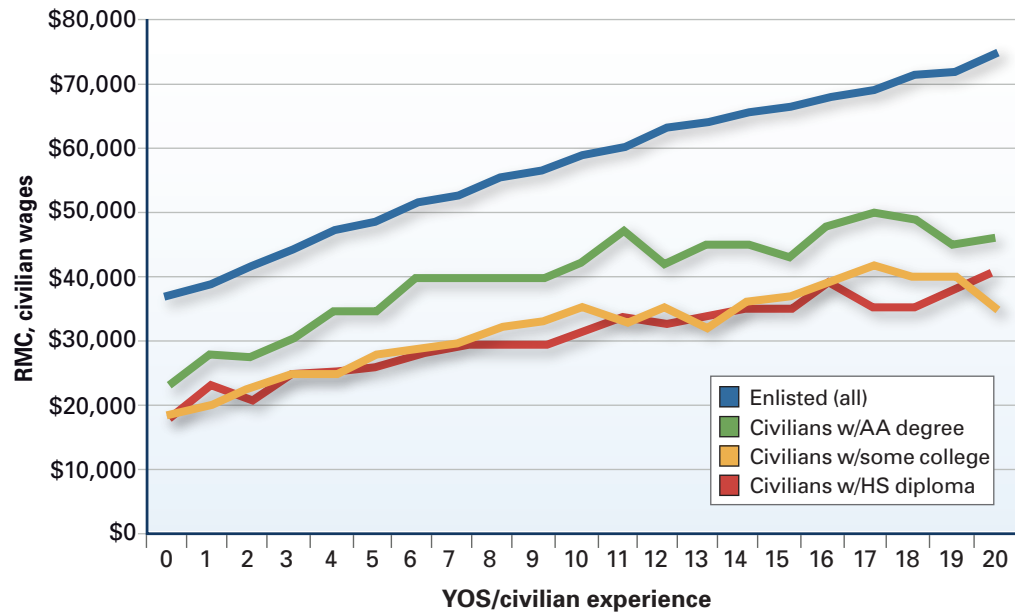
Figure 2. Average enlisted RMC and median wages of enlisted equivalent civilians, by YOS/civilian experience (2009)

Senior enlisted and civilian equivalents

In a separate evaluation, we look at RMC for senior enlisted personnel (those who are E-8 and E-9) from YOS 14, in which all are E-8, to YOS 29, in which nearly all are E-9.

In figure 3, senior enlisted are compared with civilians who have 2- and 4-year degrees. This reflects the concept that military service is equivalent to higher education in its influence on wages. The results show that, during the period of 15 to 30 years of experience, civilian wages tend to flatten, while senior enlisted RMC rises linearly and relatively steeply with YOS. Much of this rise is a result of senior enlisted being promoted from E-8 to E-9; at YOS 14 all of the senior enlisted in our data are E-8, but by YOS 29 nearly all are E-9.

Officers and equivalent civilians: career analysis

The career trajectory for officers begins with a steep slope in RMC, from nearly $55,000 in YOS 1 to over $81,000 by YOS 4 (figure 4). To the extent that the productivity of officers rises with YOS in the first years of service, this trajectory could represent the value of productivity. Because the cost of training officers is high, however, and because officers generally have a commitment in the first years
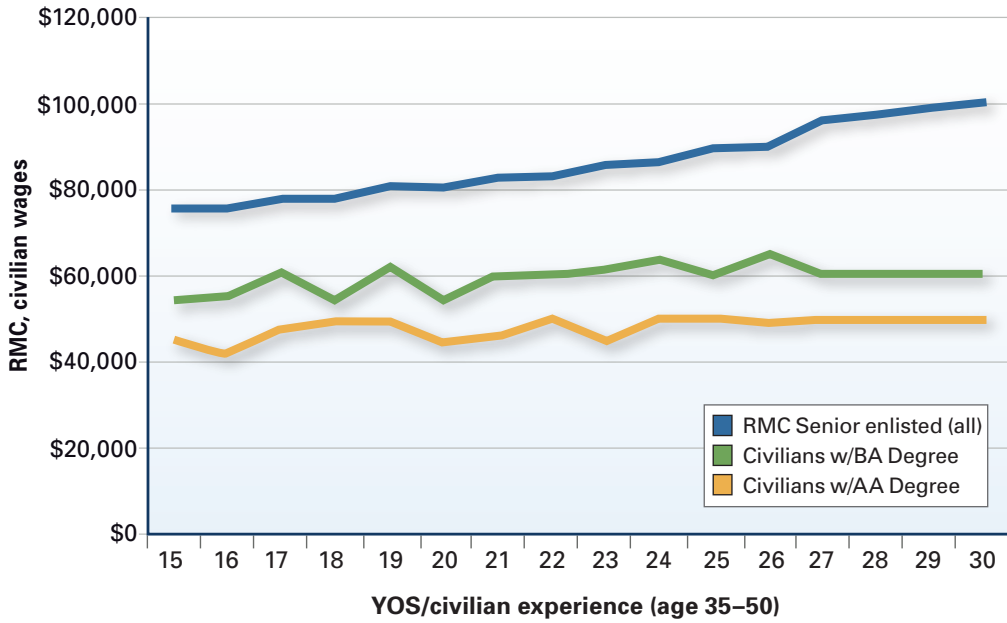
Figure 3. Average senior enlisted (E8-E9) RMC and median wages of civilians with college degrees, by YOS/civilian experience (2009)
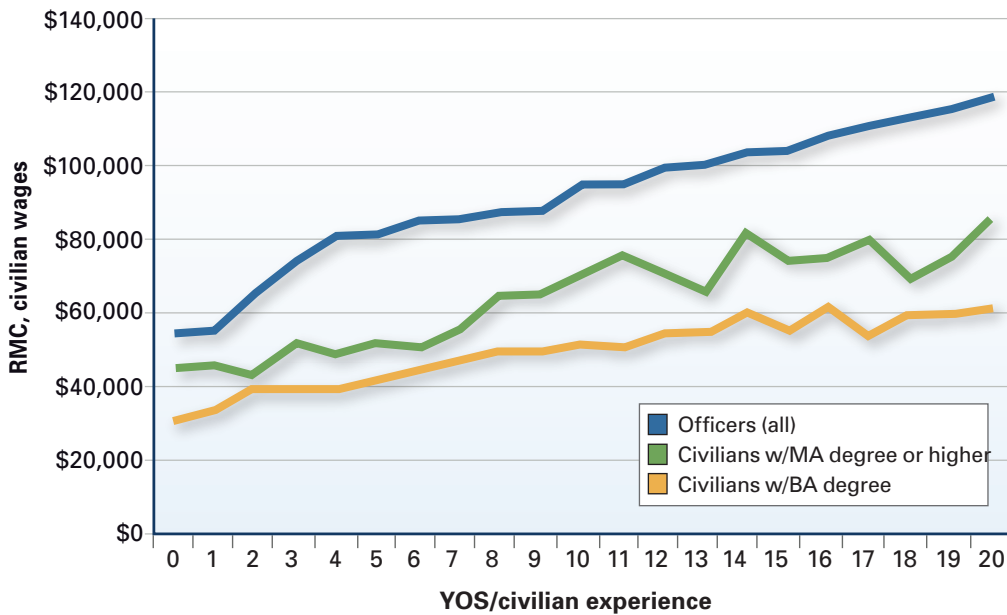

Figure 4. Average officer RMC and median wages of officer equivalent civilians, by YOS/civilian experience (2009)

of service, this type of pay trajectory could be a way for DOD to recoup some of the training investment. After the 4th year of service, RMC rises almost linearly from $81,000 to over $118,000 annually at the 20th year of service.

Officer RMC is, on average, more than 80 percent higher than wages for civilians with Bachelor's degrees, ranging from 60 higher to about twice as high through the 20-year career. Compared with median wages for civilians with graduate-level degrees, officer RMC is, on average, about 40 percent higher, ranging from about 20 percent higher in early YOS to more than 60 percent higher at later YOS.

Empirical analysis: trend perspective

Trend 1982–1999

In his analysis for the 9th QRMC, the author in [13] compared average RMC with average wages of *male* civilians from 1982–1999. The author looked at several specific groups of servicemembers and equivalent civilians. Here is a brief summary of his findings.

Looking at E-4s with 4 YOS, the author found that RMC had grown from about the 50th to the 72nd percentile of wage for male civilians age 22–26 with high school diplomas. At the same time, RMC for E-4s at 4 YOS grew from about the 50th to the 60th percentile of males with some college, as a result of high growth in returns to college during the period.

For officers, RMC for O-3s with 8 YOS actually *fell* from roughly the 75th to the 64th percentile of wages for male civilians age 28–31 with Bachelor's degrees during the same period. Similarly, O-4s with 10 YOS saw RMC fall from the 68th to the 58th percentile of wages for male civilians age 32–36 with Bachelor degrees during the period.

Trend 2001–2009

With the new century came important changes in the relative value of military and civilian compensation. Military compensation grew at a faster rate than civilian wages since the beginning of the decade because three of the four components of RMC grew faster than civilian wages *by design*.

In response to recruitment and retention problems that transpired in the late nineties, Congress enacted Title 37, Chapter 19, section 1009, entitled "adjustments of monthly basic pay," published in [14]. As a result of this new law, military Basic Pay, the largest component of RMC, grew at the Employment Cost Index plus ½

percent from 2000 to 2006. After that period, Congress chose to continue raising BP by ECI plus ½ percent in 2007, 2008, and 2009. The ECI roughly represents the average annual growth in civilian wages; thus, military BP grew faster in this period than average civilian wages.

In addition, BAH, the next largest component of RMC, and its tax advantage, have grown even faster in the last decade than BP, as a result of DOD's explicit objective to raise the military housing benefit until it reaches the level at which service-members have no out-of-pocket housing costs at the median rental price in each military housing area [15]. We describe the factors in the trend in RMC and civilian wages from 2001–2009 in more detail in the next subsection.

Military and civilian pay trends, the ECI and the CPI

The ECI for wages and salaries is estimated by the U.S. Department of Labor's Bureau of Labor Statistics. The index directly shows the change in the costs to employers of wages and salaries. It indirectly measures the annual change in average civilian wages and salaries.

The ECI showed positive growth in the last decade; for example, the ECI used for military raises in the last 3 years was 2.3 percent in the third quarter of 2005 (for the 2007 military raise), 3.0 percent in 2006 (for the 2008 raise), and 3.4 percent in 2007 (for the 2009 raise).

The ECI has been used by the military to set pay raises. In 1999, the U.S. Congress legislated that military Basic Pay should rise by ½ percentage point *above* the base ECI each year for the 2000–2006 period. In addition, from 2007 to 2009, Congress raised Basic Pay by ECI + ½ point in each of those years.

The Consumer Price Index (CPI), also published annually by the BLS, represents the average of overall prices (weighted by the items in a simulated market basket). It represents the relative price "level" in the United States from one period to another. Inflating prior-year dollars by the CPI allows us to judge changes in buying power, rather than just the changes in dollars.

Thus, the ECI tells us the growth in wages and salaries, while the CPI tells us the growth in the cost of living. If the ECI is higher, civilian workers are able to buy more, and vice versa.

Growth rates in BAH

As noted earlier, DOD's goal has been to reduce servicemember out-of-pocket housing costs to zero at the median of rents in each military housing area. Rental

prices have grown considerably but civilians do not receive increases in wages as a result of changes in housing prices. On the contrary, when housing prices rise, civilians often find themselves with less discretionary income, at least in the short term.

BAH rose considerably both in nominal and in real terms in the 2001–2009 period.[18] For example, the average increase in the nominal value of BAH was 5.7 percent in 2007, 4.7 percent in 2008, and 5.0 percent in 2009.[19] In all three of those years, increases in BAH were far above the cost of living as defined by the CPI. Although the CPI is not the metric that DOD uses to determine BAH rates, the fact is that both BP and BAH grew faster than the CPI.

Real versus nominal RMC (2001–2009)

As we show in figure 5A, average enlisted RMC was nearly $35,000 in 2001, and nearly $51,000 in 2009, both in *nominal* terms. By "nominal," we mean that these were the actual dollar amounts that servicemembers received in 2001 and 2009. When comparing the two amounts, however, our interest is in what servicemembers can buy, or the purchasing power of their compensation. That's why we make the RMC comparisons only in real dollars.

To be specific, enlisted RMC in 2001, presented in 2001 dollars, was $34,783. Inflating by the CPI, we see that *real* 2001 RMC (presented in 2009 dollars) was around $42,110, meaning that $34,783 in 2001 could buy the same amount of things that $42,110 could buy in 2009.

Similarly, while nominal officer RMC went from $71,732 in 2001 to $94,735 in 2009, real officer RMC (in 2009 dollars) grew from $86,843 in 2001 to $94,735 in 2009 (figure 5B).

In the following discussion of our analysis of RMC and civilian wages, we present the 9-year trend of real RMC for enlisted and officers, and compare them with the real wages for the civilians in each of the education groups that represent the comparable groups.

In addition to showing the trend lines in real dollar amounts, we also have calculated and present the percentile of civilian wages to which RMC corresponds.[20]

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18. To clarify, "nominal" values are those presented in same-year dollar values (e.g., 2001 RMC presented in 2001 dollars). "Real" values are those inflated by the CPI and presented in 2009 dollars values (2001 RMC inflated and presented in 2009 dollars).

19. These calculations are averages weighted by YOS.

20. For example, when we say that RMC corresponds to the 80th percentile of wages for equivalent civilians, it implies that RMC is higher than the wages of 80 percent of equivalent civilians.
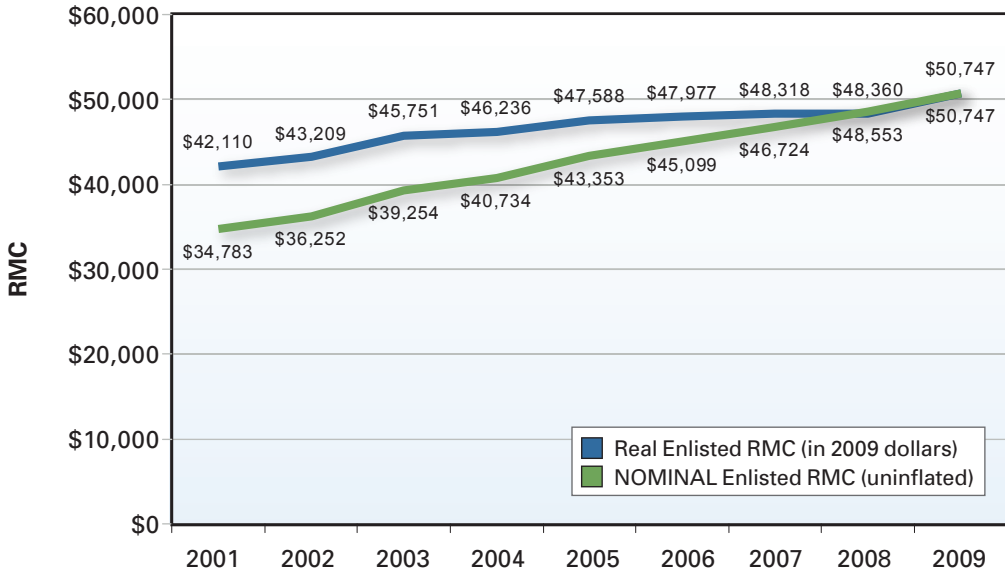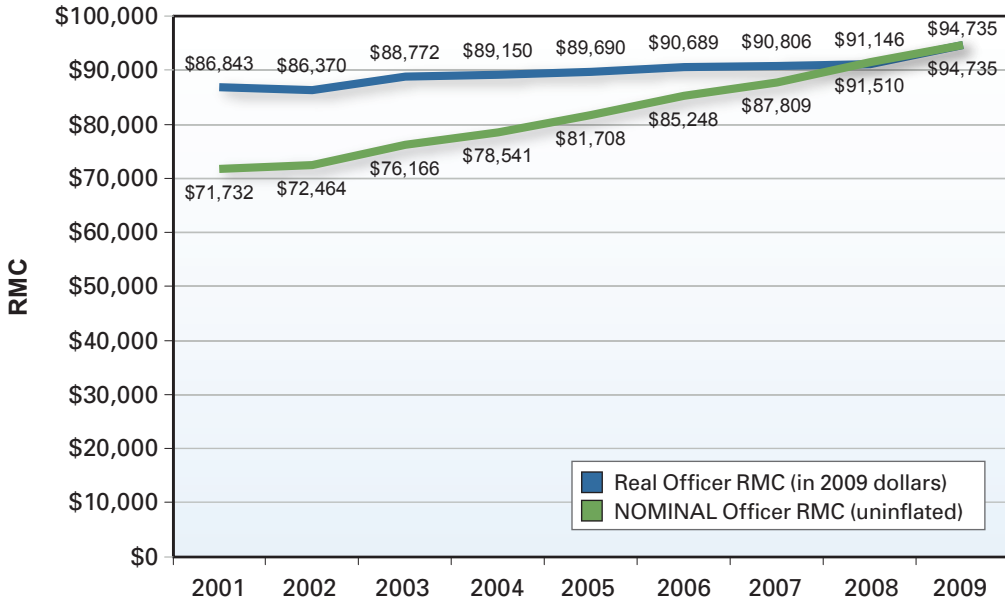
Figure 5A

Real Enlisted RMC (in 2009 dollars): $42,110, $43,209, $45,751, $46,236, $47,588, $47,977, $48,318, $48,360, $50,747

NOMINAL Enlisted RMC (uninflated): $34,783, $36,252, $39,254, $40,734, $43,353, $45,099, $46,724, $48,553, $50,747

- Real Enlisted RMC (in 2009 dollars)
- NOMINAL Enlisted RMC (uninflated)

Figure 5B

Real Officer RMC (in 2009 dollars): $86,843, $86,370, $88,772, $89,150, $89,690, $90,689, $90,806, $91,146, $94,735

NOMINAL Officer RMC (uninflated): $71,732, $72,464, $76,166, $78,541, $81,708, $85,248, $87,809, $91,510, $94,735

- Real Officer RMC (in 2009 dollars)
- NOMINAL Officer RMC (uninflated)

Figure 5. A. Real versus nominal enlisted RMC (2001–2009)
B. Real versus nominal officer RMC (2001–2009)

Enlisted personnel: trend analysis

Real trends in RMC for enlisted personnel and wages for equivalent civilians

In figure 6, we show trends in real RMC (in 2009 dollars) for enlisted personnel from 2001 to 2009, compared with real equivalent civilian wages. Although RMC has grown substantially over the decade, and real RMC in 2009 was greater than in 2001, RMC was relatively flat from 2004 through 2008, rising only early in the decade and in 2009. Real civilian wages dropped slightly over the decade for all three education groups.

From 2001 to 2009, real enlisted RMC grew by over 20 percent, from $42,110 to $50,746; civilian wages did not grow much at all for any of the three enlisted equivalent groups. In fact, for most of the decade, real median civilian wages fell, only growing in the last 3 years or so to become roughly equal with 2001 wages in 2009. Enlisted RMC corresponded to the 84th percentile of equivalent civilian wages in 2001 and grew to correspond with the 90th percentile of civilian wages by 2009.[21]
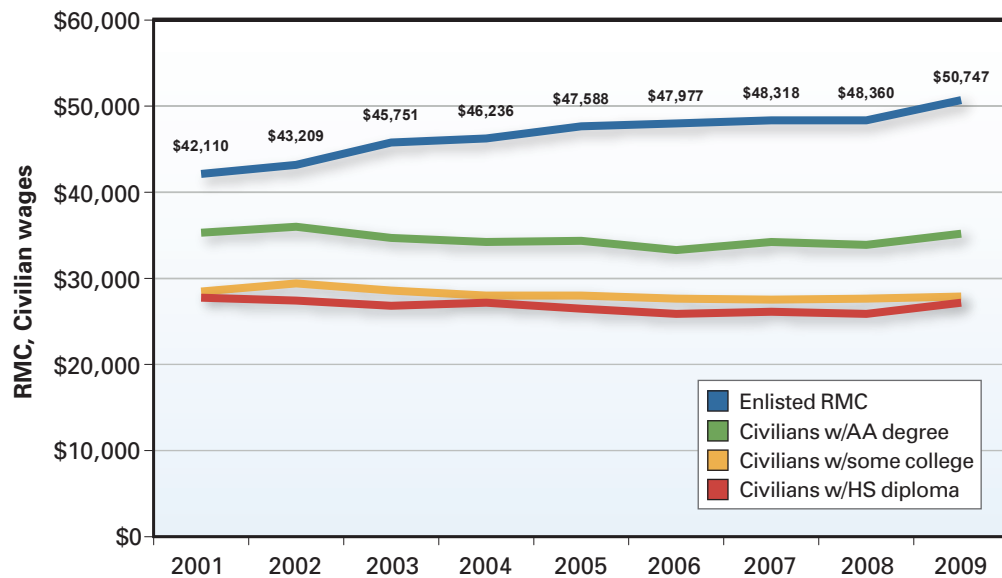

Figure 6. Real trend in average RMC for all enlisted personnel and real trend in median wages for enlisted equivalent civilians (2001–2009)

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21. In our charts, we separate the three enlisted equivalent civilian education groups, but, for the percentile calculations, we combined the three groups into one composite "civilian equivalent" group. By necessity, the estimates from the composite groups are weighted by the civilian education profiles (since data on military education profiles don't exist).

Officers: trend analysis

Real trends in RMC for officers and wages for equivalent civilians

In figure 7, we show trends in real RMC for officers from 2001 to 2009, compared with real equivalent civilian wages. As with enlisted personnel, *real* RMC for officers has been relatively flat, rising only early in the decade and in 2009.

We see here that civilian wages for more educated civilians, whom we call "officer equivalent" civilians, did not fall as much over the decade as they did for the "enlisted equivalent" civilians. As a result, the gap between officer RMC and equivalent civilian wages did not grow as much as it did for enlisted RMC.

Real officer RMC grew by over 9.1 percent from 2001 to 2009, from roughly $86,840 to about $94,735. During the same period, civilian wages for those with 4-year degrees didn't grow at all; for civilians with graduate-level degrees, real wages grew by just over 1 percent. For officers, RMC corresponded to the 80th percentile of equivalent civilian wages in 2001, and grew to correspond to the 83rd percentile of civilian wages by 2009—a significant rate of growth, though not as large as for enlisted.
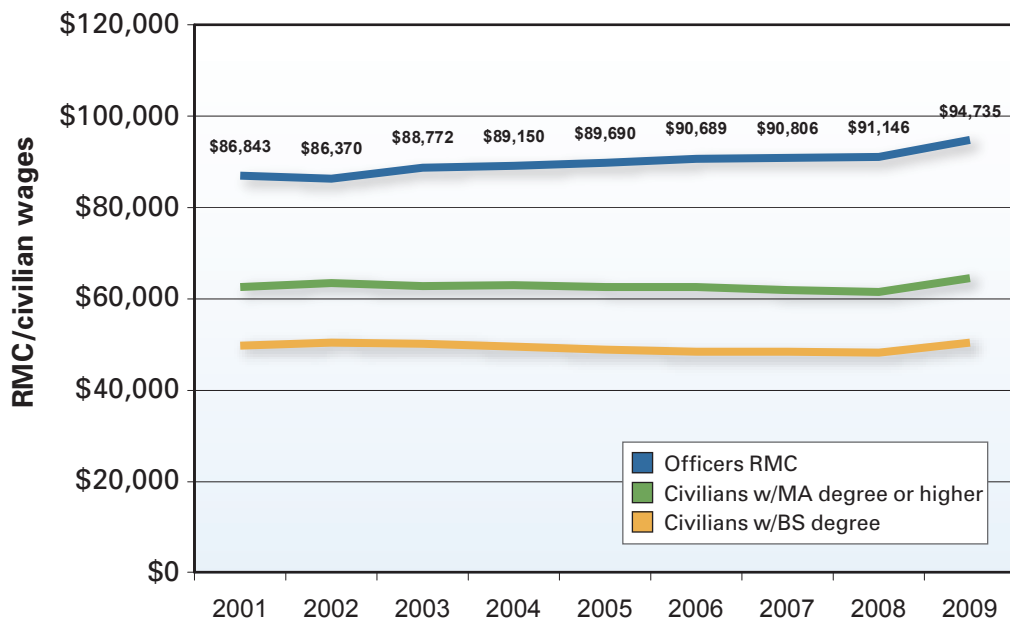

Figure 7. Real trend in RMC for all officers and real trend in median wages for officer equivalent civilians (2001–2009)

Concluding remarks on RMC

From the career perspective, average RMC tends to grow consistently through a 20-year career, compared with civilians for whom average wages grow consistently for about the first 10 years, but grow only moderately or are flat in the second 10 years of work life.

We see this in figures 2 and 4 (2009 data), where RMC for enlisted personnel grows at an average of about $1,875 per YOS for the 20-year career. Officers experience rapid growth in RMC at first (about $26,000 in the first five years), and then moderate growth of $2,000–$2,500 per year for the remaining 15 YOS.

Average wages of civilians, however, tend to grow moderately in the first 6 to 10 years of experience—around $1,600 (HS graduates) to $3,000 (Associate degrees) and about $2,000 per year for civilians with Bachelor's degrees—before seeing wage growth flattening out after 8 to 10 years of experience. Conversely, civilians with graduate-level degrees see moderate growth of wages in the first 10 years and then quite rapid growth, averaging about $5,000 per year after year 10.

From the trend perspective, average RMC rose during 2001 through 2009. Enlisted servicemembers saw average RMC rise considerably relative to the median wages of equivalent civilians. For enlisted personnel, RMC rose from the 84th to the 90th percentile of wages for equivalent civilians. For officers, average RMC rose from the 80th to the 83rd percentile of equivalent civilian wages.

These values do not, by themselves, determine whether military pay is too high or too low. Other factors, such as recruitment and retention, risk of war, the expected level of personnel tempo, and the desired quality level of military personnel, must also be considered when determining whether military pay levels are adequate. Still, this analysis suggests that military pay is relatively stable and growing over a military career and over time.

Exploring other factors of compensation

Modeling discretionary income

RMC is the traditional metric used in comparisons of military and civilian compensation because all servicemembers are eligible to receive the four components of RMC.

However, there are other factors of compensation that could be considered in developing a fuller picture of servicemember compensation. To identify which other factors are most important to focus on, we developed a formal model to deduce

and test a metric for comparing military and civilian compensation. The purpose of this excursion is not to undermine RMC as a comparison metric but to enhance comparisons of military and civilian pay by considering non-RMC components that are typically perceived as compensation.

The model is based on two traditional inferences from basic economic models of labor in a market economy. First, workers who are alike in technical skill and job experience, and whose jobs are also alike, will receive similar total compensation. Second, workers and families who receive the same total compensation will have roughly similar standards of living and approximately the same basic living expenses.

The corollary from these inferences, and by the definition of discretionary income, is that the metrics used to compare military and civilian compensation should lead servicemembers and equivalent civilians to have roughly the same discretionary income.

Therefore, we suggest that, when comparing the incomes of two groups, what matters is not gross pay, or even disposable income, but discretionary income. We will define discretionary income and evaluate its usefulness as an objective here.

Discretionary income is normally defined as the average amount of money available for a worker to spend after taxes and basic living expenses have been paid [16, 17, 18, 19, and 20]. Note that discretionary income differs from disposable income, which is net pay after taxes.

Why do we care about equalizing discretionary income in the model? There are many definitions of income; gross income, net income, and disposable income are just a few examples. Why discretionary?

Differences in tax laws can make what appears to be equal gross wages result in differing discretionary incomes. In addition, some employers pay part of compensation in the form of noncash benefits. Employers may vary in the balance of cash and noncash compensation, depending on the tax rules and the various costs to employers of providing benefits.

Further, some workers may receive a varying amount of the benefit for reasons that are unrelated to their productivity in the labor market. For example, servicemembers receive a greater housing benefit if they have a family. Similarly, employer-provided health insurance often is a greater benefit to employees with families.

Servicemembers benefit from both of these factors: (1) a significant share of their compensation is not taxed as ordinary income, and (2) they receive relatively high-value benefits in the form of in-kind compensation.

A formal model of military and civilian compensation

We present here a theoretical model of compensation, in order to deduce a set of metrics for comparing military and civilian wages that are more comprehensive than RMC in isolation.

We begin the model with gross cash wages for equivalent servicemembers and civilians. We subtract out the tax burden (which will differ for military and civilians) and basic living expenses to obtain discretionary income. Our objective is to deduce measures of military and civilian compensation that equalize discretionary income, given gross wages, tax burdens, and basic living expenses.

We make the following four assumptions in this model. The first two assumptions relate to how we must divide the populations into suitable comparison groups. The next two assumptions are related to the value of the military BAH and BAS and/or the value of onbase housing and meals, for those who don't get BAH or BAS. The four assumptions follow:

1. The people in each of the comparison groups have roughly the same job experience and technical skill levels. This implies that the value on the labor market would be roughly the same.

2. The people in each of the comparison groups have the same standard of living. This implies that, on average, the total cost of basic living expenses would be roughly the same.

3. Each servicemember in the model is eligible for military BAH and BAS, or servicemembers who do not receive BAH and BAS receive onbase housing and meals of the same value.

4. *BAH + BAS* is roughly equal to expenditures for housing and food for servicemembers.[22]

In the first phase of the formal model, we further assume that taxes, housing, and food are the only basic living expenses. Then, in the next phase, we include estimates of noncash benefits not included in RMC, focusing specifically on employer-paid health care benefits and the FICA tax advantage.

Mechanics of the formal model

For purposes of modeling the relationship between military and civilian compensation, we propose a representative agent model in which we consider two

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22. Combining assumption 4 with assumption 2 implies that civilian housing and food expenses are also equal to military BAH and BAS. However, civilian housing and food expenses are not called out separately because they are embedded in civilian wages rather than applied as allowances (as they are for servicemembers).

people—one civilian and one servicemember—who are the same in job-related characteristics (job experience and technical skills) and who have the same basic living expenses (that is, they have the same standard of living).[23]

We begin by postulating the gross income of each representative. Civilians earn wages and bonuses, and servicemembers receive Basic Pay and Basic Allowances for Housing and Subsistence (BAH and BAS).

The algorithm for discretionary income is gross wages (W) minus income taxes (t), minus basic living expenses (E). Gross wages for civilians are salaries (or hourly pay) plus bonuses. For servicemembers, *gross wages* are *BP + BAH + BAS*.

For servicemembers, discretionary income is equal to the military gross pay (W_M) minus income tax on Basic Pay (t_B), minus living expenses (E):

$$D_M = W_M - t_B - E \,.$$

For civilians, discretionary income is equal to civilian gross pay (W_C, which includes both wages and bonuses), minus income taxes on all pay (t_W), minus living expenses (E):

$$D_C = W_C - t_W - E \,.$$

Note that income taxes are different for military and civilian income because, while civilians pay tax on all income, servicemembers pay only on BP. Also note that, by assumption two, E in this simple model is the same for both military and civilians. We relax this assumption in the next subsection.

We postulate a military wage-setting goal with one of two objectives, either to (1) set military gross wages to be equal to the gross wages of equivalent civilians (i.e., $W_M = W_C$), or (2) set military gross wages such that military and civilian discretionary income are the same (i.e., $D_M = D_C$). First, equal *gross wages* implies that:

$$(D_C + t_W + E) = (D_M + t_B + E) \,.$$

Since $t_B < t_W$, then $D_M > D_C$. The servicemember's discretionary income is *higher*, in the case of equal gross wages, because servicemembers pay income taxes only on Basic Pay, whereas the civilian pays on his or her entire wage. There is no particular reason to suppose that servicemembers or workers would prefer the tax savings to more gross pay.

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23. The mathematical presentation of this formal model is in Appendix C.

However, when military compensation is such that the *discretionary income* of servicemembers and civilians are equal (i.e., when $D_M = D_C$), we find that:

$$W_C = W_M + r * (BAH + BAS)/(1 - r) \ .$$

The right-hand side of this equation is the military gross wage plus the tax advantage on BAH and BAS. If r were the marginal federal rate only, that would be RMC. However, since servicemembers also don't pay FICA tax on BAH or BAS, $r = (t + f)$, where t is the federal income tax rate, and f is the FICA tax rate. Consequently, the right-hand side is greater than RMC by at least the amount of the FICA tax advantage as long as the federal income tax is greater than zero.

This final equation tells us that if (1) the technical skills and job experience levels of servicemembers and civilians are the same, (2) housing and food are the only basic living expenses, and (3) basic living expenses, including all taxes, are the same for both servicemembers and civilians, discretionary income for servicemembers and civilians will be equal when civilians wages are equal to RMC.

What if assumptions in the formal model don't hold?

But what if the conditions and/or assumptions do not hold? We will consider each of our four assumptions in turn and will also consider the outcome when the assumption doesn't hold.

As we described in an earlier section, to simulate assumption 1, we construct equivalent comparison groups. Several other studies have focused on particular technical or professional groups [9, 10, 21, 22, and 23]. However, this study looks broadly across DOD, and so we construct broad-based comparison groups based on education levels, age/experience, gender, and full-time work status.

But the reason this matters is that, when comparison groups are the same, we expect that their value in the labor market, and thus their wages, will be the same. The fact that servicemembers who are otherwise identical are paid differently for having a family breaches this assumption. We will address this in the next subsection by analyzing compensation separately for servicemembers with and without dependents.

Assumption 2 states that servicemembers and civilians within comparison groups have the same basic living expenses (i.e., $E_M = E_C = E$). As we described in an earlier section, this is based on the premise that workers with the same skill and experience base will earn roughly the same incomes and thus be in roughly the same social class.

This concept is helpful in this study because the purpose of many inkind fringe benefits is to reduce out-of-pocket living expenses. Employer-paid health insurance,

life insurance, pensions, and other retirement contributions are all examples of benefits that reduce living expenses. But, as we'll see, since servicemembers receive free medical and most civilians don't, the assumption of equal living expenses doesn't hold. If E_M is not equal to E_C, setting discretionary income equal means that:

$$W_C = W_M + t_S/(1 - r) + (E_C - E_M) \,.$$

This states that discretionary income will be equal when civilian wages are equal to RMC plus the difference in the living expenses.

Assumption 3 says that all servicemembers either receive BAH and BAS or they receive onbase housing and meals that are valued at roughly BAH and BAS. This may be a debatable assumption because only two-thirds of servicemembers receive BAH and BAS. Further, of those who live on base, more than 60 percent are young (E-1 to E-4 or O-1) and single, and many of them are in training and living in multiperson housing.

The main issue here is whether the value of the military housing benefit is the same for servicemembers of the same rank and family status. For those not eligible for BAH or BAS, average RMC could overstate the value of compensation. This would be true to the extent that there are differences in the quality of onbase housing relative to off-base housing, and to the extent that servicemembers prefer the money to an in-kind benefit.

Two programs of the Office of the Secretary of Defense (OSD)—the Military Housing Privatization Initiative (MHPI) and OSD's Partial BAH—may have had the effect of partly narrowing any existing gap between the perceived value of BAH and military housing. The first does this by improving the quality of onbase housing. The second does this by providing a small cash reimbursement to servicemembers who live on base.[24] The MHPI program transfers part of the construction and management of onbase housing to private firms. The firms can increase profits if servicemembers choose to live on base rather than collect BAH.[25] They will be successful to the extent that this improves the quality of housing and narrows the preference gap.

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24. Partial BAH was not originally created for this purpose. The 1977 DOD Appropriation Act. Public Law 94-361, section 303(b), 90 Stat 923.925 provided that a portion of the annual military pay raise in 1977 would go to BAQ. Partial BAQ was authorized to compensate servicemembers who were not eligible for BAQ and whose pay raise that year would have otherwise been less than servicemembers who collected BAQ.

25. For more details on DOD's Military Housing Privatization Initiative, see: http://www.acq.osd.mil/housing/overview.htm.

Finally, assumption 4 depends largely on the extent to which DOD is successful at matching BAH to the median cost of local housing for servicemembers in each paygrade. Another study could confirm or reject this. But, this is what we assume.

BAS, however, was never meant to feed the entire family—only the service-member. Thus, for those with dependents, this assumption does not hold. As a result, while BAS reduces basic living expense for food, it does not reduce it to zero for military families.

Health insurance coverage and FICA

We address two large noncash benefits, which all servicemembers receive and which reduce basic living expenses. Specifically, we (1) analyze the effect of the military health care benefit since, unlike civilians, servicemembers and their families receive all medical care free of cost, and (2) the FICA tax advantage, which all servicemembers receive and civilians don't.

Most full-time working civilians also receive some type of health care benefit, either from an employer, a spouse's employer, or the government, and yet they still pay a large portion of health care expenses. Additionally, those who do not receive employer benefits will pay for their own health insurance and/or medical expenses out of pocket.

In order to include these basic living expenses that civilians have but service-members don't, civilian discretionary income is equal to wages, minus taxes, housing and food expenses, and expected health care expenses. We use the term "expected" to denote the probability that that the health insurance of civilian workers will be partially paid for by their employers.

The algorithm for discretionary income when housing, food, *and* health care are basic living expenses is:

$$D - W - t - E - HC .$$

The important point here is that, for servicemembers, *HC = 0*. In other words, health care is free. So, for them, discretionary income is the same as before:

$$D_M - W_M - t_B - E .$$

However, for civilians, expected health care expenses depend on both the probability (π) that they will have some kind of employer or government coverage and their out-of-pocket costs for either case:

$$D_C - W_C - t_W - E - \{\pi * HC_{C1} + (1-\pi) * (HC_{C2})\} .$$

The result is that military and civilian discretionary income will be equal when:

$$W_C = W_M + \{\pi * [r/(1-r) * (BAH + BAS) + HC_{C1}] + (1-\pi) * [r / (1-r) * (BAH + BAS) + HC_{C2}/(1-r)] .$$

When civilian wages (W_C) are equal to military gross wages plus the income tax advantages, plus the expected value of the military health care cost avoidance.[26]

Conclusions from the formal model

The model clearly shows that, when our four assumptions hold, discretionary income will be equal when RMC is equal to average wages for equivalent civilians. The four assumptions are strong, however, and may not hold. Assumption 1 doesn't hold because servicemembers receive different pay for having dependents. We will address this by separating those with and without dependents and analyzing them individually.

The second assumption doesn't hold because servicemembers all receive free medical care and a FICA tax advantage, while equivalent civilians pay a portion of their medical costs and FICA tax on all their income. We address this by estimating the expected value of servicemembers' health care cost avoidance and the FICA tax advantage.

For the third and fourth assumptions, we assume that DOD's use of MHPI and Partial BAH will continue to narrow any remaining gap that exists between the value of onbase housing and BAH.

Empirical analysis of other factors of compensation

We address each of these with the following empirical analyses by applying data to the results of the formal model to examine how military and civilian compensation compare.

In the first subsection, we separate servicemembers into four groups, enlisted with dependents, enlisted without dependents, officers with dependents, and officers

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26. An empirical study of the military health care cost avoidance (and other non-RMC benefits) in this formulation was developed by the author in [8], reported by the 10th QRMC in [3], and reviewed by the General Accounting Office (GAO) in [24 and 25].

without dependents. These categories are based on the observation that servicemembers with dependents are paid more than those without, even when they are alike in every other way. We don't compare single military with single civilians because, aside from the health care benefit, civilians don't get paid differently just because they have families. However, we do note that single military are substantially younger than those with dependents, so we compare them with a proportionately young civilian group.

In the next part, we estimate the difference in value of the military and civilian health care benefits. Using data from 10 years of annual Kaiser Reports on employer health benefits, we estimate the expected average out-of-pocket health care expenditure for covered and uncovered civilians. From 10 years of CPS data, we estimate the proportions of equivalent civilians whose health care is covered by employer or government plans. Using these results, we estimate an expected value of health care cost avoidance that servicemembers receive because they get their medical care free.

Finally, we estimate the tax advantage that servicemembers receive because they don't pay FICA taxes on their BAH or BAS. This benefit is made complex by the fact that today's FICA tax advantage can entail lost Social Security benefits in the distant future. We consult the literature for information about expected returns to the Social Security and the rate at which people might discount future financial benefits in order to estimate a net tax advantage, which considers both the tax advantage and potential lost benefits.

With and without dependents: career RMC

An important characteristic of servicemembers must be considered when comparing military and civilian compensation. Among like servicemembers—those who have the same skills and experience—those who have dependents receive total compensation that is higher than those who are single. The same is largely not the case among civilians.

As a consequence, while single servicemembers and single civilians will have the same basic living expenses, single civilians will typically receive the same wages as civilians who have families (all else equal). The result is that, when average RMC and civilian wages are the same, discretionary income will be higher for the single civilians than for single servicemembers. Conversely, since servicemembers with dependents receive a higher RMC, equivalent civilians with families will have a lower discretionary income.

To address this, we conduct separate comparisons of the wages of civilians with the wages of single servicemembers and with the wages of servicemembers with dependents.

Enlisted with and without dependents: career perspective

We show enlisted servicemembers with and without dependents separately in figure 8. Annual RMC is a little higher, about $3,200 on average, for enlisted personnel *with* dependents since they receive a higher housing allowance and its consequent federal income tax advantage. This ranges from about $2,700 in the early and mid years of service to around $3,800 at the higher YOS. The difference ranges from around 4.7 to 8.5 percent of RMC.

As discussed earlier, RMC for both those with and without dependents is substantially larger than median wages for enlisted equivalent civilians in all three education groups. As we'll see in more detail in the next subsection, the percentile ranking of RMC against civilian wages is not substantially affected by the difference in BAH payments by dependent status, at any given YOS.
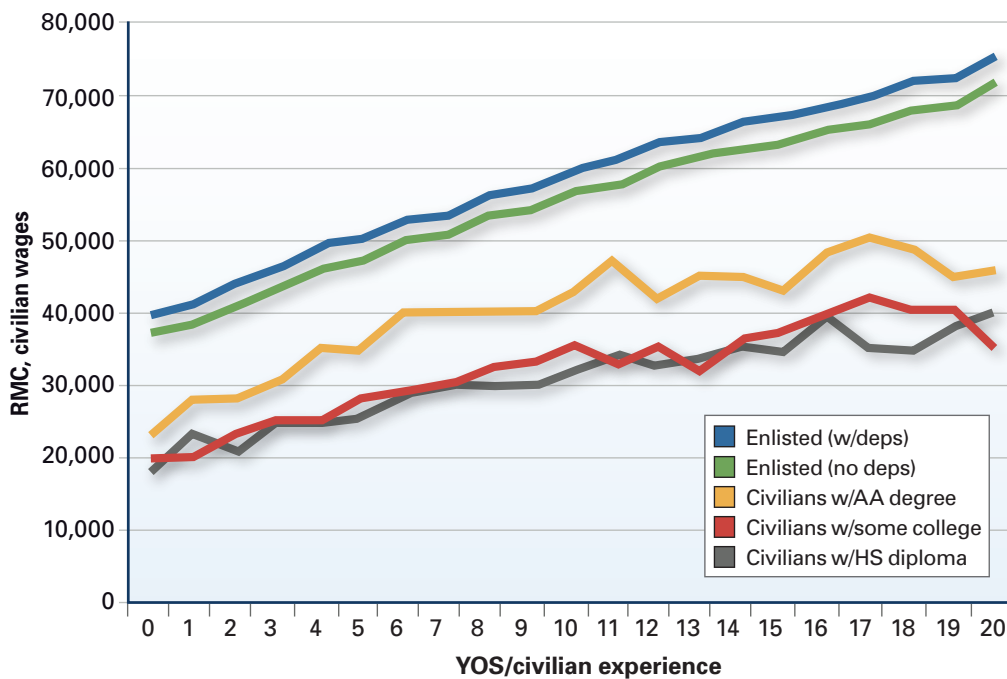
Figure 8. Average enlisted RMC, separating those with and those without dependents, and median wages of enlisted equivalent civilians, by YOS/civilian experience (2009)

Senior enlisted with and without dependents: career perspective

As with all enlisted, the difference between RMC for senior enlisted with dependents and those without dependents is small relative to overall military compensation—an average of roughly $1,500, ranging from about $700 to $2,900. This is an average of less than 2 percent of RMC (figure 9).
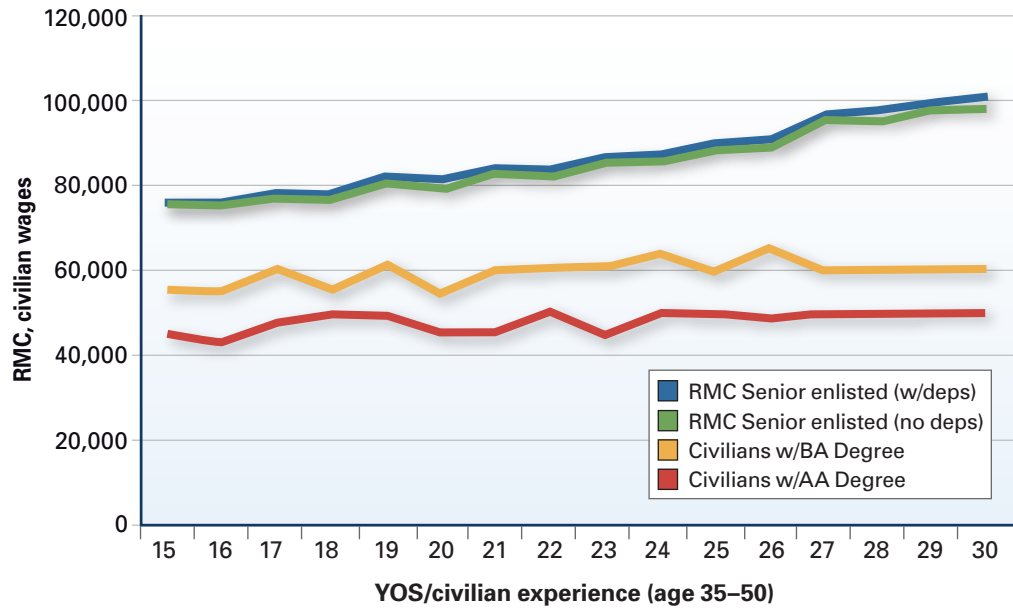

Figure 9. Average senior enlisted (E8-E9) RMC, separating those with and those without dependents, and median wages of civilians with college degrees, by YOS/civilian experience (2009)

Dependent status has a negligible effect on the percentile ranking of senior enlisted against wages for equivalent civilians at any given YOS.

Officers with and without dependents: career perspective

In figure 10, we see that officers with dependents made more on average than their single colleagues in 2009. However, almost all the difference occurs in the first 3 years of service, where officers with dependents make from about $2,750 to $5,700, or 4.3 to 10.7 percent more than their single colleagues.

After the third year of service, the difference in RMC is only about 2 to 3 percent of RMC.
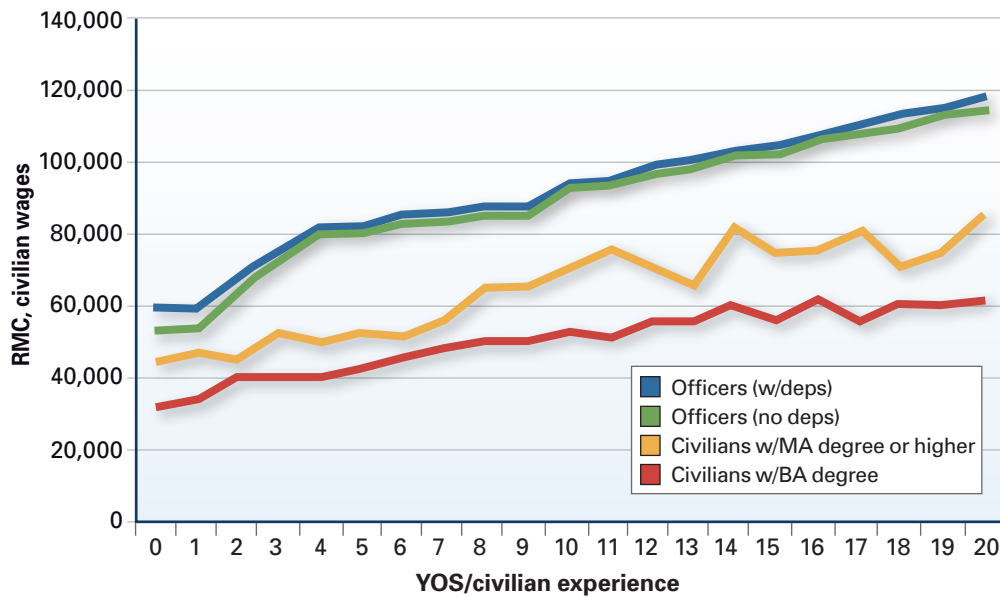
Figure 10. Average officer RMC, separating those with and those without dependents, and median wages of officer equivalent civilians, by YOS/civilian experience (2009)

As we saw in the previous section, for both officer groups, RMC is substantially higher than median wages for equivalent civilians for most of a 20-year career, where equivalent civilians are those who have either Bachelor's or graduate-level degrees.

With and without dependents: 2001–2009 RMC trends

Enlisted with and without dependents: trend perspective

Looking at servicemembers with and without dependents separately is revealing. Comparing the results in figures 11 and 12, we see first that *average* RMC is substantially less for servicemembers without dependents than for those with dependents. For example, average RMC in 2009 for those with dependents was $56,519 (figure 11), while we estimated it was $42,080 for those without dependents (figure 12).

This seems to conflict with the results presented in figure 8, which shows that the difference between the two groups is only about 4.7 to 8.5 percent of RMC. However, those numbers were estimated for servicemembers at a given YOS. In our trend estimates, the difference is almost entirely explained by the fact that servicemembers without dependents are substantially younger than those with dependents.

The median YOS for enlisted servicemembers *with* dependents is about 7, suggesting a median age of about 25 or 26, while the median YOS of those *without*
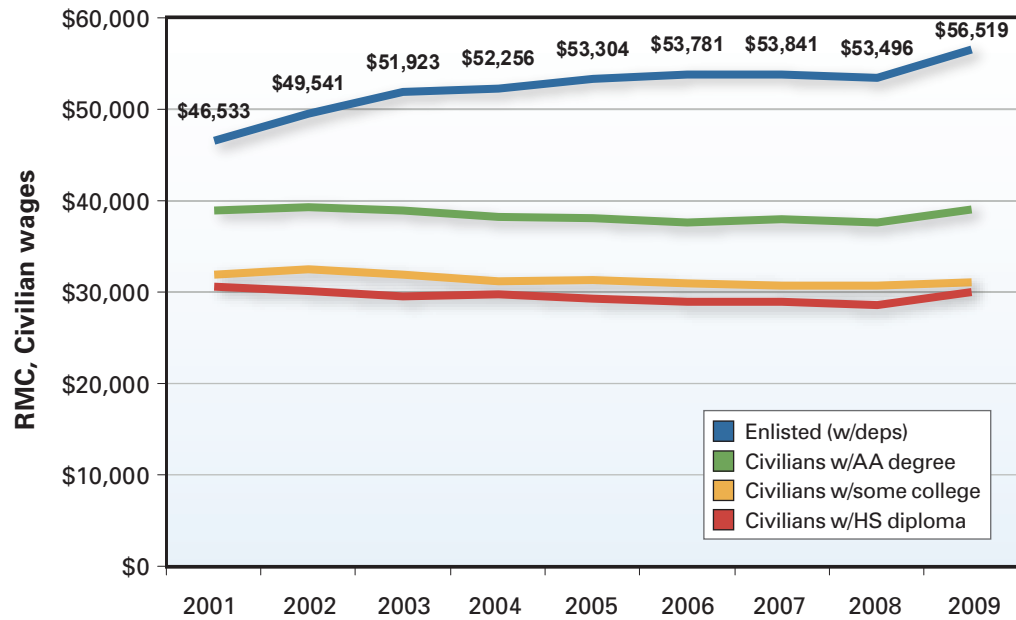
Figure 11. Real trend in average RMC for enlisted personnel with dependents and real trend in median wages for enlisted equivalent civilians (2001–2009)
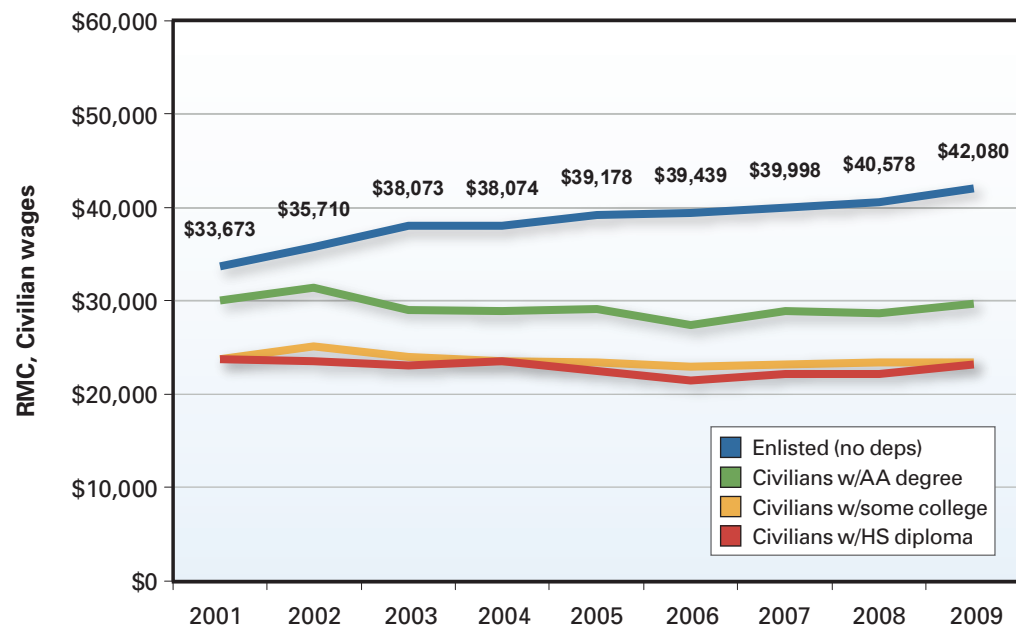

Figure 12. Real trend in average RMC for enlisted personnel without dependents and real trend in median wages for enlisted equivalent civilians (2001–2009)

dependents is about 3, suggesting a median age of around 22. Since RMC rises with YOS, average RMC will be higher for servicemembers with dependents.

Consequently, in the trend estimates, we weighted the civilian estimates by military YOS profiles when comparing wages, so that we make appropriate comparisons of military and civilian populations. So, percentile ranking reveals that RMC for both servicemembers with and without dependents corresponded in 2009 with roughly the 90th percentile of median wages for their equivalent group, as it does for the military at large.

We find that RMC corresponds to roughly the same percentile of wages for equivalent civilians for both groups of servicemembers. RMC for enlisted with dependents corresponded with the 84th percentile of wages for equivalent civilians in 2001 and rose to about the 90th percentile in 2009. This was similar for servicemembers with no dependents, whose RMC also corresponded with the 84th percentile of equivalent civilians in 2001 and rose to the 91st percentile in 2009 (figures 11 and 12).

Looking at the RMC trends for enlisted, we see that average real RMC for enlisted with dependents grew from over $46,500 in 2001 to over $56,500 in 2009 (figure 11). Average real RMC for enlisted without dependents (figure 12) grew from nearly $33,700 in 2001 to just over $42,000 in 2009.

Officers with and without dependents: trend perspective

Just as we saw with enlisted RMC, average RMC for officers without dependents is much smaller than RMC for those with dependents. For officers with dependents, average real RMC grew from $89,900 in 2001 to nearly $102,000 in 2009. For officers without dependents, average real RMC was about $64,370 in 2001 and grew to nearly $75,800 by 2009 (see figures 13 and 14).

As with enlisted personnel, this occurs for the same reason: officers without dependents are, on average, much younger. The median YOS for officers without dependents was around 5, suggesting a median age of 28 or 29. For officers with dependents, the median YOS was closer to 14, implying a median age of 37 or 38.

As before, we compared RMC with equivalent civilians whose age distribution corresponded with their comparative group, servicemembers with or without dependents. As a result, real RMC for officers without dependents corresponded with the 74th percentile of real wages for equivalent civilians in 2001 and rose to the 83rd percentile by 2009. For officers with dependents, real RMC corresponded with the 79th percentile of real wages for equivalent civilians in 2001 and rose to the 83rd percentile in 2009.
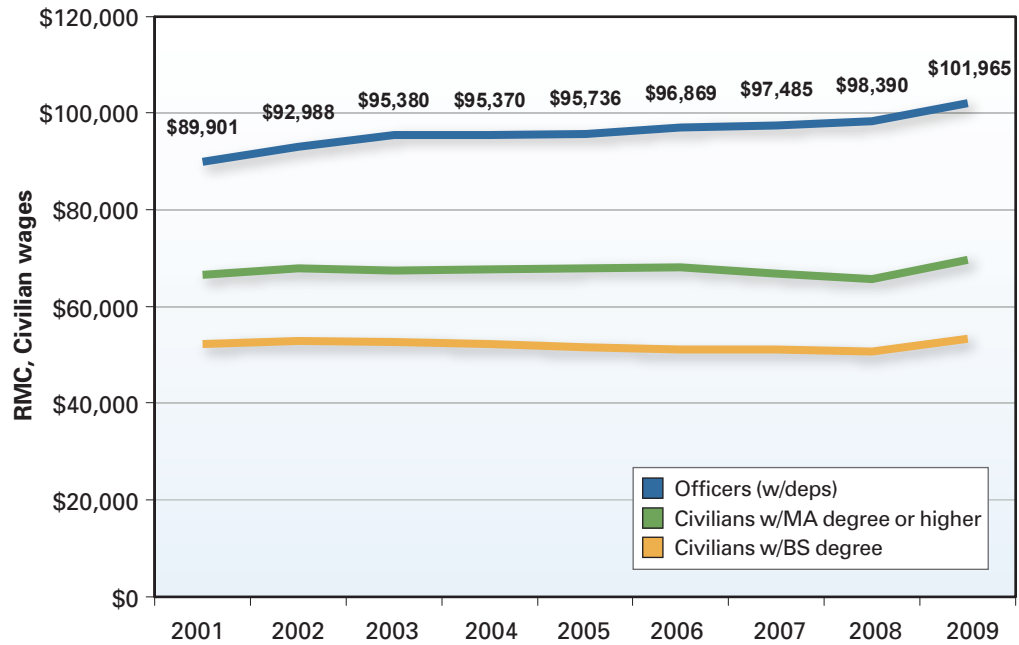
Figure 13. Real trend in average RMC for officers with dependents and real trend in median wages for officer equivalent civilians (2001–2009)
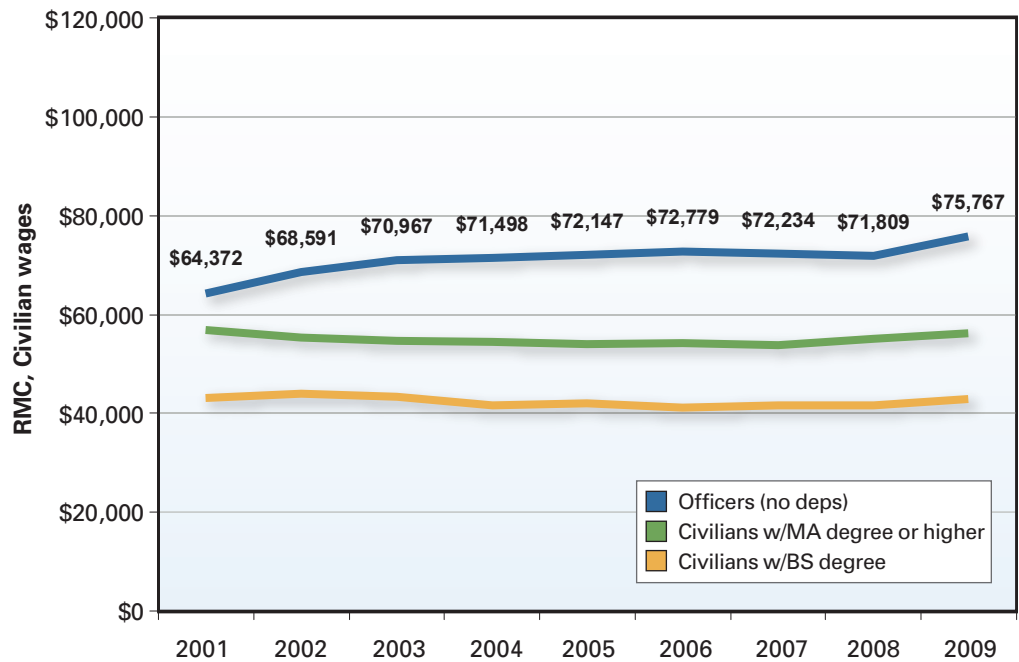

Figure 14. Real trend in average RMC for officers without dependents and real trend in median wages for officer equivalent civilians (2001–2009)

Closing remarks

We see that differences in BAH and the consequent tax advantage result in nontrivial differences in RMC for servicemembers with and without dependents. Nonetheless, comparing RMC with wages of equivalent civilians, the differences do not appear to have a substantial effect on the percentile ranking for either group of servicemembers.

We therefore conclude that, for purposes of comparing military and civilian pay, the differences in pay between those with and without dependents is relatively small.

To be clear, our conclusion is based on one criterion, that wages for service-members with and without dependents correspond to roughly the same percentile as wages for civilians in their education and experience levels. Others could argue that by some other criterion—fairness or retention—these are substantial differences.

Value of the military health care benefit

Up to now, we have assumed that basic living expenses include housing and food. Many, however, would consider medical care a basic living expense.

The reason one might consider that health care expenses are a basic living expense is that most workers in the United States have health insurance. According to the U.S. Centers for Disease Control and Prevention, about 78.9 percent of American adults under 65 have some sort of health insurance coverage [26]. And, according to Kaiser surveys on employer coverage, about 61 percent have some form of employer-paid health insurance, making health insurance the most common and the most expensive noncash benefit offered by employers.[27]

So, if nearly everyone buys some health care, it is, by definition, a basic living expense. As with all living expenses, the amount spent on health care will vary from person to person, but the average expenditure within a group is the best estimate of the basic expense.[28]

While most civilians pay for a portion of the cost of their health care, service-members and their families get their health care free. In this subsection, we take a brief look at how military and civilian health plans differ. After that, we discuss how the comparative value of the military health plan is equal to the out-of-pocket costs

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27. For some employees, the retirement benefit is more valuable and/or more costly to employers than the health care benefit. For the large majority of employees, however, the retirement benefit is in the form of employer contributions to a 401(k) or 403(b). This puts most retirement plans in the category of cash payments, even if it's deferred cash.

28. Reference [27] presents evidence that employees sacrifice some wages to get employer coverage, so they are actually paying more for health care than estimates of out-of-pocket costs would suggest.

that civilian workers can expect to pay since we would expect that servicemembers would pay them if they worked in the private sector.

Finally, we estimate these values for the four military groups: enlisted with dependents, enlisted without dependents, officers with dependents, and officers without dependents. As we did with comparisons of RMC and civilian wages, we make estimates in both the career perspective and the trend perspective in our empirical analysis.

Comparing military and civilian health care plans

Military health plans. All servicemembers and their families are beneficiaries of the military's TRICARE health coverage in one of three forms. First is TRICARE Prime, which is essentially free of charge but restricts the choice of providers to those at the Military Treatment Facilities (MTFs). Thus, TRICARE Prime is the military's version of a closed Health Maintenance Organization (HMO) along the lines of a civilian HMO, such as Kaiser Permanente.[29]

The dependents of servicemembers are also eligible for TRICARE Standard and Extra, which offer greater choice of providers but carry small out-of-pocket expenses. Standard and Extra are akin to the civilian Point of Service (POS) health plans, in which the primary provider is an HMO but some specialty care outside the HMO is allowed at higher cost, and the Preferred Provider Organization (PPO), which is a health insurance contractual arrangement in which medical care is normally given by providers within a provider network.

Civilian health insurance coverage. According to the Kaiser Family Research Foundation Report on Employer Health Benefits [28], about 61 percent of civilian workers were offered health coverage by their employer. However, they aren't the only workers who are covered. Another 20 percent of workers whose employers don't offer health insurance coverage are nonetheless covered by a spouse's or a parent's employer. Other workers are covered by a government plan, such as the Department of Veteran Affairs or TRICARE for military retirees and their families.

According to the responses in the CPS data, roughly 85 percent of full-time workers are covered by their employer, a spouse's employer, or the government. This varies somewhat by level of education, job experience, and whether workers have families.

That workers with families are more likely to have employer coverage is most likely from a selection effect, resulting from both the greater financial need for health

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29. See [8 and 29] for more details about the military TRICARE plans.

insurance of those with families and from the fact that the value of health insurance is more valuable for those with families, providing further incentives to accept positions with companies that offer health insurance.[30]

In figure 15, we show that the proportion of servicemembers who have dependents grows steeply with YOS in the first 10 or 12 years of service and then levels off at around 85 or 90 percent. Although these rates are roughly similar for officers and enlisted, enlisted servicemembers appear to have families a little more rapidly with YOS than do officers.[31]

About 60 percent of enlisted equivalent civilians with dependents have employer health insurance coverage in the first few years of job experience. This proportion of coverage grows steeply before it levels off at about 80 percent coverage by year 9 or 10 (see figure 16). For enlisted equivalent civilians who are single, coverage remains at around 60 percent and doesn't rise by much, on average, until about year 12 or 13, when the proportion of coverage grows to about 70 percent.

For officer equivalent civilians who have families, an average of 85 percent are covered, and this proportion grows with experience and levels off at over 90 percent coverage at year 7. For officer equivalent civilians who are single, the proportion of coverage is about 80 percent at all years of experience.
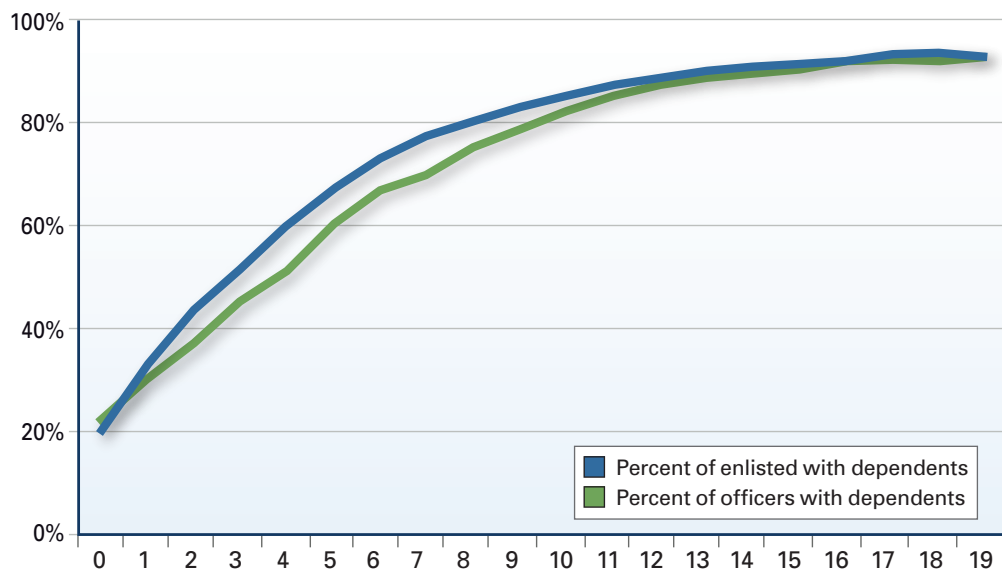

Figure 15. Percentage of servicemembers who have dependents, by YOS (2009)

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30. The first point will be correct to the extent that workers sacrifice wages for health insurance *among firms*, and that singles prefer cash. The latter point is correct to the extent that workers with families do *not* sacrifice wages for health insurance benefits *within the same firm*.

31. This is true even though officers are 3 to 4 years older, on average, at the same YOS as enlisted.
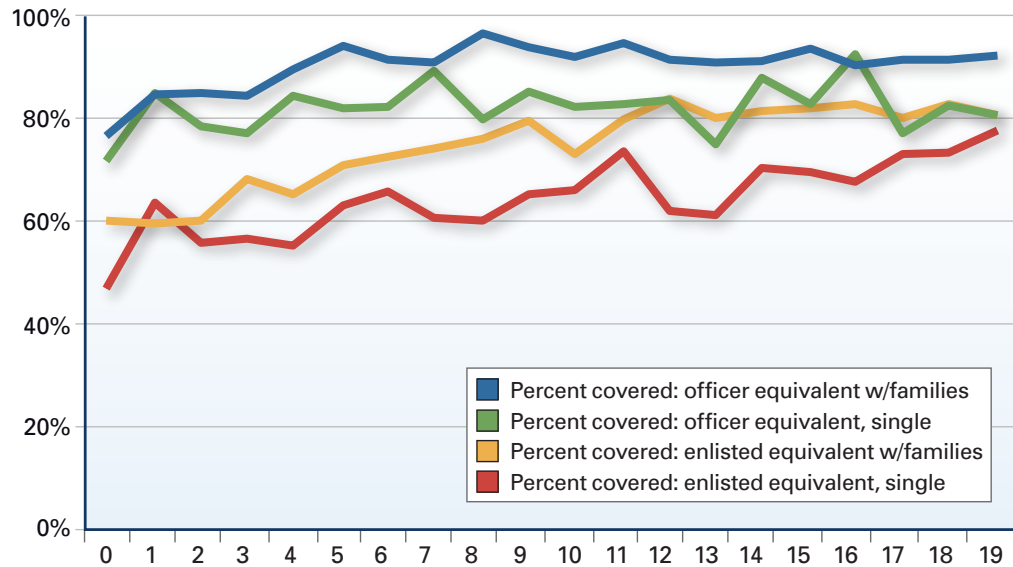
Figure 16. Percentage of civilians with health coverage by an employer, a spouse's employer, or a government health plan, by YOS (2009)
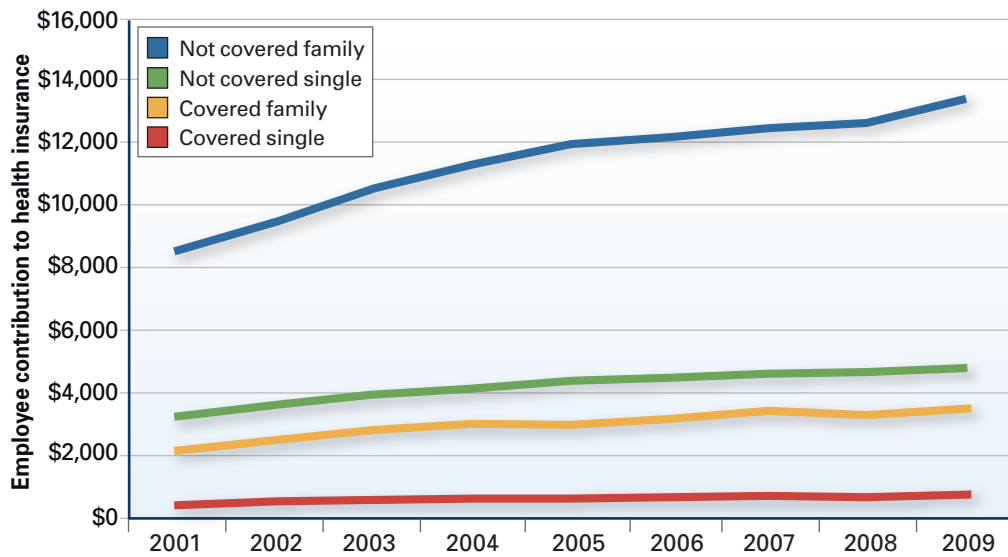
Health insurance premiums and other health care costs

Here we describe and illustrate the costs of health insurance. The data on these costs come from the Kaiser Foundation Reports of Employer Health Benefits from 2001 to 2009. We see that, on average, the cost of health insurance premiums rose by roughly 20 percent annually from 2001 through 2009 (see figure 17).[32]

Most civilians pay all or part of the insurance premium, deductibles, copayments and other out-of-pocket (OOP) costs for medical visits. About 5 percent of the CPS respondents were covered by an employer group plan but still paid 100 percent of insurance and medical costs. About 17.5 percent of full-time workers had no access to employer or government coverage and paid *all* health insurance and/or medical costs.

Families who are not covered by an employer or government plan and thus must pay for their own health insurance (or their own medical care), pay an average of over $13,000 per year for family coverage [28]. This is up from a little over $7,000 in 2001, an increase of over 85 percent in 8 years. Families who have employer or government coverage pay an average premium share of less than $4,000, which is a

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32. Health insurance premiums will be roughly the same regardless of the education level of workers. However, the average *share* of premium that covered workers pay could be different *among* firms, to the extent that some employees tend to prefer to receive higher wages to health insurance coverage. The data don't provide this level of detail, and so we combine all employees and show only the differences among the four groups—uncovered singles, uncovered families, covered singles, and covered families.

a. Source: Average health insurance premiums, Kaiser Surveys of Employer Health Coverage, 2001–2009

b. This assumes that those who are not covered by an employer or government plan pay the entire health insurance premium themselves.

Figure 17. Trends in health insurance premium costs facing workers who are and are not covered by employer or government plan[a,b]

little less than one-third of the full cost of the health insurance premium but also nearly double the average share in 2001.

Single civilians pay a much smaller average premium, and, though those singles who are covered pay a similar *share* of the premium as their colleagues with families, it is a share of a much smaller premium. Those singles who are covered paid an average of about $780 in 2009, up from about $360 in 2001. Singles who were not covered and paid the entire premium paid well over $4,000 in 2009, up from about $2,650 in 2001.

On average, health insurance premium costs nearly doubled from 2001 to 2009, ranging from about an 80- to 90-percent increase for those not covered by their employer to a 95-percent increase for covered families and a 110-percent increase for covered singles. Of course, the overall cost of living increased as well in the same period by a little over 20 percent. Dividing the rise in health insurance costs by the CPI, we see that the *real* cost of health insurance rose a little over 60 percent from 2001 to 2009.

In the next subsection, we'll use these data on the costs civilians pay, on average, for health care and estimate the value to military personnel of avoiding these costs by

being in the military. Throughout this discussion, we assume that, if servicemembers were in the private sector rather than in the military, they would expect to be covered by employers or the government in the same proportions as full-time equivalent civilians with the same family status.

Expected value of health care cost avoidance

We now present the excursion where we include in our model the average civilian out-of-pocket costs of health care that servicemembers avoid. As we did with RMC, we show the results from both a career perspective (YOS 0–19) and a trend perspective (2001–2009).

The algorithm for the expected value of health care cost avoidance (VH) is as follows:

$$V_H = \pi * (Prem_{Share} + OOP) + [(1-\pi)/(1-r) * (Prem_{All} + OOP)] \,,$$

where:

π = probability that the civilian has employer-paid or government health insurance.

r = the marginal federal tax rate; this calculation stems from the fact that civilians who are covered by an employer pay their out-of-pocket costs out of pretaxed dollars, and thus receive a tax advantage on their health care benefit. Civilians who are not covered pay out of after-tax dollars and receive no tax advantage.

$Prem_{Share}$ = the percentage of health insurance premium that employer-covered civilians pay.

$Prem_{All}$ = the entire insurance premium if the civilian is not covered by an employer or government (this is a proxy for the cost of all medical care for them.)

OOP = all other out-of-pocket expenses, such as deductibles and copayments.

Note that, because the algorithm contains a probability (π), it would be considered an "expected value."

This is the basic algorithm for health care cost avoidance that we use for both the career and trend perspectives. In the trend perspective, we add to the algorithm the weighting mechanism that controls for the differences in the YOS/experience profiles of civilians and servicemembers, and of servicemembers with and without dependents.

Health care results from a career perspective (2009)

The expected value of health care cost avoidance for servicemembers falls with YOS, largely because for civilians the probability of having employer coverage increases as job experience rises (see figure 18).[33] As we saw in figure 15, for enlisted equivalent civilians who have families, the probability that they'll be covered rises from 60 percent at 1 to 3 years of experience to about 80 percent by their 11th year of experience.

Note that the expected value of health cost avoidance is quite a bit higher for enlisted personnel than for officers. This is again because officer equivalent civilians are more likely to have jobs with employer health coverage (from 80 to 90 percent coverage, depending on experience and family status) than are enlisted equivalent civilians (from 60 to 80 percent coverage).

Thus, we can say that the expected value of the military health benefit is substantially higher for enlisted servicemembers than for officers relative to what they could expect to receive in the civilian workforce. Furthermore, the value remains higher for enlisted throughout a 20-year career.
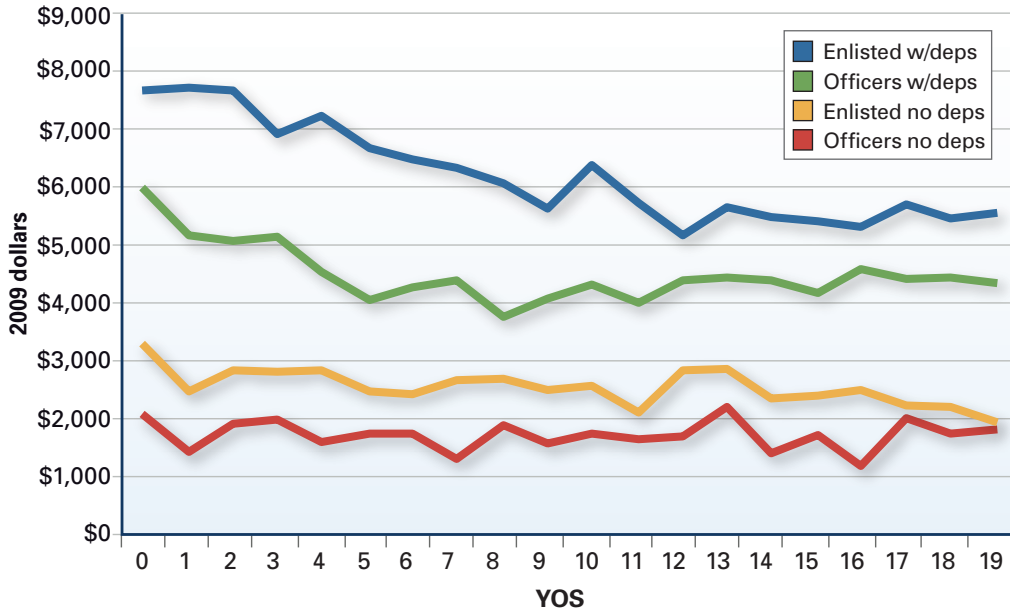

Figure 18. Expected value of health care cost avoidance, by YOS (2009)

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33. Servicemembers from YOS 20 and after are eligible for health care with very low out-of-pocket costs when they retire. As a result, we assume that the value of health care cost avoidance for servicemembers after YOS 20 is zero.

Health care results from a trend perspective (2001–2009)

The basic algorithm for calculating the overall average of expected health care cost avoidance in a particular year is much the same as the algorithm for each YOS. Here, however, just as we did with estimates of military versus civilian wages, we weighted values by each of the military YOS profiles to get a weighted average of the expected value of military health cost avoidance for the four military groups: enlisted with dependents, enlisted without dependents, officers with dependents, and officers without dependents.

For enlisted servicemembers with dependents, health care cost avoidance rose from just under $4,500 in 2001 to almost $7,000 in 2009 (figure 19). This was almost entirely a result of increasing health premiums; civilians with families pay a lot, even when they have coverage. But even officer equivalent civilians with families, 90 percent of whom are covered, still pay an average of nearly $5,000 a year of out-of-pocket costs.

The value of military health cost avoidance rose by about 55 percent from 2001 to 2009. Contrast this with the overall cost of living, measured by the CPI, which grew by just over 20 percent in the same period.
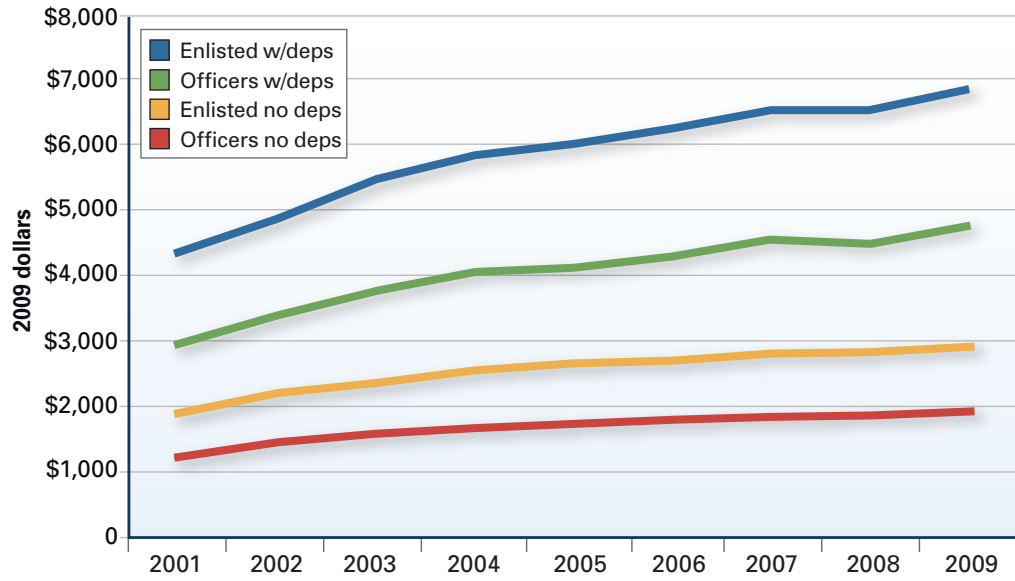

Figure 19. Trends in estimates of the value of military health care cost avoidance (2001–2009)

FICA tax advantage (TA)

The federal income tax advantage, which is one component of RMC, is not the only source of tax savings. Military allowances are also not taxed by any of the 50 states, nor are they taxed by the FICA.

The tax advantage on FICA and the state is more complicated. Seven states charge no income tax to any of its citizens, and two more charge no income tax to any military income at all. For servicemembers in these states, there is no state-level tax advantage. For this reason, we do not consider state-level tax savings as a generally expected source of compensation. But the FICA TA goes to all servicemembers; as a result, at least a portion of it can be considered part of military compensation.

The complicating issue for the FICA tax advantage is that the Social Security portion of FICA payments contributes directly to the future benefit. Specifically, the amount of Social Security benefit accrued by an eligible retiree depends on the size of his or her contributions during his or her working years.

Nonetheless, economic theory would suggest that servicemembers prefer having the tax advantage over the future benefits. The TA is part of current income, while the Social Security benefits are far in the future. As we showed earlier, the median age of an enlisted servicemember is about 24, and the median age for officers is about 31. This means that, at the median age, an enlisted person will wait more than 40 years before he or she is eligible to collect Social Security, and thus sustain any lost benefits from past tax advantages. Even at relatively low personal discount rates, the value of the expected lost benefit will be far less than the value of the current TA.[34]

Officers' personal discount rates may be lower, and officers are closer to retirement age. In spite of this, they would still have about 35 or so years before being eligible for Social Security benefits and would thus prefer the TA even at low discount rates.

Of course, at low discount rates, these lost benefits can absorb a large percentage of the tax advantage. For example, at a 5-percent personal discount rate, for a 25-year-old servicemember, the discounted value of the lost benefit can be as much as a third of the tax advantage.[35] Studies of personal discount rates suggest that a discount rate

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34. Personal discount rate is an economic concept describing a person's preference for current versus future earnings. It is generally thought that people discount future benefits as a result of two factors: (1) impatience (a desire to enjoy consumption sooner rather than later) and (2) uncertainty about the future events that influence earnings. A lower discount rate suggests a greater willingness to postpone earnings to the future.

35. Complicating the calculation of the expected value of lost Social Security benefit, however, is the 35-year rule, in which only the highest 35 years of income are included in the Social Security benefit algorithm [8 and 30]. Thus, for servicemembers under age 30, the FICA tax of early years of service may not even count toward Social Security benefits, and so the *net(TA)* is equal to the gross TA.

of 5 percent is low. But this shows the sensitivity of estimates of the value of TA to assumptions about personal discount rates.

The *net* FICA tax advantage, which we will call the net TA, is equal to the current year's *gross* FICA tax advantage minus the expected discounted value of the lost future Social Security benefits. Here we present our steps for estimating the net TA.

The total FICA tax rate (f) is equal to the social security tax rate ($t_s = 0.062$) plus medicare tax rate ($t_m = 0.0145$).

$$f = (t_s + t_m) .$$

Because BAH and BAS are not considered taxable income for either of the FICA taxes, servicemembers receive a Social Security tax savings (TS_s)[36] and a Medicare tax savings (TS_m):

$$TS_S = min[0.062*(BAH+BAS), 0.062*(106,800-(BP))] .$$

$$TS_m = 0.0145*(BAH + BAS) .$$

The total FICA tax savings (TS) is equal to the sum of the two tax savings amounts:

$$TS = TS_s + TS_m .$$

The amount of the current FICA tax *advantage*, which we call the Gross TA, is:

$$Gross\ TA = TS/(1-f) .$$

Next, we estimate the value of the Social Security benefit that would accrue from the Social Security tax savings by the age of eligibility (which we assume to be age 66). The undiscounted expected value of this future benefit depends upon the expected return on the Social Security tax amounts, and upon the rate at which servicemembers discount future benefits relative to current benefits.

Using the results derived by the authors in [30], we assume that the rate of return for Social Security taxes *(R)* is 2.5 percent for enlisted and 1.9 percent for officers. We also assume that the servicemembers will be eligible for future benefits at age 66, which is (66–YOS–A) years in the future, where A is the year of accession, A=19 for enlisted and A=23 for officers. Thus, the amount of the future benefit is:

$$B = TS_s*(1+R)^{(66-YOS-A)} .$$

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36. Note that the Social Security tax only applied to total gross income up to $106,800 in 2009. In our formula for calculating the tax on Social Security tax savings, we assume that BP+BAH+BAS is total gross income, and so the only income subject to the tax is BP (i.e. special and incentive pays aren't addressed here).

Because servicemembers discount future relative to current benefits, the discounted value of B at discount rate $d=0.125$ for enlisted and $d=0.10$ for officers is:

$$dB = B/(1+d)^{(66-YOS-A)} .$$

Finally, the net tax advantage is equal to the gross TA less the expected, discounted value of the future Social Security benefit that would be lost as a result of the TA.

Net TA = Gross TA – dB .

The net TA is the number we consider part of total compensation and the number we present here.

We choose internal rates of return on the Social Security portion of the FICA TA of $R = 2.5$ percent for enlisted and 1.9 percent for officers? Why did we chose these rates? According to [30], expected internal return on FICA taxes in the United States ranged from about 1.4 percent for high-income single men to about 4.2 percent for medium-income one-earner couples. The range is a result of two factors. First, Social Security benefits are progressively determined, with higher expected returns accruing to low-income workers than to high-income workers. Second, a nonworking spouse in one-earner families is eligible for the benefits accrued to his or her spouse, raising the expected total family return of the FICA tax for the working spouse.

We used the expected return for two-earner couples from this data, which was about 2.5 percent for enlisted and 1.9 percent for officers.

Empirical results of FICA TA estimates

We illustrate our estimates of average enlisted and officer net TA over a 20-year career.[37] Using an estimate of the Social Security expected return of $R = 2.5$ percent for enlisted personnel, and a personal discount rate of $d = 12.5$ percent, our estimate of the range of the net FICA TA for enlisted is \$1,638 to \$2,238 (figure 20). The mean average was about \$2,042 in 2009.

For officers, using our estimated expected rate of return of $R = 1.9$ percent and that a personal discount rate of $d = 10.0$ percent, we found that the range of the net FICA TA for officers is \$1,593 to \$2,060; the mean average was about \$1,922 in 2009.

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37. We only show the FICA TA from the career perspective. Because the FICA tax is 7.65 percent of wages every year, and because the income cap on the Social Security tax is raised by formula each year, the FICA tax advantage will have grown over time at approximately the rate of BAH and BAS themselves.
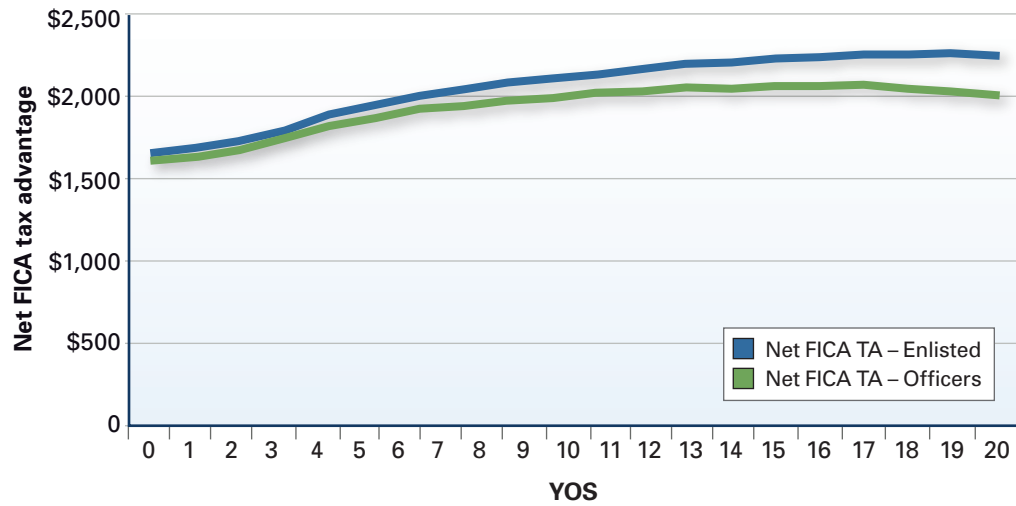
Figure 20. Net FICA tax advantage for enlisted and officers, by YOS (2009)

Concluding remarks: health care and FICA TA

We estimate that annual out-of-pocket costs for health insurance and medical care (depending on family size) are $3,000 to $7,000 for the average full-time enlisted equivalent civilian worker and between $2,000 and $4,800 for officer equivalent civilians. These costs are avoided by servicemembers and can be included in military compensation. In addition, we estimate that the discounted value of the FICA tax advantage is around $2,042 per year for enlisted and $1,922 per year for officers.

Together the health care and FICA TA add between $4,000 and $9,000 to service-members' compensation. These amounts can range from roughly 5 to 20 percent of RMC, depending on paygrade, years of service, and family size. As a result, they make a substantial contribution to the total value of the military compensation package.

Interpretations and conclusions

In this section, we summarize and put into context the three most important findings of our analysis:

1. Military pay is higher than civilian pay, and the differential between military and civilian pay widened over the last decade.

2. The difference in pay between servicemembers with and without dependents is not trivial, but it has a relatively small effect on military and civilian wage comparisons.

3. The added value of the military health care benefit and the FICA tax advantage is large.

For each finding, we summarize our results and offer our thoughts about why we see what we see and how that might influence policy.

Military pay is higher than civilian pay

We see that RMC has been growing relative to civilian pay and now corresponds to the 83rd percentile of civilian wages for officers and the 90th percentile for enlisted personnel.

This difference between military and civilian pay could be related to remuneration for the additional risk and hardship taken by servicemembers. Research has shown that servicemembers work long hours and often many more days a year then equivalent civilians.[38] In addition, they are often deployed away from their homes in dangerous and unpleasant work environments.

It is also possible that this difference is related to the quality of DOD service-members. DOD strives to recruit and retain high-quality people-—that is, those who have higher aptitude test scores, have higher levels of physical fitness, and are less likely to have been involved in criminal activity. To attract higher quality personnel from the private sector, DOD will need to make military pay attractive relative to private-sector wages.

Finally, it is possible, perhaps even likely, that the market for servicemembers is not subject to many of the competitive pressures that exist in the private sector. We see an example of this in a U.S. Congressional Act in 1999 (Public Law 105-65, Oct, 1999), which, in response to recruitment and retention problems of the 1990s, and concern over the "...level of compensation provided to service members and their families," mandated that annual increases in military basic pay be ½ percentage point above the ECI for a 6-year period.[39] Private-sector firms responded to similar recruit-ment and retention problems stemming from the favorable economy with short-run increases in wages that quickly subsided when the U.S. economy returned to average growth rates at the turn of the century.

We see another example of this in the large annual increases in the military housing allowances following rising housing prices in the 2000s. Unlike mili-tary wages, civilian wages did not change in response to rising housing prices. Homeowners, not workers, received both the perceived gains in wealth from rising

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38. References [8 and 31] and results from the 2006 Status of Forces Surveys all suggest that deployments, changes in OPTEMPO, and other duties require servicemembers to work many more days per year and more hours per day than most civilians.

39. National Defense Authorization Act for Fiscal Year 2000, Report of The Committee on Armed Services House of Representatives on H.R. 1401 (House Report 106-162), May 1999.

   National Defense Authorization Act for Fiscal Year 2000, Senate Report 106-50, May 1999.

housing prices and the consequent losses when housing prices returned to normal following the collapse.

In our formal model, we stated that, if military and civilian groups are comparable, and their jobs are comparable, compensation should be roughly the same. Yet, the empirical model shows that this is not the case. To the extent that higher pay for servicemembers compensates them for higher risk and more arduous duty, and to the extent that it is necessary to pay servicemembers more to attract and retain high quality personnel, military pay will need to be higher than wages for otherwise equivalent civilians. However, to the extent that military pay is high as a result of political decisions by legislators and other leaders, military pay runs the risk of being higher than necessary.

The effect of differences in RMC between those with and those without dependents is relatively small

For both enlisted personnel and officers, we find that, while servicemembers with dependents make more than those without dependents, the effect of the difference on military and civilian wage comparisons is relatively small.

The absolute value of the difference is not small, however. When we compare their compensation at the same YOS, the difference in RMC is an average of around 5 percent for enlisted. The average difference is a little over 2.5 percent for officers, though it varies from 8 to 11 percent in the first two YOS and 1 to 3 percent of RMC in the remaining 18 YOS.

We also observed that the overall average RMC (in 2009) for enlisted servicemembers with dependents was just over $56,000, while the overall average RMC for enlisted without dependents was just over $42,000. The overall average RMC in 2009 for officers with dependents was nearly $102,000, compared with the overall average for officers without dependents of around $75,800.

The difference in RMC, however, is driven almost entirely by the difference in the relative YOS of servicemembers with and without dependents. Recall that these are *weighted* averages, which control for the fact that servicemembers with dependents are substantially older, on average, than those without dependents.

Confirming this, when we compare RMC with equivalent civilians whose age/experience profile mirrors the YOS profiles of servicemembers with and without dependents, their RMC corresponds to roughly the same percentile of equivalent civilian wages. So, for the purpose of comparing military and civilian compensation, it is not problematic to combine servicemembers with and without dependents.

Nonetheless, there are consequences that DOD should consider. First, providing more pay for servicemembers with families will most likely increase the proportion of servicemembers who have families. Higher pay can incentivize servicemembers to get married at higher rates than in the civilian sector. The authors in [32], for example, found that, although only 5 percent of 20-year-old civilians were married, 15 percent of 20-year-old Marines were married. Second, higher pay can provide an incentive for servicemembers with families to stay in the military at higher rates than single servicemembers.

The added value of military health care and FICA TA is substantial

The military health benefit is substantially more valuable than the health benefit available to most civilians. The reasons are twofold.

First, only about 80 percent of civilians, depending on education level and job experience, are provided a health care benefit by their employer. Civilians without this benefit buy their own health insurance and/or their own medical care directly. Most civilians who receive an employer health care benefit still pay a substantial portion of the cost of the insurance premium and some direct copayments for medical treatments.

Second, health insurance is expensive. For single civilians, it can cost more than $4,000 per year. For civilians with families, it can cost more than $13,000 per year. Furthermore, health insurance premiums have risen considerably faster than the overall cost of living—nearly doubling from 2001 to 2009—while the cost of living rose about 22 percent over the same period.

Servicemembers and their families receive this benefit free, but they would pay similar out-of-pocket costs if they were in the private sector. As a result, this is a benefit that can be considered part of their overall compensation. Doing so increases the value of their compensation package by about $3,000 for single enlisted personnel and up to nearly $7,000 for enlisted personnel with dependents. The benefit for officers ranges from $2,000 for single officers to nearly $5,000 for officers with dependents.

Next, the net value of the tax advantage servicemembers receive because they don't pay FICA tax on allowances adds roughly $1,500 to $2,200 to compensation for both enlisted and officers.

Together, health care cost avoidance and the net FICA tax advantage add from $4,000 to $9,000 in value to the military compensation package, which would place servicemembers' pay at an even higher percentile ranking than just considering RMC alone.

Concluding remarks

While we found that servicemembers, in general, receive higher pay than comparable civilians, that does not, in isolation, tell us why we see these results. Our modeling approach and the discussions in this final section provide some context for the results we presented throughout this paper. DOD leaders will want to take into account both the results and the context of the results in any future deliberations of compensation policy.

Appendix A: A brief history of RMC

Two important concepts came out of the Hook Commission in 1948 [5, 33, and 34]. First, it proposed that military compensation should be roughly the same as wages for civilians who have similar skills and who work in similar jobs. This concept was made law with the Career Compensation Act of 1949. Second, the Hook Commission Report established the structure of pay that the military currently uses, Basic Pay, allowances, and special and incentive pays.

In 1962, the military established and began using RMC as the metric for comparing military and civilian compensation. Developed in a study convened by Secretary of Defense Robert McNamara, and proposed in the Gorham Report, RMC provided a rough metric for the major compensation components that all servicemembers receive either as cash, a cash allowance, or an in-kind benefit. The concept of RMC was formalized in Public Law 93-419 as Basic Pay, Basic Allowance for Quarters (BAQ), Basic Allowance for Subsistence (BAS), and a federal income tax advantage because BAQ and BAS were nontaxable.

RMC has gone through several transitions and transformations. In 1980, the definition of RMC was broadened to include variable housing allowance (VHA) and the overseas, or "station," housing allowance (SHA), both of which were additional allowances for servicemembers living in high-cost-of-housing areas.[40] This meant that it seemed no longer conceptually defined by the criteria of all servicemembers receiving it. In 1998, BAH replaced BAQ, VHA, and SHA, and RMC again included the four major components.

The Defense Authorization Act of 1967[41] required that the increases in military Basic Pay would be determined by equating RMC to general schedule (GS) salaries of civil service employees. Since Basic Pay was about 75 percent of RMC, the raises in Basic Pay were greater than concurrent raises in civilian government worker pay.

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40. Military Pay and Allowances Benefits Act of 1980, Public Law 96-579, §11, 94 Stat. 3359, 3368-3369 (1980).
41. Codified in Public Law 90-207, §8, 81 Stat. 649, 654-655 (1967).

This proved to be costly because Basic Pay was connected to other forms of pay—notably, the military retirement benefit. Also, connecting the GS to raises in all components of RMC had the effect of disconnecting changes in housing and subsistence allowances from their original purpose, which was to provide housing and subsistence to servicemembers [5].

In 1974, Congress changed the law so that, rather than incorporate the entire raise in RMC to Basic Pay, the raise would be distributed equally among the three cash components of RMC: Basic Pay, BAQ, and BAS. This solved part of the cost problem but did not address the disconnect between BAH and BAS and the cost of housing and food.

In the 1985 Defense Authorization Act,[42] the BAQ and VHA programs were restructured. The act pegged the BAQ at 65 percent of national median housing costs. Where local housing costs were above 80 percent of the median national housing price for their paygrade, the VHA would apply. Each servicemember was therefore expected to pay 15 percent of local housing costs out of pocket, a rule that was colloquially referred to as the "15-percent formula" [5].

In 1990, the Federal Employees Pay Comparability Act (Public Law 101-159) tied civil service pay to the Employee Cost Index (ECI) of the Bureau of Labor Statistics (BLS).[43] This act left in place the connection of military pay and the GS schedule; as a result, military pay became indirectly tied to an index that applied to the general civilian population.

In 1999, Congress enacted legislation, published in the FY 2000 National Defense Authorization Act (NDAA), which directed that pay raises for 2000 through 2006 would automatically be 0.5 percent above the private-sector wage increases, as measured by the ECI. Congress authorized raises to Basic Pay in 2007, 2008, and 2009 also to be ECI plus one-half point.[44]

In 2000, Secretary of Defense William Cohen announced a goal of fully eliminating servicemembers' out-of-pocket housing expenses by 2005. In support of this goal, the NDAA for FY 2001[45] removed the 15-percent formula. This legislation authorized the Department of Defense to "prescribe housing allowance rates applicable to grade, dependency status, and location, and comparable to costs incurred by civilians with similar income levels" [5].

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42. Codified in Public Law 98-525 (1985).

43. The ECI for wages and salaries is an indirect index for average civilian wages and salaries. BLS Series ECU20002A is available at the following link: http://data.bls.gov/cgi-bin/surveymost.

44. Reference: http://www.fas.org/man/congress/1999/sr050.htm.

45. Codified as Public Law 106-398 (2001).

Appendix B: Military and civilian age/experience profiles

Figures 21 through 24 compare the YOS/age/experience profiles of officers and equivalent civilians. Here we outline the differences in YOS/age profiles between ser vicemembers and civilians, and between servicemembers with and without dependents.

First, the age/experience profile is different for civilians and servicemembers. Specifically, the age/experience profile of enlisted equivalent civilian workers is much older than enlisted either with or without dependents. The median age of full-time enlisted equivalent civilian workers is about 36. For enlisted servicemembers without dependents, the median YOS is roughly 3, implying a median age of about 22. For servicemembers with dependents, the median YOS is about 8, implying a median age of about 27.

In addition to the differences in median age, the relative proportions of servicemembers at each YOS get smaller as YOS gets larger. This is because servicemembers leave but do not enter at high YOS. Among civilians, however, we see that the proportions get *larger* with age, until they reach about the middle 40s. This is because, rather than leaving the workforce as they get older, civilians are more likely to enter full-time work.

Because servicemembers are younger than equivalent civilians (by age/experience), unweighted estimates of civilian wages would overstate their value relative to military counterparts. Therefore, we use a weighting algorithm on civilian data to simulate the military's experience profile in our estimates of median civilian wages. Essentially, we estimate the median civilian wage at each age. Then, we calculate a weighted average of these values, where weighting is designed to make the civilian age profile look like the military profile. Also, we use separate weighting algorithms for calculating comparable wages for singles and those with dependents.

Second, the YOS profile of servicemembers is different for those with and without dependents. Enlisted servicemembers without dependents are, on average, markedly younger than enlisted servicemembers with dependents. As a consequence, their compensation is, on average, substantially less. When we average civilian ages for all enlisted equivalent civilians, we use the age-weighting formula differently depending on whether we are comparing their wages with RMC of servicemembers with or without dependents.
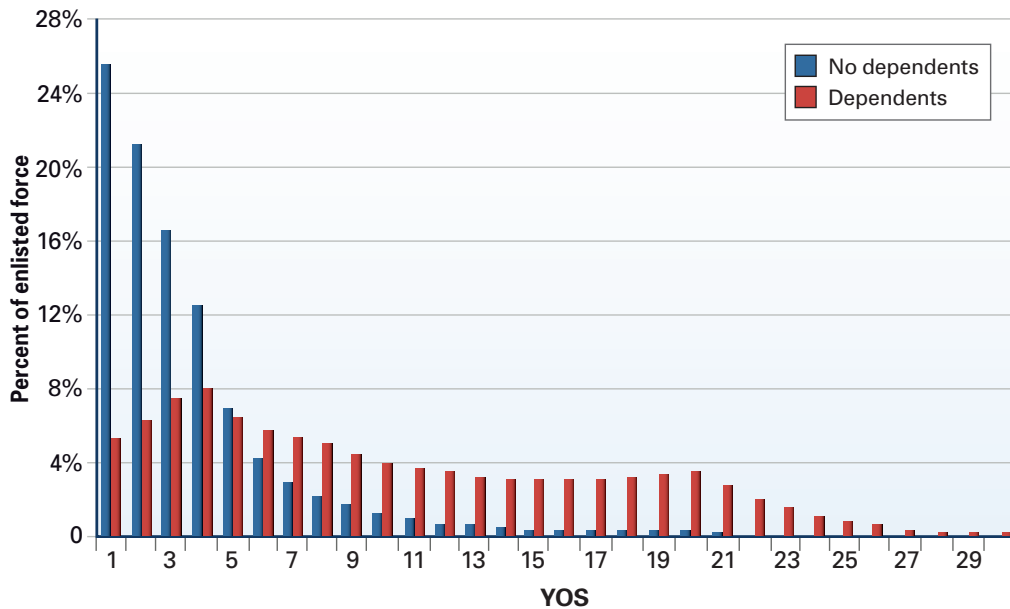
Figure 21. YOS profile of enlisted

We use civilian age minus estimated normative years of education, minus 7 (assumes first grade at age 7), as a proxy for work experience—equivalent to military YOS. Others have studied this proxy [11 and 12] and have commented on its relative strengths and weaknesses. The primary concern is that, since experience in the civilian sector is subject to labor mobility—moving in and out of the labor market or from one job to the next[46]—the age minus education proxy can overestimate actual work experience.

Another concern is that wages are subject to individual choice of hours worked, which changes with age itself. This is why civilian wages tend to decline for people in their late forties and early fifties—a result of declining hours worked rather than directly declining wages. However, since most servicemembers will have separated before that age, we're not as concerned about this effect on our study of wage comparisons in the first 20 YOS.

In forming the comparison groups, bear in mind that the gender and age profiles (or distributions) of military personnel and civilian populations are not the same.

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46. Moving from job to job, even within similar occupations, can slow experience to the extent that firm-specific tasks take time to learn.
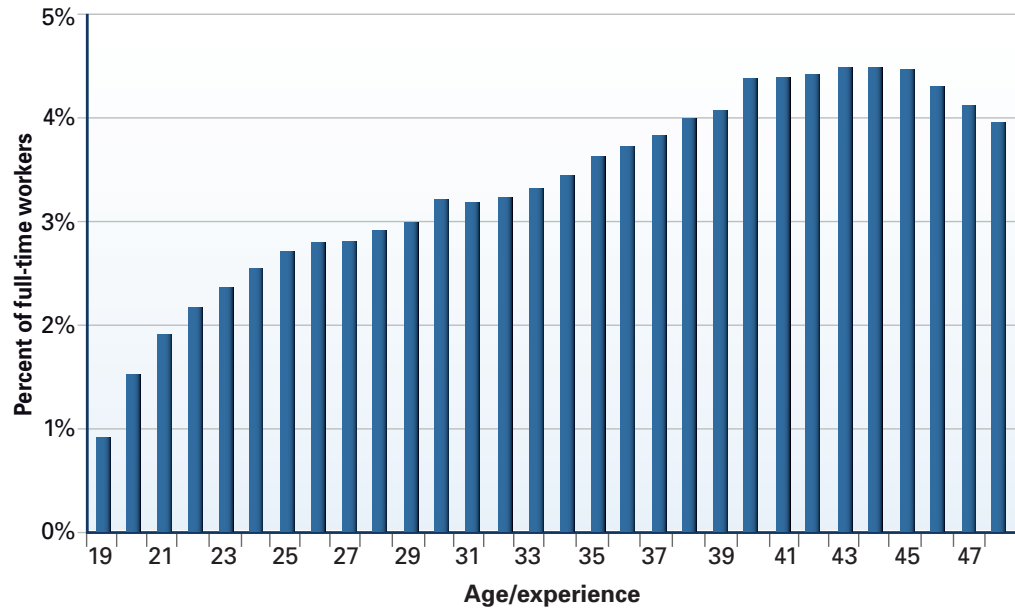
Figure 22. Age/experience profile of enlisted equivalent civilians

Nearly half (48 percent) of full-time civilian workers are women; about 15 percent of servicemembers are women. For civilians between the ages of 19 and 55, about half are over 30, but the median age of enlisted servicemembers is closer to 24.

To compensate for the difference, we weight the civilian data by military profiles of gender and age/experience to provide equivalency to the military. To make the civilian workforce look like the military workforce, we weight the civilian age distribution and male-female proportions by those of military personnel for each of the four military groups: enlisted with and without dependents, and officers with and without dependents.
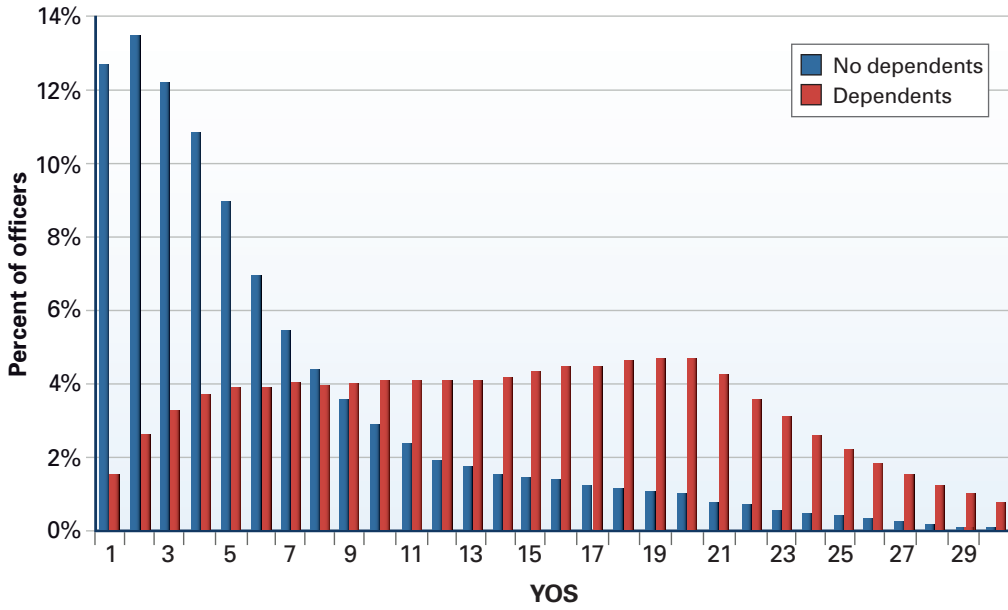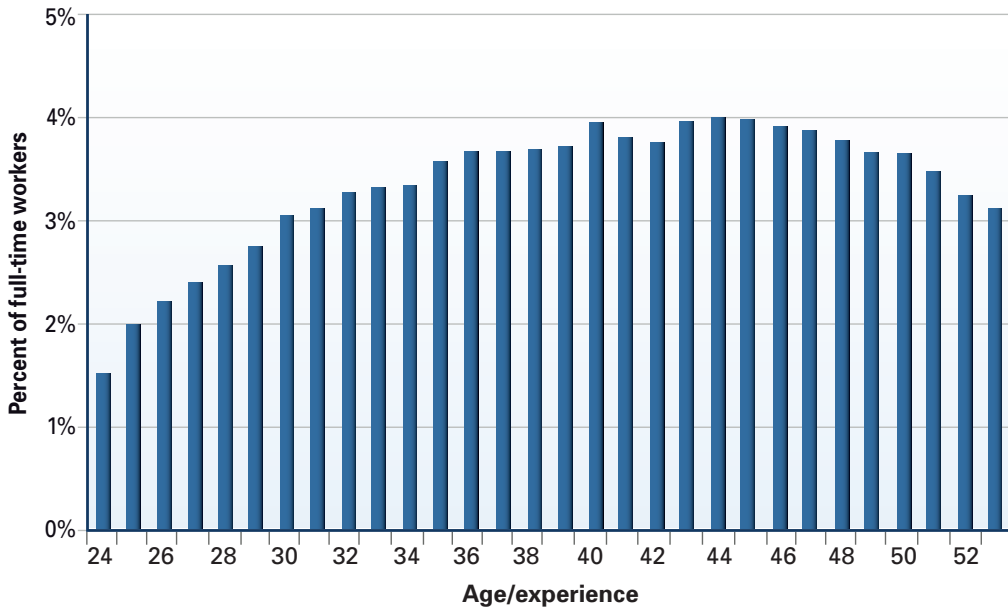
Figure 23. YOS profile of officers

Figure 24. Age/experience profile of officer equivalent civilians

Appendix C: Theoretical model of wage comparisons

This appendix contains the mathematical equations underlying the model developed in the section called "Exploring other factors of compensation: A formal model of military and civilian compensation." For the purposes of this model, consider two people—one civilian and one servicemember—who are the same in job-related characteristics (job experience and technical skills) and who have the same basic living expenses (standard of living).

RMC, civilian wages, and discretionary income

Civilians

Let's look at the civilian first. He or she receives gross wages (W_C), where W_C = civilian gross earnings from labor.

From that, the civilian pays out the following expenses:

t_W = the income taxes on the civilian wage, and

E_C = expenditures the civilian must pay out of his wage for rent[47] and food.

Finally, after taxes and housing and food expenses, the civilian has discretionary income:

$$D_C = W_C - t_W - E_C .\tag{1}$$

Equation (1) is the civilian's discretionary income.

Military

Now let's look at the servicemember. He or she receives gross wages (W_M):

$$W_M = BP + BAH + BAS ,\tag{2}$$

where:

BP = Basic Pay

BAH = Basic Allowance for Housing[48]

BAS = Basic Allowance for Subsistence.

From this, the servicemember must pay income taxes on basic pay only, but must also pay housing and food expenditures. Thus, the servicemember's discretionary

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47. We also assume that, all else equal, rent is equal to mortgage and other costs of owning.

48. We will assume that this servicemember is eligible to get BAH and BAS. We'll relax this assumption later in the analysis.

income is:

$$D_M = W_M - t_B - E_M,\tag{3}$$

where:

t_B = the income tax on BP

E_M = the servicemember's housing and food expenditures. Equation (1) implies that, for the civilian:

$$W_C = D_C + t_W + E_C.$$

That is, the civilian's wage is equal to discretionary income plus the tax on total wages plus the expenditures on housing and food.

Equation (3) implies that, for the servicemember:

$$W_M = D_M + t_B + E_M.$$

That is, the servicemember's wage is equal to his or her discretionary income plus the tax on basic pay (only) plus expenditures on housing and food.

From this point on, we will assume that expenditures for food and housing are the same for servicemembers and equivalent civilians.

What if military and civilian gross wages were equalized?

First, let's consider the case where $W_C = W_M$, that is, the civilian's and service-member's gross wages are the same. This implies that

$$W_C = [D_C + t_W + E] = W_M = [D_M + t_B + E], \text{ or just simply,}$$

$$[D_C + t_W + E] = [D_M + t_B + E], \text{ which implies that}$$

$$[D_C + t_W] = [D_M + t_B].\tag{4}$$

Since $t_W > t_B$, then $D_C < D_M$, that is, the servicemember's discretionary income is higher, in this case, because he only pays income tax on basic pay, whereas the civilian pays income tax on his or her entire wage.

In a simple world (versus the complex reality of the tax code), the difference in the tax amounts can be calculated as follows. Civilian tax is equal to the tax rate times the wage:

$$t_W = R * W_C,$$

where:

R = the tax rate

$$t_B = R * B_P = R * (W_M - BAH - BAS).$$

Then:

$$t_W - t_B = R * W_C - R * (W_M - BAH - BAS)$$
$$= R * (W_C - W_M + (BAH + BAS)).$$

Since we care about what happens if $W_C = W_M$,

$$t_W - t_B = R * (BAH + BAS) = t_S. \tag{5}$$

Thus, the difference in the tax amounts between the civilian and the service-member when their gross wage is the same is the tax savings from BAH and BAS not being taxed.[49]

From equations (4) and (5), we get that the difference in discretionary income is:

$$t_W - t_B = D_M - D_C = t_S.$$

Thus, if DOD were to set military gross wages (BP + BAH + BAS) to be equal to civilian gross wages, the result would be that military discretionary income would be greater than civilian discretionary income by the amount of the tax savings on BAH and BAS.

What if discretionary incomes were equalized?

Because economic theory suggests that people should care more about discretionary income than gross income, perhaps it would be better for DOD to set military pay to equalize discretionary incomes. Equalizing discretionary wages means:

$$D_M = D_C. \tag{6}$$

From equation (1), we have $D_C = W_C - t_W - E_C$, and

from equation (3), we have $D_M = W_M - t_B - E_M$.

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49. The tax saving is different from the tax advantage, as we will see.

Thus, equation (6) implies that:

$$W_C - t_W - E_C = W_M - t_B - E_M \, .$$

If we assume that $E_C = E_M$ (i.e., food and housing expenses are the same), then

$$W_C - t_W = W_M - t_B \, . \tag{7}$$

In order to set gross income (W_M) relative to W_C, such that discretionary incomes are equal, we need to know what the tax rates are relative to gross incomes.

$$t_W = r * W_C \tag{8}$$

$$t_B = r * B_P = r * (W_M - BAH - BAS) \, , \tag{9}$$

where r is the marginal tax rate.[50]

By equations (7) through (9) we have:

$$(W_C - r * W_C) = (W_M - r * (W_M - BAH - BAS)) \, ,$$

which implies that:

$$(1 - r) * W_C = (1 - r) * W_M + r * (BAH + BAS)$$

$$(1 - r) * (W_C - W_M) = r * (BAH + BAS)$$

$$(W_C - W_M) = r * (BAH + BAS)/(1 - r)$$

$$W_C = W_M + r * (BAH + BAS)/(1 - r) \, . \tag{10}$$

Since $r * (BAH + BAS)$ is the tax savings, on BAH and BAS, then $r * (BAH + BAS)/(1 - r)$ is the tax advantage on BAH and BAS,[51] and the right-hand side of equation (10) is RMC.

Equation (10) tells us that when (1) the technical skills and job experience levels of servicemembers and civilians are the same, (2) housing and food are the only basic living expenses, and (3) basic living expenses are the same for both service-members and civilians, then discretionary income for servicemembers and civilians will be equal when civilians wages are equal to military gross wages plus the tax advantage—RMC.

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50. In this model, we assume that the marginal tax rate (r) is the same for both military BP and the civilian gross wage, though rates could be different at income levels close to where marginal rates change.

51. This is how DOD calculates the tax advantage on BAH and BAS, which is included in RMC.

Thus, under these assumptions, RMC and civilian wages are directly comparable when civilian wages equal RMC.

In the next subsection, we will recap the model and deduce the extent to which RMC and civilian wages are comparable when these assumptions are not met.

What if our assumptions didn't hold?

To recap, the four assumptions in this model follow:

1. Members in each of the comparison groups have roughly the same technical skill and job experience characteristics.

2. Members in each of the comparison groups have roughly the same basic living expenses. Algebraically, this means that $E_{mil} = E_{civ} = E$.

3. Each servicemember is eligible for military BAH and BAS, or else consider the value of onbase housing and meals equal to BAH and BAS.

4. BAH + BAS = E_{mil}, that is, the housing and subsistence allowances are equal to expenditures for housing and food for servicemembers.

To empirically test the model, we need to simulate assumption 1. To do that, we compare civilians and servicemembers who are as alike as possible within the constraints of the data. We look at only civilians who are full-time workers, and we look only at wages, not investment or other types of nonlabor income. We consider civilians to be equivalent to enlisted servicemembers if they have a high school diploma or some college. We consider them equivalent to officers if they have a Bachelor's degree or higher.

In the private sector, there are gender-related differences in average wages, so we weight the civilian data by the male:female proportions in the military (roughly 86:14 for enlisted, 84:16 for officers).

Assumption 2 is not always the case, especially for those who are single and young (by paygrade). In fact, we found that, in 2009, about 17.5 percent of enlisted servicemembers are single E-1 through E-3 and around 15 percent of officers are single O-1 and O-2. They may not be eligible to receive BAH and BAS, but instead must live in bachelor quarters and eat at military mess halls on base. They will not receive either BAH or BAS, although it is possible that they would prefer (and thus value more highly) having the choice (of receiving BAH and BAS or military quarters and mess). For them, the military wage is not equal to BP plus BAH plus BAS, but is instead just BP. However, because they are given onbase quarters and food, the value of the military wage plus free food and housing is probably worth more, perhaps a lot more, than just simply BP.

Assumption 4 is probably pretty close for single servicemembers who are eligible to receive BAH and BAS. However, about two-thirds of the military force are married and/or have children. RMC is higher for servicemembers with dependents due to higher BAH and the subsequent higher TA. Nonetheless, having larger families than single members, their housing expenditures will also be higher. Thus, for them, BAH probably will still be approximately equal to their expenditure on housing.

The BAS, however, does not change with dependents. In the simple model, we assume that BAH + BAS = E_{mil}, but, for those with dependents, that won't be the case. In fact, for them, BAH + BAS < E_{mil} since BAS does not grow with family size and, thus, will probably not equal family food costs.

Other basic living expenses: the case of health insurance

In the foregoing model, we assume that expenses for basic necessities are the same for both military and civilian workers—that is, that $E_{mil} = E_{civ} = E$. But is that correct?

Consider health insurance and medical expenses. Are they part of basic necessities? If so, the discretionary income is

$$D = W - t - E - HC,$$

where HC is expenditures on health insurance and medical.

Discretionary income for civilian workers is:

$$D_C = W_C - t_{W2} - E - HC_C. \tag{11}$$

Note that t_{W2} is not equal to t_W from the previous section since many health care costs for civilians come out of nontaxed funds.

And for the servicemember, it is:

$$D_M = W_M - t_B - E - HC_M. \tag{12}$$

Setting $D_M = D_C$ here, we have

$$W_C - t_{W2} - E - HC_C = W_M - t_B - E - HC_M.$$

Recall that E = expenditures on housing and food and is the same for both military and civilians. Also note that, since military personnel and their families pay no health insurance or medical expenses, $HC_M = 0$. Thus,

$$W_C - t_{W2} - HC_C = W_M - t_B . \tag{13}$$

Civilians with employer-paid health insurance

Civilians whose health insurance coverage is provided by their employers won't pay taxes on most of the amounts they pay out of pocket for health insurance or medical treatments. For them, income tax is on their gross wage minus the health insurance expenditure:

$$t_{W2} = r * (W_C - HC_{CP}) . \tag{14}$$

Servicemembers pay income tax on only basic pay and not their entire gross wage:

$$t_B = r * BP = r * (W_M - BAH - BAS) . \tag{15}$$

Consequently, if equal discretionary income were the rule, DOD would need to set W_M such that:

$$W_C - r * (W_C - HC_{CP}) - HC_{CI} = W_M - r * (W_M - BAH - BAS) , \tag{16}$$

which implies that

$$(1 - r) * (W_C - HC_{CP}) = (1 - r) * W_M + r * (BAH + BAS)$$

$$(1 - r) * (W_C - HC_{CI} - W_M) = r * (BAH + BAS)$$

$$(W_C - HC_{CI} - W_M) = (r * (BAH + BAS))/(1 - r)$$

$$W_C = W_M + (r * (BAH + BAS))/(1 - r) + HC_{CI} . \tag{17}$$

Recall that:

$W_M = BP + BAH + BAH$ is the servicemember's gross pay, and

$(r * (BAH + BAS))/(1 - r)$ is the tax advantage because BAH and BAS are not taxable.

The right-hand side of equation (17) is RMC plus the civilian's health care expenses, for civilians with employer health coverage.

Thus, RMC plus the out-of-pocket civilian health care expenditures is an accurate military pay comparison of civilian wage when (a) the object is to equalize discretionary income, and (b) the civilians have employer-paid health insurance, for which some out-of-pocket costs come out of untaxed income.

Civilians without employer-paid health insurance

If the civilian does not have employer paid health insurance, all health insurance and/or medical costs come out of post-taxed dollars.

Civilians who don't have employer-paid health insurance coverage must either buy health insurance and/or their own copayments or else their total medical care expenses. Further, they pay for these out of already taxed income, and thus receive no tax advantage as do those with employer coverage.

$$W_C - t_W - HC_{C2} = W_M - t_B . \tag{18}$$

Recall that, by equations (8) and (9), civilians pay taxes: (19)

$$t_W = r * W_C .$$

And military people pay taxes:

$$t_B = r * BP = r * (W_M - BAH - BAS) .$$

Putting equations (8) and (9) into equation (18), we get:

$$W_C - r * W_C - HC_{C2} = W_M - r * (W_M - BAH - BAS) \tag{20}$$

$$(1 - r) * W_C - HC_{C2} = (1 - r) * W_M + r * (BAH + BAS)$$

$$(1 - r) * (W_C - W_M) = r * (BAH + BAS) + HC_{C2}$$

$$(W_C - W_M) = r * (BAH - BAS + HC_{C2})/(1 - r)$$

$$W_C = W_M + (r * (BAH + BAS) + HC_{C2})/(1 - r) . \tag{21}$$

In other words, the comparison with civilian wages for those who are not covered by employers would be RMC plus the amount civilians pay for health care plus some tax advantage on the health care expenditures.

If the proportion of full-time civilian workers who have employer-paid health coverage is π, the correct comparison is:

$$W_C = W_M + \{\pi * [r/(1 - r) * (BAH + BAS) + HC_{C1}] + (1 - \pi) * [r/(1 - r)* $$
$$(BAH + BAS) + HC_{C2}/(1 - r)] . \tag{22}$$

Equation (22) states that, under the conditions and assumptions outlined, civilian wages will be directly comparable to RMC plus the average civilian out-of-pocket expenditures for health care, including the average tax advantage that military personnel receive because some civilians pay health care out of pre-taxed dollars.

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