Projecting the Structure of the Air Force Civilian Workforce in Light of Concerns about a Possible Retirement Wave

Steven Trochilis
Abstract

Concerns about a retirement wave among the federal civilian workforce are common. Reasons for large-scale retirements among senior civilians include the end of the working careers of the baby boomer generation, the 2013 federal government shutdown, and sequestration. A retirement wave could lead to a serious drain of human capital and a loss of expertise and senior management capability. This issue is even more relevant in occupations that are deemed mission critical to the Department of Defense (DoD). A further issue is the ability of the federal workforce to attract workers to replace those that retire.

Using the RAND Inventory Model (RIM), a stock-and-flow inventory model for federal civilians, this dissertation finds that although there is not likely to be a force-wide shortage of Air Force civilians over the next ten years, there is the possibility of human capital gaps in some mission critical occupations (MCO). Specifically, of the seven selected MCO’s, two will likely face gaps among workers with between ten and six years until retirement eligibility, two among workers with ten or fewer years until retirement eligibility, and two among workers within five years of becoming or having become retirement eligible.

Based on these findings, the dissertation recommends that the contracting, computer and electronics engineering, IT and HR occupations hire more experienced workers and create advanced development programs to identify and train younger workers to take on the responsibilities of more experienced roles. The dissertation estimates the number of additional workers that will be needed and the cost of these options. These estimates show that retention bonuses are far more expensive than the other two options. These options will require the combined efforts of the career field managers, the Department of the Air Force and the DoD for successful implementation. To increase hiring of workers, they will likely need to increase the quality of life for employees and make the hiring process easier. Advanced development programs will involve devoting more resources to rigorous training programs. Following these recommendations will leave the Air Force equipped to fill any gaps in its human capital.

This research is sponsored by RAND Project Air Force. The target audience for this research is career field managers within the Department of the Air Force and anyone interested in federal workforce issues.

The views expressed in this dissertation are those of the author and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the U.S. Government.
Contact Information

The authors invite comments on the information presented in this report and welcome modification as well as additional ideas for consideration as part of our current research effort. Comments should be directed to Steven Trochlil as follows:

Steven Trochlil  
RAND Corporation  
1776 Main Street  
Santa Monica, CA 90407-2138  
E-mail: trochlil@rand.org  
Tel: 310-393-0411, x7714

RAND Project AIR FORCE

RAND Project AIR FORCE (PAF), a division of the RAND Corporation, is the U.S. Air Force’s federally funded research and development center for studies and analysis. PAF provides the Air Force with independent analyses of policy alternatives affecting the development, employment, combat readiness, and support of current and future aerospace forces. Research is conducted in four programs: Force Modernization and Employment; Manpower, Personnel, and Training; Resource Management; and Strategy and Doctrine. The research reported here was prepared under contract FA7014 06-C-0001.

Additional information about PAF is available on our Web site: http://www.rand.org/paf
# Table of Contents

Abstract .......................................................................................................................................... iii

Contact Information .......................................................................................................................... iv

RAND Project AIR FORCE ................................................................................................................. iv

Table of Contents ............................................................................................................................ v

Figures ........................................................................................................................................... vii

Tables ............................................................................................................................................. xi

Acknowledgments ........................................................................................................................ xiii

Abbreviations ................................................................................................................................ xv

Chapter One: Introduction .............................................................................................................. 1

Is There a Looming Workforce Crisis? .......................................................................................... 1

How Has the Government Responded to Past Crises? ................................................................. 3

Recent Trends in the DoD and Air Force Civilian Workforces ....................................................... 4

  DoD Hiring and Retirement Trends ................................................................................................. 5

  Air Force Hiring and Retirement Trends ........................................................................................ 7

Comparison of Trends ..................................................................................................................... 9

Summary .............................................................................................................................................. 9

Organization ...................................................................................................................................... 9

Chapter Two: Review of Federal Workforce Issues ..................................................................... 10

Background on the Federal Civilian Workforce ........................................................................... 10

  Structure of the Air Force Civilian Workforce ........................................................................... 10

History of the Federal Workforce ................................................................................................... 12

  Retirement Systems ....................................................................................................................... 15

Workforce Research of the Past ...................................................................................................... 18

  First Concerns and Outcome: 1987-1993 ...................................................................................... 18

  Second Wave of Concern: 1999-2004 ......................................................................................... 23

  Current Concerns: 2008-Present .................................................................................................. 27

Factors that Lead to Increased Retention ....................................................................................... 30

Trends in the Federal Workforce ...................................................................................................... 31

Summary ................................................................................................................................................ 36

Chapter Three: Historical Analysis ............................................................................................... 38

The Air Force Civilian Workforce .................................................................................................... 38

  Overview ......................................................................................................................................... 38

    The White-Collar Full-time Permanent Workforce ..................................................................... 42

    Specific MCOs ............................................................................................................................... 44

    Grade Characteristics .................................................................................................................. 55

Summary ................................................................................................................................................ 60

Chapter Four: Projections ............................................................................................................. 61
Figures

Figure 1.1: Air Force civilian workforce age comparison from 2009 to 2014 ........................................ 2
Figure 1.2. Air Force and DoD white-collar employment from Sept. 2004 to Sept. 2014 .................... 5
Figure 1.3. DoD white-collar hires, retirements, and net transfers out FY2005-2014 .......................... 6
Figure 1.4. Air Force white-collar retirements, new hires, and net transfers out FY2005-2014 .... 8
Figure 2.1: Civilian workforce management organizational chart ......................................................... 11
Figure 2.2: The Changing Federal Workforce, 1950-2000 .................................................................. 15
Figure 2.3: Distribution of DoD civilians by age, 1989 and 2000 ......................................................... 32
Figure 2.4: Distribution of DoD civilians by years of service, 1989 and 2000 ................................. 32
Figure 2.5: Distribution of the age of the DoD civilian workforce, 2000 and 2010 .................. 33
Figure 2.6: Years of service distribution in the federal workforce, 2000 and 2010 ...................... 34
Figure 2.7: Percentage of full-time permanent federal employees younger than 30 years old .... 35
Figure 3.1: Requested and enacted Air Force civilian end-strengths FY2010-2015 ............................ 40
Figure 3.2: Air Force civilian workforce worker flows ................................................................. 41
Figure 3.3: Air Force civilian workforce YORE distribution end of FY2010 and FY2015 .................. 41
Figure 3.4: Air Force white-collar full-time permanent worker flows ............................................... 43
Figure 3.5: Air Force full-time permanent white-collar workforce age distribution end of FY2010 and FY2015 ........................................................................................................... 43
Figure 3.6: Size of selected MCO’s, end of FY2010-FY2015 ............................................................ 45
Figure 3.7: Percentage change in selected MCO’s compared to the white-collar workforce FY2011-2015 .................................................................................................................................................. 46
Figure 3.8: Air Force contracting occupation worker flows ............................................................ 46
Figure 3.9: Air Force contracting occupation YORE distribution end of FY2010 and FY2015 ........ 47
Figure 3.10: Air Force IT occupation worker flows .............................................................................. 48
Figure 3.11: Air Force IT YORE distribution end of FY2010 and FY2015 .................................. 48
Figure 3.12: Air Force electronics engineering occupation worker flows ......................................... 49
Figure 3.13: Air Force electronics engineering occupation YORE distribution end of FY2010 and FY2015 ......................................................................................................................... 49
Figure 3.14: Air Force human resources occupation worker flows .................................................. 50
Figure 3.15: Air Force human resources occupation YORE distribution end of FY2010 and FY2015 ........................................................................................................................................ 50
Figure 3.16: Air Force auditing occupation worker flows ............................................................... 51
Figure 3.17: Air Force auditing occupation YORE distribution end of FY2010 and FY2015 .... 52
Figure 3.18: Air Force computer engineering occupation worker flows ....................................... 52
Figure 3.19: Air Force computer engineering occupation YORE distribution end of FY2010 and FY2015 .......................................................................................................................... 53
Figure 3.20: Air Force nuclear engineering occupation worker flows ........................................ 54
Figure 3.21: Air Force nuclear engineering occupation YORE distribution end of FY2010 and FY2015 .......................................................... 54
Figure 3.22: Grade level sizes at the end of FY2010-2015 .................................................. 56
Figure 3.23: Air Force entry level (GS 1-8) worker flows ..................................................... 56
Figure 3.24: Air Force entry level (GS 1-8) YORE distribution end of FY2010 and FY2015... 57
Figure 3.25: Air Force mid-level (GS 9-13) worker flows ..................................................... 57
Figure 3.26: Air Force mid-level (GS 9-13) YORE distribution end of FY2010 and FY2015... 58
Figure 3.27: Air Force senior-level (GS 14-15) worker flows ................................................. 58
Figure 3.28: Air Force senior-level (GS 14-15) YORE distributions end of FY2010 and FY2015... 59
Figure 3.29: Air Force executive level (SES) worker flows ................................................ 59
Figure 3.30: Air Force executive level (SES) YORE distribution end of FY2010 and FY2015. 60
Figure 4.1: FY2020 Air Force civilian workforce projections ................................................ 64
Figure 4.2: FY2025 Air Force civilian workforce projections ................................................ 65
Figure 4.3: FY2020 projections for the full-time permanent white-collar workforce .......... 66
Figure 4.4: FY2025 projections for the full-time permanent white-collar workforce .......... 66
Figure 4.5: FY2020 projections for the contracting occupation ............................................. 67
Figure 4.6: FY2025 projections for the contracting occupation ............................................. 67
Figure 4.7: Comparison of contracting occupation workforce with YORE -15 to -6 ............. 68
Figure 4.8: Comparison of projected contracting occupation to present with YORE -5 to +4... 68
Figure 4.9: FY2020 projections for the electronics engineering occupation .......................... 69
Figure 4.10: FY2025 projections for the electronics engineering occupation ....................... 70
Figure 4.11: Comparison of electronics engineering workforce with YORE -15 to -6 ......... 70
Figure 4.12: Comparison of projected electronics engineering workforce to present with YORE -5 to +4 ................................................................. 71
Figure 4.13: FY2020 projections for the HR occupation ...................................................... 71
Figure 4.14: FY2025 projections for the HR occupation ...................................................... 72
Figure 4.15: Comparison of HR workforce with YORE -20 to -16 ...................................... 72
Figure 4.16: Comparison of projected HR workforce to present with YORE -10 to -6 ........ 73
Figure 4.17: FY2020 projections for the computer engineering occupation ......................... 73
Figure 4.18: FY2025 projections for the computer engineering occupation ....................... 74
Figure 4.19: Comparison of computer engineering workforce with YORE -20- to -11 ....... 74
Figure 4.20: Comparison of projected computer engineering occupation to present with YORE -10 to -1 ............................................................... 75
Figure 4.21: FY2020 projections for the IT occupation ...................................................... 76
Figure 4.22: FY2025 projections for the IT occupation ........................................................ 76
Figure 4.23: Comparison of IT workforce with YORE -20 to -16 ....................................... 77
Figure 4.24: Comparison of projected IT workforce to present with YORE -10 to -6 ......... 77
## Tables

- Table 2.1: OPM Evaluation of Past Retirement Projections ......................................................... 28
- Table 2.2: Evaluation of Past Retirement Projections ................................................................. 28
- Table 2.3: Separations and retirements from the full-time permanent Air Force civilian workforce ............................................................................................................................................. 36
- Table 3.1: Air Force civilian workforce characteristics end of FY2010-2015 .......................... 39
- Table 3.2: Air Force white-collar full-time permanent workforce characteristics FY2010-2016. 42
- Table 5.1: Retention bonus effects on the white-collar workforce .............................................. 93
- Table 5.2: Range of costs for the new hires option in the baseline case ...................................... 95
- Table 5.3: Range of costs for the ADP option in the baseline case ............................................ 96
- Table 5.4: Range of costs of the $5,000 bonus in the baseline case ............................................ 96
- Table 5.5: Range of costs for the new hires option in the low hires case ................................. 97
- Table 5.6: Range of costs for the ADP option in the low hires case .......................................... 97
- Table 5.7: Range of costs of the $5,000 bonus in the low hires case ......................................... 98
- Table C.1: Air Force civilian workforce characteristics FY2010-2015 ..................................... 106
- Table C.2: Air Force full-time permanent white-collar workforce characteristics FY2010-2015. ............................................................................................................................................. 106
- Table C.3: Air Force contracting occupation workforce characteristics FY2010-2015 ........... 107
- Table C.4: Air Force computer engineering occupation workforce characteristics FY2010-2015. ............................................................................................................................................. 107
- Table C.5: Air Force electronics engineering occupation workforce characteristics FY2010-2015. ............................................................................................................................................. 107
- Table C.6: Air Force nuclear engineering occupation workforce characteristics FY2010-2015. ............................................................................................................................................. 108
- Table C.7: Air Force human resources occupation workforce characteristics FY2010-2015.... 108
- Table C.8: Air Force IT occupation workforce characteristics FY2010-2015 ........................... 108
- Table C.9: Air Force auditing occupation workforce characteristics FY2010-2015............... 109
- Table C.10: Air Force entry level (GS-1 to GS-8) workforce characteristics FY2010-2015 .... 109
- Table C.11: Air Force mid-level (GS-9 to GS-13) workforce characteristics FY2010-2015. .... 109
- Table C.12: Air Force senior level (GS-14 to GS-15) workforce characteristics FY2010-2015. ............................................................................................................................................. 110
- Table C.13: Air Force executive level (SES) workforce characteristics FY2010-2015 .......... 110
Acknowledgments

I would like to thank my committee, Bart E. Bennett (chair), Raymond E. Conley, and Nelson Lim, for their invaluable help throughout the writing and researching of this dissertation. I would also like to thank Project Air Force, a research division of the RAND Corporation, which gave me a generous amount of funding for this research. I am also indebted to Susan Gates and Shanthi Nataraj who provided a great deal of help with the RAND Inventory Model. Perry Firoz helped me to start examining the AFPC data. Beth Roth practically taught me SAS in a couple of months and gave me irreplaceable programming advice. Lt. Gen. (ret.) Darrell Jones and members of various defense personnel management agencies gave me excellent insight into the inner workings of defense civilian management in general and Air Force civilian management in particular. Nolan Sweeney helped me work through the dissertation process, for which I am very grateful. Finally, my fellow cohort members Mick Powell and Tim Smith (two monads of the nuclear triad) always encouraged and listened to me throughout the dissertation, which often yielded surprisingly good results. Ubi Veritas, Deus ibi est.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADP</td>
<td>Advanced Development Program</td>
</tr>
<tr>
<td>ATD</td>
<td>Association for Talent Development</td>
</tr>
<tr>
<td>AFPC</td>
<td>Air Force Personnel Center</td>
</tr>
<tr>
<td>CSRS</td>
<td>Civil Service Retirement System</td>
</tr>
<tr>
<td>CPI</td>
<td>Consumer Price Index</td>
</tr>
<tr>
<td>DoD</td>
<td>Department of Defense</td>
</tr>
<tr>
<td>FERS</td>
<td>Federal Employees Retirement System</td>
</tr>
<tr>
<td>FY</td>
<td>Fiscal Year</td>
</tr>
<tr>
<td>GAO</td>
<td>General Accounting Office/Government Accountability Office</td>
</tr>
<tr>
<td>GS</td>
<td>General Schedule</td>
</tr>
<tr>
<td>IRA</td>
<td>Individual Retirement Account</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>MAJCOM</td>
<td>Major Command</td>
</tr>
<tr>
<td>MCO</td>
<td>Mission Critical Occupation</td>
</tr>
<tr>
<td>NSPS</td>
<td>National Security Personnel System</td>
</tr>
<tr>
<td>OPM</td>
<td>Office of Personnel Management</td>
</tr>
<tr>
<td>PMI</td>
<td>Presidential Management Intern</td>
</tr>
<tr>
<td>RIM</td>
<td>RAND Inventory Model</td>
</tr>
<tr>
<td>ROM</td>
<td>Rough Order of Magnitude</td>
</tr>
<tr>
<td>SES</td>
<td>Senior Executive Service</td>
</tr>
<tr>
<td>STEM</td>
<td>Science, Technology, Engineering, Math</td>
</tr>
<tr>
<td>TSP</td>
<td>Thrift Savings Plan</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>YORE</td>
<td>Years of retirement eligibility</td>
</tr>
</tbody>
</table>
Chapter One: Introduction

Policymakers and policy analysts have been concerned about the ability of federal workforce managers to replace retiring baby boomers for years. The objective of this dissertation is to show whether and to what extent this retirement wave is a problem within the Air Force civilian workforce. In addition to showing to what extent this is a problem, this dissertation also shows which areas of the Air Force civilian workforce are most likely to be affected. Some options for responding to any gaps among senior specialists and managers will also be addressed.

In order to meet these objectives, we will answer the following research questions:

1. During previous federal workforce waves of concern, what has been the result?
2. What are the recent trends in the various grades and occupations of the Air Force civilian workforce?
3. What occupations or grades are most at risk for shortages in the future? What are some possible options for mitigating these shortages?

The first question requires a retrospective exploration of the relevant literature and regulations that have governed civilian workforce policies as well as what this literature recommended for future improvements. We will draw on key lessons learned to collect options to mitigate future potential shortages. Answering the second question leads to an empirical assessment of the most recent Air Force personnel data including recent hiring, and separation rates based on age and years of service both from an Air Force-wide perspective and from the perspective of the mission-critical occupations. The third question will then use these data as a baseline for projecting what might happen to the Air Force civilian workforce in the future. These projections are only a baseline because the demands on the Air Force civilian workforce may change quite dramatically based on missions or world events even within the next five year period. We will also estimate potential shortages and consider options for mitigating the shortages.

Is There a Looming Workforce Crisis?

There are two main concerns that lead us to believe that there is the strong potential for a problem in replacing and retaining Air Force human capital. The first is the overall demographics of the U.S. and federal workforces in general and the Department of Defense (DoD) workforce in particular. The senior members of the workforce are part of the Baby Boomer generation, which is larger than the generations that are replacing it. These same workers are generally older than they were in the past. Additionally, there are concerns about the ability of the federal government to compete with the private sector in hiring. This does not
impact the number of retirees, but does impact the ability of the government to replace the human capital it loses. Below, we briefly delve more deeply into each of these issues.

The Air Force is concerned about its workforce for many of the same reasons as the DoD. Over all of these concerns is the specter of mass retirements by baby boomers. The baby boomer generation, born between 1946 and 1965, is one of the largest birth cohorts in U.S. history. This has led to a great deal of concern that when this generation begins to retire, there will be a shortage of workers to replace them at the same skill level. The retirement age for a federal civilian with at least five years of service is 62. This means that the beginning of a large number of baby boomer retirements should have occurred in 2008. However, 2008 was the year in which the stock market crashed, making it more financially difficult for these individuals to retire. Thus, there was actually a sharp decrease in retirements from the federal workforce during Fiscal Year (FY) 2009. There have been a number of major news outlets that have raised concerns that the baby boomer retirement wave, although delayed by the stock market crash of 2008, is about to return in strength (Wenger 2012, Moore 2013, Hick 2014). Concerns about the Baby Boomer retirement wave are not new, and policy analysts have been warning about the possibility since at least 2000 (Barr 2000).

Additionally, the data show that the Air Force civilian workforce is aging as well. Figure 1.1 displays the numbers and percentages of the Air Force civilian workforce in 2009 and 2014 broken out into four age brackets for those age 50 and older. Since 2009, the number of Air Force civilian workforce older than 55 has increased both in absolute numbers and as a percentage of the workforce despite an overall increase in federal civilian retirements.

**Figure 1.1: Air Force civilian workforce age comparison from 2009 to 2014.**

![Bar chart showing the number of Air Force civilians aged 50-64 in 2009 and 2014](http://www.fedscope.opm.gov/)

Source: Fedscope data on http://www.fedscope.opm.gov/
There are also concerns that the uncertainty of the past few years with sequestration, shutdowns, and furloughs, has led to a decrease in willingness to work for the federal government (Cole 2013). A 2001 RAND study on the pay, promotion and retention of DoD civilians found that those with professional degrees had poorer retention than those without (Asch 2001). This could be a serious problem if it has continued, as the federal workforce has trended towards an older and more educated workforce. Additionally, there is concern that the federal government is not doing enough to attract and hire young civil servants (Feintzeig 2014). The federal government hiring process is often referred to as an example of something that needs to be reformed to entice young workers (McCullar 1990, The Acquisition 2005 Task Force 2000, The National Commission on the Public Service 2003, Feintzeig 2014). The Secretary of the Air Force has specifically mentioned her worry that young college graduates may be more likely to go to Silicon Valley than work for the federal government (James 2015).

One final concern is the implementation of the Federal Employee Retirement System (FERS), which is a mix of a defined contribution and defined benefit plan. The old plan, the Civil Service Retirement System (CSRS), was strictly a defined benefit plan, meaning retirement benefits were only received at the time of retirement. Under FERS, employees will receive a portion of their retirement benefits even if they leave government service before they are eligible for full retirement benefits. Additionally, FERS may provide fewer incentives for staying beyond initial retirement eligibility (Cole 2013). The federal government is transitioning to a point where almost all employees are under FERS, which began in 1987. This means that there may be a transition from people staying in their occupations well past retirement eligibility to increase their benefit to people staying in the minimum necessary to meet their personal goals.

How Has the Government Responded to Past Crises?

Previously, shortages in the federal government were solved by Congress and the President appropriating more money to expand the workforce for the various executive agencies. Historically, the largest increases always occur at the beginning of a crisis, generally a war, but also sometimes for economic disasters, such as the Great Recession of the late 2000’s. These temporary crises generally increase government employment dramatically during the early years of the crisis and then cut employees after, although not to the level that existed before the crisis. For example, in 1940 before the country’s entrance into World War II the federal civilian workforce more than quadrupled, yet after the war in 1950, the federal civilian workforce was still twice as large as it had been in 1940. During the Korean War, the civilian workforce increased by more than 40%, yet in 1956 was still almost 30% larger than it was in 1950. Similar patterns occurred during the Vietnam War and Great Recession (Office of Personnel Management 2014).

The federal government has also made it easier to hire military veterans into the civilian workforce when wanting to ease the hiring of civilians. In 1999, President Clinton signed a law
that allowed military retirees to collect their pension while also collecting a federal civilian salary (U.S. Congress 1999). Previously, military retirees were restricted to receiving a combined income of the lowest executive level.¹ This repeal made the federal civilian workforce more attractive to military retirees. Additionally, after the 9/11 attacks, it became legal to hire military members to civilian positions without waiting 180 days, as under previous law (Rein 2016). This allows veterans to apply for civilian jobs after they become retirement eligible and then submit their retirement paperwork, so they can start work as a civilian in the same pay period they retire (Grundman 2014). This policy may change in the near future as the Senate has already passed a bill that reinstates the wait-period of 180 days (Rein 2016). This may affect civilian hiring, although not to a large degree as fewer than 9% of hires during FY2002-2012 were to veterans with fewer than 180 days since they left the military (Grundman 2014). For that 9%, the reinstatement of the 180 day restriction may make hiring more difficult.

Without a serious crisis, the government will not be able to justify large expenditures on the civilian workforce and may not be able to quickly move to fill in workforce gaps. Additionally, since the defense civilian workforce has been a much larger part of the DoD under President Obama than under President Bush, there are calls to actually reduce the civilian workforce, some of which have even made it through Congress. This means that the Pentagon and Air Force are likely not to be able to count on any large appropriations to fill in any gaps, but will have to find ways to enhance the management of their human capital.

Recent Trends in the DoD and Air Force Civilian Workforces

Priorities for the DoD are set every year in the President’s Budget, while priorities for the Air Force civilian workforce are not explicitly broken out in this document. The DoD can generally decide, based on its strategic workforce plan and within budget constraints, how many people will be employed as civilians in the department. This means that in order to have an idea of the reasons for the trends in the Air Force civilian workforce, we will need to first examine the trends in the DoD workforce. Next, we will see what the President’s Budgets say about these trends. Finally, we will examine the Air Force civilian workforce and compare its trends to those in the DoD civilian workforce.

In Figure 1.2, we see how closely white-collar civilian employment trends are for the DoD and Air Force. The figure compares white-collar DoD employment, represented by the red line, with Air Force white-collar employment represented by the blue line. The x-axis shows the end of the fiscal year, while the y-axis measures the number of employees represented by each line.

¹ 1994 5 U.S. Code § 5532
The trends in DoD white-collar employment and Air Force white-collar employment match closely. The number of Air Force white-collar employees as a percentage of DoD white-collar employees ranged from 20.0% to 21.6%. The only difference in trend is the Air Force civilian workforce stayed about the same size from 2007 to 2008, while the overall DoD workforce increased that year. We focus on the white-collar workforce for two reasons. First, this workforce is more likely to contain the high-skill, high-value workers we are concerned the Air Force could lose. Additionally, the blue-collar workforce is making up a smaller percentage of the overall workforce every year. In 1998, almost a third of the Air Force civilian workforce was blue collar, while in 2014, the blue collar force made up only a quarter of the workforce (Office of Personnel Management 2015).

**DoD Hiring and Retirement Trends**

After considering the trends in overall employment over the past ten years, it is important to consider where these increases and decreases are occurring. For example, a workforce can grow because no one is retiring and an average number of people are being hired. It could also grow because many more people are being hired and an average number of people are retiring. The former situation would be much more concerning than the latter because hiring is much easier to control than retirements.

Figure 1.3 shows those trends for the DoD civilian workforce. The axes once again show the number of employees and the fiscal year. The blue line shows the number of new hires into the DoD civilian workforce. The red line shows transfers out and the green line shows retirements. Figure 1.3 shows why there is concern about a retirement wave: hiring is low while retirements...
are up. Hiring increased substantially during FY2008 and 2009, but over the next four fiscal years declined. Even when it increased during FY2014, the number of new hires was still substantially fewer than it was in FY2005. Retirements declined dramatically during FY2009, but have since returned to pre-2009 levels. Net transfers out are steady but small as a part of the total workforce.

Figure 1.3. DoD white-collar hires, retirements, and net transfers out FY2005-2014.

One question this chart raises is how much of this hiring was done to meet increased demand as opposed to replacing separating workers. The first explanation we see is in the FY2010 President’s Budget Request. In that document, the DoD explains that they would like to “in-source” more of their positions, meaning that contractors would be replaced with DoD civilians. The ultimate goal of this request is to return “Contractor advisory and assistance services and other service contracts […] to pre-2001 levels. The Department will attempt to hire an additional 13,600 civil servants to replace contractors and plans to hire 33,600 new civil servants over the next five years. To facilitate this hiring process, the budget funds an additional 225 human resources personnel” (U.S. Department of Defense 2009). Additionally, “This budget funds the addition of 4,080 acquisition professionals to begin the process of revitalizing the acquisition workforce” (U.S. Department of Defense 2009). Both of these proposals required the hiring of more DoD civilians. These requests were supported in the National Defense Authorization Act of

---

2 The FY2008 and FY2009 President’s budgets do not mention any reason for increasing the defense civilian workforce.
2010. The budget request for 2011 continues this trend. It is difficult to know what the exact impact of this was on the Air Force civilian workforce because the budget does not specifically target the Air Force. However, it is likely that about a fifth of the increase was in the Air Force since the ratio of workers in the Air Force to the DoD, as we have noted, has remained fairly constant.

The pattern reverses in the FY2012 budget request which focuses on efficiency and force shaping. This is reflected in the shrinking number of civilians we see hired during fiscal year 2012, as shown in Figure 1.3. For example, the budget request for FY2012 says, “Actions may include temporary suspension of recruitment actions to allow Components to more fully assess the impact of mission set changes and the introduction of process efficiencies on their workforce composition. DoD intends to hold the civilian workforce at FY 2010 budgeted levels” (U.S. Department of Defense 2011). This was carried out as few people were hired that year in the DoD.

In view of this history, there are a number of important things that pertain to this research. The first is that the president’s budgets usually give some idea of the rationale for hiring quantities that will occur over the next fiscal year. However, president’s budgets should not be regarded as exact statements of how much the civilian workforce will grow or shrink in a given year. Sometimes, for example the FY2009 request, the change in the budget does not reflect what actually happened in the change of hiring.

Air Force Hiring and Retirement Trends

We will next examine the hiring and retirement trends for the Air Force to compare to the DoD. Figure 1.4 below shows the hiring, retirement, and net transfer trends for the Air Force civilian workforce.

Figure 1.4 shows an increase in the workforce from 2009-2011 due to increased hiring and reduced retirements. However, since then the combination of reduced hires and increased retirements has helped to increase fears of a gap in senior specialists and managers. Air Force hiring increased dramatically in FY2009, but during FY2012-2014 has been as low as it ever was over the past ten years. Figure 1.4 shows that the Air Force does not seem to have a problem increasing hiring when it needs to, at least as of five years ago. However, these were also times of severe economic contraction, so it may have been easier to entice workers into the federal

---

3 NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2010. P. Law 111-84.

4 Furthermore, while budget requests state the number of employees in full-time equivalents, these numbers do not match up with the FedScope records. For example, the number of full-time equivalents in the budget request for FY 2010 shows 725,000 full-time equivalents for FY2009. FedScope shows 727,000 workers, but 80,000 of those are part time workers, meaning that it is highly unlikely that there were in fact 725,000 full-time equivalents that year. The conflicting numbers also serve to illustrate the importance of using the Air Force’s own personnel records to see which numbers are correct.
civilian workforce. In the future, the Air Force may face a much larger need due to a retirement wave and it may not have such favorable economic conditions to easily hire replacements.

**Figure 1.4. Air Force white-collar retirements, new hires, and net transfers out FY2005-2014**

The number of retirements for each fiscal year has changed within a fairly large range over time. During the late 2000’s, the number of retirements steadily increased until FY2008, plummeted during 2009 and 2010, and then sharply increased in FY2012. This was most likely due to a combination of employees delaying their retirements until the markets had recovered and early retirement programs as the DoD strived to maintain the same number of civilians it had in FY2010. Since 2012, the number of retirements has been more in line with the average, but is still lower than the number seen before the financial crisis. In fact, the average number of retirements from 2009-2014 is smaller than the average number from 2005-2009, indicating there still may be some danger of a retirement wave. The net transfers are used as a comparison, to show that they change the Air Force civilian numbers only slightly and to note there have been steady net transfers from the Air Force civilian workforce over this time period.

Source: FedScope database.
Comparison of Trends

The overall DoD trends in white-collar hiring, retirements, and transfers are very similar to those of the Air Force, and both are generally in line with the various president’s budget requests. For new hires, the DoD and Air Force trend is the same except from 2009-2010, when the Air Force slightly increased its hiring and the DoD decreased theirs. The retirement trend is also similar to the DoD, with a sharp drop in 2009, followed by a gradual increase and peak of retirements in 2012. In the DoD, interestingly, the average number of retirements has been larger after FY2009 than in the four preceding years, which is not what we see in the Air Force workforce. This suggests a larger number of retirements may be looming among Air Force civilians, and thus, the Air Force should be more concerned about a retirement wave than the DoD as a whole.

Summary

Evidence exists for concerns about a retirement wave for senior Air Force civilians. Within the DoD, civilian retirements are increasing and hiring is down. Civilian retirements in the Air Force are smaller than in the DoD as a whole suggesting that there may still be a large increase in pending retirements. Additionally, there are currently no external crises to spur the DoD to increase funding for replacing senior workers that are lost. This means that policy changes may be difficult to make. The combination of these factors leads observers to note the potential for a retirement wave with potentially serious consequences for the human capital of the Air Force civilian workforce.

Organization

This dissertation has five chapters. The present one is designed to introduce the reader to the Air Force civilian workforce and recent issues it has faced. The next chapter investigates similar problems from the past as well as policies designed to address those problems. Chapter Three will be a summary of the current hiring, separations, and transfer trends in the Air Force civilian workforce. These trends will then form the foundation for the fourth chapter, which will use these historical trends in part to project the future of the Air Force civilian workforce. The current trends will form a baseline rate for the future, while multiple excursions will be performed to help account for the uncertainty of these rates. The final chapter synthesizes the prior chapters, and analyzes and recommends policy options to policymakers.
Chapter Two: Review of Federal Workforce Issues

Before exploring the recent trends in the Air Force civilian workforce, it will be useful to provide the context of these trends. This includes the structure of the civilian workforce, its history, and the structure of the two largest retirement systems. This information will give the requisite context to understand the review of previous workforce literature. The purpose of that review will be twofold: to examine past concerns about the federal workforce and to review what other researchers have recommended to mitigate shortages. We will see that there have been concerns about an aging workforce for many years. Many of the projected problems do not come to fruition because of factors external to the workforce such as a financial crisis or the end of the Cold War. The recommendations to mitigate the projected problems are almost always for agencies to increase flexibility and to streamline the hiring process. Flexibility includes both work hours based on an employee’s needs and more opportunities for telework. It also includes variable pay scales for agencies to use to attract the best workers or pay them based on their performance. Finally, to set up the historical analysis of the data, we will compare the workforces of the past to more recent workforces and note what newspapers are saying about federal workforce issues today. This is a workforce that is older, more educated, and more professional than any civilian workforce of the past. By more professional, we mean both more white-collar workers and more workers in the higher grades. In theory, this means it will be more difficult than ever to replace experienced workers.

Background on the Federal Civilian Workforce

Structure of the Air Force Civilian Workforce

Management of the Air Force civilian workforce is decentralized, making it difficult for an Air Force-wide problem to be detected. Final authority on issues applying to the entire Air Force civilian workforce resides with the Secretary of the Air Force. The principal office within her office that oversees manpower is the Assistant Secretary for Manpower and Reserve Affairs (SAF/MR). On the military side of the department, there is the Deputy Chief of Staff for Manpower, Personnel and Services (AF/A1). Within this organization, there is a Director of Civilian Force Management (AF/A1C) and a field operating agency, the Air Force Personnel Center (AFPC). Authority proceeds down through the functional authority and career field manager to the individual.5

5 Career fields may be grouped into functions, which are careers that all have similar tasks or duties.
Figure 2.1 shows this structure in career field management. SAF/MR is part of the Air Force Council, AF/A1 is shown in the upper left and AFPC in the bottom left. The Civilian Force Development Panel is chaired by the civilian AF/A1 (Senior Executives Association 2015). The functional authority is “the senior Air Force official, normally at the Headquarter Air Force (HAF) level, responsible for the mission of the function or career field and support of specific career field management programs” (Camarillo 2016). For the auditing occupation, for example, the functional authority is the auditor general (SAF/AG). The functional authority chairs the functional advisory council, which is made up of other senior civilians in that functional group. The functional manager is the person with authority for a functional group at the Major Command (MAJCOM) level. There are ten MAJCOM’s in the Air Force and they report directly to HAF. The development team is also made up of senior civilians, including the career field manager, and seeks to integrate both functional and Air Force corporate leadership requirements (Hanser, Lim et al. 2015). This means it will balance the views and requirements of the MAJCOM’s, AFPC representing the corporate Air Force, and the specific career field. The career field team is the team of specialists at AFPC that is in charge of the career field management program, which includes “workforce analysis, forecasting and planning, and the systematic selection, development, assessment, and use of employees in centrally managed positions” (Camarillo 2016).

**Figure 2.1: Civilian workforce management organizational chart.**

History of the Federal Workforce

In order to gain some context on the federal workforce and issues it has faced in the past, it is necessary to view the history of the federal civil service, which dates to the earliest years of the republic. The aspects of this history that will be important for our purposes are the origins of the structure of the civil service, the relationship between the wider civil service and the War and later Defense Department, and previous struggles with worker shortages. Until 1883, employees were almost entirely appointed by the president based on whatever criteria seemed appropriate to him. This could and did vary widely by which president was in power. This changed with the Civil Service Act of 1883, which required certain federal positions be filled based on competitive tests, and that political considerations could not impact the decisions of who to hire (Office of Personnel Management 2003). However, the number of civil servants employed by examination did not outnumber political appointees until the first decade of the 20th century. In 1923, the classification act was passed which set up the requirements for classifying all jobs, and assigning them salaries based on their position (Office of Personnel Management 2003). By 1940, almost all federal positions in the executive branch were based on merit and not how politically connected the employee was. By 1958, the civil service required agencies to publish their promotion plans and select for promotion from amongst their best-qualified employees. This led to a much more systematic method of promoting employees. In 1962, the step increases of the General Schedule were changed to quality step increases, which were meant to reward high performers, and be less automatic.

The largest reform to the civil service since 1883 was the Civil Service Reform Act of 1978, which established the modern federal personnel system. The Civil Service Commission, which had overseen the federal civilian workforce since 1883 was abolished and broken up into a number of agencies, each of which oversaw a different aspect of the civil service. The Office of Personnel Management would be responsible for providing a framework for all agencies to successfully manage their personnel through training, recruiting, promotion, and classification. The Merit Systems Protection Board also came into existence, both to protect the merit systems of promotion spread throughout the federal government and to hear appeals from federal employees related to their employment. The Civil Service Reform Act also codified the principles that would guide all merit systems in the federal government. It also described a list of prohibited personnel actions that circumscribed hiring and firing decisions of the federal agencies.

The General Schedule pay scale, which is the pay scale of two-thirds of Air Force civilians, and 89% of its white-collar force, was implemented in 1949 with the Classification Act. The General Schedule was meant to standardize and rationalize federal pay. This was done by setting up a system in which each occupation was classified, and within each occupation a certain number of grades was created. Each grade represented an increase in responsibility and pay. This system was called the general schedule because it merged several schedules of pay rates into one.
There has been much talk, and some action about reforming the general schedule, yet it remains almost the same as it was in 1949. Each occupation in the general schedule has a specific description and grade associated with it. Within each grade, there are ten “steps”. Each step is achieved by accomplishing the job at an acceptable level of confidence and working for a certain number of years. Quality step increases can also be awarded based on high performance. Pay varies across the country depending on locality, but does not take into account occupational differences. This means a GS-12 biologist makes the same as a GS-12 attorney in Atlanta, even if the pay rates for those two private sector jobs are different (James 2002).

Promotions in the general schedule are often fully competitive, meaning that anyone from outside the government may apply for any job and everyone one grade below the open position may apply from within the government. At grades between GS-6 and GS-11, government employees from two grades below the open position may apply in addition to those only one grade below. For GS-12 and above, there are only special exceptions which allow someone to skip a grade 6. In addition to applying for promotions, there are “career ladder” promotions that only depend on time-in-grade. However, only ten percent of white-collar full-time permanent positions available in the Air Force are career-ladder positions, based on a sample of job postings on the USAJOBS website.

The Civil Service Reform Act of 1978 also created the Senior Executive Service (SES), something unprecedented in the merit system. This service was unique because it was meant to be a grade based on the person, rather than the position. This created a mobile executive workforce that could quickly step into whichever job was required of them. If the payments were not tied to their occupation, they did not have to worry about what grade they were going to and how much of a pay cut or pay raise they were getting, but could focus on the job. SES employees could be selected based on merit or be political appointees, although the political appointees were limited to ten percent of the total. Executives ranked above GS-15, the highest civil servant rank. If an agency thought one of their GS-15 employees was ready to be an executive, they could nominate him or her to OPM. OPM would then review the qualifications of all the employees nominated using a qualifications review board made up of executives drawn from Federal agencies.

Executives are required to be highly interchangeable. This means that after 120 days in a position the SES employee could be moved to any other position with fifteen days of notice, without having any say in the matter. Executives are evaluated not only on their own performance, but also on that of the agency or program they managed. If the organization is not performing successfully, the executive could be demoted. Successful executives could receive annual bonuses or even large one-time awards from the President for exceptional performance (Office of Personnel Management 2003).

---

6 5 C.F.R. § 300.604
In addition to creating the Senior Executive Service, the Civil Service Reform Act changed the management of the grades just below the SES level as well. Instead of the ten quality step increases used at the other grades, the GS-13, 14, and 15 grades all received a “pool of funds from which, in addition to their base pay, they could receive annually merit pay increases based on the level of performance of the individual and the organizational unit in meeting the goals and objectives of the department or agency” (Office of Personnel Management 2003).

The Civil Service Reform Act also started the Presidential Management Intern (PMI) Program that focused on bringing in recent college graduates for a two-year assignment in the federal service. These interns are promised at least eighty hours of training a year, and are able to switch assignments to learn more about other aspects of the agencies they worked in (Office of Personnel Management 2003). In 2002, the government expanded the PMI program because it had been so successful.

Another reform the act allowed was the creation of so-called demonstration projects, which had to be consistent with merit system principles, but which could also be organized completely differently than the typical general schedule organization. The first and most famous of these is the Navy China Lake demonstration program, which began in 1980. This program featured wider pay bands, so that, for example, GS-7 to GS-9 would all be set at one pay level. Additional provisions include more flexibility on entry level pay, greater access to bonus payments, and line managers allowed to assign position classification (Office of Personnel Management 2003).

In 1989, the federal government decided that the civil service was not attracting enough young workers, and commissioned a report on recommendations for its improvement. These recommendations included dramatically increased pay for the SES, and increased pay across the federal government. Some of these recommendations were incorporated into law in 1990. The new regulations allowed much greater flexibility in pay and established new studies to be completed about the relationship between pay and performance. In the wake of the savings and loan crisis of the late 1980’s, the federal government gave even wider authority to agencies to design their own compensation systems, so that these proliferated throughout the civil service.

Figure 2.2 below shows how the federal civilian workforce changed to a much more professional service between 1950 and 2000. The vertical axis shows the percentage of the workforce, while the horizontal axis divides the workforce into grades.
The history of the civil service shows a number of things that are important to this research. Concern about attracting younger workers has been an issue since the beginning of the professionalization of the civil service. It should also be noted that there has been a steady emphasis on merit-based promotions and hiring throughout the history of the civil service. In the late 20th century this was extended to concern about the flexibility, responsiveness, and fairness of pay, which led to many of the reforms that shape the civil service today. Many of the concerns the reform was trying to address are still concerns today, meaning there may be room for additional improvements.

**Retirement Systems**

There are two large retirement systems in the federal civilian workforce. The Civil Service Retirement System (CSRS) was made effective August 1, 1920. This system covered civilian employees in federal civil service until 1987. In that year, the Federal Employees Retirement System (FERS) was implemented. Any federal employee who entered federal service after that date is covered by FERS. In 1998, almost all federal employees were allowed to switch into FERS (Asch and Warner 1999). However, as of the end of FY2015 about 7% of Air Force civilians remain on the CSRS plan. The FERS plan covers almost 77% of Air Force civilians,
with the remaining approximately 16% on the variety of smaller retirement plans. The CSRS and the FERS plans operate slightly differently from each other and will be explained below.

The CSRS has operated the same way with only minor changes since 1967 (Breth 1998). In this system, employees pay seven percent of their salaries into the retirement fund, which is then matched by the government (Breth 1998). This guarantees the employee a pension of a certain percentage of the highest three years of salary. This is based on years of service, so the pension paid out an annual payment of 1.5% of the high-3 average salary for each of the first five years, 1.75% for each of the second five years, and 2% for each full year after that (Breth 1998). So someone with twenty years of service would receive 36.25% of their highest three year average salary, while someone with thirty years would receive 56.25% (Breth 1998). The maximum pension is 80% of the highest three years, plus credit for unspent sick leave (Office of Personnel Management). Retirement eligibility is the result of years of service and age. After thirty years of service, an employee may retire at age 55, after twenty at age 60, and after five at age 62 (Office of Personnel Management). If an employee retires before age 55, the annuity is reduced by one-sixth of one percent for each month short of the employee’s fifty-fifth birthday (Office of Personnel Management). CSRS benefits are adjusted upward according to the consumer price index (CPI). CSRS employees are also not covered by the Social Security program, so they neither pay taxes into the system nor receive benefits upon retirement (Breth 1998).

The newer Federal Employee Retirement System was required after the passage of the Social Security Amendments of 1983. This law reformed the Social Security System and required federal employees to pay into the system (Breth 1998). This changed the way the federal retirement system worked. Since the government wanted to modernize the retirement system anyway, it passed the Federal Employees Retirement System Act of 1986 (Breth 1998). The system was effective retroactively to January 1, 1984, and all federal employees in the CSRS were given the second half of 1987 to switch into the system if they so desired (Breth 1998).

The FERS was meant to bring the federal retirement plan more into line with private sector trends by emphasizing a defined contribution plan as opposed to the defined benefit plan of the CSRS (Breth 1998). This was done by reducing the defined benefit received upon retirement and adding two defined contribution components: the social security component, and the Thrift Savings Plan (TSP), which is explained below. The retirement portion of Social Security works by having participants pay a 6.2 percent tax on their income. When participants have retired at the age of at least 62, they receive retirement benefits based on their average earnings while they were working, and the age they retired. The benefit also increases in line with the CPI. The defined benefit plan works the same way as the CSRS, but is a smaller benefit. Additionally, the benefit in the FERS depends both on age at separation from federal service, and number of years worked. If one retires before the age of 62 or with fewer than twenty years of service, the benefit is 1 percent of their highest-3 average annual salaries multiplied by the number of years worked. Someone who retires after the age of 62 and with more than twenty years of service receives a benefit of 1.1 percent of their highest-3 average annual salaries multiplied by the number of years worked.
years worked (Office of Personnel Management). For the TSP, the government places the equivalent of a certain percentage of a worker’s pay into one of a number of different retirement funds. These very low-cost funds range from funds that invest in government securities, to international funds, to funds that track the U.S. stock market. If a federal employee chooses to, he may deposit more of his pay in the TSP. The agency he works for will then contribute a certain amount of money to supplement what the employee contributed, until the agency has contributed the equivalent of 5% of the employee’s pay (Breth 1998). Additionally, up to 10% of an employees’ contribution may be placed in the funds (Breth 1998). Investments are tax-deferred like a traditional individual retirement account (IRA) (Breth 1998). After 2012, employees also have the option of contributing to a Roth TSP account, which uses after-tax earnings and provides a way to earn money on investments without paying taxes on those earnings (Buco 2012).

Retirement benefits in the FERS are paid when the employee is 62 years of age and has five years of service, is 60 and has twenty years of service, or meets the minimum retirement age and has thirty years of service (Breth 1998). The minimum retirement age ranges from 55 to 57 depending on the year in which the employee was born. Older workers have a younger minimum retirement age (Breth 1998).

A 1999 RAND study compared the two retirement systems to see what the effect of each system would be on survival curves for the federal workforce. It found that the FERS was a more generous system, and that it incentivized employees to retire at the same age if the minimum retirement age is 55. It does incentivize employees to retire at a later age if the minimum retirement age is 57 as it is for all employees born after 1970. Even though the FERS will likely induce employees to retire later, the variability would likely be higher as well because there is only a small penalty for not retiring at the wealth-maximizing age. The FERS also creates stronger incentives for those who are at the beginning of their careers to stay, but provides a smaller incentive to stay after the mid-career point. From this analysis, it seems that the FERS is generally better equipped to face a large-scale retirement of older employees. However, two features of the FERS may make it less resistant to such a retirement wave. First, the greater variability that comes with the system might make it more difficult to predict when employees retire. Second, the smaller incentive at the mid-career point might lead to higher turnover of mid-level workers (Asch and Warner 1999).

Now that we are aware of the history and structure of the federal civilian workforce and the largest retirement systems, we will turn to past federal civilian workforce research. This research will show what types of issues and recommendations have been made in the past. These will then give us context for the issues we face today.
Workforce Research of the Past

Few studies have focused specifically on the Air Force portion of the DoD civilian workforce. In this subsection, we will primarily review studies examining the DoD civilian workforce as a whole. Service-specific or career-field specific studies are also discussed where they exist. Beginning in the late 1980’s, concerns about the ability of the federal government to cope with demographic changes led to frequent reports on the topic. The reports from the late 1980’s worried about the ability of federal government to retain and recruit the best professionals. However, most of these concerns did not materialize because of the end of the Cold War and the subsequent drawdown in government positions. By the early 2000’s worries of a retirement wave became prominent again with the baby boomers on the verge of retirement and the buildup of government civilian positions after 9/11. In spite of many dramatic recommendations, often directed at the hiring process and making work more flexible, retrospective studies concluded that the dire projections largely turned out to be incorrect. However, other studies concluded that there was reason to worry about the ability of the federal government to retain and recruit people with critical skills, which will be studied in this dissertation.

First Concerns and Outcome: 1987-1993

The earliest examination of potential large-scale retirements that this dissertation will consider was the General Accounting Office (GAO) report to Congress from 1987. This report specifically examined the ability of the government to recruit and retain scientists and engineers in spite of differences in pay with the private sector. It found that there was little to no correlation between comparability of pay and the quit rate of the various occupations. While the report does not define quit rate, the standard definition is the number of voluntary separations divided by the number of employees in a given time period. For example, chemists, although facing a large pay gap, had very low quit rates. Typists, meanwhile, had a very small pay gap between the government position and a similar private sector position, yet quit at relatively high rates. The DoD reported larger quit rates as the 1980’s went on, but this is likely due to some of the retirement law changes and specific initiatives the DoD used to draw down its civilian workforce as noted in the 1990 McCullar study, discussed in more detail below. The GAO report also noted that “as a rule, agencies and OPM do not collect data on attainment of recruiting goals” (Anderson 1987), which makes it difficult to tell whether the number of new hires is as high as the specific agency desired. There were no data collected on the quality of these recruits and the study did not make any recommendations. This study is relevant for two reasons. One is illustrating how a lack of relevant data hampers the ability of researchers to accurately describe defense civilian workforce requirements. The other is its finding that the pay gap is not a large factor in recruitment and retention in the federal workforce.
Another late 1980’s workforce report, *Civil Service 2000*, commissioned by OPM and written by the Hudson Institute, examined “the long term workforce needs of the Federal Government” (The Hudson Institute 1988). As with many of the other reports, this report simply analyzes the past and predicts those trends to continue into the future without making rigorous projections. The two biggest concerns of this report are the aging of the federal workforce, and specifically the relatively small number of college graduates that were projected to be available for hire in the 1990’s. The report states that these two factors, along with the fact that the distribution of federal workers was heavily skewed towards thirty-six to forty year old employees, meant that there would be a retirement explosion around the year 2000. This was not based off a rigorous projection, but the fact that few people left the federal government in their late 30’s, and many did when they turned fifty-five. From this, they drew the conclusion that in about fifteen years a large portion of the workforce would suddenly retire. The very small number of college entrants that would be able to be hired due to the “baby bust” would exacerbate the impact of the sharp increase in retirements. The report also notes that federal workers are better educated, older and trending towards more white-collar jobs, attributes that all hold true today.

The report makes some strong recommendations to counteract these possible shortages. The first and most important according to the report is the decentralization of government authority and responsibility to the various agencies. Their reason was that this would allow each agency to tailor their recruiting and hiring approach, as well as the pay, training and classification for their jobs. The other two recommendations that pertain to this study are to “substantially increase internal and external education of Federal workers” and upgrade federal pay and benefits in return for demanding performance (The Hudson Institute 1988). Specific recommendations at the individual agency include more advertising, which the study states was highly effective for the Army, using employment recruiters, adjusting pay scales to reflect localities as well as position so that all pay is competitive with the private sector, and finally streamlining the hiring process, both on the prospective employee’s end and at the agency’s end after the employee has turned in his or her application.

Linda McCullar, an Air Force civilian completing her degree at the Air War College wrote a study examining the Air Force civilian workforce in 1990. McCullar was concerned about the declining size and skills of the U.S. labor force and how this would impact the Air Force civilian workforce (McCullar 1990). As the educational level of Air Force civilians increases over time, this reduction in the pool of future qualified labor within the general populace bodes ill, particularly if a large number of new hires is needed.

The methodology in this study simply examined then current trends in both the U.S. labor force as a whole and in the Air Force civilian workforce specifically. These trends pointed towards an older workforce that was not as well-educated. The education trends seemed to be based on less evidence than the demographic trends. The demographic trends were collected from the Census, the Bureau of Labor Statistics and the Air Force civilian personnel database.
The education trends were collected from the Census and groups with more of an interest in predicting shortages of educated workers such as the National Science Foundation and the Business Council for literacy. Requirements projections were based on the assumption that cuts in the workforce would occur as the Cold War ended. However, the study did note that “It is impossible to predict with any confidence how the Air Force civilian workforce will be structured in the next 5 years, let alone the end of the decade” (McCullar 1990).

This uncertainty did not prevent the author from making a number of wide-ranging recommendations. The recommendations first focus on recruiting strategies, including active participation and offering jobs at job fairs, an option that has not been possible due to the restrictions of federal hiring regulations. Other recommendations include more extensive advertising, more cooperative programs with colleges, and expansion of the Outstanding Scholar Program. This is a federal civilian program that allows people with a 3.5 GPA or higher to receive non-competitive government jobs according to the needs of the government. Further recommendations are a Public Service Scholarship Program, where the government pays for someone to go to college and then commit to the federal government afterwards, as well as for competitive pay and pay banding for high-skilled Air Force civilians. The final recommendation for recruitment is the common complaint that the application process for government civilians is complicated, difficult to navigate, and inflexible.

McCullar also makes recommendations to improve retention and educational opportunities for Air Force civilians. The study suggests increasing child care support and access for Air Force civilians, and moving to a more flexible benefits plan where employees can choose from a number of different options that all add up to the same total cash value benefits package. The recommendations for educational opportunities include more access to graduate degrees during the career of the civilian, especially in the engineering and science occupations. The study also recommends more access to non-governmental training resources that not only help the person in their current job but also help them to grow into the job that they will next have.

Training reform did come into effect in the early 1990’s. The obstacle to more training opportunities was the Government Employees Training Act of 1958, which allowed government agencies to determine their training needs and the best ways of securing that training. However, “existing restrictions dictate that any restrictions be related to an employee’s official duties” (Gore 1993). This was modified in 1994 so that it now reads:

In order to assist in achieving an agency’s mission and performance goals by improving employee and organizational performance, the head of each agency, in conformity with this chapter, shall establish, operate, maintain, and evaluate a program or programs, and a plan or plans thereunder, for the training of employees in or under the agency by, in, and through Government facilities and non-Government facilities.7

---

7 5 U.S. Code § 4103
This means that training no longer must be directly related to the employee’s official duties, but can include career advancement training as well.

The Air Force carried out education reform directly, through a program called Palace Knight. This program came into existence in 1994 and allows the Air Force to pay for a civilian to continue in his or her graduate studies up to a doctoral level of education. There is special emphasis on the Air Force research laboratories, but any agency with a requirement may try to have one of its employees funded by this program. Upon completion of the doctorate, the employee is promoted after appropriate time in grade and supervisor recommendations have been met, and employees must stay with the civilian workforce for three times the length of their training (Boles 1994).

There are a couple of conclusions we can draw from McCullar’s concerns about the Air Force civilian workforce in 1990. Fears of the aging workforce have not gone away; neither have fears about the ability of the Air Force to recruit young civilians into its ranks. However, there have also been positive steps taken after the 1990 report was published that have mitigated the potential gaps in the education level of the workforce, particularly the ability of that workforce to receive that education while employed by the government. Also, of note, is the relative lack of rigor of this study, as there was little effort to quantify the future composition of the workforce. The study instead focused on trends that affected the entire U.S. working population, and speculation that the Air Force was struggling to recruit the best and brightest.

Another useful perspective is a report by the U.S. Merit Systems Protection Board, examining the projections of the late 1980’s to see whether government agencies were facing the issues projected or still worried about them. This report was written in 1993. The authors developed a questionnaire for twenty-two agency heads to answer, revolving around four issues that were of common concern in the late 1980’s. The four issues were:

- A decline in the number of qualified applicants for entry-level jobs;
- A rise in the average age of the workforce;
- An increase in the proportion of minorities entering the national labor force; and
- An increase in job skill and education requirements.

Three of these issues are still concerns today. The concern about the increase of minorities has decreased in recent years because this is a very gradual and old trend. The agencies’ responses to these issues will be relevant for future workforce planning as well.

The first issue asked about was the ability of federal agencies to attract young workers. The report mentions that the opinion of experts was generally that the baby bust would lead to a smaller pool of entrants and that this would lead to shortages in the workforce. However, other experts argued that the reduction in entrants to the labor force would also reduce demand for goods and services, meaning that the worker shortage would be relatively unimportant. The agencies found that the worker shortage had not affected them yet, and that they had actually
found the early 1990’s to be a good time for hiring workers. The agencies listed a number of reasons they thought this might be the case. One of the main reasons for this was the relatively poor economy of the early 1990’s. Another was the downsizing the agencies, especially the DoD, were going through. A third factor was the better public image of federal civil servants, brought about both by the agencies themselves through morale-boosting exercises and a general change in political climate. The one policy change that agencies thought was helpful in recruiting large numbers of and good quality employees was the Federal Employees Pay Comparability Act of 1990 which allowed agencies more flexibility in offering pay for new and excellent employees, and allowed pay grades to be tied to locality. Additionally, they thought a number of current programs were especially effective in hiring young workers. Most of these were cooperative programs with schools, where the federal government worked with one of the students and then offered them a job as soon as they graduated. The other successful techniques included offering more flexible work schedules and work sites, as well as special pays on top of the typical government salary for select occupations. (Erdreich 1993).

The next issue addressed is that of the aging workforce. In 1993, the concern was the actual aging of the workforce, as opposed to the concern that this will lead to a retirement wave and the inability to replace the skills and experience that have been lost. This did include concerns that the aging workforce may take up so many of the middle management positions that the younger workers may become discouraged with their chances of promotion. In 1993, the projections of an aging workforce were correct. However, the agencies did not seem to be very concerned about this. There was little being done to specifically address issues of age, and those that were tended to be part of larger programs that dealt with everyone rather than specifically targeting the older workers. The report did not mention whether the agencies were concerned that aging would be an issue in the future (Erdreich 1993).

The third issue of relevance to this dissertation is that of a possible increase in skills required of federal workers that becomes difficult to fill. As we saw with the hiring of young workers, however, this did not seem to be a serious problem as agencies were able to fill their positions regardless of the skills required. The agency response to this problem was discussed in the recruiting young workers section.

The study then concludes with recommendations for the federal agencies. The first is that the agencies should continually update their projections of future demographics so they are not caught off guard by any drastic changes. This way they can adapt appropriately before the changes hit them. The second is that agencies should prepare for the worst and not assume that hiring will always be as easy as it was in the early 1990’s. This means being especially responsive to employees’ needs and increased flexibility in the workplace. The report also recommends that agencies begin to design programs specifically for their older workers to keep them motivated and address their concerns as the workforce includes proportionally more of them. Finally, training, retraining and developing federal employees should be at the top of each
agency’s priorities, because this is where demographic crises can be averted. This could include more partnerships with schools, or training on the job after a worker is hired (Erdreich 1993).

This study shows that demographic trends can be overridden quickly by changes in the economy. Even though there had been worries about the aging of the workforce and the population, this did not become a problem in the early 1990’s because of the weak economy. The economy even seemed to override policy changes in its effects. This makes projections difficult and means that any projections that are too drastic should be critically evaluated.

Second Wave of Concern: 1999-2004

Paul C. Light, then vice president and director of Governmental Studies and of the Center for Public Service at the Brookings Institution, wrote a book in the late 1990’s in which he surveyed government civilians of all ages about their time in the federal civil service and how it has changed. Light is mainly concerned that talented workers are not planning to enter the federal workforce and that the government is not doing enough to attract them. He backs up these ideas with the results of this survey: “Fewer than one in ten of the 1998 Phi Beta Kappa graduates surveyed by George Washington University rated the federal government as their first preference for an employer, while nearly six in ten said they would not know how to get a federal job even if they wanted one, and nine in ten said that the process for getting a federal job would be long and burdensome” (Light 1999). He also cites a 1996 Merit Systems Protection Board survey of almost 10,000 government employees. While mostly satisfied with their jobs, “the vast majority of respondents said that the budget cuts, downsizing, and back-to-back government shutdowns in 1995 had a negative impact on their organizations, and four out of ten said that fears of future reductions in force were having a continued, negative impact on productivity” (Light 1999). This is a similar situation to today as the federal civilian workforce has also had to deal with two government shutdowns and sequestration.

Light also argues that the shape of government has changed in ways that are important to understand. During the Clinton administration, the federal government cut its civil workforce by a sixth, eliminated a quarter of its middle management positions, and a third of its defense contract workforce. He argues that “most of that slimming was a product of attrition-based downsizing, and lack of clear guidelines for deciding which jobs should stay inside government, and which should go” (Light 1999). This shows that it is therefore essential that the Department of the Air Force should have a plan to retain its human capital to avoid haphazard cuts.

Light makes three recommendations to the government to recruit, retain, and attract the very best to the federal civilian workforce. His first recommendation is to stop the bleeding by stopping government cutbacks and imposed headcounts. Light sees legislators and executives not taking the human capital crisis seriously and making it easier for people to leave rather than working on ways to attract and retain the best. In particular he singles out the government for “doing virtually nothing to create new entry points for replacements to enter later in career” (Light 1999). Thus, he recommends that the government aggressively open more jobs to outside
competition, especially those in mid- and senior-level positions. This would include more advertising of those positions and more recruitment incentives. He writes that meaningful career development is important to retain workers. In order to facilitate this, Light also recommends more support for human resource workers whose jobs have been “decimated” by downsizing. It is not entirely clear what this support would entail, but a first step involves hiring more human resources officers so that they can dedicate time to creating more fulfilling career paths, and more inventive recruiting strategies (Light 1999). The first recommendation is dated, as the federal workforce today is not recovering from a decade of downsizing. The second recommendation is extremely relevant to today as the Air Force civilian workforce will be faced with workforce shortages of experienced workers in critical occupations. The third recommendation is also relevant to today as the human resources career in the Air Force civilian workforce has shrunk over the past five years, after growing dramatically in the previous decade.

Reports of a possible retirement crisis in the federal civilian workforce began appearing in earnest around the year 2000. An article in the Orlando Sentinel summarized many of the concerns (Barr 2000). At that time, the combination of regular retirement and early retirement eligible employees added up to 50% of the total federal workforce. The problem was even worse in the Senior Executive Service, as almost two-thirds of them would be eligible for retirement by 2004. This of course would not be a major issue if the government could quickly and efficiently replace these highly-skilled workers, but Barr reported that “It is not clear the government has honed a strategy to offset the talent drain by hiring people with the right skills, providing competitive pay and devising a management system that gives taxpayers the best for their bucks” (Barr 2000). The White House was “considering an executive order to create a government-wide internship to boost recruitment” and was drafting proposals to help the government compete with the private sector. The Department of the Air Force was singled out as having more than 45% of its civilian staff eligible for early or regular retirement. The Information Technology (IT) field was also highlighted as a place where the government would struggle to replace and add to its workforce. The article also raised concern about the ability of the government to compete with the private sector and the impact of recent government shutdowns and anti-government rhetoric (Barr 2000). Both of these issues are relevant today.

The government, especially the DoD, was aware of this threat, and commissioned a task force in 1999 to develop recommendations for facing this possible crisis in the acquisitions workforce. The acquisitions workforce comprises all of the employees, regardless of department within the DoD, who work on DoD acquisitions. The task force wrote that five years into the future more than half of the civilian acquisition workers would be eligible to retire. The DoD estimated that 39 percent of the September 1999 civilian acquisition workforce would not be with the DoD in 2005. The methods used to make these estimates are unclear. It was also unclear whether all of these workers would need to be replaced, or if this estimate projected some further downsizing in the civilian acquisition workforce. As usual, the task force was concerned that many of the retirement losses would come from the oldest and therefore most experienced
workers. The focus of the report was on the recommendations that were collected by experts in government, industry, academia, and employees’ unions (The Acquisition 2005 Task Force 2000).

The recommendations the task force makes are thorough and numerous. Many would apply to the wider Defense civilian workforce. The recommendations are similar to the typical proposals for improving government hiring. These include maximizing the use of hiring authorities, making pay more competitive, expanding recruiting efforts both public and private, providing more career-broadening opportunities, and increasing civilian leadership development programs. This example shows once again that many of the problems associated with a large-scale retirement loss have been written about and thought about for years before, and that this kind of apparent crisis can be overtaken by external factors. In this case, the post-9/11 defense buildup led to an expanded acquisitions workforce.

At the beginning of the post 9/11 era, the Department of Defense was worried about the potential retirement wave, and so designed a strategic human capital plan for the civilian workforce as a whole. The Department was concerned that after years of downsizing and minimal entry-level hiring that they were facing a shortage of people with the “right skills and experience”. They noted that, “the average age of DoD employees was 46 and 31 percent of the DoD’s workforce was over age 51” (Office of the Under Secretary of Defense (Personnel and Readiness) 2002). The plan endorsed seven goals for the civilian workforce. Three are relevant to this dissertation. They are:

1. Promote focused, well-funded recruiting to hire the best talent available.
2. Provide a human resources system that ensures the readiness of tomorrow’s integrated force structure.
3. Promote quality of work life as an integral part of daily operations.

Each of these goals is directly relevant to the problem of matching skills and experience to jobs and to recruiting and retaining new workers. The recommendations that follow from these goals are numerous and it is difficult to say whether they have been implemented. Some, such as the flexible work schedules and child care services are implemented. Others, such as the retention bonuses had existed even before the study. Still others, such as broad-banding were tried and then rejected. Each of these recommendations stems from a goal.

The first goal highlights the use of recruitment and relocation bonuses as well as retention bonuses as a useful way to obtain necessary skills. The goal entails studying in more detail the problem and possible solutions, especially by outside research organizations, such as the Brookings Institution. These studies also lead to better civilian workforce planning for the future. Furthermore, the DoD needs to become a center of excellence where people want to work. The plan praises the hiring of highly-skilled veterans to replace retiring civilians in high-ranking positions. The other items mentioned under this goal are the usual list of increasing flexibilities, acquiring more authority from Title 5, broad banding and pay for performance (Office of the Under Secretary of Defense (Personnel and Readiness) 2002).
In order to achieve the second goal, the DoD plans on both studying and updating its human resources information and consolidating all of its personnel information onto one system. This helps to establish baselines for the human resources system and allow for further study of best practices (Office of the Under Secretary of Defense (Personnel and Readiness) 2002).

To achieve the last goal, the DoD offered programs and policies that make work more pleasant and attractive and are comparable to those available in the private sector. These include telework, flexible schedules, and part-time employment, but may also include services offered by the DoD such as child care services (Office of the Under Secretary of Defense (Personnel and Readiness) 2002).

In 2004, the RAND Corporation completed a study specifically examining the science and technology workforce of the federal government. Concern about the science, technology, engineering, and mathematics (STEM) disciplines often dovetails with concerns about an aging workforce because STEM workers tend to be the employees who most benefit from more experience and are often thought to have acquired difficult degrees. The RAND study states, “Knowledgeable sources both inside and outside of government have voiced fears that this workforce is aging and may soon face a dwindling labor pool, a problem that could be compounded by skill shortages in key areas and a growing proportion of non-U.S. citizens obtaining STEM degrees in the United States” (Butz, Kelly et al. 2004).

This study’s methodology was once again to examine trends rather than use a model to make projections. However, the study went beyond the federal workforce to see if there were shortages in the STEM workforce in the U.S. as a whole. They considered not only the characteristics and size of this workforce but also the labor market conditions including earnings, unemployment and underemployment in the workforce. For the federal workforce they also analyzed the age of the workforce, noted the lack of good data for this workforce and spoke to many government agencies to discover their concerns (Butz, Kelly et al. 2004).

Interestingly, the study found that there was little reason to worry about the STEM workforce. They noted that while the STEM workforce was in fact aging, with a projected 69.5% eligible to retire ten years in the future, they emphasized that being retirement eligible was very different than actually retiring. They found that both federal and STEM workers tend to retire about four years after they become retirement eligible, meaning that there is more time to correct any shortages than is usually thought. They found research stating that only about two percent of STEM workers left between June 2000 and December 2001 for a better opportunity elsewhere (Eitelberg and Lauter 2002). Of those who did leave for better opportunities, almost half were in their 30’s. During this eighteen month period, there were about 85,000 DoD STEM workers and 1,531 left. Fifty-six percent of workers left for better opportunities, and of those almost half were in their 30’s. Since it is impossible to retire from federal service in one’s 30’s, the most that could have retired and moved on to better opportunities is about 515. They note that the federal government simply hired older workers, so this would lead to what would appear as an aging workforce (Butz, Kelly et al. 2004).
As with the study on the acquisition workforce and the study interviewing managers in the early 1990’s, the dire problems predicted did not materialize. The expansion of the workforce after 9/11 helped increase the size of the workforce and cover shortages. Additionally, as the STEM workforce study noted, the predictions did not fully analyze the difference between actual retirements and retirement eligibility, nor did they account for the high hiring age. We learned from this wave of concern that careful analysis is essential and external events can have a much larger impact on the workforce than the specific characteristics of that workforce.

Current Concerns: 2008-Present

In March 2008, OPM conducted a study of federal employee retirement data. This is one of the few studies done by researchers outside of the RAND Corporation that attempts to project the civilian workforce into the future. Their projection is both more and less ambitious than the one we will perform with the Air Force civilians. It is more ambitious because it attempts to project retirement rates ten years into the future, and calculates retirement rates based on sex, occupational category, retirement system, and years since or until retirement eligibility. It is less ambitious because it does not try to project the size of the workforce, only the rates and numbers of retirements from one cohort over time. This means it does not take into account new hires or other types of separation. They base the retirement rates on the most recent two years of retirement data, while our analysis is based on the most recent five years. They then evaluate the past workforce retirement projections. Finally, they run a survival analysis of the people in the workforce between 1997 and 1999 to see how long they remain after they become retirement eligible. They find that the median employee retires four years after he or she becomes eligible, and that about 24% of the workforce stayed for longer than nine years after they become eligible to retire. This shows that while retirement eligibility numbers are important, workforce managers have some time to correct any possible shortages before actual shortages appear. The report does not make any recommendations (Office of Personnel Management 2008).

There are two important tables from this study. The first, shown here as Table 2.1, is a projection of retirements from FY2003-2006. Presumably, the rates of retirement are based on FY2000 and FY2001 data, but this is not explicitly stated. The actual retirement numbers from FY2003-2006 are included from OPM’s study. The second table, Table 2.2, is a projection of retirements in FY2007-2014 based on data from FY2005 and FY2006. For this table, we have supplied the actual retirement numbers from the FedScope database.

Table 2.1 shows projected retirements for FY2002-2006 and compares them to the number of actual retirements. The reader will notice that the projections were markedly off for the year 2002, which should have been the easiest to project because it was closest. To some extent, it was also off in 2003 and 2004, and then did reasonably well in 2005 and 2006. In 2002 and 2003 there was a recession as well as perhaps an increase in patriotic sentiment, which likely led to the dramatic overshoot in projections. This table shows the pitfalls of projecting workforces based on past trends, because trends can easily change.
Table 2.1: OPM Evaluation of Past Retirement Projections

<table>
<thead>
<tr>
<th>FY</th>
<th>Number of Predicted Retirements</th>
<th>Predicted Retirement Percentage</th>
<th>Number of Actual Retirements</th>
<th>Actual Retirement Percentage</th>
<th>Difference of Predicted and Actual Number of Retirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>51,011</td>
<td>3.4%</td>
<td>41,705</td>
<td>2.8%</td>
<td>9,306</td>
</tr>
<tr>
<td>2003</td>
<td>54,218</td>
<td>3.6%</td>
<td>50,240</td>
<td>3.4%</td>
<td>3,978</td>
</tr>
<tr>
<td>2004</td>
<td>56,850</td>
<td>3.8%</td>
<td>53,649</td>
<td>3.6%</td>
<td>3,001</td>
</tr>
<tr>
<td>2005</td>
<td>58,129</td>
<td>3.9%</td>
<td>59,609</td>
<td>4.0%</td>
<td>-1,480</td>
</tr>
<tr>
<td>2006</td>
<td>59,269</td>
<td>4.0%</td>
<td>57,649</td>
<td>3.9%</td>
<td>1,620</td>
</tr>
</tbody>
</table>

Source: An Analysis of Federal Employee Data, OPM.

Table 2.2 shows the projections for FY2007-2014 compared to the actual number of retirements according to FedScope. The second column, the predicted count of retirements, shows the number of retirements based on the data of FY2005 and FY2006 and the methodology described above. The number of actual retirements comes from the FedScope database for full-time non-seasonal federal civilian employees. The table allows us to analyze how well the OPM projections matched up to reality.

Table 2.2: Evaluation of Past Retirement Projections

<table>
<thead>
<tr>
<th>FY</th>
<th>Predicted Count of Retirements</th>
<th>Predicted Retirements as a Percent of End of FY 2006 Count</th>
<th>Number of Actual Retirements</th>
<th>Percent of the 2006 Workforce</th>
<th>Difference of Predicted and Actual Number of Retirements</th>
<th>Difference of Predicted and Actual Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>60741</td>
<td>3.9%</td>
<td>60162</td>
<td>3.8%</td>
<td>579</td>
<td>0.1%</td>
</tr>
<tr>
<td>2008</td>
<td>61702</td>
<td>3.9%</td>
<td>56985</td>
<td>3.6%</td>
<td>4717</td>
<td>0.3%</td>
</tr>
<tr>
<td>2009</td>
<td>62019</td>
<td>3.9%</td>
<td>44389</td>
<td>2.8%</td>
<td>17630</td>
<td>1.1%</td>
</tr>
<tr>
<td>2010</td>
<td>61748</td>
<td>3.9%</td>
<td>50827</td>
<td>3.2%</td>
<td>10921</td>
<td>0.7%</td>
</tr>
<tr>
<td>2011</td>
<td>60950</td>
<td>3.9%</td>
<td>62063</td>
<td>3.9%</td>
<td>-1113</td>
<td>0.0%</td>
</tr>
<tr>
<td>2012</td>
<td>59547</td>
<td>3.9%</td>
<td>66977</td>
<td>4.3%</td>
<td>-7430</td>
<td>-0.5%</td>
</tr>
<tr>
<td>2013</td>
<td>57839</td>
<td>3.7%</td>
<td>62719</td>
<td>4.0%</td>
<td>-4880</td>
<td>-0.3%</td>
</tr>
<tr>
<td>2014</td>
<td>55919</td>
<td>3.6%</td>
<td>66029</td>
<td>4.2%</td>
<td>-10098</td>
<td>-0.6%</td>
</tr>
</tbody>
</table>

Source: An Analysis of Federal Employee Data, OPM.

Clearly, this round of projecting did much worse than the first round. Part of the problem was the quite long range of these projections based only on data from FY2005 and FY2006. It is difficult to make accurate predictions of retirements based on almost ten-year old data, when any number of things may have changed about the relevant population. Another obvious problem is the Great Recession which dramatically reduced the number of retirements, especially in the fiscal years 2009 and 2010. The later numbers may also be impacted by the large amount of time
that has passed since the FY2006 workforce. which may mean employees hired after FY2006 make up some of those who have actually retired. This is not likely to be a large effect because the average age of new hires is around 36, meaning that there would be few hires since 2006 that would reach the minimum retirement age of 55 by 2014. An even smaller number of these employees would then also have the required time in service to retire at age 55.

We learn from the OPM projections the same things we have learned from other projections. The most important lesson is that external events can easily overtake projections based on trends. September 11th and the Great Recession both dramatically changed the number of retirements. However, outside of those events, projections can give a reasonable approximation of how many retirements there will be.

A Federal News Radio report from May of 2013 raises the question of why so many dire retirement wave projections have not turned out as expected. They answer with three reasons. One is that many of the projections were based on retirement eligibility projections, which are not the same as actual retirements. In our projections, we will avoid this by projecting actual separations. A second reason is that when a report says 30% of the workforce will be retirement eligible in the next five years, they are generally discussing 30% of the present workforce, which does not include all the younger workers that will have replaced the retired workers by the end of that projection.\(^8\) The final reason is that the financial crisis delayed a great deal of retirements (Moore 2013). Part 1 of the report ends with a quote from a benefits expert with the lobbying group for larger federal civilian pensions saying that there will not be a retirement wave because not everyone retires at once (Moore 2013). In Part 3 of the report, the author mentions that although fears of a retirement wave may be overstated, even a modest amount of retirements by people with critical skills and experience could lead to problems for some agencies (Moore 2013). This will be examined in detail in this dissertation.

A 2014 RAND report projected the Army’s civilian workforce, using an earlier version of the same stock-and-flow model we will be using for this dissertation. Hiring, separation and transfer rates over the past five years were calculated for the Army civilian workforce. They divided the Army civilian workforce up into years of retirement eligibility (YORE) by age, years of service, and retirement plan. Once grouped, the population could be aged, and rates of hiring, separation and transfer applied to each YORE group. The Army requested this study to see whether they were ready to face the upcoming drawdown in funding and personnel. Because the report only had data on new hires and separations through FY2012, the model only included one year of reduced hiring. This means that their projections found that if current hiring trends had continued, the Army workforce would have continued to grow dramatically as it had from 2007

\(^8\) For example, in the white-collar full-time permanent workforce, 32% of the FY2010 workforce would be retirement eligible in FY2015. Due to a combination of separations and new hires, however, the retirement eligible population as a percentage of the workforce in FY2015 was 15.9%.
to 2011. They did examine other scenarios and found that the Army could continue to hire at 75% of its previous rate to maintain the size of its civilian workforce. They also found that this rate should meet the required authorizations for the next five years. These are interesting results when compared with the dramatic warnings of skills and experience gaps and manpower shortages expressed in other studies. The report did not make any recommendations, but noted that the Army would need to reduce overall hiring to meet future targets. This did not mean that every command or occupation would need reduced hiring. Some needed to increase hiring. Only one command was projected to need active reductions in personnel to meet future targets (Nataraj, Hanser et al. 2014).

Factors that Lead to Increased Retention

In addition to the reports that made projections about the future, two studies by the RAND Corporation found factors that lead to increased retention in parts of the federal workforce.

The first, a 2014 RAND report, examined the retention and promotion of civilian defense acquisition workers. Specifically, it analyzed each cohort that entered between FY1998 and FY2005 and used the Cox proportional-hazard model to predict how education both before and during federal service and performance ratings would affect retention. The model is an exponential regression model. The study found that among individuals who entered the civilian acquisition workforce between FY1998 and FY2005, higher performance ratings were associated with lower retention, while having less than a bachelor’s degree also correlated with lower retention. Specifically, a one unit higher performance rating was associated with a ten percent larger hazard of separation in the lower grades. In the higher grades, a one unit higher performance rating was associated with a 53-66% increase in hazard of separation. The hazard of separation is the probability that an employee will separate at any given time. The report also found that on average, achieving a degree while in federal service increased retention. The authors of the study did not make any recommendations based on their findings (Guo, Hall-Partyka et al. 2014).

Another RAND Corporation study, entitled “The Effects of Workforce-Shaping Incentives on Civil Service Retirements: Evidence from the Department of Defense”, examined the effect of financial incentives on DoD civilians (Asch, Haider et al. 2003). This study used federal workforce data to design an econometric model that predicted retirements based on financial incentives. The researchers then applied this model to changes in retention allowances, early retirement incentives, and buyouts to predict their effects on retirements and separations. The model predicts that both early retirement incentives and retention allowances have an impact on the number of people that retire from the DoD. Both of these incentives had been used in the

---

9 Based purely on historical hiring, the authors of the RAND study expected the Army civilian workforce to expand from about 260,000 to about 275,000 from FY2013 to FY2015. In fact, it shrunk to about 250,000, and was close to their projection if hiring occurred at 50% of the historical level.
DoD in the recent past, but retention allowances, which would be of particular interest in a situation where there is concern about a skills or experience gap, were given to less than one percent of federal employees. Specifically, they found that the financial incentive to retire was decreased by 60% when the maximum retention bonus of 25% of one’s salary was offered (Asch, Haider et al. 2003). These allowances gave higher salaries to people with critical skills, but do not increase the retirement annuity, thereby creating an incentive to stay. However, because approval was required at high levels within the agency, low-level managers were less willing to offer retention bonuses. Additionally, the departments were generally downsizing, meaning such payouts were rarely used.

There are three important findings from these three waves of concern. The first is the difficulty of projecting the workforce based on past trends, mainly due to external shocks quickly outweighing previous trends. In the early 1990’s, downsizing at the DoD coupled with a recession made hiring when necessary relatively easy. In the early 2000’s, 9/11 and the following defense build-up gave the DoD the ability to restore its civilian workforce. The next finding is that the DoD and the federal government as a whole have responded to calls for greater flexibility and quality of life for federal workers. This includes offering locality pay and increased ability to offer training and education for better professional development. The third is the importance of making rigorous projections that are based on actual separations rather than top-level trends such as retirement eligibility and the age distribution of the workforce. The researcher needs to explore what is happening in hiring, retention and separations rather than staying at the top level of analysis. Next, we will examine the workforce characteristics during the past waves of concern to the present workforce.

### Trends in the Federal Workforce

In order to set the context of the historical analysis in the next chapter, we will review the recent trends and characteristics of the federal workforce. This section will also allow the reader to compare the age and years of service distribution of the workforce from the three waves of concern about retirements: late 1980’s, early 2000’s and late 2000’s. The workforce of the late 2000’s has a more similar age and years of service distribution to the workforce of the late 80’s and so should not be as concerning as the workforce of the early 2000’s.

First, in order to provide some context for the later comparisons, we compare the workforce of 1989 to the workforce of 2000. Figures 2.3 and 2.4 show how the DoD civilian workforce increased in median age and years of service between 1989 and 2000. Figure 2.2 shows the distribution of DoD civilians by age in 1989 and 2000. The red line shows the distribution in the year 1989 and the blue line shows the distribution in 2000. The y-axis is the number of employees and the x-axis is their age. The figure shows that the workforce became older and smaller between 1989 and 2000. There were fewer workers at every age except from 50 to 55. This caused a shift in the median age of the workforce from 41 to 46 years. Figure 2.3 is the
same as Figure 2.2, but shows the number of years of service along the x-axis instead of age. This figure shows that just as the median age increased, so had the median years of service.

**Figure 2.3: Distribution of DoD civilians by age, 1989 and 2000.**

**Figure 2.4: Distribution of DoD civilians by years of service, 1989 and 2000.**

Source: (The Acquisition 2005 Task Force 2000)
Figure 2.5 illustrates the aging of the DoD civilian workforce from 2000 to 2010. It shows that the distribution of age has become smoother since 2000, without such a large bulge in middle of the distribution. The blue columns represent the percentage of the DoD civilian workforce that was that age in September 2000. The red columns represent the same for September 2010. In 2010, there is a much higher percentage of workers who are 55 years or older. We see how that increase in the number of employees age 50-55 from 1989 to 2000 transitioned so that there is a larger percentage of workers between the ages of 60 and 64 in 2010. We also see that the workforce of 2010 is somewhat more evenly distributed than the workforce of 2000, with more young and old workers. The increase in younger workers is encouraging, but, as we will see below, was at a peak that has declined in subsequent years.

Figure 2.5: Distribution of the age of the DoD civilian workforce, 2000 and 2010.

The years of service distribution for 2000 and 2010 is shown below in Figure 2.5. The figure is laid out similarly to Figure 2.5, but instead of age, the x-axis is years of service. The distribution has changed so that there is now a much larger percentage of workers with fewer than ten years of service, and a slightly higher percentage of workers with more than twenty-five years of service. This makes the distribution in 2010 more like the distribution in 1989. This distribution seems to be less vulnerable to a retirement wave because of the high percentage of workers with few years of service.

Source: OPM Fedscope Database
A RAND report published in 2013 analyzes trends in the acquisition workforce. They project that about 4% of the DoD and acquisition workforce would become retirement eligible each year until about 2017. They found that there were low rates of attrition in both the acquisition workforce and the STEM occupations, which are a large component of the acquisition workforce (Gates, Roth et al. 2013).

An August 2013 Washington Post article stated that a wave of retirements was hitting the federal workforce. The writer worries that the retirees are not being properly replaced because federal government training and education budgets have been reduced. The article does note that Congress had recently approved a phased retirement program where workers could begin receiving retirement benefits while still working part-time to mentor new workers (Rein 2013). OPM states that these rules went into effect at the end of 2014 (Office of Personnel Management 2014). The DoD developed policies and procedures for this program effective June 21, 2016 (Levine 2016).

A Wall Street Journal article from 2014 raises questions about the federal government’s ability to attract and hire young workers. The article points out that the percentage of federal workers that are under 30 is the lowest it has been in eight years. It is also much lower than it was in the years before 2000 as shown in Figure 2.6.
In the same Wall Street Journal article, the writer noted an annual survey of undergraduates found that interest in working for the government had been declining for the past four years. Paul Light, author of a book on public service discussed above, believed that the hierarchy and bureaucracy in the federal government were driving away the recent college graduates. He also supposed the government shutdown caused recent graduates to no longer think of a government job as stable. (Feintzeig 2014).

An article from Federal News Radio published in 2014 tries to answer the question why the federal workforce has increased numbers of workers over the age of 60 and decreased numbers under the age of 30. The article says that turnover for young people is higher than it is for older workers, but that this is typical of younger workers. What is not typical is the recent collapse in hiring of young people, which the article states, is down almost 55% from 2009 to 2013. They provide three reasons for this. The first is that young workers are less interested in a federal career. The second is that budget cuts have led agencies to have less entry-level jobs available, and the third is that there are few federal programs for hiring recent college graduates. The writer then speculates that if these trends continue there could be a serious retirement wave in the future, even if previous predictions of a retirement wave have not been fulfilled (Neal 2014).

Another article by the same author delves into the numbers at the highest grades. He finds that the number of workers in grades GS-13 through 15 has increased substantially since 1998, with all of these grades enjoying faster rates of growth than the federal civilian workforce as a whole. Unsurprisingly, these workers also tend to be older than they were in 1998. Perhaps more surprisingly, they also tend to have fewer years of service than their counterparts from 1998, with an average decrease of more than two years of service. These numbers are concerning for two reasons. One is that the federal workforce may be a victim of grade inflation, meaning that there is now less opportunity to make a career in the federal workforce where one is promoted over time. Instead, a worker is hired in at a high grade and then stays there his or her whole
career. The other is that the increased age at the higher grades may lead to a retirement wave that is more serious at the high grades than across the federal workforce (Neal 2014).

Finally, for context, we present the numbers on types of separations in the full-time permanent Air Force civilian workforce over the past five fiscal years. These numbers are presented in Table 2.3. The top row below the fiscal year shows the total number of full-time permanent civilian employees of the Air Force. The row below that shows the number of separations of employees from that workforce. The fifth row shows the number of retirements from that workforce. This table illustrates that 49.7% of separations from the full-time permanent workforce over the past five fiscal years have been retirements. Retirements have a large impact on the number of separations each year, but they do not completely account for changes in the number of separations in the Air Force.

Table 2.3: Separations and retirements from the full-time permanent Air Force civilian workforce.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>FY 2011</th>
<th>FY 2012</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total workforce (end of FY)</td>
<td>166,560</td>
<td>161,712</td>
<td>159,614</td>
<td>156,304</td>
<td>156,743</td>
</tr>
<tr>
<td>Total separations</td>
<td>9,204</td>
<td>12,542</td>
<td>10,228</td>
<td>10,437</td>
<td>10,525</td>
</tr>
<tr>
<td>Quit</td>
<td>3,396</td>
<td>3,820</td>
<td>3,995</td>
<td>3,922</td>
<td>4,076</td>
</tr>
<tr>
<td>Retirement</td>
<td>4,495</td>
<td>7,413</td>
<td>4,484</td>
<td>5,017</td>
<td>4,885</td>
</tr>
<tr>
<td>Reduction in Force (RIF)</td>
<td>96</td>
<td>21</td>
<td>50</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>Termination or Removal</td>
<td>958</td>
<td>1,023</td>
<td>1,436</td>
<td>1,226</td>
<td>1,297</td>
</tr>
<tr>
<td>Death</td>
<td>257</td>
<td>265</td>
<td>263</td>
<td>242</td>
<td>234</td>
</tr>
</tbody>
</table>

SOURCE: OPM FedScope Database.

The characteristics and trends of the DoD and federal civilian workforce show that while the workforce in some ways was healthier in 2010 than it was in 2000, there are still a number of concerning factors. The first is the decline in the number of young workers in the federal government, which could mean that it will be more difficult to replace old workers than it was in the past. The second is the higher percentage of workers who are older than 55. These workers are always at the highest risk of retiring. Along with the fact that most of these workers are in the highest grades, this could be a serious issue even if it was easy to hire young workers. We will examine each of these issues for the Air Force civilian workforce below.

Summary

The DoD and Air Force civilian workforces are complex entities that may be in danger of being hit with a retirement wave. While past projections have often overstated the danger of changing workforce demographics, this time may be the exception as there has not been much of an external shock and there has been a decreasing number of young workers. The first two waves turned out to be little more than ripples. One of the main questions this dissertation seeks to answer is whether the third will turn out the same. The federal government has made some
progress in preparing and preventing a retirement crisis, but more could be done. With this in mind, we will examine the Air Force civilian workforce of the past five years in close detail.
Chapter Three: Historical Analysis

Now that the requisite background has been built, we will explore the most recent data on the Air Force civilian workforce. We will examine the workforce using four different levels of analysis. First, we will describe the Air Force civilian workforce as a whole. This will be followed by analysis of the white-collar workforce. We will then proceed to describe the selected mission critical occupations (MCO’s). The chosen MCO’s are those that have drawn concerned attention in the past. After surveying the MCO’s we will describe the grades of the Air Force civilian workforce. The results of these examinations will form the basis of the projections to be presented in the next chapter.

The Air Force Civilian Workforce

Overview

We will first examine the recent trends in the Air Force civilian workforce as a whole including all full- and part-time, permanent and non-permanent, and blue- and white-collar workers. The primary source for this analysis is Air Force Personnel Center (AFPC) data that provides a snapshot of the workforce at the beginning of the month of September each year. Table 3.1 below shows the breakdown of these employees into categories that will be used in the charts and figures that follow. The charts and figures that follow will include the entire accounted workforce, which are all of the FERS and CSRS employees that can be assigned a YORE, and all of the employees on other retirement plans. YORE is based on both age and years of service, so both a birthdate and service computation date are required. The most common reason a YORE is missing is because the data do not contain the service computation date used to calculate years of service. The total workforce number in Table 3.1 is the total number of employees in the AFPC database, while the accounted workforce is the total number of employees that will be shown in Figures 3.2 and 3.3. Each of the following pairs of figure and table will show the level of analysis’s respective accounted workforce.

10 The service computation date is generally the date the employee entered the federal civilian workforce, but can sometimes be earlier if the employee has previous military service that can count towards his or her years of service.
Table 3.1: Air Force civilian workforce characteristics end of FY2010-2015.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FERS Employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With Date(s)</td>
<td>128,442</td>
<td>138,122</td>
<td>136,600</td>
<td>135,281</td>
<td>133,464</td>
<td>136,238</td>
</tr>
<tr>
<td>Without Date(s)</td>
<td>38</td>
<td>41</td>
<td>26</td>
<td>23</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>CSRS Employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With Date(s)</td>
<td>18,610</td>
<td>16,626</td>
<td>12,721</td>
<td>10,885</td>
<td>9,037</td>
<td>7,520</td>
</tr>
<tr>
<td>Without Date(s)</td>
<td>5,875</td>
<td>5,534</td>
<td>5,716</td>
<td>5,584</td>
<td>5,475</td>
<td>5,399</td>
</tr>
<tr>
<td>Other Employees</td>
<td>36,127</td>
<td>33,536</td>
<td>31,529</td>
<td>30,074</td>
<td>29,776</td>
<td>28,732</td>
</tr>
<tr>
<td>Total Workforce</td>
<td>189,092</td>
<td>193,859</td>
<td>186,592</td>
<td>181,847</td>
<td>177,774</td>
<td>177,906</td>
</tr>
<tr>
<td>Total Accounted Workforce</td>
<td>183,179</td>
<td>188,284</td>
<td>180,850</td>
<td>176,240</td>
<td>172,277</td>
<td>172,490</td>
</tr>
</tbody>
</table>

It is also important to note whether the Air Force was intentionally shrinking or growing during this time period. Figure 3.1 shows the requested and enacted end-strengths in each fiscal year. The enacted end-strengths are lower than the first three years of Table 5.1, but are then higher for the last three years. This suggests that the Air Force has struggled to hire as many workers as it is authorized since FY2013. However this is contradicted by the deputy chief of staff for manpower, personnel and services. She states, “Voluntary efforts to balance the civilian workforce since fiscal year 2014 have moved us significantly closer to our target manning levels” (Secretary of the Air Force Public Affairs 2016). This implies that the Air Force is continuing to reduce end-strength in spite of the numbers reported in the budget documents. Figure 3.1 also suggests that the increased separations during FY2012 were partially due to early-retirement and buyout programs the Air Force implemented. Early-retirement programs were offered to civilians over age 50 with 20 years of service or to anyone with more than 25 years of service (Gildea 2011). Severance pay packages varied based on the employee, but could be as large as $25,000 (Gildea 2011). As noted above, these programs continued, although at a smaller scale since FY2012 (Secretary of the Air Force Public Affairs 2016).
Before we begin to talk about the trends in the overall workforce, we will discuss what the new hires and separations bars in Figure 3.2 represent. The red separations column shows the number of workers who are in the workforce at the beginning of the fiscal year, but are no longer in the workforce at the end of the fiscal year. This number includes only the accounted workforce. The blue new hires column shows the total number of employees that are in the workforce at the end of the fiscal year, but not at the beginning. The number under “New Hires” is more inclusive than the “Separations” since all newly hired employees are assigned a YORE. Three conditions are considered. First, if a calculation date is available, that is used to calculate the YORE. If it is not available, we check to see if a prior military service date is available and use that to calculate the YORE. Finally, if neither of these dates is available, we simply assign the YORE to 0 years.

In Figure 3.2 below, the blue columns represent the number of new hires that occurred each fiscal year for the overall workforce, while the separations are represented by the red columns below. We will use charts like this throughout this paper as we examine subgroups of the Air Force civilian workforce. The workforce at the end of FY2015 is smaller than it was at the end of FY2010. However, in the interim it grew and then shrank significantly. Figure 3.2 shows that the reduction in the workforce was mainly accomplished by reducing new hires into the workforce. The number of separations stays about the same throughout the time period, while the number of new hires varies according to whether the workforce is growing or shrinking.
Figure 3.3 compares the YORE distribution of the Air Force civilian workforce at the end of FY2010 to the end of FY2015. As a reminder, someone with a YORE of -7 has seven years until he or she is eligible to retire, while a YORE of +7 would represent someone who has been eligible for the past seven years. A YORE of 0 means someone who will be retirement eligible during the current fiscal year. The comparison shows that the Air Force civilian workforce has grown older over this time period. Each group with fewer than ten years until retirement eligibility has increased as a percentage of the workforce. The largest decrease has occurred in the -11 to -20 YORE group. If the workforce continues to shrink, the workforce may continue to age, raising the concern of a possible retirement wave.

Now that we have examined the trends and characteristics of the Air Force civilian workforce, we will examine the full-time permanent white-collar workforce. This workforce is
important because these are more likely to be the career civil servants that are the main focus of concerns about the federal workforce. They include all of the mission critical occupations, and exclude all of the temporary employees that are unlikely to work long enough to earn retirement. This allows us to focus on where an aging workforce would be most serious.

The White-Collar Full-time Permanent Workforce

This workforce generally contains far fewer employees in the FERS or CSRS retirement plans that do not have a calculation date. For example, in Table 3.2, only thirteen out of more than 100,000 employees did not have a calculation date. This is a vanishingly small number of employees for which we cannot calculate a YORE. So, we are able to essentially examine the entire full-time permanent white-collar workforce.

Table 3.2: Air Force white-collar full-time permanent workforce characteristics FY2010-2016.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FERS Employees</td>
<td>With Date(s)</td>
<td>97,054</td>
<td>105,219</td>
<td>104,466</td>
<td>104,549</td>
<td>103,368</td>
</tr>
<tr>
<td></td>
<td>Without Date(s)</td>
<td>5</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CSRS Employees</td>
<td>With Date(s)</td>
<td>14,704</td>
<td>13,121</td>
<td>10,152</td>
<td>8,770</td>
<td>7,346</td>
</tr>
<tr>
<td></td>
<td>Without Date(s)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other Employees</td>
<td></td>
<td>8,412</td>
<td>7,158</td>
<td>6,659</td>
<td>6,292</td>
<td>6,404</td>
</tr>
<tr>
<td>Total Workforce</td>
<td></td>
<td>120,175</td>
<td>125,506</td>
<td>121,277</td>
<td>119,611</td>
<td>117,118</td>
</tr>
<tr>
<td>Total Accounted Workforce</td>
<td></td>
<td>120,170</td>
<td>125,498</td>
<td>121,277</td>
<td>119,611</td>
<td>117,118</td>
</tr>
</tbody>
</table>

In Figure 3.4, we calculate the workers flows of this portion of the Air Force civilian workforce. Figure 3.4 introduces the concept of the switch in and switch out. Switch in are those that, at the beginning of the fiscal year, are among the Air Force civilian workforce, but outside the specific level of analysis under investigation. During the year, these employees are brought into our level of analysis by changing career field for example. Switches out are those that were in the workforce level of analysis. During the year, these employees leave the level of analysis but stay in the Air Force civilian workforce by changing career fields for example. Figure 3.4 shows that many more employees switch into the white-collar workforce, but switching as a whole makes up a relatively small portion of the additions and subtractions to the workforce. Figure 3.4 also shows that the white-collar workforce showed the same trends as the workforce as a whole, but with fewer cuts. At the end of FY2013, the white-collar workforce was larger than it was at the end of FY2010, unlike the civilian workforce as a whole. Similarly, the white-collar workforce at the end of FY2015 was not much smaller than at the end of FY2010. Once again, we see separations remain fairly constant while hiring varies according to whether the workforce is shrinking or growing.
Figure 3.4: Air Force white-collar full-time permanent worker flows.

Figure 3.5 compares the YORE distribution of the white-collar full-time permanent force at the end of FY2015 and FY2010. The trends are similar to the workforce as a whole, but with more aging at the higher YORE’s. All YORE’s with fewer than ten years until retirement eligibility have increased as a percentage of the workforce since FY2010. The largest decrease is in the YORE -11 to -20 range, this will affect the projections for the white collar force as we will see in Chapter Four.

Figure 3.5: Air Force full-time permanent white-collar workforce age distribution end of FY2010 and 2015.

While the white-collar full-time permanent force as a whole has experienced somewhat of a rise in those employees that are retirement eligible and a decline in younger workers, of
particular concern are the civilian workforce characteristics within the MCO’s. We next examine a sample of these MCO’s.

**Specific MCOs**

Mission critical occupations are the thirty-two occupations that the DoD has decided are “critical to the success of meeting the DOD mission in functional communities” (Department of Defense 2013). Based on previous research, the occupations that are most concerning from past drawdowns are the STEM occupations (Butz, Kelly et al. 2004), the acquisitions occupations (Gill 2001), and the human resources occupations (Light 1999). We have included a sample of all of these MCO’s. We also included the auditing occupation because of its projected decline.

To gain perspective on the size of these MCO’s, we present Figure 3.6. This figure shows the size of each of the selected MCO’s from the end of FY2010 to the end of FY2015. First note that contracting, IT, and electronics engineering are the three largest occupations we examine by far. The human resources occupation is medium sized, and auditing and computer engineering are small occupations. Nuclear engineering, which as of the end of FY2015 had eighteen members, is so small it is barely noticeable on the chart. Different sizes of occupations should concern policymakers for different reasons. A large occupation might be difficult to fill if it has shortages. Furthermore, these shortages might impact the entire white-collar force if the shortage is large enough. However, a tiny occupation such as nuclear engineering may also be concerning. Although a shortage may not have much of an effect on the white-collar force as a whole, only a few people could decide to retire and impact the career field dramatically.

Figure 3.6 also shows the trends in each of the occupations. Contracting, electronics engineering and IT have all grown, with IT increasing by more than 15% during FY2010. The auditing and human resources occupations have shrunk, and computer engineering has stayed about the same size. Nuclear engineering has grown. The auditing and human resources occupations may be the most concerning because they have been shrinking, but we will see that each occupation has its own issues when we explore them in more detail.
Figure 3.7 shows the changes in each occupation and the white-collar workforce as a whole in each fiscal year from FY2011 to FY2015. The largest changes occur in the nuclear engineering force, but this is to be expected because each person leaving or entering the occupation would have a significant impact on its size. More impressive is the change in the IT workforce during FY2011. This is one of the larger occupations we examine, and yet it has one of the biggest changes in percentage terms, increasing its size by more than 15%. Figure 3.7 also shows the general trends in the various occupations: increasing in FY2011, decreasing in FY2012-2014, then rebounding in FY2015. The exceptions will be discussed when we explore the individual occupations in more detail.
Now that we have some perspective on the selected MCO’s as a whole, we will next explore them individually in more detail. The first occupation we will explore is contracting. The contracting workforce has followed the same pattern of growth and then decline. However, the decline in the contracting workforce ended during FY2013 and growth resumed, so that the contracting workforce is the largest it has been in the past five years. Figure 3.8 shows this growth has come from increasing new hires, separations staying relatively constant and switches in consistently outnumbering switches out.
Figure 3.9 shows the age distribution change in the contracting occupation between the end of FY2010 and FY2015. The increase in retirement eligible workers is the same as the whole white-collar workforce, but there has also been a marked increase in the youngest contracting workers. They have expanded from 25.5% of the occupation at the beginning of FY2010 to 32% at the beginning of FY2015. This means that the contracting workforce should be well-equipped in the long-term for dealing with the increase in retirement eligible members. However, it is also apparent that there has been a steep drop in the number of contracting workers with between one and five years until retirement. This is an important point to remember when we analyze the contracting projections.

Figure 3.9: Air Force contracting occupation YORE distribution end of FY2010 and FY2015.

The in-flows and out-flows of the next largest occupation, IT, are shown in Figure 3.10. The IT workforce saw explosive growth in its workforce during FY2011. It continued to grow during FY2012 and 13, unlike the white-collar workforce as a whole. Since FY2011, growth in the workforce has been entirely due to switches in outnumbering switches out. Hiring into this occupation has been sharply curtailed since 2011.
Figure 3.10: Air Force IT occupation worker flows.

Figure 3.11 shows the age distribution of the IT workforce at the end of FY2010 and FY2015. The largest changes have occurred in the -11 to -20 YORE range and the -6 to -10 YORE range. The reduction in the -11 to -20 YORE range is concerning if the IT workforce only hires to maintain its size in the coming years as we will see in Chapter Four.

Figure 3.11: Air Force IT YORE distribution end of FY2010 and FY2015.

The next largest occupation is a STEM occupation, electronics engineering. Figure 3.12 shows the worker flows in and out of this occupation. The electronics engineering workforce shows some similarities and some differences compared to the white-collar workforce. Perhaps the most surprising is the decline in this occupation did not begin until FY2014. It grew during
FY2012, and then stayed the same during FY2013. Switches in and out of this occupation are also relatively static and close to parity with each other.

**Figure 3.12: Air Force electronics engineering occupation worker flows.**

Figure 3.13 shows the age distribution of the electronics engineering occupation at end of FY2010 and FY2015. The shift in the distribution of the age of the workforce is similar to the computer engineering field. There are now a higher proportion of workers with more than twenty years until retirement, but a far smaller proportion have between six and twenty years until retirement. The proportion of employees who have less than six years until retirement is higher as well. This distribution of workers could lead to a bathtub effect where there are not enough young workers to fill in the gaps, because the mid-career worker pool is so small.

**Figure 3.13: Air Force electronics engineering occupation YORE distribution end of FY2010 and FY2015.**
The human resources occupation is a medium size occupation and its flows are shown in Figure 3.14. The human resources occupation has seen a more extreme decline than the white-collar workforce as a whole, with fewer people working in the occupation at the beginning of FY2015 than at the beginning of FY2010. The decline was so steep because there were three years where hiring was averaging less than half of its peak. The number of new hires during FY2015 and slight increase in the size of the workforce indicates that the career field may be aware of this issue, which bodes well for the future. Another positive indicator is that switches in are consistently greater than the switches out.

![Figure 3.14: Air Force human resources occupation worker flows.](image)

Figure 3.14 shows the age distribution of the human resources occupation at end of FY2010 and FY2015. The career field also appears to be older than it was at the end of FY2010, although the number of workers with more than twenty years until retirement has increased. All of these factors indicate that the human resources career field may be in danger of a decline if current trends continue. Additionally, there is the danger of a gap in the mid-YORE ranges as there are far fewer workers with between eleven and twenty years until they become retirement eligible.
The in-flows and out-flows of the auditing occupation are shown in Figure 3.16. It is easy to see why this career field is facing a projected decline. For three fiscal years, almost no one was hired. In FY2015, hiring reached its highest level in five years, but still more people separated than were hired. Switches are net positive for the career field, but they are only a fraction of the number of people separating.

Figure 3.17 shows the age distribution of the auditing occupation at the end of FY2010 and FY2015. While there are fewer retirement eligible auditing employees than at the end of FY2010, there is also a much larger percentage of workers close to retirement. This could exacerbate the shrinking of the workforce in the near future.
The next occupation is computer engineering, another small MCO. Its worker flows are shown in Figure 3.18. The number of employees in this occupation follows the same pattern as the overall workforce and white-collar workforce as a whole: growth until the end of FY2012, then decline. However, growth was stagnant during FY2012. Most of the decline was once again due to a reduction in new hires. Switches in and out have stayed relatively steady with switches out tending to outnumber switches in.

Figure 3.18: Air Force computer engineering occupation worker flows.

Figure 3.19 compares the YORE distribution of the computer engineering occupation at the end of FY2010 and FY2015. The distribution of the workforce shows one that has many more retirement eligible employees, and far fewer workers with between ten and twenty years until
they are retirement eligible. This means the occupation could face gaps in the mid-level workers as this far smaller pool of employees ages.

**Figure 3.19: Air Force computer engineering occupation YORE distribution end of FY2010 and FY2015.**

The final mission critical occupation we will examine is the nuclear engineering occupation. Its worker flows are shown in Figure 3.20. This occupation is so small that we will not be able to project this occupation. However, the past five years can give us some information on the state of this workforce. This occupation has consistently grown between FY2010 and FY2014 no matter the condition of the overall white-collar workforce. The only concerning thing about this workforce is the large number of switches out during FY2015, which led to a decline in the size of the workforce.
The distribution of workers, compared between the end of FY2010 and FY 2015 in Figure 3.21, appears healthy. There are a large number with more than twenty years until retirement eligibility and no one with more than five years since they became retirement eligible.

For context, we also examined the nuclear engineering occupation from ten years earlier, FY2003-2005. There are about twice as many nuclear engineering employees today than there were in the early 2000’s. All but one of the workers in the early 2000’s had more than ten years until they were eligible to retire, so the workforce is older today.

The examination of the whole workforce, the white-collar workforce, and the selected MCO’s has shown that the Air Force did not have trouble hiring new civilians during FY2010 and 2011, made few hires during FY2012-14, and has since increased hiring. There does not
seem to be evidence of a mounting retirement wave in any of the groups examined because hiring has mostly been able to replace the people who have retired. There will continue to be large declines in the auditing workforce if current trends continue. Additionally, there are likely future gaps at certain age and experience levels in many of the MCO’s.

Grade Characteristics

In order to capture the full effect of the possible gaps in the workforce, we also examined the grades as a whole, to see if there was any danger of a more serious crisis at the higher grades. It is often difficult to hire into the high grades. This analysis is done by dividing the white-collar workforce into four groups: entry, mid, senior and executive level workers. We will see that the number of entry-level employees has declined in the last five years due to the number of employees transferring from these jobs not being replaced by new hires. The number of mid-level workers has expanded slightly, while the number of senior and executive level workers has declined. The declines in the senior and executive level workforces is concerning and will be examined in more detail in the projections.

This analysis was somewhat complicated by the use of the National Security Personnel System (NSPS) during the past five years. This system banded together a number of General Schedule (GS) grades, and so makes it difficult to use the RIM and have the fine level of detail provided by the GS scale. In order to avoid the problem of constantly trying to determine whether someone was really a GS-14 or GS-15 when they were the highest NSPS grade, Susan Gates and other researchers at RAND developed a four-tiered system that breaks the workforce up into entry-level, mid-level, senior-level, and executive level workers. The entry-level workers correspond to GS-1 through GS-8, mid-level to GS-9 to GS-13, senior-level to GS-14 and -15 and executive level to the Senior Executive Service. The exact details of the division scheme are contained in the appendix.11

First, we will provide an overview of the different grades over time. Figure 3.22 shows the number of employees at each grade level from the end of FY2010 to the end of FY2015. We notice that the majority of white-collar workers are in the mid-level grades. The entry-level grades are about twice as large a group as the senior level grades, while the executives are a very small portion of the total. The mid-level grades have grown the most since FY2010, while the entry-level grades have shrunk. The senior level and executive grades have remained about the same size.

---

11 The only old grade that really caused difficulty was the IA-4 grade, which split almost exactly in to the GS-13 and GS-14 grades. During FY2011, 914 IA-4’s became GS-14’s and 1,184 became GS-13’s. To resolve this, we counted IA-4’s in both the senior and mid-level workforces. We then removed the IA-4’s from the switch counts, so this would not throw off the switch count for the projections.
Now that the overall size of the four different grade levels is clear, we will examine each in more detail, beginning with the entry level workers. Figure 3.23 shows the in-flows and out-flows to the entry level grades. Figure 3.23 shows something unique to the entry level workforce: a decline already during FY2011. This is followed by a large drop during FY2012, followed by reductions in FY2013 and 14 as well. As we would expect for entry-level grades, there are far more switches out than switches in. New hires were not even matching separations for three fiscal years, which is certainly going to lead to a declining workforce.

Figure 3.24 compares the entry level workforce YORE distribution at the end of FY2010 to the end of FY2015. The entry level workforce is clearly becoming older. This indicates that the trend away from entry level work in the federal government is continuing.
Figure 3.24: Air Force entry level (GS 1-8) YORE distribution end of FY2010 and FY2015.

Figure 3.25 shows the in-flows and out-flows of the mid-level workforce. Its hiring and separations trends reflect those of the white collar workforce as a whole. There was a large reduction in hiring during FY2012 that stayed relatively constant until hiring increased in FY2015. Separations stayed relatively constant except during FY2012. Switches out have been relatively small since FY2012, which means there could be a reduction in promotion availability. Switches in have consistently outnumbered switches out.

Figure 3.25: Air Force mid-level (GS 9-13) worker flows.

Figure 3.26 compares the YORE distribution at the end of FY2010 and FY2015. The YORE distribution trend also is similar to the white-collar workforce as a whole, with the middle three categories making up a smaller percentage of the workforce, but the youngest and oldest making up a larger percentage.
Figure 3.26: Air Force mid-level (GS 9-13) YORE distribution end of FY2010 and FY2015.

Figure 3.27 shows the in-flows and out-flows of the senior level workforce from FY2011 to FY2015. The senior level workforce is the part of the workforce that corresponds to GS-14 and -15. The senior level workforce is smaller than it was at the beginning of FY2010. It also grew during FY2013, both of which make it different from the white-collar workforce as a whole. Separations have been relatively constant except for the spike during FY2012. Switches out have been constant since FY2011, which is not a good baseline because of the large number of people still transitioning from NSPS-type pay plans. New hires have declined dramatically since FY2011, but since then have been relatively steady. Switches in fluctuate between 400 and 700 and may represent different waves of promotion.

Figure 3.27: Air Force senior-level (GS 14-15) worker flows.
Figure 3.28 shows the YORE distribution of the senior-level grades at the end of FY2010 and FY2015. This workforce is much older than the white-collar workforce as a whole. Since FY2010, it is uniformly older as well.

Figure 3.28: Air Force senior-level (GS 14-15) YORE distributions end of FY2010 and FY2015.

Finally, we will examine the executive service, which is a much smaller part of the workforce. Figure 3.29 shows the in-flows and out-flows to this workforce. The executive grades also follow the pattern of the workforce as a whole, but with a more dramatic decline during FY2014. There was a substantial increase in switches in in FY2015. New hires also increased to the largest level in five years.

Figure 3.29: Air Force executive level (SES) worker flows.
Figure 3.30 shows the age distribution of the executive workforce at the end of FY2010 and FY2015. This workforce is much older than any of the others, but this has been fairly constant since FY2010. There do not appear to be any concerning issues with this workforce.

Figure 3.30: Air Force executive level (SES) YORE distribution end of FY2010 and FY2015.

The examination of the four grade groups shows that there may be something to the concern about the senior level workers as they have slightly declined over the past five years. The senior level grades have become older over the past five years as well. The mid-level workforce seems to be healthy with a slight expansion. The entry-level workforce has continued to decline as the Air Force civilian workforce continues to transition to a more professional and educated workforce.

Summary

The past five years of data on the Air Force civilian workforce shows little evidence of an imminent retirement wave, but does show the possibility of gaps in certain occupations or grades, especially at certain levels of experience. Additionally, the auditing occupation will continue its steep decline in employees if hiring is not increased. None of the grade groups are showing dramatic declines or seem to be unable to hire new workers, but the senior level workforce is becoming older and smaller. To gain more precise insight into the possibility of gaps and where they might form in the workforce, we will examine the projections for the next ten years in the following chapter.
Chapter Four: Projections

We completed projections for each of the levels of analysis: whole workforce, white-collar workforce, selected MCO’s, and grades. We found that there is unlikely to be a shortage at any of the levels of analysis, but that there are likely to be gaps at certain YORE’s in many of the occupations. This is illustrated through three projections. Two are supply constrained projections and one is demand restricted. The two supply constrained projections are based on the highest and lowest number of hires over the past five years. In the demand projection, the Air Force hires exactly the number of employees who separate that year with new hires distributed according to the average distribution of the past five years. This gives some sense of the range of possible outcomes for the next ten years. In addition to the projections, charts of the workforce today compared to the workforce of ten years ago show why gaps are likely.

Assumptions

Before we detail the RAND Inventory Model (RIM), we will describe the assumptions used to make inputs to the model. Separations are employees whose random unique identifier is present in one year and not the next. New hires are just the opposite: employees whose random unique identifier is present in one year and not the previous. Transfers are people who are coded as being in or outside of the level of analysis at the beginning of the year, are coded the opposite at the end of the year, but are still in the Air Force civilian workforce. They are referred to in the model as switches in and switches out. So if the level of analysis is the contracting occupation, transfers out are employees who are in the contracting occupation at the beginning of the year, are not at the end of the year, but remain in the Air Force civilian workforce the entire time.

The model also assumes that the service computation date (the date from which years of service are calculated) stays the same throughout an employee’s career. A sample of the full-time permanent white-collar workforce that was in the FERS retirement plan at the beginning of FY2011 and 2012 showed that 1503 out of 89866 employees had service computation dates that changed. This is less than 1.7% of these employees.

Methodology

The projections for the Air Force civilian workforce as a whole, white-collar workforce, mission critical occupations (MCO) and grade levels are created in the RIM. This is a stock and flow model that models groups of workers according to their retirement plan and YORE.

To implement this model we first cleaned the data and added indicator variables. The most important variables that are in the raw data set include age, service computation date, and retirement plan. In any situation where more detail is needed, other variables become important,
such as occupational code, for determining occupation or whether a worker is white-collar, or pay plan and grade, for identifying whether a worker is entry, mid-, senior or executive level. Using these variables, we then add a variable that indicates how many years relative to retirement the individual has. We next count how many of each type of person is in the data set. For example, there were 1477 Air Force civilian workers in the FERS retirement plan with thirty years left until they were eligible to retire at the beginning of FY 2010. We use SAS to count the number of new hires and separations. For situations where we are not examining the Air Force civilian workforce as a whole, we use the program to count how many people switch both in and out from one year to the next from other parts of the workforce. These counts of people are put into an .xml file that is then read by the Excel workbook that actually creates the RIM.

The RIM then creates projections using a four-step process, as elaborated in “The RAND Inventory Model: A User Guide for the DoD Acquisition Workforce”. These steps are then repeated for each year out to ten years into the future. Before it begins the steps, the RIM averages the rates for new hires, separations, and transfers if necessary over the previous five years. The model uses five years because this strikes a balance between including data that is so old that it is no longer relevant and not capturing enough data to account for variation from year to year. Once the model begins to make projections about the future, the first step is to age the current population. This means that everyone in the baseline population for the previous year is moved into the next higher YORE. A person with a YORE of -7 at the beginning of FY 2015 will have a YORE of -6 at the beginning of FY 2016. This aging process only applies to the employees in the two main retirement plans. Employees in any other retirement plan are gathered together in the “other” category and not assigned a YORE, because they are often not full-time permanent workers. Additionally, a large amount of workers in the “other” retirement plan do not even have a YORE because there is no service computation date in the raw data for these employees.

The next step in the process is to remove the employees who are projected to separate. For the FERS and CSRS employees, the rate of separation is calculated according to YORE and retirement plan. This rate is then applied to the previous distribution of the workforce and removed. For example, there were 89 employees with thirty-five years until retirement at the beginning of FY 2015 in the FERS retirement plan. The rate at which these employees separate is 0.122, so 78 of these workers will appear with a YORE of -34 at the beginning of FY 2016. The continuation rate is the rate at which workers stay in the workforce, and in this example is 0.878. For workers in the Other retirement plans, the rate is calculated for the workforce as a whole rather than by YORE.

During this step, the model also takes into account those workers that transfer out of the level of analysis, but remain in the Air Force civilian workforce. The switch-out rate is calculated in exactly the same way as the separation rate, and is subtracted from the continuation rate.

The projections also account for plan transfers. These are the employees who transfer from one retirement plan to another. The plan transfers are assumed to take place between the FERS
plan on the one hand and the CSRS and Other retirement plans on the other. First the rate of transfers out of these plans is calculated using the separation, new hire, switch in and switch out rates of the other and CSRS plans and comparing that number to the next year’s baseline population. The difference between the current year and the next year which cannot be accounted for through switches in and out, separation or new hires is the number of transfers. The number of transfers is then divided by the total number of CSRS employees to make a rate. This rate is then multiplied by the total number of employees in these plans in the previous year for the projection. The numbers of transfers out for the CSRS and Other retirement plans are then the number of employees who transfer in to the FERS retirement plan. This addition occurs before new hires are added.

Switches in are calculated in the same way as switches out and separations. Based on previous years’ hiring and baseline populations, a rate of switching in is calculated. This rate is then multiplied by the population after separations, switches out, and plan transfers have been calculated. Once again, these rates are calculated for each YORE for the FERS and CSRS plans and are calculated for the total number of employees in the Other retirement plans.

There will be three projections of new hires for each level of analysis. The first will be demand-driven, assuming that the Air Force civilian career field managers will always hire to keep the size of the workforce the same. The next two will be a high and a low supply-constrained case. The high case will be the number of workers hired if the highest number of hires from the past five years is hired every year, and the low-case will be if the lowest number of workers is hired every year.

The RIM then projects the workforce into the future. It calculates the future workforce based on historical levels of hiring, separations, and switches. The only exception is the Other retirement workforce for the high hiring case of the overall workforce. In this projection, the Other workers are hired at the exact same number that separate. This is a high hiring rate for the Other workers because they are a shrinking part of the Air Force civilian workforce.

While the RIM used in this dissertation is very much like the RIM used in other RAND reports, we have made some modifications. The first one is to allow the RIM to be compatible with AFPC data. The RIM programs were designed for the DoD civilian files, which use different variable names than the AFPC files. The most significant change we made was to allow the model to be used with the four grade levels. This allows us to examine the trends in the grade levels to an unprecedented degree. Finally, the hiring models were all created for this dissertation. The original RIM allows the user to specify an end-strength, but does not allow for a constant hiring model. We modified the model to use constant hiring for the low and high hiring cases. The first projection we will see is the Air Force civilian workforce as a whole.
Projection Results

Air Force Civilian Workforce

Figure 4.1 shows the projection for the Air Force civilian workforce as a whole for FY2020. The x-axis contains five year groups of YORE from farthest away until retirement eligibility to far past retirement eligibility. The y-axis shows the number of workers. The purple line represents a constant number of hires each year equivalent to the highest number of hires over the past five fiscal years. The red line (baseline) represents hiring if new hires exactly matched separations. The green line represents the projection for constant low hiring equivalent to the number of hires of the lowest hiring year of the past five fiscal years. Finally, the blue line represents the actual workforce during September 2015. Figure 4.2 is the same, but for FY2025.

Figures 4.1 and 4.2 show that the Air Force civilian workforce is projected to expand if hiring stays constant at FY2011 (the highest number of hires in the past five years) levels, shrink if hiring stayed at constant FY2014 (the lowest) levels, and would not have to hire more workers than were hired during FY2015 to maintain the same size workforce. The cases give an idea of both the size and the distribution of a workforce with more and less hiring. The biggest concern in the distribution is the drop in the number of workers with between ten and six years until retirement. There will be a smaller number of them in the year 2025 in all of the projections except the high hiring case, and even then there will be far fewer of these workers relative to the number of workers with less experience. This means there is the high probability of an experience gap at this YORE range in the next ten years. Clearer examples of these shortages will be seen in the MCO’s.

Figure 4.1: FY2020 Air Force civilian workforce projections.
White-collar Workforce

The full-time permanent white-collar Air Force civilian workforce shows similar projections to the workforce as a whole. Figures 4.3 and 4.4 as well as all line graphs to follow are the same format as Figures 4.1 and 4.2, but with the fiscal year and workforce analyzed different for each.

Figures 4.3 and 4.4 project the future of the white-collar workforce in three scenarios. Under the baseline scenario, where the workforce stays the same size, there is a dip in the number of workers with between -10 and -1 YORE. Meanwhile, the number of the oldest workers increased. Hiring at the lowest number leads to a much smaller workforce, and one that has a much larger percentage of older workers, but still leads to a dip in workers with between -10 and -6 YORE relative to the total number of workers. The high hiring case leads to a younger and larger workforce. Since there was a smaller number of hires in the baseline case than was accomplished in FY2015, it should not be difficult to keep the white-collar workforce the same size. However, the distributions show that workforce planners should be concerned about the workers who are in the -10 to -1 range. These workers typically are not entry-level workers and so a reduction in their numbers could lead to negative consequences in the experience and skills necessary for the Air Force civilian workforce to function properly.
Selected MCO’s

The first MCO we will examine is the contracting occupation. Figures 4.5 and 4.6 show that hiring in the contracting workforce has mainly been among young and inexperienced workers. When hiring is increased, more people with between eleven and twenty years until retirement are in the workforce. Hiring is so strong in this YORE group that even the low hiring projection has more workers in this group than there are currently. While this is a good sign for the long-term health of the workforce, a concern for the next ten years is the decrease in workers who have just
become retirement eligible with YORE’s of zero to four. Even in the high hiring case, there are fewer workers in this YORE range than there are today. To see why this is the case, we compare the contracting occupation of ten years ago to the contracting workforce of today.

**Figure 4.5: FY2020 projections for the contracting occupation.**

![Figure 4.5: FY2020 projections for the contracting occupation.](image)

**Figure 4.6: FY2025 projections for the contracting occupation.**

![Figure 4.6: FY2025 projections for the contracting occupation.](image)

Figures 4.7 and 4.8 below compare different cohorts of the contracting occupation. Figure 4.7 shows two cohorts with YORE’s between -15 and -6. The blue columns show the average cohort from FY2003-2005 and the red columns show the average cohort from FY2013-FY2015.
This allows the reader to compare the cohorts across time to see why there is the possibility of a gap in the next ten years. Figure 4.8 compares the present cohort of workers with YORE -5 to +5 to the projected cohort at the end of FY2025. The blue columns represent the current cohort and the red columns represent the future cohort. The reader will notice that the blue columns in both charts are the same cohort, aged ten years in the second chart.

**Figure 4.7: Comparison of contracting occupation workforce with YORE -15 to -6.**

![Figure 4.7](image)

**Figure 4.8: Comparison of projected contracting occupation to present with YORE -5 to +4.**

![Figure 4.8](image)
Figures 4.7 and 4.8 show why the contracting occupation will be facing a shortfall in its workers near retirement age. The average size of the workforce with fifteen to five years until retirement ten years ago was much larger than the current workforce with the same level of experience. This explains why the projection shows a much smaller workforce ten years in the future with a YORE of -5 to 4. When the current smaller cohort with YORE -15 to -5 ages to become the cohort with YORE -5 to 4, that cohort will be smaller than the current cohort with YORE -5 to 5. This means there may be an experience gap in the contracting workforce ten years in the future.

Electronics engineering is the next MCO and its projections are shown in Figures 4.9 and 4.10. The electronics engineering occupation has a large number of employees close to retirement eligibility compared to the number of workers with other levels of experience. This means there will almost certainly be fewer workers around retirement age ten years from now in this workforce. This may create an experience gap in this occupation.

Figure 4.9: FY2020 projections for the electronics engineering occupation.
Figure 4.10: FY2025 projections for the electronics engineering occupation.

To see why there might be an experience gap, we present the historical data in Figures 4.11 and 4.12. Once again we see a smaller cohort in the present than there was ten years in the past, leading to a smaller cohort in the more positive YORE in the future.

Figure 4.11: Comparison of electronics engineering workforce with YORE -15 to -6.
The projections for the human resources occupation are shown in Figures 4.13 and 4.14. In the baseline and low hiring cases, the HR occupation is projected to face a decrease of employees with between ten and six years until they are retirement eligible. These workers are most likely to be mid-level workers important for facilitating the transition from entering the civilian workforce to assuming a senior level position.
A cohort comparison, shown in Figures 4.15 and 4.16, illustrates the reasons for this shortfall. Because the -20 to -16 YORE cohort was so much smaller in FY2015, the cohort is projected to be smaller ten years from now than its corresponding cohort is today.
Figure 4.16: Comparison of projected HR workforce to present with YORE -10 to -6.

The projections for the computer engineering occupation are shown in Figures 4.17 and 4.18. The computer engineering occupation is another that hires young workers as a high percentage of its new hires. The projected shortages in this occupation are in the middle YORE’s, between ten and one years until retirement eligibility. There are also projected to be more of the oldest and most experienced workers in ten years. The shortage in the middle years could affect the middle management positions of this occupation making it difficult for young workers to successfully transition from inexperienced to experienced workers.

Figure 4.17: FY2020 projections for the computer engineering occupation.
Once again we see in Figures 4.19 and 4.20 how a smaller cohort in the past leads to a smaller cohort in the future. As the small cohort ages, the YORE group above it will become smaller as the separation rate stays about the same on a smaller population.

**Figure 4.19: Comparison of computer engineering workforce with YORE -20- to -11.**
The final engineering MCO is nuclear engineering which is so small that projections are not particularly helpful in determining its future. The nuclear engineering workforce is currently relatively young, but had a large number of employees switch to a different occupation during FY2015. This will need to be closely monitored in order to keep the number of nuclear engineers steady.

Figures 4.21 and 4.22 show the projections for the IT occupation. The IT career field increased hiring dramatically during FY2010 and 2011. This means that the constant high hiring case is quite different from the other two projections. The baseline and constant low hiring cases show shortages mainly in the -6 to -10 YORE group. The low hiring case would also lead to a smaller workforce with more than ten years until retirement. This indicates the low hiring case would not be sustainable for the workforce.
Figures 4.23 and 4.24 show the IT occupation cohort comparison. This cohort analysis is surprising because the smaller cohort grew larger than the larger cohort is projected to grow. This is the result of the IT career growing rapidly between FY2005 and FY2013, while the projection is only maintaining the current size of the IT workforce. For instance, in the cohort that had twenty years until retirement at the end of FY2005, forty-three workers were hired into its cohort in FY2010 and then another forty-one in FY2011. The equivalent cohort that had
twenty years until retirement at the end of FY2015 is only projected to add eleven and twelve workers in the equivalent years.

**Figure 4.23: Comparison of IT workforce with YORE -20 to -16.**

![Bar chart showing IT workforce comparison with YORE -20 to -16.](image)

**Figure 4.24: Comparison of projected IT workforce to present with YORE -10 to -6.**

![Bar chart showing projected IT workforce comparison with YORE -10 to -6.](image)

Figures 4.25 and 4.26 show the projections for the auditing occupation. Unlike the IT occupation, the outlying projection for the auditing occupation is the low hiring projection, while the high and baseline projections are fairly similar. Based on the spread of these projections, the auditing occupation is likely to continue to shrink unless hiring is increased to the highest level.
of the past five years and then consistently maintained. Even at the highest levels of hiring, there is likely to be a decline in workers that are within five years of retirement eligibility.

Figure 4.25: FY2020 projections for the auditing occupation.

Figure 4.26: FY2025 projections for the auditing occupation.

Figures 4.27 and 4.28 compare auditing occupation cohorts. The auditing occupation has almost the exact opposite characteristics of the IT workforce, because it was shrinking over this time. Even though the cohort from the early 2000’s in Figure 4.27 is much larger than the cohort from the past three years, the cohorts in Figure 4.28 are almost the same size. This is because
between 2005 and 2015 the auditing workforce has shrunk, while the projection is based on the workforce staying the same size. This means that there are higher levels of hiring during the projection than there were between 2005 and 2015.

**Figure 4.27: Comparison of auditing workforce with YORE -20 to -11.**

![Figure 4.27: Comparison of auditing workforce with YORE -20 to -11.](image)

**Figure 4.28: Comparison of projected auditing workforce to present with YORE -10 to -1.**

![Figure 4.28: Comparison of projected auditing workforce to present with YORE -10 to -1.](image)

Finally, we will briefly explain trends in the other MCO’s. Five other MCO’s are projected to have shortfalls in the YORE -6 to -10 range in the next ten years. The quality assurance career field is projected to have shortfalls in the -6 to -10 YORE range as well as the 0-4 range. Finally,
the general supply career field is projected to have a shortfall in the 0-4 YORE range. Two MCO’s have large cohorts in a YORE group that are projected to level out in the future. The remaining sixteen MCO’s are projected to maintain their current distributions.

These projections shows that while there is not likely to be a retirement wave in either the workforce as a whole, the white-collar workforce or any specific MCO, there may be gaps in certain levels of age and experience in a number of occupations. For the workforce as a whole and the white-collar workforce, the gap is likely to occur among those with between six and ten years until they are retirement eligible. The contracting and electronics engineering occupations are likely to face shortfalls in the -5 to +4 YORE range. The computer engineering and auditing occupations are projected to have shortfalls in the workers who have ten or fewer years until they become retirement eligible. Finally, the HR and IT occupations are projected to have gaps in the workforce with between six and ten years until they are retirement eligible, like the white-collar workforce at large.

**Grade Projection Results**

Next we will examine the projected shifts in grade structure, beginning with the entry level workforce. These projections will be done using the same grouping of grades as in Chapter 3. The projections for the entry-level and executive-level workforces do not show any dramatic changes in the distributions. The mid-level workforce shows a likely decline in the number of workers with between six and ten years until they are retirement eligible. The most concerning is the senior level workforce which is highly likely to see a decline in the number of workers that have fewer than five years until retirement eligibility. There could be a serious loss of experience at those grade levels.

First, we will examine the entry-level workers. Their projections are shown in Figures 4.29 and 4.30, with the same colors and layout as before. These workers are full-time permanent white-collar GS-1 to GS-8 or equivalent. The entry-level workforce will likely become younger over the next ten years, which is appropriate for entry-level jobs. However, if hiring stays constant at its low rate, the workforce will shrink.
The mid-level workforce, which is the equivalent of GS-9 through GS-12 is shown in Figures 4.31 and 4.32. The mid-level workforce may face a shortfall of workers with between ten and six years until retirement, along with more hiring of workers at lower ages and levels of experience. This is good from a very long term perspective, but could lead to gaps in experience in the short-term as younger workers are thrust into these mid-level positions with fewer mentors than in the past.
The projected gap in experience at YORE’s near retirement is very apparent in Figures 4.33 and 4.34. These figures show the senior-level workforce, which is the equivalent of GS-14 and GS-15. The baseline and low hiring projections show shortages in the number of workers who are ten or fewer years away from retirement eligibility. These grade levels would likely require more experienced workers. This means that a younger workforce may have some serious shortfalls in experience to handle these senior positions. However, the projections also show a
larger number of workers with more than five years since retirement eligibility, which should help with mentoring the younger workers.

Figure 4.33: FY2020 projections for the senior level workforce.

Figure 4.34: FY2025 projections for the senior level workforce.

Figures 4.35 and 4.36 present the cohort comparisons for the senior level workforce. This is another example of a comparison between an expanding workforce from between 2005 and 2015 and a workforce that is projected to stay the same size from 2015 to 2025. Although the top chart
shows a red cohort that is larger than the blue cohort, the blue cohort becomes larger because so many are added to it during the intervening years.

**Figure 4.35: Comparison of senior-level workforce with YORE -20 to -11.**

![Bar chart showing comparison of senior-level workforce with YORE -20 to -11.](image)

**Figure 4.36: Comparison of projected senior-level workforce to present with YORE -10 to -1.**

![Bar chart showing comparison of projected senior-level workforce to present with YORE -10 to -1.](image)

Finally, the executive positions, which are the equivalent of the SES employees, are expected to maintain their current distribution under all hiring projections, with little variation. Their projections are shown in Figures 4.37 and 4.38.
The projections of the grade groups show that there may be a gap in experience in the senior grades. This would be a serious issue as the senior grades are exactly where the collected experience is supposed to be used. The executive and entry level workforces do not show any concerning issues. The mid-level workforce has a small concern with workers who have between six and ten years until retirement, which could lead to shortages in experience for that group.
Summary

All of these charts reveal that while the Air Force civilian workforce is not likely to face widespread shortages as a whole, in the white-collar workforce or any MCO’s, this is masking potential gaps. Particularly for the engineering MCO’s and the contracting occupation, there may be shortages of workers that are close to retirement eligibility. These workers would be the most experienced workers that are not already retirement eligible and therefore the backbone of these occupations. A shortage of workers with these ages and experience could be detrimental to the ability of these occupations to carry out their tasks. The shortage of workers from the -10 to -6 YORE is likely to most affect the mid-level grades, while the senior-level grades may be faced with shortages of the workers with five or fewer years until they become retirement eligible. Now we will discuss some possible options to address the gaps.
Chapter Five: Evaluations of Policy Options

While a looming disaster in the federal civilian workforce, and within the Air Force civilian workforce as a whole, is not projected to occur in the next ten years, some remediation will be necessary to reduce the potential of gaps occurring in some segments of the workforce. We examine five options for filling in potential gaps: hiring more experienced and older workers, advanced development programs, retention allowances, hiring temporary workers, and hiring contractors. One caution should be made here about filling gaps. While making the right adjustments may relieve a troubled occupation, an excess of “gap filling” could cause equal if not greater problems. These options are not new, and some were briefly described in Chapter 2. The applicability of each will be dependent on the specific actions that are desired. Below, we describe the benefits and limitations of each, as well as rough order of magnitude cost estimates for the full-time permanent workforce options.

Options for Policymakers

We have thought of five possible policy options for mitigating the projected workforce shortages. The three most promising options will be evaluated based on how much they will cost to fill the shortages.

**Hiring more Experienced and Older Workers**

One possible option for the Air Force is to hire more workers from outside the federal workforce that are more experienced in their respective fields. For example, the Air Force hires an electronics engineer, who has worked in the private sector for many years, immediately into a mid- or senior-level position. They do this currently of course, but the hiring would have to be increased. With a healthy economy, the Air Force may have difficulty increasing hiring. So this option may require streamlining the hiring process, offering favorable pay, and targeting workers that would be open to working in the federal government. Even given the fact that the Air Force is able to hire more workers, there are a number of drawbacks to this approach. One is that often private-sector experience, although the occupation title is similar, does not translate to government expertise. This means that even if the worker is older and appears to fill a gap in the workforce, the worker would actually have fewer job-content skills than a government worker who had risen through the ranks. Another difficulty in hiring older and more experienced workers is the federal discrimination laws preventing bias based on the age of the prospective worker. It would be possible to avoid this by hiring purely based on skills and experience. There is some concern within the Air Force career field management staff that the Air Force is not able to compete very well with the other services and agencies. They cited quality of life issues such
as telework and flexible hours as a hindrance to DoD competitiveness, and the relative lack of higher grade positions in the Air Force compared to the Army or Navy. The Air Force may want to reclassify more positions to higher grades to increase the opportunity for upward mobility in its workforce.

Another related option is keeping retired federal workers on in a mentoring capacity to help workers transition and fill in gaps in their knowledge. As mentioned in Chapter 2, the DoD has recently developed policies and procedures for its phased retirement program (Levine 2016).

**Advanced Development Programs**

Advanced development programs might help fill gaps using younger workers. The goal of these programs would be to provide education and training to more junior-level workers in order to provide them more of the same skill as more senior-level workers. These programs would need to assess which young workers have the potential to rise to these higher positions, as not everyone will be needed to replace the more senior workers. This program has the advantage of execution within the government workforce. A program would need to be created to assess young workers for potential and the course content needed for them to acquire the requisite skills. Additionally, the requirements for the program would need to be clear so that employees can position themselves to be selected if they so desire. According to a RAND researcher who worked as an expert advisor to the Air Force and Secretary of Defense for more than four years, there is no program like this within the Department of Defense. Another RAND staffer, who spent twenty-six years in DoD HR and retired at a very senior position, said that civilian employees frequently do not take ownership of their own development and that this is often because they do not know the requirements for the next position.

We also spoke to a career field manager and her staff within the Department of the Air Force. They stated that their development programs in place were adequate and they did have some of the career broadening programs in place for advanced development. In order to move beyond what they currently have, they thought it would be necessary to implement a training pipeline that first gathered up all of the scenarios their career faces, and then simulates them in a meaningful, efficient way. The simulated scenarios would allow workers to gain some experience that they would be able to use when they faced real-life, similar scenarios. This would require more resources than the career field currently has. Currently, this training is accomplished over time through on-the-job training, but because it is on-the-job, the training is more ad hoc than it would be in a strict training pipeline.

**Retention Bonuses**

Another possibility is to increase the use of retention allowances. This can only help to a certain degree, because if you retain an entire small cohort, it still may be smaller than the requirement. However, as mentioned in Chapter 2, this has been shown to be an effective strategy at improving retention rates. In a resource constrained environment, this may be
difficult, but should not be more expensive than the turnover it is preventing. The bigger challenge seems to be delegating the authority to low enough level as to more readily and rapidly identify those considering separation to whom a retention allowance would make a difference.

**Hiring Temporary Workers**

A fourth possible option, particularly for positions such as IT where frequent injections of new people and ideas are required, is to hire workers for a specific term. This does not seem like a good solution for people in managerial positions or for occupations where high skills are required, because the government would like to keep people with those skills in place as part of a more reliable, permanent workforce. However, it might be useful for the gaps in the IT workforce as this is such a fast-changing field. It is possible to hire these types of employees under Schedule A of the Excepted Services of the Code of Federal Regulations. For certain occupations, employees can be employed under this authority for up to four years. A RAND staff member who has extensive experience in the DoD civilian workforce believes this type of hiring will increase in the future and will be very helpful for the IT and similar occupations.

**Hiring Contractors**

A final option for remedying these shortages is to hire more contractors to fill in the gaps in experience. This would likely work better for some occupations than others, and is an expensive and likely inefficient option. It is expensive because contractors usually require higher pay than government civilians and inefficient because contractors are not trained to do exactly the same jobs as government civilians, so the duties they perform will not exactly replace the work of previous government civilians. This is unlikely to be a short-term politically feasible solution because there are currently caps on the number of contractors allowed to work for the federal government.

While all five options listed above, and potentially others, might be used to fill in any manpower gaps, the first three – hiring extra workers, conducting advanced development programs, and offering retention bonuses – impact full-time, permanent employees. These are likely the first approaches that would be considered for responding to shortages because they fill manpower gaps with full-time permanent employees and do not require changing the legal structure of the workforce. The next subsection describes to what extent these might be needed and provides rough order of magnitude costs for each.

**Methodology for Evaluating Policy Options**

While each agency or career field may have a preference or rationale for using one of the options over the others, in this section we will perform a more macro examination for the white collar workforce as a whole. The basic methodology for evaluating the three approaches potentially affecting full-time, permanent employees involves two steps. First, the cost in
FY2015 dollars per employee affected by the policy option is estimated. Second, the individual cost is multiplied by the number of employees affected yielding a total cost. Below we describe the rough order of magnitude cost for each option and then provide a comparison.

**Hire More Employees at the Needed Level**

For the new hires case, we decided that we would hire a constant number of workers each year. This method takes into account the attrition of each agency and provides a more realistic timeline to hire these new workers. For example, the white-collar workforce is projected to be short 2,491 workers in the YORE -6 to -10 range in FY2025. We calculate the attrition rate for each year of hiring, and then calculate the number of hires each year. For our example, we hire 317 workers a year for a total of 3,170 new hires. We then multiply the total number of workers hired by the cost of hiring to estimate the total cost of this program. Additionally, we calculate the range of annual costs for the program by doing the same for each individual year. Throughout these analyses we will calculate all costs in constant FY2015 dollars. This means that nominal costs will likely be higher than our estimates. This effect will be larger the farther away the spending is accomplished from FY2015.

The costs for hiring a new worker were estimated using a range of cost-per-hire estimates from the private sector. Two organizations collect cost-per-hire data across the private sector every year. Bersin by Deloitte estimates a range of $3,033 to $6,465 for each hire (Staffing Industry Analysts 2015) (Smykal 2015). This is based on a survey of mid-size and large U.S. organizations of at least 1,000 employees (Glassdoor 2015). These benchmarks will be adjusted to FY2015 dollars. The Society of Human Resource Managers also does a survey of 864 human resources managers to find out a range of cost-per-hire benchmarks. The 25th percentile cost-per-hire was $500, while the 75th percentile was $4,500. The society explains its cost-per-hire methodology as totaling all the external and internal costs of hiring and dividing by total number of hires. The highest estimate comes from a meta-study of turnover costs by the Center for American Progress, which found that the turnover cost was 20.4% of the replaced salary (Boushey and Glynn 2012). For the high estimate, we use a GS-12 salary at step five as a conservative estimate of the salary being replaced. This would be classified as a high mid-level job according to the classification system used in this dissertation. Using the 2015 pay scale, the high estimate is $14,216.

There are challenges to hiring more experienced workers that are unaccounted in this methodology. One is the possible difficulty of hiring more experienced workers. These workers may be less willing to transfer jobs, or have to take a larger pay cut than less experienced workers. This approach also implies increasing the end-strength with higher cost workers who are more likely to eventually collect a pension. This may be difficult to implement in a budget-constrained environment. Additionally, the more experienced workers may still need some time to acculturate and may not have the same knowledge of federal workforce practices as someone who gained their experience in the federal government.
Conduct Advanced Development Programs

We supposed this program would include a five-year commitment so there would be no attrition. The employee, upon accepting the program would commit to the occupation for a total of five years after completing the program. The Government Employees Training Act authorizes agency heads to attach service commitments to training programs provided by the government. The minimum length of these commitments is three times the length of the training program (Kichak 2009). This sample program would incur a longer commitment to attract workers who are planning on making a career in the Air Force civilian workforce.

ADP’s vary across the DoD and the private sector. The most involved leadership development program for the DoD is an intensive ten-month course that “combines hands-on/experiential military training” and “introduces new concepts along the development continuum” (Defense Civilian Personnel Advisory Service). The other training courses for DoD civilians vary from a length of eighteen to thirty-six graduate-level credits that can be accomplished online or a fourteen week in-residence training course (Office of Personnel Management). Siemens, IBM, and Textron each have two-year development programs that rotate candidates between two and four times to gain experience in different parts of the company (Siemens Corporation 2015, Textron, Inc. 2016, IBM). This program would vary according to the specific needs of the occupation, base, and MAJCOM, but a sample program would involve nine weeks of a four hour class once a week coupled with rotations to other specialties. The rotations would help the trainee become familiar with specialties that are not the same as his. The number of rotations would depend on the size of the occupation, but we envision rotations taking one year to complete. Many companies have rotation programs that last longer than this, but they are much larger than the individual Air Force occupations that will be responsible for these programs. Career fields may already have these programs in place in which case they should expand what they currently have and ensure it is specifically targeted at gaining the experience and skills that are necessary.

The number of employees needed for the advanced development programs (ADP) was simply the number the workforce was short. We also supposed this program would occur over the duration of five years before the shortage so that costs and the program size could be spread out. For the high estimate of the cost, we assumed a 5% attrition rate from the program. We do not account for are the possible fixed costs required to design and create an advanced development program.

The cost range for the ADP comes from an annual study by Deloitte on the cost per participant of leadership training programs, an annual survey by the Association for Talent Development (ATD), and information from the Pentagon’s own Executive Leadership Development Program. The ATD survey found that large organizations spend an average of $838 per employee on training and development in 2013 (Miller 2014). The brief from 2014, the latest which is publicly available is $4,716 per participant for a mid-level leadership
development program (Bersin 2014). The DoD document states that costs for an employee to attend their program would range from $36,500 to $44,500 (Defense Civilian Personnel Advisory Service). Although this document is undated, it is linked to on a webpage for courses for FY2015, so we are presuming the costs are up to date for that year.

To keep the end strengths comparable between the three policy options, we also are hiring an equal number of young workers to replace the workers in the advanced development program. Applying the methodology of the Center for American Progress report, we estimated that a young worker costs 59% of the cost of the hiring the more experienced workers hired under the new hires option.

**Provide Retention Bonuses**

The calculation for retention bonuses is more complicated. The most important consideration is that there may not be enough people to retain to make up for the shortage. If the cohorts coming into the YORE group are very small, retaining the entire cohort will not be enough. In order to calculate this retention, we estimated that everyone would be retained each year the retention bonus was offered. The projected short cohort was stepped back in time one fiscal year. Then, we removed all attrition, added the new hires, and accounted for the number of switches. We continued this process until we had retained enough employees to fill the shortage. We are unsure of the size of the bonus that would be effective, but we know that the lowest bonus pilots were offered in the 1990’s was $6,000, and retention never reached 100% (Sweeney 2014). On the low end we will assume a $5,000 bonus and 100% retention. On the high end, we assume a $10,000 bonus and 100% retention. Even with a smaller bonus and more favorable retention we will show this is the most expensive option. We assume a 60% take rate of the entire cohort because this was the median take rate for Air Force pilots during the 1990’s (Sweeney 2014).

**Evaluations**

We will evaluate the white-collar workforce and the selected MCO’s. We will not evaluate the senior-level grades because it is unclear what the best YORE profile would be for these grades. It is implicitly assumed that a higher YORE in the occupations corresponds to a higher level of expertise or responsibility. In the senior-level grades, we already know that the government trusts these workers with higher levels of responsibility, so it is unclear that adding more workers at higher YORE is better.

First, we will examine the white-collar workforce as a whole. This will give an idea of the costs for the Air Force civilian workforce as a whole. Each level of analysis will include a table and two figures. The table, in this case Table 5.1, will show information on the number of employees actually retained. This table will be used throughout this chapter to show the reader how the cohorts met the requirement. The first column shows the number of fiscal years the retention bonus is offered. For example, if the number in the column is 3, 60% of the employees
in that cohort are taking the bonus for three years. The next column shows the original cohort size. This is the size of the cohort when the bonuses were first offered. The following two columns show the cumulative number of new hires and switches in for the entire time period bonuses are taken. The third from last column is the sum of the previous three columns. This is the size of the cohort at the end of FY2025 after retention bonuses were offered for the number of years specified in the table. The second to last column is the number of employees required to match the FY2015 YORE group. For example, if the white-collar workforce is projected to be short in the -6 to -10 YORE range in FY2025, the required column will show the number of employees in the -6 to -10 YORE range in FY2015. The final column shows the average retention rate if there had not been any retention bonus. A low number indicates that the retention bonus is assumed to be very effective because it raised the retention rate by a larger percentage. For example, a retention rate of 91% raised to 100% would be a more effective retention bonus than one that raised a rate of 96% to 100%.

Table 5.1 shows this information for the white collar workforce. Three years of bonuses would be required to cover the shortage in the YORE -6 to -10 range. Retention bonuses are helped here by the relatively high number of switches in and new hires each year.

Table 5.1: Retention bonus effects on the white-collar workforce.

<table>
<thead>
<tr>
<th>Number of Years</th>
<th>FY2022 -13 to -9 YORE Cohort Size</th>
<th>New hires to cohort FY2023-2025</th>
<th>Net switch in FY2023-2025</th>
<th>FY2025 with Retention Bonus</th>
<th>Required Bonus</th>
<th>Average Retention Rate w/out Bonus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3</td>
<td>18718</td>
<td>3431</td>
<td>607</td>
<td>22756</td>
<td>22702</td>
</tr>
</tbody>
</table>

Figure 5.1 shows columns of the three policy options’ total costs compared in FY2015 dollar amounts. The new hires option would be the cheapest option by total cost, while the retention bonus would be the most expensive. The ADP and new hires options are projected to cost about the same amount, but there is much greater uncertainty about the cost of the ADP. However, even with this uncertainty, the ADP is cheaper than the lowest retention bonus estimate.
Figure 5.2 shows the annual costs of the three policy options. The new hires option and ADP are projected to cost the same amount in FY2015 dollars in each year. Of course, because the costs are all in FY2015 dollars, it is likely that the nominal costs will grow each year. The retention bonus is likely to be more expensive in later years in real terms because the cohort should grow over time as more and more people are retained. So the low estimate for the retention bonus is a $5,000 bonus in the earliest year and the high estimate is a $10,000 bonus in the latest year. For the white-collar workforce, the retention bonus is spread over three years and retains more than enough employees to fill the gap in the white-collar workforce.
Estimated Costs for each Policy Option and Occupation

While the column charts in Figures 5.1 and 5.2 are useful for comparing costs between the policy options, they are not as helpful to the policymaker who needs to estimate the extra amount of money he requests to carry out the policy options. The tables below provide these estimates for each of the select occupations and the white collar workforce as a whole. The first three tables show the estimates for filling the gap for the baseline hiring case.

Table 5.2 shows the range of estimates for the new hires option. The total hires are larger than the gap because attrition reduces the number of new hires who are still in the workforce in FY2025.

Table 5.2: Range of costs for the new hires option in the baseline case.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Gap</th>
<th>Hire per year</th>
<th>Total Hires</th>
<th>Annual Cost Low Estimate</th>
<th>Annual Cost High Estimate</th>
<th>Total Cost Low Estimate</th>
<th>Total Cost High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-collar</td>
<td>2491</td>
<td>317</td>
<td>3170</td>
<td>$160,085</td>
<td>$4,506,472</td>
<td>$1,600,850</td>
<td>$45,064,720</td>
</tr>
<tr>
<td>Contracting</td>
<td>228</td>
<td>30</td>
<td>300</td>
<td>$15,150</td>
<td>$426,480</td>
<td>$95,950</td>
<td>$2,701,040</td>
</tr>
<tr>
<td>IT</td>
<td>141</td>
<td>19</td>
<td>190</td>
<td>$9,595</td>
<td>$270,104</td>
<td>$40,400</td>
<td>$1,137,280</td>
</tr>
<tr>
<td>HR</td>
<td>57</td>
<td>8</td>
<td>80</td>
<td>$4,040</td>
<td>$113,728</td>
<td>$40,400</td>
<td>$1,137,280</td>
</tr>
<tr>
<td>Audit</td>
<td>42</td>
<td>5</td>
<td>50</td>
<td>$2,525</td>
<td>$71,080</td>
<td>$25,250</td>
<td>$710,800</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>29</td>
<td>4</td>
<td>40</td>
<td>$2,020</td>
<td>$56,864</td>
<td>$20,200</td>
<td>$568,640</td>
</tr>
</tbody>
</table>
Table 5.3 shows the range of cost estimates for the selected MCO’s and the white-collar workforce for the ADP option. Fewer workers are needed to replace the ADP workers because hiring is spread out over five years, as opposed to ten in the new hires option, meaning there is less attrition.

Table 5.3: Range of costs for the ADP option in the baseline case.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Gap</th>
<th>Hire per year</th>
<th>Total hires</th>
<th>Annual Cost Low Estimate</th>
<th>Annual Cost High Estimate</th>
<th>Total Cost Low Estimate</th>
<th>Total Cost High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-collar</td>
<td>2491</td>
<td>553</td>
<td>2765</td>
<td>$588,534.59</td>
<td>$27,955,338</td>
<td>$2,942,673</td>
<td>$139,776,688</td>
</tr>
<tr>
<td>Contracting</td>
<td>228</td>
<td>54</td>
<td>270</td>
<td>$54,872.33</td>
<td>$2,587,003</td>
<td>$274,362</td>
<td>$12,935,013</td>
</tr>
<tr>
<td>IT</td>
<td>141</td>
<td>32</td>
<td>160</td>
<td>$33,520.40</td>
<td>$1,588,208</td>
<td>$167,602</td>
<td>$7,941,041</td>
</tr>
<tr>
<td>Electronics Engineering</td>
<td>530</td>
<td>116</td>
<td>580</td>
<td>$124,727.75</td>
<td>$5,934,084</td>
<td>$623,639</td>
<td>$29,670,418</td>
</tr>
<tr>
<td>HR</td>
<td>57</td>
<td>14</td>
<td>70</td>
<td>$13,866.43</td>
<td>$650,927</td>
<td>$69,332</td>
<td>$3,254,633</td>
</tr>
<tr>
<td>Audit</td>
<td>42</td>
<td>9</td>
<td>45</td>
<td>$9,826.99</td>
<td>$468,641</td>
<td>$49,135</td>
<td>$2,343,204</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>29</td>
<td>7</td>
<td>35</td>
<td>$7,018.41</td>
<td>N/A</td>
<td>$35,092</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 5.4 shows the cost estimate for the $5000 retention bonus for the selected MCO’s and the white-collar workforce. The $10,000 bonus estimate would be double each of these numbers. The estimates are not applicable for electronics engineering and computer engineering because the retention bonus will not retain enough workers to fill the gap for those occupations.

Table 5.4: Range of costs of the $5,000 bonus in the baseline case.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Gap</th>
<th>Years Bonus Required</th>
<th>Annual Cost Low Estimate</th>
<th>Annual Cost High Estimate</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-collar</td>
<td>2491</td>
<td>3</td>
<td>$56,153,156</td>
<td>$64,622,267</td>
<td>$181,344,155</td>
</tr>
<tr>
<td>Contracting</td>
<td>228</td>
<td>2</td>
<td>$4,044,448</td>
<td>$4,181,967</td>
<td>$8,226,414</td>
</tr>
<tr>
<td>IT</td>
<td>141</td>
<td>4</td>
<td>$3,071,681</td>
<td>$3,772,931</td>
<td>$13,716,784</td>
</tr>
<tr>
<td>Electronics Engineering</td>
<td>530</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>HR</td>
<td>57</td>
<td>3</td>
<td>$1,475,188</td>
<td>$1,736,852</td>
<td>$4,821,235</td>
</tr>
<tr>
<td>Audit</td>
<td>42</td>
<td>6</td>
<td>$498,479</td>
<td>$618,476</td>
<td>$3,376,402</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>29</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The following three tables show the cost estimates for the three policy options if the future is like the low hiring case rather than the baseline projection. If the low hiring case does hold, the occupations will be short in more than these areas, but these will still be the shortages in the most experienced YORE groups because hiring has less of an impact the older the YORE group is.
Table 5.5 shows the three options’ costs for the selected MCO’s and the white-collar workforce with the gap if low hiring continues.

Table 5.5: Range of costs for the new hires option in the low hires case.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Gap</th>
<th>Hire per year</th>
<th>Total Hires</th>
<th>Annual Cost Low Estimate</th>
<th>Annual Cost High Estimate</th>
<th>Total Cost Low Estimate</th>
<th>Total Cost High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-collar</td>
<td>5588</td>
<td>710</td>
<td>3170</td>
<td>$358,550</td>
<td>$10,093,360</td>
<td>$3,585,500</td>
<td>$100,933,600</td>
</tr>
<tr>
<td>Contracting</td>
<td>303</td>
<td>40</td>
<td>400</td>
<td>$20,200</td>
<td>$568,640</td>
<td>$202,000</td>
<td>$5,686,400</td>
</tr>
<tr>
<td>IT</td>
<td>239</td>
<td>32</td>
<td>320</td>
<td>$16,160</td>
<td>$454,912</td>
<td>$161,600</td>
<td>$4,549,120</td>
</tr>
<tr>
<td>Electronics</td>
<td>603</td>
<td>70</td>
<td>700</td>
<td>$35,350</td>
<td>$995,120</td>
<td>$353,500</td>
<td>$9,951,200</td>
</tr>
<tr>
<td>Engineering</td>
<td>239</td>
<td>33</td>
<td>330</td>
<td>$16,665</td>
<td>$469,128</td>
<td>$166,650</td>
<td>$4,691,280</td>
</tr>
<tr>
<td>HR</td>
<td>91</td>
<td>10</td>
<td>100</td>
<td>$5,050</td>
<td>$142,160</td>
<td>$50,500</td>
<td>$1,421,600</td>
</tr>
<tr>
<td>Audit</td>
<td>49</td>
<td>7</td>
<td>40</td>
<td>$3,535</td>
<td>$99,512</td>
<td>$35,350</td>
<td>$995,120</td>
</tr>
</tbody>
</table>

Table 5.6 shows the three policy options’ costs for the white-collar workforce and selected MCO’s for the low hires scenario.

Table 5.6: Range of costs for the ADP option in the low hires case.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Gap</th>
<th>Hire per year</th>
<th>Total Hires</th>
<th>Annual Cost Low Estimate</th>
<th>Annual Cost High Estimate</th>
<th>Total Cost Low Estimate</th>
<th>Total Cost High Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-collar</td>
<td>5588</td>
<td>1241</td>
<td>6205</td>
<td>$1,320,384</td>
<td>$6,601,922</td>
<td>$313,577,224</td>
<td>$17,158,082</td>
</tr>
<tr>
<td>Contracting</td>
<td>303</td>
<td>71</td>
<td>355</td>
<td>$72,696</td>
<td>$363,480</td>
<td>$17,158,082</td>
<td>$5,686,400</td>
</tr>
<tr>
<td>IT</td>
<td>239</td>
<td>54</td>
<td>270</td>
<td>$56,747</td>
<td>$283,734</td>
<td>$13,450,276</td>
<td>$4,549,120</td>
</tr>
<tr>
<td>Electronics</td>
<td>603</td>
<td>131</td>
<td>655</td>
<td>$141,617</td>
<td>$708,086</td>
<td>$33,716,284</td>
<td>$13,617,314</td>
</tr>
<tr>
<td>Engineering</td>
<td>239</td>
<td>58</td>
<td>290</td>
<td>$57,933</td>
<td>$289,667</td>
<td>$13,617,314</td>
<td>$5,097,822</td>
</tr>
<tr>
<td>HR</td>
<td>91</td>
<td>20</td>
<td>100</td>
<td>$21,440</td>
<td>$107,201</td>
<td>$5,097,822</td>
<td>$2,796,377</td>
</tr>
</tbody>
</table>

Finally, we examine the retention bonus of $5,000 for the selected MCO’s and white-collar workforce for the low hires case. There are many more cases where retention bonuses are ineffective because there are far fewer workers available to retain.
<table>
<thead>
<tr>
<th>Occupation</th>
<th>Gap</th>
<th>Years Bonus Required</th>
<th>Annual Cost Low Estimate</th>
<th>Annual Cost High Estimate</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>White-collar</td>
<td>5588</td>
<td>7</td>
<td>$42,859,145</td>
<td>$65,492,120</td>
<td>$377,895,717</td>
</tr>
<tr>
<td>Contracting</td>
<td>303</td>
<td>3</td>
<td>$4,003,751</td>
<td>$4,265,348</td>
<td>$15,481,440</td>
</tr>
<tr>
<td>IT</td>
<td>239</td>
<td>4</td>
<td>$2,879,613</td>
<td>$3,671,900</td>
<td>$13,130,129</td>
</tr>
<tr>
<td>Electronics Engineering</td>
<td>603</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>HR</td>
<td>239</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Audit</td>
<td>91</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>49</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The tables above show the range of costs estimated for each policy option under two different scenarios. The cost for the retention bonus is always larger than even the highest estimate for the ADP, even under favorable assumptions for the retention bonus.

**Summary**

This chapter has described five possible policy options for policymakers and evaluated three of them for the white-collar workforce and selected MCO’s. In every case, the retention bonus was the most expensive option in both total and annual cost. Additionally, for two of the occupations, computer and electronics engineering, the retention bonus fails to retain enough workers to make up the shortage. The new hires option was the least expensive option by annual and total cost, and there was less uncertainty around the estimate than the ADP option.
Chapter Six: Conclusions and Policy Responses

The policy objective of this dissertation was to identify and if necessary suggest options to mitigate shortages in the Air Force civilian workforce. There was some concern that the Air Force civilian workforce may face a gap in skills or experience due to a retirement wave. Retiring baby boomers, the recent government shutdowns, and surveys of recent college graduates all suggested the possibility of a federal workforce shortage. The increased number of Air Force civilians over the age of 50 since 2009 pointed to the same possibility for the Air Force in particular. These civilians had the most experience in the workforce and their pending loss of skills and experience would have to be replaced. If they were not, the Air Force’s capability to achieve the objectives of the United States’ national military strategy would be inhibited.

In order to meet this objective, we answered three research questions:

1. During previous federal workforce waves of concern, what has been the result?
2. What are the recent trends in the various grades and occupations of the Air Force civilian workforce?
3. What occupations or grades are most at risk for shortages in the future? What are some possible options for mitigating these shortages?

Answering these questions required a multidisciplinary approach that included historical analysis, modeling and simulation, and rough order of magnitude (ROM) cost estimation. Before we provide an answer to the research questions, we will briefly review how each portion of our methodology was used to address the research questions.

The first research question was answered by surveying the relevant literature on previous waves of concern about gaps in skills and experience in the federal workforce. This survey included research conducted by non-profit organizations dedicated to improving public policy and research by government agencies spanning more than twenty years.

The second was answered by analyzing the past five fiscal years of data on the Air Force civilian workforce according to YORE. These data were provided by AFPC and contain unique identifiers for each individual Air Force civilian as well as demographic and career information. This showed the potential cohorts that might be at risk for shortages in skills and experience. The workforce was examined at four different levels of analysis: the Air Force civilian workforce, the white-collar full-time permanent workforce, selected MCO’s, and the four grade levels.

To address the third research question, modifications to the RIM, a stock-and-flow model used for modeling government civilians, were made in order to project the Air Force civilian workforce for the next ten fiscal years. This model tracks the number of separations, transfers in and out, and new hires at each YORE. We made three improvements to this model. The first was adapting it to use AFPC data. The next was to create a version of the RIM that modeled by grade.
level, as opposed to occupation. The final modification created three types of hiring projections:
a baseline, where the workforce maintains the same size; a low-hiring case, where the lowest
annual number of hires from the past five years is hired each year of the projection; and a high-
hiring case where the highest annual number of hires over the past five years is hired each year
of the projection. These three hiring cases allowed us to see a range of possible outcomes for
each part of the workforce we analyzed.

The projections allowed us to identify most likely gaps in particular career fields and YORE
groups. Policies were derived for filling these gaps. The methodology for the ROM cost
estimates for these policy options was straightforward. Per capita costs for some of the options
were based on recent surveys of corporations. We then estimated the number of participants in
each option, accounting for attrition. Additionally, we estimated the number of younger new
hires that would be brought on to replace the workers in the ADP. This kept the end strengths
between the three options approximately the same. For the retention bonuses, we estimated the
lowest plausible bonus and a take rate that was very favorable to the Air Force, and showed that
it was still more expensive than the highest estimates for the other two options. The results of
these investigations are summarized below.

In the late 1980’s, researchers worried that the demographics of the country were becoming
unfavorable for the federal government as the generation replacing the baby boomers was
projected to be much smaller. Additionally, researchers were concerned that the federal
government was an undesirable place to work with uncompetitive pay. However, this wave of
concern ended due to three primary reasons. First, the federal government began cutting back its
workforce in the early 1990’s. Second, the country faced a recession, so the ability to hire was
eased. Third, the federal government created policies that made the federal government a more
attractive place to work and increased pay depending on a worker’s locality.

The second wave of concern arose during the late 1990’s as the baby boomers stood on the
verge of retiring. This time the concerns had less to do with the federal government’s ability to
hire young workers and more to do with the combination of a looming retirement wave and
nearly a decade of drawing down the workforce. Once again, external events overtook
demographics and the defense build-up after 9/11 eliminated most of the concerns about the
aging of the workforce. The federal government was flooded with new workers and so reversed
much of the downsizing.

The third wave of concern, the end of which we are investigating in this dissertation, began
in 2008. This concern was built again on the workforce growing older. This wave of concern has
been more uneven, with concern first decreasing during the Great Recession as federal workers
pushed off retirement until the market recovered. After these retirements occurred, and the
workforce was still older and becoming more so, concern once again increased, leading to this
dissertation.

The second research question was answered by analyzing the most recent five years of Air
Force civilian workforce data. The five years of data from the end of FY2010-2015 show no
signs of a dramatically declining workforce, but do show that there is the danger of potential shortages in certain occupations and YORE ranges. Most occupations, and the workforce as a whole, expanded during FY2011, shrank during FY2012-2014, then began expanding again in FY2015. However, hiring and retention was not spread out evenly throughout the YORE levels, meaning some occupations have very different YORE distributions than they did during FY2010. When we examined the four grade levels, we found that the entry-level grades were shrinking as a whole, the mid-level grades expanding, and the senior and executive level grades remaining about the same size. The only changes in YORE that were concerning occurred in the senior level grades, which were growing older. This data formed the basis for our projections.

The first part of the third question was answered by projecting the workforce over the next ten years using the RAND inventory model. The projections showed that the Air Force civilian workforce is likely not facing a retirement wave that will lead to shortages of employees in mission critical occupations, the white-collar workforce, or the overall workforce. This is primarily due to robust hiring and high retention. However, it is possible that gaps among the middle age and experience levels could occur. These gaps could make it difficult for necessary tasks to be accomplished with fewer experienced workers. In the white-collar workforce as a whole, the shortage will likely occur in the six to ten years until retirement cohort. Four of the selected mission critical occupations, namely the HR, IT, computer engineering and auditing occupations, also are projected to have shortages at this age and experience level. The computer engineering and auditing occupations are additionally projected to have a shortage of workers who have fewer than five years until they are retirement eligible. Finally, the contracting and electronics engineering occupations are in danger of having a steep decrease in the number of workers who are within five years of retirement eligibility. Seven MCO’s other than the selected MCO’s have the danger of shortages, most in the YORE -6 to -10 range. Half of all MCO’s are projected to maintain their same distributions.

The projections also detailed the future fluctuations in the grade structure. These results correlated closely with what would be expected. The entry-level workforce is getting younger, which is a positive development. The mid-level workforce, those in grades GS-8 to GS-12 or equivalent, is projected to be short in workers with between six and ten years until retirement. The senior-level workforce is projected to be short in workers with five or fewer years until retirement. Finally, the executive level workforce, equivalently to the SES workers, is projected to maintain its distribution.

To answer the second part of the third research question, we explored some policy options to mitigate the shortages that may arise. We evaluated three of these policy options: hiring new workers with the appropriate amount of experience, advanced development programs for training younger workers to take over new responsibilities, and retention bonuses for the at-risk cohort. We found that the retention bonus was the most expensive in total cost and annual cost. The new hires option was the cheapest option in total and annual cost and had less uncertainty in its estimates than the ADP. The ADP was cheaper than the retention bonus even under unfavorable
assumptions. The retention bonus was infeasible for the electronics and computer engineering occupations under the baseline hiring projection. Under the low hiring projection, retention bonuses are only feasible for the white-collar workforce as a whole, and the contracting and IT occupations.

Responses

Based on the relative benefits, drawbacks and costs of the options for policymakers, we think a combination of hiring more experienced workers from the outside and improving and expanding their development programs would be an appropriate response. The two options should complement each other in combating the workforce shortages. For instance, difficulties in hiring can be overcome by more training for the employees that are already there. This will require reforms from the career field managers of the individual occupations, from the Department of the Air Force, and from the DoD as a whole. This will allow the government to both utilize the talent it has within organizations as well as bring in fresh perspectives on how to do the required work.

This will not be without challenges. These solutions are likely to require more resources from every agency involved. It may be difficult to hire workers with the needed experience. This has been a continual worry in the literature of the federal workforce. Although we did not find much evidence to justify this fear in our research, we also were not able to closely examine the number of hires compared to the recruiting goals of the Air Force. The ADP program may be difficult to design and develop for certain occupations. As the workforce shifts, the ADP may no longer be as useful, so policymakers will need to weight the costs and benefits of developing such a program. In spite of this, with an appropriate mix of these two options, policymakers can fill in the gaps as the current workforce structure changes over time.

Further Areas of Study

This dissertation could be expanded to improve cost estimations for the policy options, to apply survival analysis for more detailed retention and turnover estimates, and to analyze the implementation of past workplace reforms. The relative costs of the policy options should be subjected to more rigorous study. The numbers used in this study were only an estimate, so gaining more accuracy on these numbers would be very beneficial for policymakers and researchers. In addition to the cost of policy options, further research could be accomplished in the area of retention and turnover. While this dissertation examined the future structure and size of the Air Force civilian workforce, more work could be done analyzing the survival patterns of Air Force civilians and whether those have changed over time. For instance, while our projections generally show a larger number of young workers in the future, it is unclear whether these workers are being retained at the same level as workers in the past, or if there is more hiring and turnover of these workers. Finally, more study could be done on the actual
implementation of various workforce reforms over the years. Which were implemented and why? Of those that were implemented, do they live up to expectations? Of the recommendations that were not implemented, why? This would be a difficult and complex study to undertake, but would be extremely helpful to policymakers.

Beyond improving the analysis within the context of this dissertation, our methods could be expanded and modified for analysis of other sectors of the federal civilian workforce. For instance, this analysis could be done for a different branch of the military. This would be instructive not only for the individual services, but also as a comparison. If one service is having more success than another, the other services could perhaps learn from what that service is doing correctly.
Appendix A: Grade Categories

**Entry level** includes GS (and related) 1-8; WG, WD, WY, XF, WK 1-8; YA, YB, YP, YD, YE, YH, YI, YK,YL, YM, DR 1; NM 2; DA, DB, DE, DJ, DP, ND, NH, NJ, NK, NO, NP, NR, NT 1-2; DK 1-3. For the TP pay plan workers are coded by grade and step. Entry level includes all AA workers, and steps 1-5 for the C*, D*, E*, and F* grades. In addition, all WT workers and workers in the NH and DR pay plan are at grade 0.

**Mid level** includes GS (and related) 9-13; WG, WD, WY, XF, WK 9-15; WL, XG, WR 1-7, WS, WJ, WQ, XH, WA 1-7; YC, YF, YJ, YN -1; YA, YB, YC, YD, YE, YH, YI, YK, YL, YM, DR -2; YB, YE, YL, DB, DE, DJ, DP, NH, NK, NO, NP, NM-3; DK-4; DA, ND, NJ, NR, NT 3-4; IA-2-3. For the TP pay plan workers are coded by grade and step. Mid level includes steps 6-10 for the C*, D*, E*, and F* grades. *IA-4 counts as both mid and senior

**Senior level** includes GS (and related) 14-15; WL, XG, WR, WS, WJ, WQ, XH, WA 8 and above; YF, YJ, YN 2 and 3; YC 3; YA, YD, YH, YI, YK, YM 3; YB, YE, YL, DB, NH, NP 4; DE, DJ, IA, NO, NM 4-5, DR 3-4; DP, NR, ND 5; DA, NT 5-6; IP (all). We have also tentatively coded all members of the YJ (Medical supervisors) and YG (Medical physicians/dentists) as senior pending further input. For the TP pay plan workers are coded by grade and step. Senior level includes steps 11 and above for the C*, D*, E*, and F* grades, as well as all steps for the L*, O*, and P* grades.

**Executive includes**: ES (all); DB 5-6; ND 6; NP 5; IE (all); For the TP pay plan we include those in the-K* grade.
Appendix B: MCO’s

1102 Contracting
1910 Quality Assurance
0840 Nuclear Engineering
0854 Computer Engineering
0855 Electronics Engineering
0346 Logistics Management
2010 Inventory Management
2130 Traffic Management
2003 Supply Program Management
1670 Equipment Services
2150 Transportation Operations
2001 General Supply
2101 Transportation Specialist
0017 Explosive Safety
0018 Safety and Public Safety
0081 Fire Protection and Prevention
1550 Computer Science
0201 Human Resources Management
1811 Criminal Investigating
0180 Psychology
0185 Social Work
0602 Medical Officer
0610 Nurse
0660 Pharmacist
0501 Financial Administration
0510 Accounting
0511 Auditing
0560 Budget Analysis
0130 Foreign Affairs
2210 Information Technology
0132 Intelligence
0080 Security Administration
## Appendix C: Historical Data

### Table C.1: Air Force civilian workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</strong></td>
<td>183,179</td>
<td>188,284</td>
<td>180,850</td>
<td>176,240</td>
<td>172,277</td>
<td>172,490</td>
</tr>
<tr>
<td><strong>Separations Due to Attrition</strong></td>
<td>20,801</td>
<td>22,331</td>
<td>18,138</td>
<td>20,582</td>
<td>19,010</td>
<td></td>
</tr>
<tr>
<td><strong>New Hires to Meet Target or On-Board Strengths</strong></td>
<td>26,493</td>
<td>15,741</td>
<td>14,149</td>
<td>17,210</td>
<td>19,799</td>
<td></td>
</tr>
<tr>
<td><strong>Percent of workforce with:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>21.0%</td>
<td>21.3%</td>
<td>21.4%</td>
<td>20.6%</td>
<td>20.3%</td>
<td>20.7%</td>
</tr>
<tr>
<td>YORE -11 to -10</td>
<td>30.4%</td>
<td>30.2%</td>
<td>29.4%</td>
<td>28.4%</td>
<td>27.3%</td>
<td>26.9%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>17.7%</td>
<td>17.7%</td>
<td>18.7%</td>
<td>18.9%</td>
<td>19.2%</td>
<td>19.4%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>17.3%</td>
<td>17.2%</td>
<td>17.6%</td>
<td>18.4%</td>
<td>18.4%</td>
<td>17.7%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>10.1%</td>
<td>10.0%</td>
<td>9.6%</td>
<td>10.1%</td>
<td>10.9%</td>
<td>11.2%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>3.5%</td>
<td>3.6%</td>
<td>3.4%</td>
<td>3.7%</td>
<td>3.9%</td>
<td>4.0%</td>
</tr>
<tr>
<td><strong>% Eligible for Retirement</strong></td>
<td>13.6%</td>
<td>13.6%</td>
<td>12.9%</td>
<td>13.8%</td>
<td>14.8%</td>
<td>15.2%</td>
</tr>
</tbody>
</table>

### Table C.2: Air Force full-time permanent white-collar workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</strong></td>
<td>120,165</td>
<td>125,490</td>
<td>121,277</td>
<td>119,611</td>
<td>117,118</td>
<td>117,947</td>
</tr>
<tr>
<td><strong>Separations Due to Attrition</strong></td>
<td>10,093</td>
<td>12,080</td>
<td>9,029</td>
<td>10,836</td>
<td>10,063</td>
<td></td>
</tr>
<tr>
<td><strong>Switches Out</strong></td>
<td>877</td>
<td>669</td>
<td>611</td>
<td>393</td>
<td>414</td>
<td></td>
</tr>
<tr>
<td><strong>New Hires to Meet Target or On-Board Strengths</strong></td>
<td>14,681</td>
<td>7,250</td>
<td>6,488</td>
<td>7,306</td>
<td>9,639</td>
<td></td>
</tr>
<tr>
<td><strong>Switches In</strong></td>
<td>1,617</td>
<td>1,279</td>
<td>1,486</td>
<td>1,430</td>
<td>1,667</td>
<td></td>
</tr>
<tr>
<td><strong>Percent of workforce with:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>18.8%</td>
<td>19.2%</td>
<td>19.2%</td>
<td>18.6%</td>
<td>18.3%</td>
<td>18.7%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>30.8%</td>
<td>30.4%</td>
<td>29.6%</td>
<td>28.4%</td>
<td>27.2%</td>
<td>26.7%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>18.4%</td>
<td>18.5%</td>
<td>19.5%</td>
<td>19.6%</td>
<td>20.0%</td>
<td>20.3%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>18.0%</td>
<td>17.9%</td>
<td>18.4%</td>
<td>19.1%</td>
<td>19.2%</td>
<td>18.5%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>10.3%</td>
<td>10.2%</td>
<td>9.9%</td>
<td>10.5%</td>
<td>11.4%</td>
<td>11.8%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>3.7%</td>
<td>3.8%</td>
<td>3.5%</td>
<td>3.8%</td>
<td>4.0%</td>
<td>4.1%</td>
</tr>
<tr>
<td><strong>% Eligible for Retirement</strong></td>
<td>14.0%</td>
<td>14.0%</td>
<td>13.4%</td>
<td>14.3%</td>
<td>15.4%</td>
<td>15.9%</td>
</tr>
</tbody>
</table>
### Table C.3: Air Force contracting occupation workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>5,817</td>
<td>5,876</td>
<td>5,745</td>
<td>5,828</td>
<td>5,920</td>
<td>6,006</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>530</td>
<td>594</td>
<td>444</td>
<td>489</td>
<td>564</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>82</td>
<td>60</td>
<td>66</td>
<td>53</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>507</td>
<td>298</td>
<td>361</td>
<td>436</td>
<td>574</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>164</td>
<td>225</td>
<td>232</td>
<td>198</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>28.8%</td>
<td>29.7%</td>
<td>30.9%</td>
<td>31.6%</td>
<td>32.0%</td>
<td>33.2%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>24.2%</td>
<td>24.4%</td>
<td>24.5%</td>
<td>24.2%</td>
<td>24.6%</td>
<td>25.5%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>14.7%</td>
<td>14.0%</td>
<td>13.4%</td>
<td>13.1%</td>
<td>13.2%</td>
<td>13.4%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>18.5%</td>
<td>18.0%</td>
<td>18.0%</td>
<td>17.4%</td>
<td>15.2%</td>
<td>12.8%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>10.5%</td>
<td>10.2%</td>
<td>9.8%</td>
<td>10.4%</td>
<td>11.5%</td>
<td>11.4%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>3.3%</td>
<td>3.6%</td>
<td>3.5%</td>
<td>3.4%</td>
<td>3.4%</td>
<td>3.7%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>13.8%</td>
<td>13.9%</td>
<td>13.3%</td>
<td>13.8%</td>
<td>14.9%</td>
<td>15.1%</td>
</tr>
</tbody>
</table>

### Table C.4: Air Force computer engineering occupation workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>370</td>
<td>378</td>
<td>377</td>
<td>374</td>
<td>366</td>
<td>364</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>21</td>
<td>27</td>
<td>20</td>
<td>24</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>16</td>
<td>13</td>
<td>13</td>
<td>17</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>35</td>
<td>31</td>
<td>14</td>
<td>16</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>10</td>
<td>8</td>
<td>16</td>
<td>17</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>28.5%</td>
<td>31.0%</td>
<td>31.8%</td>
<td>29.9%</td>
<td>30.3%</td>
<td>28.0%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>29.0%</td>
<td>23.8%</td>
<td>22.8%</td>
<td>21.1%</td>
<td>18.3%</td>
<td>20.3%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>17.9%</td>
<td>19.8%</td>
<td>20.2%</td>
<td>19.8%</td>
<td>19.9%</td>
<td>17.6%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>16.8%</td>
<td>17.7%</td>
<td>17.0%</td>
<td>18.4%</td>
<td>17.2%</td>
<td>17.9%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>7.3%</td>
<td>6.3%</td>
<td>6.6%</td>
<td>8.3%</td>
<td>11.7%</td>
<td>13.2%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>0.5%</td>
<td>1.3%</td>
<td>1.6%</td>
<td>2.4%</td>
<td>2.5%</td>
<td>3.0%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>7.9%</td>
<td>7.7%</td>
<td>8.2%</td>
<td>10.7%</td>
<td>14.2%</td>
<td>16.2%</td>
</tr>
</tbody>
</table>

### Table C.5: Air Force electronics engineering occupation workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>4,943</td>
<td>5,056</td>
<td>5,066</td>
<td>5,066</td>
<td>4,999</td>
<td>5,097</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>185</td>
<td>259</td>
<td>223</td>
<td>249</td>
<td>229</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>121</td>
<td>75</td>
<td>96</td>
<td>102</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>328</td>
<td>241</td>
<td>228</td>
<td>196</td>
<td>346</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>91</td>
<td>103</td>
<td>91</td>
<td>88</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>31.9%</td>
<td>33.3%</td>
<td>33.6%</td>
<td>33.0%</td>
<td>32.4%</td>
<td>32.8%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>20.2%</td>
<td>19.3%</td>
<td>18.3%</td>
<td>18.1%</td>
<td>18.4%</td>
<td>18.8%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>20.4%</td>
<td>18.8%</td>
<td>18.2%</td>
<td>15.3%</td>
<td>13.4%</td>
<td>12.8%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>17.4%</td>
<td>17.9%</td>
<td>18.4%</td>
<td>20.8%</td>
<td>20.9%</td>
<td>19.3%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>6.8%</td>
<td>7.4%</td>
<td>8.5%</td>
<td>9.4%</td>
<td>11.4%</td>
<td>12.6%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>3.4%</td>
<td>3.2%</td>
<td>3.0%</td>
<td>3.3%</td>
<td>3.6%</td>
<td>3.7%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>10.2%</td>
<td>10.7%</td>
<td>11.5%</td>
<td>12.8%</td>
<td>15.0%</td>
<td>16.3%</td>
</tr>
</tbody>
</table>
Table C.6: Air Force nuclear engineering occupation workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>20</td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Percent of workforce with:

- YORE -21 and less: 37.5% 41.2% 38.9% 35.0% 33.3% 22.2%
- YORE -11 to -20: 31.3% 23.5% 33.3% 30.0% 28.6% 33.3%
- YORE -6 to -10: 25.0% 23.5% 16.7% 20.0% 19.0% 16.7%
- YORE -1 to -5: 6.3% 11.8% 11.1% 15.0% 14.3% 22.2%
- YORE 0 to 4: 0.0% 0.0% 0.0% 0.0% 4.8% 5.6%
- YORE 5 and more: 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%

% Eligible for Retirement: 0.0% 0.0% 0.0% 0.0% 4.8% 5.6%

Table C.7: Air Force human resources occupation workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>3,117</td>
<td>3,169</td>
<td>2,956</td>
<td>2,837</td>
<td>2,705</td>
<td>2,789</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>271</td>
<td>308</td>
<td>224</td>
<td>288</td>
<td>258</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>123</td>
<td>116</td>
<td>117</td>
<td>123</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>219</td>
<td>68</td>
<td>70</td>
<td>115</td>
<td>198</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>228</td>
<td>142</td>
<td>152</td>
<td>164</td>
<td>269</td>
<td></td>
</tr>
</tbody>
</table>

Percent of workforce with:

- YORE -21 and less: 13.8% 14.2% 14.5% 14.7% 14.3% 15.8%
- YORE -11 to -20: 33.8% 32.4% 32.0% 29.2% 27.4% 26.5%
- YORE -6 to -10: 19.5% 19.8% 20.6% 21.8% 22.3% 22.8%
- YORE -1 to -5: 18.7% 19.2% 19.8% 19.6% 20.5% 19.1%
- YORE 0 to 4: 10.6% 10.8% 9.9% 11.0% 11.6% 12.0%
- YORE 5 and more: 3.6% 3.6% 3.1% 3.6% 3.9% 3.9%

% Eligible for Retirement: 14.2% 14.4% 13.0% 14.7% 15.5% 15.9%

Table C.8: Air Force IT occupation workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>5,055</td>
<td>5,861</td>
<td>5,913</td>
<td>5,952</td>
<td>5,869</td>
<td>5,912</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>331</td>
<td>535</td>
<td>395</td>
<td>469</td>
<td>491</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>85</td>
<td>102</td>
<td>111</td>
<td>101</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>1,014</td>
<td>529</td>
<td>308</td>
<td>276</td>
<td>408</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>209</td>
<td>159</td>
<td>237</td>
<td>211</td>
<td>228</td>
<td></td>
</tr>
</tbody>
</table>

Percent of workforce with:

- YORE -21 and less: 15.6% 16.9% 17.7% 16.4% 15.6% 15.5%
- YORE -11 to -20: 33.3% 34.6% 32.9% 31.7% 30.9% 29.8%
- YORE -6 to -10: 18.6% 18.7% 20.2% 21.0% 21.7% 22.2%
- YORE -1 to -5: 19.0% 17.8% 17.9% 18.9% 18.6% 18.0%
- YORE 0 to 4: 9.8% 9.0% 8.7% 9.1% 9.9% 11.9%
- YORE 5 and more: 3.7% 3.0% 2.8% 2.9% 3.3% 3.3%

% Eligible for Retirement: 13.5% 12.0% 11.3% 12.0% 13.2% 14.5%
Table C.9: Air Force auditing occupation workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>674</td>
<td>666</td>
<td>627</td>
<td>595</td>
<td>555</td>
<td>552</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>37</td>
<td>56</td>
<td>37</td>
<td>42</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>18</td>
<td>18</td>
<td>6</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>28.2%</td>
<td>27.9%</td>
<td>27.6%</td>
<td>26.6%</td>
<td>25.4%</td>
<td>24.6%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>26.4%</td>
<td>26.3%</td>
<td>26.6%</td>
<td>25.9%</td>
<td>26.1%</td>
<td>27.4%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>20.3%</td>
<td>19.2%</td>
<td>19.9%</td>
<td>18.7%</td>
<td>16.6%</td>
<td>16.5%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>11.6%</td>
<td>12.6%</td>
<td>12.8%</td>
<td>16.0%</td>
<td>19.8%</td>
<td>21.0%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>9.9%</td>
<td>10.2%</td>
<td>10.2%</td>
<td>9.4%</td>
<td>7.4%</td>
<td>6.9%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>3.6%</td>
<td>3.8%</td>
<td>2.9%</td>
<td>3.5%</td>
<td>4.7%</td>
<td>3.6%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>13.5%</td>
<td>14.0%</td>
<td>13.1%</td>
<td>12.9%</td>
<td>12.1%</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

Table C.10: Air Force entry level (GS-1 to GS-8) workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>27,802</td>
<td>27,357</td>
<td>24,961</td>
<td>23,448</td>
<td>21,915</td>
<td>21,915</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>3,910</td>
<td>3,849</td>
<td>2,770</td>
<td>2,674</td>
<td>2,466</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>2,772</td>
<td>1,877</td>
<td>2,085</td>
<td>1,963</td>
<td>2,019</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>4,545</td>
<td>2,520</td>
<td>2,379</td>
<td>2,201</td>
<td>3,508</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>1,509</td>
<td>698</td>
<td>854</td>
<td>767</td>
<td>771</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>30.7%</td>
<td>29.4%</td>
<td>28.7%</td>
<td>27.6%</td>
<td>26.9%</td>
<td>28.4%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>30.1%</td>
<td>30.0%</td>
<td>29.9%</td>
<td>29.1%</td>
<td>28.3%</td>
<td>27.6%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>13.4%</td>
<td>14.1%</td>
<td>15.2%</td>
<td>15.4%</td>
<td>16.0%</td>
<td>16.3%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>13.5%</td>
<td>13.8%</td>
<td>13.9%</td>
<td>14.5%</td>
<td>14.5%</td>
<td>13.6%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>8.8%</td>
<td>8.9%</td>
<td>8.7%</td>
<td>9.3%</td>
<td>9.8%</td>
<td>9.5%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>3.5%</td>
<td>3.8%</td>
<td>3.6%</td>
<td>4.1%</td>
<td>4.5%</td>
<td>4.6%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>12.3%</td>
<td>12.7%</td>
<td>12.4%</td>
<td>13.4%</td>
<td>14.2%</td>
<td>14.1%</td>
</tr>
</tbody>
</table>

Table C.11: Air Force mid-level (GS-9 to GS-13) workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>77,388</td>
<td>82,582</td>
<td>79,941</td>
<td>79,560</td>
<td>78,671</td>
<td>79,967</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>5,305</td>
<td>7,167</td>
<td>5,356</td>
<td>5,737</td>
<td>5,477</td>
<td>5,825</td>
</tr>
<tr>
<td>Switches Out</td>
<td>1,816</td>
<td>1,624</td>
<td>982</td>
<td>700</td>
<td>956</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>9,256</td>
<td>4,132</td>
<td>3,587</td>
<td>3,245</td>
<td>5,477</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>3,060</td>
<td>2,013</td>
<td>2,370</td>
<td>2,303</td>
<td>2,600</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>16.6%</td>
<td>17.7%</td>
<td>18.3%</td>
<td>18.0%</td>
<td>17.9%</td>
<td>18.1%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>31.7%</td>
<td>31.3%</td>
<td>30.3%</td>
<td>29.0%</td>
<td>27.7%</td>
<td>27.3%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>19.0%</td>
<td>18.8%</td>
<td>19.8%</td>
<td>20.1%</td>
<td>20.6%</td>
<td>20.9%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>18.6%</td>
<td>18.3%</td>
<td>18.6%</td>
<td>19.1%</td>
<td>18.9%</td>
<td>18.3%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>10.5%</td>
<td>10.2%</td>
<td>9.7%</td>
<td>10.3%</td>
<td>11.1%</td>
<td>11.6%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>3.6%</td>
<td>3.6%</td>
<td>3.3%</td>
<td>3.5%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>14.1%</td>
<td>13.9%</td>
<td>13.0%</td>
<td>13.8%</td>
<td>14.9%</td>
<td>15.4%</td>
</tr>
</tbody>
</table>
Table C.12: Air Force senior level (GS-14 to GS-15) workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>10,796</td>
<td>11,218</td>
<td>9,822</td>
<td>10,048</td>
<td>9,933</td>
<td>10,199</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>693</td>
<td>875</td>
<td>587</td>
<td>682</td>
<td>618</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>414</td>
<td>105</td>
<td>125</td>
<td>81</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>792</td>
<td>357</td>
<td>236</td>
<td>175</td>
<td>296</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>738</td>
<td>410</td>
<td>702</td>
<td>473</td>
<td>698</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>4.3%</td>
<td>4.4%</td>
<td>3.7%</td>
<td>4.0%</td>
<td>3.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>26.5%</td>
<td>25.7%</td>
<td>23.6%</td>
<td>22.0%</td>
<td>21.1%</td>
<td>20.9%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>27.6%</td>
<td>27.3%</td>
<td>27.7%</td>
<td>25.7%</td>
<td>24.0%</td>
<td>23.4%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>24.4%</td>
<td>25.1%</td>
<td>27.0%</td>
<td>29.2%</td>
<td>30.2%</td>
<td>29.4%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>12.1%</td>
<td>12.8%</td>
<td>13.5%</td>
<td>14.4%</td>
<td>16.4%</td>
<td>17.3%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>5.1%</td>
<td>4.7%</td>
<td>4.5%</td>
<td>4.7%</td>
<td>4.7%</td>
<td>5.2%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>17.2%</td>
<td>17.5%</td>
<td>18.0%</td>
<td>19.1%</td>
<td>21.1%</td>
<td>22.5%</td>
</tr>
</tbody>
</table>

Table C.13: Air Force executive level (SES) workforce characteristics FY2010-2015.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Workforce (Actual or Projected), Based on User-Provided End Strengths</td>
<td>216</td>
<td>211</td>
<td>201</td>
<td>196</td>
<td>179</td>
<td>198</td>
</tr>
<tr>
<td>Separations Due to Attrition</td>
<td>26</td>
<td>26</td>
<td>29</td>
<td>31</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Switches Out</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>New Hires to Meet Target or On-Board Strengths</td>
<td>15</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Switches In</td>
<td>9</td>
<td>8</td>
<td>12</td>
<td>5</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Percent of workforce with:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YORE -21 and less</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>YORE -11 to -20</td>
<td>12.1%</td>
<td>12.4%</td>
<td>11.5%</td>
<td>8.2%</td>
<td>8.4%</td>
<td>9.1%</td>
</tr>
<tr>
<td>YORE -6 to -10</td>
<td>23.7%</td>
<td>24.8%</td>
<td>26.0%</td>
<td>27.0%</td>
<td>24.0%</td>
<td>24.9%</td>
</tr>
<tr>
<td>YORE -1 to -5</td>
<td>37.2%</td>
<td>34.8%</td>
<td>33.0%</td>
<td>34.7%</td>
<td>35.2%</td>
<td>37.1%</td>
</tr>
<tr>
<td>YORE 0 to 4</td>
<td>22.3%</td>
<td>23.3%</td>
<td>23.0%</td>
<td>25.5%</td>
<td>26.8%</td>
<td>24.4%</td>
</tr>
<tr>
<td>YORE 5 and more</td>
<td>4.7%</td>
<td>4.8%</td>
<td>6.0%</td>
<td>4.1%</td>
<td>5.6%</td>
<td>4.1%</td>
</tr>
<tr>
<td>% Eligible for Retirement</td>
<td>27.0%</td>
<td>28.1%</td>
<td>29.0%</td>
<td>29.6%</td>
<td>32.4%</td>
<td>28.4%</td>
</tr>
</tbody>
</table>
References

"5 C.F.R. § 300.604."