

---

# Military Recruiting and Retention After the Fiscal Year 2000 Military Pay Legislation

---

Beth Asch  
James R. Hosek  
Jeremy Arkes  
C. Christine Fair  
Jennifer Sharp  
Mark Totten

*Prepared for the  
Office of the Secretary of Defense*

*National Defense Research Institute*

**RAND**

Approved for public release; distribution unlimited

The research described in this report was sponsored by the Office of the Secretary of Defense (OSD). The research was conducted in RAND's National Defense Research Institute, a federally funded research and development center supported by the OSD, the Joint Staff, the unified commands, and the defense agencies under Contract DASW01-01-C-0004.

**Library of Congress Cataloging-in-Publication Data**

Military recruiting and retention after the fiscal year 2000 military pay legislation /  
Beth Asch ... [et al.].  
p. cm.  
Includes bibliographical references.  
"MR-1532."  
ISBN 0-8330-3192-9  
1. United States—Armed Forces—Recruiting, enlistment, etc. 2. United States—Armed Forces—Pay, allowances, etc. I. Asch, Beth J.

UB333 .M55 2002  
355.2'23'0973—dc21

2002067970

RAND is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. RAND® is a registered trademark. RAND's publications do not necessarily reflect the opinions or policies of its research sponsors.

© Copyright 2002 RAND

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 2002 by RAND

1700 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138

1200 South Hayes Street, Arlington, VA 22202-5050

201 North Craig Street, Suite 202, Pittsburgh, PA 15213

RAND URL: <http://www.rand.org/>

To order RAND documents or to obtain additional information,  
contact Distribution Services: Telephone: (310) 451-7002;

Fax: (310) 451-6915; Email: [order@rand.org](mailto:order@rand.org)

---

## PREFACE

---

This report concerns the effectiveness of the military pay increases mandated by the FY00 National Defense Authorization Act with respect to improving active duty recruiting and retention. The act requires the Department of Defense to report to Congress annually on the effectiveness of the act, and the material in this document is relevant to the preparation of that report.

The nation has faced two defense manpower crises since the inception of the all-volunteer force in 1973. The first and more severe crisis came in 1979. It was marked by a deterioration of recruiting, recruit quality, and retention so acute that it threatened the existence of the volunteer concept. When the extent of the crisis finally became apparent—after several years of steadily worsening conditions—the nation acted boldly, passing large increases in military pay for FY80 and FY81, widely expanding enlistment and reenlistment bonuses, and creating controlled experiments on alternative forms of educational benefits. The results of the experiments verified the importance of educational benefits as a recruiting incentive and laid the foundation for the highly successful college fund programs introduced by the services to supplement the Montgomery GI Bill.

The second crisis came twenty years later, in 1999. Again, several years passed before the symptoms of the crisis were apparent, but these symptoms differed from those in 1979. This time, the crisis was detected before it had reached the desperate circumstances of 1979. Recruit quality was still reasonably high in 1999, though it had declined steadily since 1993. The Army and Air Force did not reach their recruiting goals despite increases in recruiting resources, all

services had difficulty retaining experienced personnel in technical skill areas, and the Air Force and Navy struggled with the outflow of aviators to the private sector. Added to the mix, recruiting targets had risen from the mid-1990s, a time when they were low as part of the services' manpower drawdown strategy, and retention goals had also risen. An issue related to the fairness of the new retirement benefit system also surfaced, and although it was not related to immediate manning problems, it was a widely watched signal of the nation's commitment to fairness in military compensation. Personnel who entered the service after July 1986 were under a reduced retirement benefit structure. By the late 1990s, when they had been in service for more than ten years and were deciding whether to stay for twenty years, they realized that their retirement benefits would be less than those of peers who had entered the service only a few months or years ahead of them.

The FY00 National Defense Authorization Act addressed the full range of these issues. It raised military pay; increased bonus ceilings; reformed military retirement benefit options; and increased special pays, including those for aviators.

This report focuses primarily on two major areas, the recruiting of high-quality recruits and the reenlistment of first- and second-term enlisted personnel. The report presents estimates of the predicted effects of the act's basic pay increases for FY00 and FY01. Further, the report provides fairly rich contextual information about enlisted recruiting and retention trends, officer retention, changes in the recruiting market, military educational benefits versus benefits available at colleges and universities, enlistment and reenlistment bonus budgets, changes in special pays, changes in recruiting resources and recruiter incentive structures, and other items. By including the contextual information along with the pay effect estimates, the report aims to describe at least partly the complexity of issues and responses that characterize today's manpower supply environment.

This report was prepared under the sponsorship of the Office of Compensation, Office of the Under Secretary of Defense for Personnel and Readiness. It was prepared within the Forces and Resources Policy Center of RAND's National Defense Research Institute, a

federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Chiefs of Staff, the unified commands, and the defense agencies.

---

## CONTENTS

---

Preface .....	iii
Figures .....	ix
Tables .....	xi
Summary .....	xiii
Acknowledgments .....	xxi
Abbreviations .....	xxiii
Chapter One	
INTRODUCTION .....	1
Chapter Two	
PREDICTED EFFECTS OF THE FY00 PAY	
LEGISLATION .....	3
High-Quality Contracts .....	4
The Warner, Simon, Payne Model .....	4
Change in Military/Civilian Pay .....	6
Predicted Effect of Pay Change on High-Quality	
Contracts .....	8
More Complete Predictions of High-Quality	
Contracts .....	10
Predicted Versus Actual Changes in High-Quality	
Contracts .....	21
Reenlistment .....	23
Estimating Perceived Pay Changes from the Pay	
Legislation .....	23

Predicted Changes in Reenlistment .....	25
Summary .....	32
Chapter Three	
CONTEXTUAL INFORMATION ON RECRUITING .....	35
Recruiting Goals .....	36
Environmental Factors .....	41
Trends in Military and Civilian Pay .....	41
Trends in Recruiting Resources .....	45
Recruiters .....	45
Access to New Technologies for Recruiters .....	48
Advertising .....	50
Enlistment Bonuses .....	54
Military Educational Programs .....	57
Trends in Civilian College Costs and Financial Aid Opportunities .....	63
Chapter Four	
CONTEXTUAL INFORMATION ON RETENTION AND CONTINUATION .....	67
Enlisted Retention Trends .....	68
Officer Continuation Rates .....	73
Changes in Resources .....	78
Other Retention Initiatives .....	82
Chapter Five	
CONCLUDING THOUGHTS .....	85
Appendix	
A. TABLES OF ENLISTED RETENTION RATES AND OFFICER ANNUAL CONTINUATION RATES .....	89
B. METHOD FOR COMPUTING AN EFFECTIVE INCREASE IN MILITARY PAY .....	93
References .....	95

---

**FIGURES**

---

3.1.	Total DoD Accession Objective . . . . .	37
3.2.	Percent of Total Recruiting Accession Mission Achieved Minus 100 Percent . . . . .	38
3.3.	Fraction of Males, Aged 17 to 21, with Positive Propensity to Join the Military . . . . .	40
3.4.	Recruiting Cost Per Recruit . . . . .	46
3.5.	Total Annual Advertising Expenditures (FY89 to FY00) and Budget (FY01 and FY02) . . . . .	52
3.6.	Enlistment Bonus Expenditures (FY89 to FY00) and Budgets (FY01 and FY02) . . . . .	55
3.7.	The ACF Budget . . . . .	60
3.8.	The Navy College Fund Expenditures (FY89 to FY00) and Budget (FY01) . . . . .	62
3.9.	College Tuition and Fees by Length of Program and Institutional Control . . . . .	63
3.10.	Room and Board College Costs . . . . .	64
4.1.	First-Term Retention Rates . . . . .	70
4.2.	First-Term Reenlistment Rates . . . . .	71
4.3.	Second-Term Retention Rates . . . . .	72
4.4.	Annual Officer Continuation Rates, YOS 0-5 . . . . .	74
4.5.	Annual Officer Continuation Rates, YOS 6-9 . . . . .	75
4.6.	Annual Officer Continuation Rates, YOS 10-13 . . . . .	76
4.7.	Annual Officer Continuation Rates, YOS 14-19 . . . . .	77
4.8.	Annual Officer Continuation Rates, YOS 20+ . . . . .	78
4.9.	Selective Reenlistment Bonus Budgets . . . . .	80



---

**TABLES**

---

2.1. Military/Civilian Pay Ratio . . . . .	7
2.2. Predicted Percentage Change in High-Quality Contracts Due to Military/Civilian Pay . . . . .	9
2.3. Description of Explanatory Variables Used in Predictions . . . . .	11
2.4. Values of Variables, Percentage Change in Variables, and Predicted Effect on High-Quality Contracts: Army . . . . .	12
2.5. Values of Variables, Percentage Change in Variables, and Predicted Effect on High-Quality Contracts: Navy . . . . .	13
2.6. Values of Variables, Percentage Change in Variables, and Predicted Effect on High-Quality Contracts: Air Force . . . . .	14
2.7. Values of Variables, Percentage Change in Variables, and Predicted Effect on High-Quality Contracts: Marine Corps . . . . .	15
2.8. Percentage Change in High-Quality Contracts from FY95-97: Predicted Versus Actual . . . . .	22
2.9. Estimated Additional Percentage Increase in Military Pay from TRIAD . . . . .	24
2.10. Actual and Counterfactual Military/Civilian Pay Ratio Changes Relative to FY96-97 . . . . .	24
2.11. Predicted Effect on Reenlistment Rates of Actual and Counterfactual Military Pay Changes Relative to FY96-97 . . . . .	26

2.12.	Values of Variables, Percentage Change in Variables, and Predicted Effect on Reenlistment Probability: Army . . . . .	27
2.13.	Values of Variables, Percentage Change in Variables, and Predicted Effect on Reenlistment Probability: Navy . . . . .	28
2.14.	Values of Variables, Percentage Change in Variables, and Predicted Effect on Reenlistment Probability: Air Force . . . . .	29
2.15.	Values of Variables, Percentage Change in Variables, and Predicted Effect on Reenlistment Probability: Marine Corps . . . . .	30
2.16.	Comparing the Range of Predicted Effects on Reenlistment Rates with Actual Changes . . . . .	33
3.1.	Percent of Accessions Who Are High Quality . . . . .	39
3.2.	Percent DoD Enlisted with Higher Education . . . . .	43
3.3.	Active-Duty Enlisted Production Recruiters . . . . .	47
3.4.	Navy Advertising Expenditures FY95–01 . . . . .	53
3.5.	Maximum MGIB Benefit Paid over 36 Months . . . . .	58
4.1.	Average Amounts of Enlisted and Officer Cash Pay, 1999. . . . .	80
A.1.	First-Term Enlisted Retention Rates . . . . .	89
A.2.	First-Term Enlisted Reenlistment Rates . . . . .	89
A.3.	Second-Term Enlisted Retention Rates . . . . .	90
A.4.	Annual Officer Continuation Rates, YOS 0–5 . . . . .	90
A.5.	Annual Officer Continuation Rates, YOS 6–9 . . . . .	91
A.6.	Annual Officer Continuation Rates, YOS 10–13 . . . . .	91
A.7.	Annual Officer Continuation Rates, YOS 14–19 . . . . .	92
A.8.	Annual Officer Continuation Rates, YOS 20+ . . . . .	92

---

## SUMMARY

---

In 1998, military recruiting and retention were showing signs of problems. The services began to miss their recruiting targets and in some skill areas retention goals were not being met. Furthermore, service members in midcareer were beginning to recognize that their retirement system was less generous than that of members who had entered only a few years before them. In response to these growing concerns, the FY00 National Defense Authorization Act contained special provisions related to military pay. Because there were three major provisions, the pay actions were referred to as TRIAD. TRIAD raised military basic pay in January 2000 by 4.8 percent and committed to higher-than-usual pay increases through FY06. Each year basic pay would be increased by 0.5 percentage point more than the change in the Employment Cost Index. TRIAD restructured the basic pay table, giving somewhat higher raises to more experienced members who had reached their rank in fewer years of service and eliminating some “notches” in the pay table. Finally, TRIAD allowed members covered by the REDUX retirement system (which began in 1986) the choice of converting to the previous retirement plan or remaining under REDUX and getting a \$30,000 bonus at year of service 15 in exchange for a commitment to complete 20 years of service. The act required the Department of Defense to submit an annual report to Congress summarizing the effects of TRIAD on military recruiting and retention. Our report is pursuant to that requirement.

We consider the areas of high-quality recruits, reenlistment of junior and early midcareer enlisted members, and the continuation of junior and early midcareer officers. Making use of empirical estimates of behavioral response from previous studies, we predict the effect of

TRIAD on the number of high-quality enlisted recruits and the reenlistment probability of enlisted members. We also present information on recruiting and retention trends, including officer continuation, and describe many of the recent policy actions taken in addition to TRIAD to improve recruiting and retention.

## **HIGH-QUALITY RECRUITING**

We found that the basic pay increases produced by TRIAD were a small but by no means negligible factor in ending the recruiting difficulties of the late 1990s.

More generally, from the mid-1990s onward, a set of supply-side factors made recruiting increasingly difficult. First, entry-level military pay declined relative to civilian pay. Second, the unemployment rate declined to record lows, indicating that job opportunities were excellent. Third, the college attendance rate had risen substantially in the 1980s and continued to rise in the 1990s, though much more slowly. The higher college attendance rate reduced the size of the traditional high-quality recruiting market. Fourth, family incomes rose, making it easier to support a son or daughter's job search or college education.

There were a number of demand-side responses to the supply-side trends. By the late 1990s, the services were increasing their advertising, enlistment bonuses, and college fund awards (which add funds to the Montgomery GI Bill [MGIB]); and adding recruiters. In addition, TRIAD passed, stopping the erosion in relative military pay in FY00 and increasing relative pay in FY01. Joined by these other initiatives, TRIAD clearly helped the services improve high-quality recruiting in FY01.

Because the models we use and the data available for predictions do not account for all factors affecting recruiting and reenlistment in recent years, we provide additional information on changes in recruiting and reenlistment outcomes in recent years and the factors affecting those outcomes. This information offers a more complete picture of the manpower supply environment.

Military recruiting has undergone tremendous change in the past decade. With the end of the cold war, the number of youth the ser-

vices sought to enlist dropped by about a third. Recruit quality rose during the drawdown years, reaching a historic peak in FY92. However, by FY94, recruiting was beginning to show signs of problems, and those problems became grave in the late 1990s. The Army and Navy missed their recruiting goals in 1998, and the Army, Navy, and Air Force missed their goals in 1999. Furthermore, recruit quality fell every year after FY92. Although the percent of recruits who were high quality in the late 1990s was similar to the percent who were high quality in the late 1980s, the continuous downward trend in recruit quality was troubling. In response to these difficulties, the services made substantial and widespread changes in their recruiting methods and have devoted substantially more resources and attention to recruiting in recent years. The result, as mentioned, has been recent improvement in recruiting.

While not all of the results are available, the overall recruiting picture is cause for cautious optimism. For example, all four service branches met their overall accession goals in FY00 and FY01. Between FY99 and FY01, the percent of recruits who were high quality rose across the Department of Defense (DoD) from 59 percent to 61 percent. The FY01 figure excludes from the computation those individuals who entered under the Army's experimental program, GED Plus. This program allows the enlistment of high-aptitude individuals who are seeking to achieve a General Educational Development (GED) degree and, therefore, do not meet the traditional definition of high quality. When these individuals are excluded, the fraction of high-quality recruits in the Army rose markedly from 53 percent in FY99 to 59 percent in FY01. Except for the Navy, which experienced a slight decline in recruit quality during this period, recruit quality rose in the other services as well.

Among the many policy changes that were made to improve recruiting, the Army, Navy, and Air Force increased their recruiter forces dramatically. The Air Force's recruiter force increased by 57 percent between FY95 and FY01, with the largest increase occurring between FY99 and FY01. The Navy increased its recruiter force by 31 percent between FY95 and FY01. The Army, the service with the most recruiters, has steadily increased its recruiter force since FY95, for a total increase of 27 percent between FY95 and FY01. In addition to increasing the number of recruiters and recruiting stations, the services also made significant changes to their recruiter incentive plans

and took steps to give recruiters and the recruiting commands access to new and better technology to improve their overall productivity. For example, recruiters were given cell phones, laptop computers, and access to data and software to help them organize and pursue leads.

The services also dramatically expanded their enlistment bonus programs (with the exception of the Marine Corps) and advertising campaigns. The TRIAD legislation increased the maximum enlistment bonus to \$20,000; and the number of occupational specialties eligible for a bonus was increased in the Army and Navy. The total dollar budget allocated to enlistment bonuses rose from \$20.4 million in FY95 to \$376 million in FY01 across all of the services. The advertising budget aggregated across the services rose from \$111 million in FY95 to \$255 million in FY01. Furthermore, the services revamped their advertising strategies to recognize the dramatic changes in marketing and communications technology that have occurred in the world of advertising. These changes include the growing importance of the Internet, direct marketing, targeted television programming, cable, satellite, and infomercials.

Improvements also occurred in the military's various educational benefit programs. These programs provide service members and veterans the opportunity to add to their education and training while they are in service or once they leave service. Until 1999, each service had a separate tuition assistance program that provided service members with tuition subsidies for coursework pursued off duty. However, these programs differed considerably across the services. As of 1999, the benefit was uniform across the services and equaled 75 percent of tuition costs up to a maximum of \$3,500 per year. The MGIB, the program by which eligible veterans can receive a monthly stipend to cover education costs, was also improved. The real stipend amount increased by 38 percent between FY95 and FY01. In addition to the benefits of the MGIB, high-quality recruits who enlist in hard-to-fill occupational areas can receive monies from the College Fund, a program that offers a "kicker" that adds to their MGIB benefit. The maximum benefit under the College Fund was raised from \$30,000 in FY95 to \$50,000 in FY97. The budgets for the Army College Fund and Navy College Fund have risen significantly since FY94. Both the Army and the Navy significantly increased the dollar

benefit available to high-quality recruits and the number of occupational specialties that are eligible for the benefit.

## **ENLISTED REENLISTMENT AND OFFICER CONTINUATION**

The TRIAD increases also had a positive predicted effect on first- and second-term reenlistment. As a result of TRIAD, the military/civilian pay ratio rose substantially in FY00 and FY01 for all services. The ratio in FY00 was from 4.5 to 11 percent higher than it was in FY96–97, depending on zone and service. The relative military pay increase helped to offset the continuing decrease in the unemployment rate in FY00, which reduced reenlistment. By FY01, the economy began to soften and the unemployment rate increased.

We found that, in the years before TRIAD, the combined effect of the change in relative military pay and the decrease in the unemployment rate was to reduce predicted first- and second-term reenlistment in FY98–99 relative to that in FY96–97. The predicted effect of these variables in FY99–00 was uncertain. Although the TRIAD pay increase had a positive effect on reenlistment, the further decline in the unemployment rate produced a negative predicted effect. However, in FY01 military pay rose relative to civilian pay and unemployment rose, so both had a positive effect on first- and second-term reenlistment.

Like recruiting, retention was under duress in the second half of the 1990s. The Air Force consistently missed its first- and second-term enlisted retention targets beginning in FY98, and the Army experienced declines in first- and second-term retention rates beginning in FY97. Navy retention rates actually rose during the late 1990s, but they still fell short of target. Only the Marine Corps retention rates held steady during this period. Officer continuation rates also fell in the second half of the 1990s, especially among Air Force officers and those in midcareer. Although the year-to-year declines in the annual continuation rates were relatively small, such declines can accumulate over time and translate into troublesome shortfalls in manpower and declines in the pool of midcareer personnel from which future senior leaders are drawn. Declines in retention in key areas, such as among Army captains and among aviators in all services, in the 1990s were particularly problematic.

The services generally attributed these enlisted and officer retention problems to three factors: trends in the civilian economy; more frequent deployments of longer duration; and the handling of the defense drawdown, which reduced the pool of junior personnel in the early 1990s and required higher retention rates among midcareer personnel in the late 1990s to meet requirements.

In addition to the FY00 TRIAD pay action, numerous steps were taken to improve retention. As with enlistment bonuses, the budgets for Selective Reenlistment Bonuses (SRBs) have grown tremendously since FY97. The Army's budget more than doubled in nominal terms between FY97 and FY02. The Air Force budget increased from \$0 to \$126 million over this period, and the Navy and Marine Corps budgets also increased. The expansion in the reenlistment bonuses program can also be seen by the growth in the number of skills eligible to receive an SRB. In the case of the Air Force, the expansion went from 0 to over 70 percent of skills covered by an SRB. Past research has shown that reenlistment rates are responsive to increases in SRB amounts.

Another major set of resource changes with respect to retention were those made to special pays. In some cases, the dollar amount of the pays was increased, while in other cases, the legislative limit on the maximum amount that could be paid was increased. For example, the FY00 National Defense Authorization Act increased the nuclear officer incentive pay rate to \$25,000. In still other cases, new special pays were created or earlier pays were restructured. For example, aviator continuation pay was restructured to enable aviators to receive the pay until they had 25 years of aviation service, and the up-front payment cap was increased for those extending their service for longer periods. The Career Sea Pay Program has been expanded to include E-1 to E-3 personnel and O-1 to O-6 personnel with less than 3 years of sea duty.

While the effectiveness of the specific changes in the SRB program and special pays has not been determined, all services reported improvements in retention in FY01. The Air Force met its first-term reenlistment goal, second-term reenlistment increased, and the career reenlistment rate held steady. The Navy said in July 2001 that it had made significant retention improvements and predicted that end strength for FY01 would exceed the authorized strength. The



Marine Corps and Army reported that enlisted retention was under control. Officer retention improved, even in previous problem areas.

Despite these improvements, the services reported that pockets of retention problems still persist. The Air Force stated that the enlisted second-term reenlistment rate was still below target, and Air Force officer retention was still a problem among scientists, engineers, and communication and computer system officers. The Army reported a continued shortage of captains, and the Navy indicated that it must continue to improve retention if it is to meet its officer manning requirements among the unrestricted line communities (i.e., aviation, submarine, surface, and special warfare). Therefore, the overall retention picture, like the recruiting picture, is cause for cautious optimism.

---

## ACKNOWLEDGMENTS

---

We are grateful to the Defense Manpower Data Center and specifically Michael Dove and Teri Cholar for their help in providing data on enlisted personnel and officers. We also appreciate the input provided to us by the service representatives and the individuals in the Office of the Secretary of Defense on whom we relied considerably for information on recent trends in recruiting and retention resources and outcomes. We are pleased to thank John Warner for help in applying the model of high-quality recruits that he, Curtis Simon, and Deborah Payne estimated, and for his thoughtful comments on our work. At RAND, we appreciate the input and reviews of our colleagues Charles Kaylor and Ron Fricker, the programming support of Craig Martin, and the research assistance of Lee Mizell. Finally, we wish to thank Captain Chris Kopang, Dr. Saul Pleeter, and Mr. Charles Witschonke in the Office of Compensation of the Office of the Under Secretary of Defense for Personnel and Readiness.

---

## ABBREVIATIONS

---

ACF	Army College Fund
AFQT	Armed Forces Qualification Test
AY	Academic year
CNRC	Commander, Navy Recruiting Command
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DRTV	Direct response television
ECI	Employment Cost Index
GED	General Educational Development
G/R	Goal per recruiter
HI-THREE	Military retirement program
HQ	High quality
HYT	High year of tenure
LRP	Loan Repayment Program
MCCF	Marine Corps College Fund
MGIB	Montgomery GI Bill
NCF	Navy College Fund
NRAMS	Navy Recruiting and Accessions Management System

QMA	Qualified military available
REDUX	Military retirement program begun in 1986
RMC	Regular Military Compensation
SRB	Selective Reenlistment Bonus
TA	Tuition assistance
TIG	Time in grade
TIS	Time in service
TRIAD	Pay actions effected by the FY00 National Defense Authorization Act
USAREC	U.S. Army Recruiting Command
YATS	Youth Attitudinal Tracking Survey
YOS	Year of service

Three years ago, the nation started its most recent debate about military pay in response to recruiting and retention problems in the armed services. All services reported difficulty in recruiting. The percentage of recruits who were high quality declined, and several of the services were even unable to meet their overall recruiting goals. The services also reported difficulty in retention. Retention in technical areas was often below target, and all services expressed more widespread concern over retention. In particular, midcareer personnel were unhappy with their retirement benefit program, REDUX (begun in 1986), because it was less generous than its predecessor, HI-THREE, and, therefore, seemed unfair and inequitable.

In response to concern about this situation, Congress held hearings and formulated several military pay bills. These actions led to the passage of the FY00 National Defense Authorization Act, which made significant enhancements to the existing military compensation system. Among the main provisions were a 4.8 percent increase in basic pay effective January 1, 2000, and a structural adjustment to the basic pay table effective July 1, 2000. In addition, each year from 2001 to 2006 basic pay was to be increased by 0.5 percent more than the private sector rise in employment cost, measured by the Employment Cost Index (ECI). Finally, personnel were given the choice to return to HI-THREE retirement or stay under REDUX and receive \$30,000 at year of service (YOS) 15 in return for a commitment to stay until YOS 20. These three provisions are collectively known as TRIAD. The expectation was that these compensation increases would be a major step toward overcoming the recruiting and retention difficulties.

Section 673 of the act requires the Secretary of Defense to submit to Congress an annual report that sets forth the secretary's assessment of the effects of the improvements to compensation and other personnel benefits made in Title VI of the act on recruiting and retention. RAND was asked by the Office of the Secretary of Defense to develop a methodology and estimates to help in the preparation of the report. This document summarizes the results of the RAND analysis.

The analysis is organized around the question, what are the effects of the FY00 compensation initiatives on recruiting and retention? The analysis focuses on the active duty force. To answer this question, we first developed descriptive information using available data on recruiting, retention, and force management flexibility. We then applied models to assess the effect of the FY00 compensation initiatives on recruiting and reenlistment. Specifically, we used these models to predict expected recruiting performance and reenlistment performance in the absence of the compensation initiatives and in their presence. The difference in predictions provides an estimate of the expected effect of the compensation initiatives.

The document presents the predicted effects of the compensation initiative on recruiting and reenlistment in Chapter Two. To put these results in context and to provide information on relevant trends, we present contextual data on recruiting (Chapter Three) and on continuation and retention (Chapter Four). We then offer some closing thoughts (Chapter Five).

The information in this report draws heavily from available sources of data, particularly the services and the Office of the Secretary of Defense. In some cases, current information as well as projections for the future were available. However, in many cases the most recent information available was for the end of FY00, the year the pay legislation took effect, or before. In these cases, data for recent years will need to be incorporated into future reports.

---

**PREDICTED EFFECTS OF THE FY00 PAY LEGISLATION**

---

We predicted the effects of the FY00 increase in military pay on recruiting and reenlistment by using estimates from econometric models. The recruiting model is that of Warner, Simon, and Payne (2001), who focus on high-quality recruits as indicated by *high-quality contracts*. A high-quality recruit has a high school diploma and a score of 50 or higher on the Armed Forces Qualification Test (AFQT).<sup>1</sup> For reenlistment, we reviewed the range of pay and unemployment effect estimates from other studies and chose representative values.

We used the average of FY95–97 as a reference period for the predicted changes in high-quality contracts and reenlistment. These years represent the transition from the end of the drawdown, when recruiting goals were still low and retention was not a problem, to the period of aftereffect as marked by the increase in recruiting goals that began around FY97. The economy was expanding gradually in the mid-1990s, although the strength and duration of the boom were not yet apparent. The unemployment rate had come down from around 7 percent in the early 1990s to 5.6 percent in 1995 and 5.5 percent in 1996. At those rates, one in 18 members of the labor force was jobless and seeking work, compared with one in 25 at the 4 percent unemployment rate in 2000.

---

<sup>1</sup>High-quality recruits are supply limited; the services would accept more high-quality recruits if they were available. The services generally must pay more and use more recruiting resources to increase the supply of high-quality recruits. A crucial purpose of the FY00 pay legislation was to sustain, or increase, the supply of high-quality recruits.

Because recruiting worsened after the mid-1990s, a positive impact of the FY00 legislation will be seen as reversing a downward slide. For instance, an uptick in FY00 or FY01 relative to FY99 would thus be consistent with a positive impact, even though recruiting might not have been restored to its mid-1990s values. If we had used FY99 as the reference point, we might have lost sight of the powerful downward trend that ultimately led to the FY00 pay increase. In contrast, reenlistment rates initially tended to rise after the mid-1990s, perhaps because they had been held down during the draw-down. Thus, reenlistment looked better in FY98 than it did a few years earlier. However, it is still the case that an uptick in FY00 or FY01 relative to FY99 would be consistent with a positive impact of the FY00 legislation.

## **HIGH-QUALITY CONTRACTS**

We begin with comments on the suitability of the Warner, Simon, Payne model for our predictions. We discuss how large an effect the FY00 pay increase had on the military/civilian pay ratio and then describe the predicted effect of that increase on high-quality contracts. The presentation broadens to include other factors that also affected high-quality contracts.

### **The Warner, Simon, Payne Model**

This model provides relatively up-to-date estimates of a wide variety of factors that affect high-quality contracts. The authors based their regression specification on Dertouzos's (1985) well-regarded theory of recruiter effort, carefully constructed the explanatory variables, and used an appropriate econometric technique for estimating the model. Nevertheless, because of issues related to the data available for estimating the model, it is useful to reflect for a moment on the model and its application to prediction.

Warner, Simon, and Payne estimated the model on monthly data by service and state for the period FY88–97. The method of estimation was “two-way fixed effects.” This method recognizes that states may persistently differ from one another over time, and that all states may be subject to common influences in any given year. This leads to a fixed effect for each state and a fixed effect for each year. It also leads



to two groups of explanatory variables. These are variables that (a) vary over time within each state, and (b) either differ by state but remain constant over years for each state (say, real median family income) or differ over years but remain constant over states for each year (say, the enlistment bonus program).

The model was estimated in two stages. In the first stage, the raw observations were differenced from the state- and time-fixed effects.<sup>2</sup> The differenced observations were then regressed on variables that vary over time within each state—the (a) variables. These were recruiters, recruiting goals, advertising, and unemployment rate. In the second stage, using the estimates from the first stage, the effect of the first-stage variables was subtracted from the raw observations. The transformed observations were then regressed on the (b) variables. The (b) variables that varied over time but not across states at any given time were college fund and enlistment bonus programs for the Army and the Navy, fiscal year dummy variables, and month dummy variables. The (b) variables that were treated as varying across states but not over time were military/civilian pay, median family income, percent enrolled in college, qualified military available (QMA), percent black, percent Hispanic, population density, and percent veterans. Although these variables exhibited some change within a state over time, it was so little that the authors believed it best to handle the variables as though they were fixed over time. Thus, they used the average value of the variable over FY88–97.

Although we believe the model's estimates are the best available, we cite four concerns regarding prediction. First, the estimate of the military/civilian pay effect is based on cross-section variation, but the FY00 legislation calls for increases in military pay over time. The military/civilian pay effect as estimated across states may not be equivalent to the military/civilian pay effect that would be estimated from changes in this variable over time within a state. Among quantitative analysts, it is well known that cross-sectional estimates are inherently different from time series estimates and the two should not be assumed to be interchangeable. This point also applies to the other variables that varied across states but not over time.

---

<sup>2</sup>For differencing, a state-fixed effect is the average value of a state's observations over FY88–97, and a year-fixed effect is the average value of observations over states for that year.

Still, we use the cross-sectional estimates for prediction. Second, the cross-sectional estimates may be biased because of the possible presence of unobserved factors that are correlated with the included variables. For instance, the variable percent veterans is found to have a large positive effect on high-quality contracts—perhaps too large. The positive effect may be due to the role of veterans as influencers; it is reasonable to believe that veterans set a good example and provide information and counseling to young men and women who are interested in enlisting. However, it may be that veterans tend to locate in states that have attitudes and cultures that esteem the military, and it is these attitudes and cultures that influence high-quality youth to enlist. If so, the coming decline in veterans as the World War II generation passes may have less of an effect on high-quality contracts than the model would predict. Third, reverse causality may be present. The concern is that the services increase recruiting resources (bonuses, college funds, advertising, recruiters) when high-quality contracts are relatively low. If so, the effect of these variables may be biased toward zero. Warner et al. tried to control for reverse causality in the enlistment bonus variable but found little change in the estimate. This may mean that reverse causality is not much of a problem or that the means for avoiding reverse causality is not powerful enough to do so. Fourth, the model is estimated on state-level data, but we use it to make national-level predictions. Ideally, the national predictions would be aggregated from state-level predictions, but up-to-date data by state are not yet available. The use of national data to make national predictions raises the possibility of bias. Our expectation is that the bias is small, but we have no specific estimate to offer.<sup>3</sup>

### Change in Military/Civilian Pay

Table 2.1 displays the military/civilian pay ratio for recruits. The upper part of the table indicates the actual change, while the lower part indicates an assumed counterfactual change for FY00 and FY01. A

---

<sup>3</sup>The bias will be small if for each state the percentage change in an explanatory variable at the state level is approximately the same as the percentage change at the national level. Since the percentage change at the national level is a weighted average of the percentage changes at the state level, there is reason to expect that the bias will be small.

**Table 2.1**  
**Military/Civilian Pay Ratio**

	FY95–97	FY98	FY99	FY00	FY01
<b>Actual</b>					
Military/civilian pay ratio	1.12	1.07	1.07	1.03	1.05
Percent change FY95–97		-4.5	-4.7	-8.5	-6.3
<b>Counterfactual<sup>a</sup></b>					
Military/civilian pay ratio				1.02	1.04
Percent change FY95–97				-8.9	-7.2

<sup>a</sup>Counterfactual assumes basic pay would have increased in FY00 and FY01 by 4.3 and 3.2 percent, respectively.

comparison of the actual and counterfactual changes highlights the immediate boost the FY00 legislation gave to military/civilian pay. As seen, the boost is noticeable but not huge.

In Warner et al. (2001), a military pay index for year t was created by taking military pay (t)/military pay (1987), and a civilian wage index was done similarly. The military/civilian pay ratio in year t is the ratio of the indexes in that year.<sup>4</sup> The measure of military pay for recruits is the basic pay for an E-1.<sup>5</sup> The measure of civilian pay is the mean wage of 18- to 35-year-old males with a high school diploma who are full-time workers.

As seen, the pay ratio fell in FY98, FY99, and even in FY00, the first year of the FY00 pay increase.<sup>6</sup> However, the pay ratio rose from

<sup>4</sup>Other studies present absolute pay comparisons, e.g., Hosek and Sharp (2001) and Asch, Hosek, and Warner (2001).

<sup>5</sup>The purpose of choosing E-1 is to have a pay cell that reflects the movement in entry-level pay over time. It should be recognized that recruits who have completed some college enter at a higher grade. For instance, the Army places an accession with 30 semester hours of college at E-2. Also, progression through the lower ranks is rapid. Promotion guidelines call for 6 months time in service (TIS) for promotion to E-2, 12 months TIS and 4 months time in grade (TIG) for promotion to E-3, and 26 months TIS and 6 months TIG for promotion to E-4. These aspects—entering at a higher pay grade than E-1 and being promoted rapidly—have been fairly stable over time. Because they have changed little, the major factor affecting the movement of entry pay over time is probably the annual adjustment of the basic pay table.

<sup>6</sup>Basic pay was increased by 4.8 percent across the board on January 1, 2000, and targeted increases in basic pay were implemented on July 1, 2000. Since E-1 pay was not targeted for an increase, the relative pay increase for an E-1 in FY00 remained at 4.8 percent.

FY00 to FY01. Because the military pay increases for FY00 and FY01 were 0.5 percentage point above the ECI, one might have expected the military/civilian pay ratio for those years to be above the FY99 military/civilian pay raise value of 1.07. However, the ECI reflects wages and salaries for all workers in the private sector, young and old. Military members are young, and the wages of different groups in the economy change at different rates. During the boom, the wages of young workers rose more rapidly than the ECI. Thus, despite the implementation of the pay increase, the continued decline of relative pay into FY00 reflected the fast civilian wage growth among young workers as the boom reached its peak.

The counterfactual pay increase assumes that basic pay would have been adjusted by the percentage change in the ECI, i.e., by 4.3 percent for FY00 and 3.2 percent for FY01.<sup>7</sup> These percentages compare with the legislated changes of 4.8 percent and 3.7 percent, respectively, for those years. Under the counterfactual, the pay ratio fell from FY99 to FY00 and began to recover in FY01. In FY00, the counterfactual pay ratio was 8.9 percent less than the FY95–97 pay ratio, while the actual pay ratio was 8.5 percent less. In FY01, the counterfactual pay ratio was 7.2 percent less than the pay ratio in FY95–97, while the actual pay ratio was 6.3 percent less.

### **Predicted Effect of Pay Change on High-Quality Contracts**

Our basic finding is that high-quality contracts would have improved from FY00 to FY01 if military pay had been adjusted as usual by the ECI percentage, but they improved more because of the FY00 TRIAD pay increase.

Table 2.2 displays the pay elasticity and the predicted percentage change in high-quality contracts. The latter equals the percentage

---

<sup>7</sup>The 1990 Federal Employees Pay Comparability Act mandates the ECI as the guide for adjusting basic pay. Because of the time required by the legislative process, the third quarter ECI for 1998 would have been used as guidance for the FY00 pay adjustment, and similarly for other years. The particular ECI used in adjustment is the 12-month change in private sector wages and salaries, not seasonally adjusted.

**Table 2.2**  
**Predicted Percentage Change in High-Quality Contracts**  
**Due to Military/Civilian Pay**

Kind of Change in Pay	Elasticity	Percentage Change from FY95–97			
		FY98	FY99	FY00	FY01
<b>Actual</b>					
Army	1.05	-4.8	-4.9	-8.9	-6.7
Navy	1.17	-5.3	-5.5	-10.0	-7.4
Air Force	0.67	-3.0	-3.2	-5.7	-4.2
Marines	0.38	-1.7	-1.8	-3.2	-2.4
<b>Counterfactual<sup>a</sup></b>					
Army	1.05			-9.4	-7.6
Navy	1.17			-10.5	-8.5
Air Force	0.67			-6.0	-4.9
Marines	0.38			-3.4	-2.8

<sup>a</sup>Counterfactual assumes basic pay would have increased in FY00 and FY01 by 4.3 and 3.2 percent, respectively.

change in the military/civilian pay ratio (Table 2.1) times the military/civilian pay ratio elasticity<sup>8</sup> as estimated by Warner et al. (2001).

As seen, predicted high-quality contracts fell from FY95–97 to FY00, consistent with the decline in the military/civilian pay ratio through this period. The increase in the pay ratio from FY00 to FY01 led to an increase in predicted high-quality contracts. Although high-quality contracts in FY01 were still below their FY95–97 value, they were not as far below as they were in FY00. (This is a comparative statement and not meant to endorse FY95–97 as a target to be achieved.) Furthermore, the gains from FY00 to FY01 were larger for the Army and Navy because their pay elasticities were larger than those of the Air Force and Marine Corps.

The lower part of the table uses the counterfactual case of basic pay changing by the same percentage as the ECI. By comparing the upper and lower parts of the table, it is clear that the immediate

<sup>8</sup>The elasticity gives the percentage change in high-quality contracts in response to a 1 percentage point increase in the pay ratio, holding constant other factors.

improvement in high-quality contracts attributable to the higher-than-usual pay increase in FY00 and FY01 was small.

Table 2.2 may underestimate the high-quality contract increase due to the FY00 legislation. The elasticity was estimated from past military/civilian pay ratios where military pay changes were decided year by year and, by law, were expected to follow the ECI. In fact, basic pay changes throughout the 1990s were in close step with the ECI. This implies that service members and prospective recruits were seemingly protected against the possibility that military pay would lag far behind increases in private sector wages and salaries. But the FY00 pay legislation should have reset this expectation: Basic pay would not just keep pace with the private sector but would outpace it by half a percentage point per year through FY06. Therefore, one might expect a larger response from the pay increases that took effect in FY00 and FY01 than from past increases of nominally equal percentages.

### More Complete Predictions of High-Quality Contracts

To provide a more comprehensive view, we prepared tables that include a number of explanatory variables in addition to relative pay. These variables are defined in Table 2.3. The variables are used with estimates from Warner et al. (2001) to predict the change in high-quality contracts.<sup>9</sup>

---

<sup>9</sup>The Warner et al. (2001) model contains additional variables not used here. We attempted to use enlistment bonus and college fund variables but found that the predicted effects were far too large. The large expansion in bonus and college fund budgets in the late 1990s in effect resulted in out-of-sample-range prediction. Joint advertising expenditures are not included because data for FY99–01 are not yet available. The percent QMA is not used because it did not change over the period FY95–01. QMA is defined as the estimated fraction of 17- to 21-year-old youth who are high quality and eligible to join the military. Population density, percent black, and percent Hispanic were likewise omitted because they changed little and had small estimated effects and so had a negligible effect on predicted high-quality contracts. The percentage of veterans was omitted because its coefficient reflects the role of differences across states in this percentage. States having a high percentage of veterans, such as southern states, may have values or cultural factors that are associated with high enlistment and that are attractive to veterans. A high percentage of veterans does not necessarily cause high enlistment. By the same token, a decline in the percentage of veterans over time—as is occurring now—does not necessarily cause a decline in enlistment. To the extent that it causes a decline, the decline may be far less than is implied by the large elasticity on veterans in the Warner et al. (2001) model. Finally, fis-

**Table 2.3**  
**Description of Explanatory Variables Used in Predictions**

Variable	Description
Military/civilian pay ratio	Relative growth of E-1 basic pay since 1987 divided by relative growth of civilian wages of full-time males aged 18–35 with high school or higher education since 1987
Unemployment rate	Unemployment rate for the labor force
Family income	Median family income (2000 \$)
College attendance	Fraction of high school graduate population aged 17–21 enrolled in college
Recruiters	Number of production recruiters
Goal	Number of contracts sought by a service
Cross-service recruiting effort	The sum of other services' high-quality contracts divided by the sum of their goals
Total advertising	Total advertising budget data are used to approximate the percentage change in advertising expenditures (\$ million)

Tables 2.4 to 2.7 contain the predictions. In these tables, the top panel gives the values of the variables, the middle panel gives the percentage change in the variables relative to FY95–97, and the bottom panel uses the percentage change for each explanatory variable and its estimated elasticity to predict the change in high-quality contracts.<sup>10</sup> These predicted changes are summed to obtain the

---

cal year dummy variables for FY90–97 were not used because their effects are specific to past years and not applicable in any obvious way to future years.

<sup>10</sup>The elasticities are reported in Warner et al. (2001). However, because their model contains an interaction between goal per recruiter (G/R) and the log of recruiters, we recomputed the elasticity for recruiters and for goals at the values prevailing in our base period, FY95–97. Furthermore, the recruiter elasticity reported in Warner et al. is computed assuming G/R is held constant, whereas in practice it can change. We therefore prepared tables comparing the results when the elasticity held G/R constant and those when it was allowed to vary. The comparison suggested that the predictions were more accurate under the assumption of constant G/R. A possible explanation is that year-to-year changes in G/R contain noise relative to a multiyear average of G/R. Based on these comparisons, Tables 2.4 to 2.7 use a recruiter elasticity that holds G/R constant.

**Table 2.4**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on High-Quality Contracts: Army**

Variable	FY95-97	FY98	FY99	FY00	FY01
Military/civilian pay	1.12	1.07	1.07	1.03	1.05
Unemployment rate	5.4	4.6	4.3	4.1	4.4
Family income <sup>a</sup>	35,583	37,430	38,440	39,694	40,942
College attendance	0.63	0.63	0.63	0.64	0.64
Recruiters	5,251	6,098	5,813	6,208	6,194
Goal	101,520	114,444	120,331	114,729	94,397
Cross-service recruiting	0.69	0.67	0.62	0.62	0.63
Total advertising	72.1	95	101	105	102
HQ contracts <sup>a</sup>	48,717	46,125	40,753	43,901	43,813
Percentage Change from FY95-97		FY98	FY99	FY00	FY01
Military/civilian pay		-4.5	-4.7	-8.5	-6.3
Unemployment rate		-15.4	-20.0	-25.0	-18.5
Family income		5.2	8.0	11.6	15.1
College attendance		0.5	0.7	1.0	1.4
Recruiters		16.1	10.7	18.2	18.0
Goal		12.7	18.5	13.0	-7.0
Cross-service recruiting		-2.7	-9.6	-10.6	-8.0
Total advertising		3.5	4.4	5.0	4.6
HQ contracts		-5.3	-16.3	-9.9	-10.1
Predicted Percentage Change in HQ Contracts	Elasticity	FY98	FY99	FY00	FY01
Military/civilian pay	1.05 <sup>b</sup>	-4.7	-4.7	-8.4	-6.6
Unemployment rate	0.26 <sup>b</sup>	-3.9	-5.3	-6.3	-4.8
Family income	-0.72 <sup>b</sup>	-3.7	-5.8	-8.3	-10.8
College attendance	-0.87 <sup>b</sup>	0.0	0.0	-1.4	-1.4
<b>Subtotal</b>		-12.3	-15.8	-24.4	-23.6
Recruiters	0.49 <sup>b</sup>	7.9	5.2	8.9	8.8
Goal	0.16 <sup>b</sup>	2.0	2.9	2.1	-1.1
Cross-service recruiting	-0.12 <sup>c</sup>	0.3	1.2	1.2	1.0
Total advertising	0.16 <sup>b</sup>	5.1	6.4	7.3	6.6
<b>Subtotal</b>		15.3	15.8	19.5	15.4
<b>Total</b>		3.1	0.0	-4.9	-8.2

<sup>a</sup>FY01 is an estimate. <sup>b</sup> = significant at 0.01; <sup>c</sup> = significant at 0.10.



**Table 2.5**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on High-Quality Contracts: Navy**

Variable	FY95-97	FY98	FY99	FY00	FY01
Military/civilian pay	1.12	1.07	1.07	1.03	1.05
Unemployment rate	5.4	4.6	4.3	4.1	4.4
Family income <sup>a</sup>	35,583	37,430	38,440	39,694	40,942
College attendance	0.63	0.63	0.63	0.64	0.64
Recruiters	3,701	3,630	4,514	4,492	4,588
Goal	52,921	54,147	58,075	61,000	64,000
Cross-service recruiting	0.59	0.53	0.47	0.50	0.59
Total advertising	38	62	66	64	66
HQ contracts	33,987	31,271	31,742	32,782	32,871
Percentage Change from FY95-97		FY98	FY99	FY00	FY01
Military/civilian pay		-4.5	-4.7	-8.5	-6.3
Unemployment rate		-15.4	-20.0	-25.0	-18.5
Family income		5.2	8.0	11.6	15.1
College attendance		0.5	0.7	1.0	1.4
Recruiters		-1.9	22.0	21.4	24.0
Goal		2.3	9.7	15.3	20.9
Cross-service recruiting		-9.8	-20.5	-15.1	-0.7
Total advertising		6.9	8.1	7.5	8.1
HQ contracts		-8.0	-6.6	-3.5	-3.3
Predicted Percentage Change in HQ Contracts	Elasticity	FY98	FY99	FY00	FY01
Military/civilian pay	1.17 <sup>b</sup>	-5.2	-5.2	-9.4	-7.3
Unemployment rate	0.29 <sup>b</sup>	-4.3	-5.9	-7.0	-5.4
Family income	-0.78 <sup>b</sup>	-4.0	-6.3	-9.0	-11.7
College attendance	-1.01 <sup>b</sup>	0.0	0.0	-1.6	-1.6
<b>Subtotal</b>		-13.6	-17.4	-27.0	-26.0
Recruiters	0.53 <sup>b</sup>	-1.0	11.7	11.4	12.7
Goal	0.33 <sup>b</sup>	0.8	3.2	5.0	6.9
Cross-service recruiting	-0.13 <sup>b</sup>	1.3	2.6	2.0	0.0
Total advertising	0.07 <sup>c</sup>	4.4	5.2	4.8	5.2
<b>Subtotal</b>		5.5	22.7	23.1	24.8
<b>Total</b>		-8.1	5.3	-3.9	-1.3

<sup>a</sup>FY01 is an estimate. <sup>b</sup> = significant at 0.01; <sup>c</sup> = significant at 0.05.

**Table 2.6**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on High-Quality Contracts: Air Force**

Variable	FY95-97	FY98	FY99	FY00	FY01
Military/civilian pay	1.12	1.07	1.07	1.03	1.05
Unemployment rate	5.4	4.6	4.3	4.1	4.4
Family income <sup>a</sup>	35,583	37,430	38,440	39,694	40,942
College attendance	0.63	0.63	0.63	0.64	0.64
Recruiters	942	961	962	1,108	1,384
Goal	31,143	32,200	35,000	35,923	38,375
Cross-service recruiting	0.55	0.50	0.45	0.47	0.52
Total advertising	11	12	60	49	48
HQ contracts	28,176	25,561	24,625	26,564	30,452
Percentage Change from FY95-97		FY98	FY99	FY00	FY01
Military/civilian pay		-4.5	-4.5	-8.0	-6.3
Unemployment rate		-14.8	-20.4	-24.1	-18.5
Family income		5.2	8.0	11.6	15.1
College attendance		0.0	0.0	1.6	1.6
Recruiters		2.0	2.1	17.6	46.9
Goal		3.4	12.4	15.3	23.2
Cross-service recruiting		-9.1	-18.2	-14.5	-5.5
Total advertising		9.1	445.5	345.5	336.4
HQ contracts		-9.3	-12.6	-5.7	8.1
Predicted Percentage Change in HQ Contracts	Elasticity	FY98	FY99	FY00	FY01
Military/civilian pay	0.67 <sup>b</sup>	-3.0	-3.0	-5.4	-4.2
Unemployment rate	0.23 <sup>b</sup>	-3.4	-4.7	-5.5	-4.3
Family income	-0.62 <sup>b</sup>	-3.2	-5.0	-7.2	-9.3
College attendance	-1.17 <sup>b</sup>	0.0	0.0	-1.9	-1.9
<b>Subtotal</b>		-9.6	-12.7	-19.9	-19.6
Recruiters	0.40 <sup>b</sup>	0.8	0.8	7.0	18.5
Goal	0.41 <sup>b</sup>	1.4	5.1	6.3	9.6
Cross-service recruiting	-0.08	0.7	1.5	1.2	0.4
Total advertising	-0.01	-0.1	-4.5	-3.5	-3.4
<b>Subtotal</b>		2.8	3.0	11.0	25.2
<b>Total</b>		-6.8	-9.7	-8.9	5.6

<sup>a</sup>FY01 is an estimate. <sup>b</sup> = significant at 0.01.

**Table 2.7**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on High-Quality Contracts: Marine Corps**

Variable	FY95-97	FY98	FY99	FY00	FY01
Military/civilian pay	1.12	1.07	1.07	1.03	1.05
Unemployment rate	5.4	4.6	4.3	4.1	4.4
Family income <sup>a</sup>	35,583	37,430	38,440	39,694	40,942
College attendance	0.63	0.63	0.63	0.64	0.64
Recruiters <sup>b</sup>	2,627	2,754	2,702	2,650	2,650
Goal	43,677	37,137	36,914	39,146	37,589
Cross-service recruiting	0.60	0.51	0.46	0.49	0.54
Total advertising	15	26	32	33	39
<b>HQ contracts</b>	<b>25,746</b>	<b>25,972</b>	<b>24,612</b>	<b>24,473</b>	<b>25,404</b>
Percentage Change from FY95-97		FY98	FY99	FY00	FY01
Military/civilian pay		-4.5	-4.5	-8.0	-6.3
Unemployment rate		-14.8	-20.4	-24.1	-18.5
Family income		5.2	8.0	11.6	15.1
College attendance		0.0	0.0	1.6	1.6
Recruiters		4.8	2.9	0.9	0.9
Goal		-15.0	-15.5	-10.4	-13.9
Cross-service recruiting		-15.0	-23.3	-18.3	-10.0
Total advertising		73.3	113.3	120.0	160.0
<b>HQ contracts</b>		<b>0.9</b>	<b>-4.4</b>	<b>-4.9</b>	<b>-1.3</b>
Predicted Percentage Change in HQ Contracts	Elasticity	FY98	FY99	FY00	FY01
Military/civilian pay	0.38 <sup>c</sup>	-1.7	-1.7	-3.1	-2.4
Unemployment rate	0.28 <sup>c</sup>	-4.1	-5.7	-6.7	-5.2
Family income	-0.40 <sup>c</sup>	-2.1	-3.2	-4.6	-6.0
College attendance	-0.89 <sup>c</sup>	0.0	0.0	-1.4	-1.4
<b>Subtotal</b>		<b>-7.9</b>	<b>-10.6</b>	<b>-15.8</b>	<b>-15.0</b>
Recruiters	0.43 <sup>c</sup>	2.1	1.2	0.4	0.4
Goal	0.05	-0.8	-0.8	-0.5	-0.7
Cross-service recruiting	-0.27 <sup>c</sup>	4.1	6.3	5.0	2.7
Total advertising	-0.07 <sup>c</sup>	-5.1	-7.9	-8.4	-11.2
<b>Subtotal</b>		<b>0.2</b>	<b>-1.2</b>	<b>-3.6</b>	<b>-8.9</b>
<b>Total</b>		<b>-7.7</b>	<b>-11.8</b>	<b>-19.4</b>	<b>-23.9</b>

<sup>a</sup>FY01 is an estimate. <sup>b</sup>FY99 is an estimate. <sup>c</sup> = significant at 0.01.

overall predicted percentage change in high-quality contracts. Table 2.8 compares the predicted and actual percentage changes in high-quality contracts.

In discussing Tables 2.4 to 2.7, we begin with variables that have the same values for all services. These are the military/civilian pay ratio, the unemployment rate, median family income, and the college attendance rate. We then discuss variables whose values differ by service. These are recruiters, goals, cross-service recruiting effort, and total advertising. Except for cross-service recruiting effort, each service has some discretion over its values of these variables. Cross-service recruiting effort depends on the goals and recruiting resources of the other services.<sup>11</sup>

**Common Variables.** The military/civilian pay ratio averaged 1.12 in FY95–97, fell to 1.07 in FY98 and FY99 and 1.03 in FY00, then rose to 1.05 in FY01.<sup>12</sup> The unemployment rate averaged 5.4 percent in FY95–97, declined to 4.1 percent over the next three years, and rose to 4.4 percent in FY01. Real family income and the college attendance rate rose steadily from FY95–97 to FY01. Family income grew from \$35,583 in FY95–97 to \$40,942 in FY01. College attendance inched up from 0.63 in FY95–97 to 0.64 in FY01. Each of these variables had a similar effect on high-quality contracts for each of the services. Military/civilian pay and unemployment had a positive effect and family income and college attendance had a negative effect on high-quality contracts. The decline in military/civilian pay and unemployment from FY95–97 to FY00 decreased the predicted num-

---

<sup>11</sup>Since the services compete for recruits, other services' recruiting efforts cannot be assumed independent of a service's own recruiting effort. It is instead reasonable to assume that the services' recruiting strategies result from a strategic interaction analogous to Bertrand equilibrium in oligopoly theory. In Bertrand behavior, a firm takes other firms' quantities as given and sets the best-response price. In recruiting, the best-response price would include enlistment bonuses, educational benefits, as well as individual attention from recruiters to persuade a prospect to enlist. Advertising helps to differentiate each service's market.

<sup>12</sup>Because the military pay increases for FY00 and FY01 were 0.5 percentage point above the ECI, one would have expected the military/civilian pay ratio for those years to be above the FY99 military/civilian pay ratio value of 1.07. However, the ECI reflects wages and salaries for all workers in the private sector, young and old. Military members are young, and the wages of different groups in the economy do not change at the same rate. During the boom, the wages of young workers rose more rapidly than the ECI.

ber of high-quality contracts for all services. As mentioned, the percentage change in predicted high-quality contracts due to these variables was negative and worsened over this period, reaching a low point in FY00. Some improvement was apparent in FY01. For instance, the decline in military/civilian pay and unemployment from FY95–97 to FY00 led respectively to 8.9 and 6.5 percent predicted decreases in Army high-quality contracts (Table 2.4)—a combined decrease of 15.4 percent. The increase in military/civilian pay and rise in unemployment from FY00 to FY01 mitigated this decrease. These variables now accounted for only an 11.5 percent predicted decrease in Army high-quality contracts. The corresponding predicted decreases for the other services due to military/civilian pay and unemployment were Navy, 17.2 percent in FY00, 12.8 percent in FY01; Air Force, 11.4 percent in FY00, 8.4 percent in FY01; and Marine Corps, 10.2 percent in FY00, 7.6 percent in FY01.

The rise in family income and the small rise in college attendance exerted negative effects on predicted high-quality contracts for all services.<sup>13</sup> The large increase in family income combined with its large negative elasticity to produce 6 to 12 percent reductions in predicted high-quality contracts from FY95–97 to FY01, depending on the service. The continued growth of family income from FY00 to FY01 coupled with the very slight growth in college attendance meant that by FY01 these variables accounted for a 12.0 percent predicted decrease in Army high-quality contracts relative to FY95–97. The Navy and Air Force fared similarly. Their predicted decreases from FY95–97 to FY01 were 13.1 percent and 11.0 percent, respectively, while the predicted decrease for the Marine Corps was 7.3 percent. The combined effect of military/civilian pay, unemployment, family income, and college attendance was worst in FY00, but FY01 was not much better. These variables led to large predicted decreases in high-quality contracts (see the subtotals in Tables 2.4 to 2.7): Army, 24.4 percent in FY00, 23.6 percent in FY01; Navy, 27.0 percent in FY00,

---

<sup>13</sup>The Warner et al. (2001) model and our discussion focus on civilian family income. An argument can be made that military family income is an appropriate variable to consider as well. However, about 85 percent of recruits enter the military without dependents. Given that many marry during the first or second term of service, military family income may be an important determinant of retention. Military family income is not routinely collected in military personnel data, although it has been included in periodic surveys of enlisted and officer personnel.

26.0 percent in FY01; Air Force, 19.9 percent in FY00, 19.6 percent in FY01; and Marine Corps, 15.8 percent in FY00, 15.0 percent in FY01. The services fought this decline by increasing their recruiting resources and, as noted in the next section, reengineering their recruiter management and incentives.

**Service-Specific Variables.** The service-specific variables are recruiters, recruiting goals, cross-service recruiting effort, and total advertising. Warner et al. (2001) estimated that for all services recruiting goal and recruiters had a positive effect on high-quality contracts and cross-service recruiting effort had a negative effect. Also, advertising, bonus, and college fund had positive effects for the Army and the Navy, while the advertising effects for the Air Force and Marine Corps were negative.<sup>14</sup>

Navy and Air Force goals increased every year over the FY95–97 to FY01 period, while Army and Marine Corps goals increased in some years and decreased in others. The Army recruiting goal averaged 101,520 in FY95–97; rose to 114,444 in FY98 and to 120,331 in FY99; then fell to 114,729 in FY00 and 94,397 in FY01. The Navy goal was 52,921 in FY95–97; 54,147 in FY98; 58,075 in FY99; 61,000 in FY00; and 64,000 in FY01. For the Air Force, the goals were 31,143 in FY95–97; 32,200 in FY98; 35,000 in FY99; 35,923 in FY00; and 38,375 in FY01. The Marine Corps goals were 43,677 in FY95–97; 37,137 in FY98; 36,914 in FY99; 39,146 in FY00; and 37,589 in FY01.

The elasticity of high-quality contracts with respect to goals differed by service. It was low for the Army and Marine Corps at 0.16 and 0.05, respectively, compared with 0.33 for the Navy and 0.41 for the Air Force. The higher elasticities for the Navy and Air Force meant that the steady increase in their goals from FY95–97 to FY01 made a sizeable contribution to their predicted high-quality contracts. For instance, the increase in goals from FY95–97 to FY00 was 15.3 percent for the Navy and 15.3 percent for the Air Force. The respective predicted increase in high-quality contracts due to the increase in goals was 5.0 percent for the Navy and 6.3 percent for the Air Force.

---

<sup>14</sup>Warner et al. (2001) did not estimate bonus and college fund effects for the Air Force and Marine Corps; their programs were small or nonexistent (the Air Force did not have a college fund program). As mentioned, we do not use bonus or college fund in Tables 2.4 to 2.7 because exploratory attempts to do so were well out of sample range.

The Army goal was 13 percent higher in FY00 than it was in FY95–97, but the predicted increase in high-quality recruits was only 2.1 percent. The Marine Corps goal was 10.4 percent lower in FY00 than in FY95–97, and this led to a predicted 0.5 percent decrease in FY00 high-quality contracts.

The relationship between recruiters and high-quality contracts was similar across the services. The elasticity of high-quality contracts with respect to recruiters was 0.49 for the Army, 0.53 for the Navy, 0.40 for the Air Force, and 0.43 for the Marine Corps. Given elasticities in this range, one might roughly expect a service to change its recruiters by roughly twice the percentage its goal changed. For instance, if the goal increased by 5 percent and the service wanted to maintain the percentage of recruits who were high quality, then the service would want to increase recruiters by about 10 percent. Given changes in other factors, such as the downward drag from higher family income and college attendance, the increase in recruiters might be even greater. Advertising, bonuses, and benefits could also be employed more intensively, however. But the data show that changes in goals were not closely matched by changes in the number of recruiters. For example, the Army goal rose by 18.5 percent from FY95–97 to FY99, but recruiters rose by 10.7 percent.<sup>15</sup> The Army goal was 7 percent lower in FY01 than in FY95–97, but it had 18 percent more recruiters. In FY99, the Navy had 22 percent more recruiters than in FY95–97 and a 9.7 percent higher goal, and the Air Force had 0.8 percent more recruiters and a 12.4 percent higher goal. The Marine Corps had about 1.2 percent more recruiters and a 15.5 percent lower goal. Clearly, many factors other than goals influence a service's decision about the number of recruiters to allocate.<sup>16</sup>

Cross-service recruiting effort is defined as the ratio of *other* services' combined high-quality contracts relative to their combined recruiting goals. For each service, the value of this variable was lower in

---

<sup>15</sup>Although the Army goal rose by even more—8,000 compared to the Navy's 4,000—the Army reduced recruiters from FY98 to FY99. The demands to fill units deploying to Bosnia and Kosovo might have taken precedence over recruiting, although we have not researched this point.

<sup>16</sup>For example, the Army's Hometown Recruiter Assistant Program sends qualified enlisted members back to their hometowns to work with local recruiters for several weeks following graduation from training.

FY98–01 than it had been in FY95–97. For instance, from the Army’s perspective, cross-service recruiting effort was 10.6 percent lower in FY00 than in FY95–97. Comparable values for the other services were Navy, 15.1 percent lower; Air Force, 14.6 percent lower; and Marine Corps, 19.0 percent lower. Even though these are large decreases, the effect of cross-service recruiting effort was fairly small for three of the services. Its elasticity was  $-0.12$  for the Army,  $-0.13$  for the Navy, and  $-0.08$  for the Air Force. The small elasticity muted the possible advantage these services could gain from other services’ difficulty in high-quality recruiting relative to their recruiting goals. However, the elasticity had a value of  $-0.27$  for the Marine Corps, nearly twice the size of the other services’ elasticities. Thus, the Marine Corps benefited from the other services’ comparative lack of success in high-quality recruiting, especially in FY98–00. For example, cross-service recruiting effort had a predicted increase of 1.3 percent on Army high-quality contracts in FY00 versus FY95–97, whereas the predicted increases were 2.0 percent for the Navy, 1.2 percent for the Air Force, and 5.1 percent for the Marine Corps.

Advertising had a small effect on predicted high-quality contracts. Army advertising budgets in FY98–01 were 4 to 5 percent higher than in FY95–97, and the increase in high-quality contracts was predicted to be less than 1 percent. The Navy had somewhat larger growth in its advertising budget (7 to 8 percent), but it too had a small increase in predicted high-quality contracts—only around 0.5 percent. That is, advertising raised Navy high-quality contracts by about 0.5 percent over FY98–01 relative to FY95–97. The estimated negative advertising effects for the Air Force and the Marine Corps are problematic, probably because of the poor quality of advertising data available to Warner et al. (2001).<sup>17</sup> The Air Force began with a small advertising budget and had the biggest budget increase. Its budget was 40 to 50 percent higher in FY99–01 than in FY95–97. But the model estimated the impact of Air Force advertising to be practically zero; therefore, the increase in advertising was predicted to have virtually no effect on high-quality contracts. This seems unrealistic;

---

<sup>17</sup>They did not have TV advertising for the Air Force and had only TV advertising data for the Marine Corps. Not only that, their data indicated that the Air Force and Marine Corps programs were quite small relative to the Army and Navy programs. Consequently, the poor estimates could just be due to incomplete data and measurement error.



the estimated effect of Air Force advertising over the period FY88–97 may be a poor guide to the effectiveness of the current Air Force advertising campaign. For the Marine Corps, advertising budget increases were moderate. Budgets were 8 to 18 percent higher in FY98–01 than in FY95–97. Paradoxically, the estimated effect of advertising was negative, so the Warner et al. (2001) model predicts that Marine Corps advertising reduced high-quality contracts by 0.5 to 1 percent in FY98–01 relative to FY95–97. If the Marine Corps advertising effect were set to zero, however, the change in predicted high-quality recruits in Table 2.7 would be small.

We combined the predicted effects of all the service-specific variables to find their net effect on predicted high-quality contracts relative to FY95–97 (see subtotals in Tables 2.4 to 2.7).<sup>18</sup> These predicted changes are generally positive in FY98–01 for the Army, Navy, and Air Force. They are also positive for the Marine Corps if the advertising effect is set to zero. Thus, as expected, these demand-side changes helped counteract the strong supply-side trends that were working against high-quality recruiting. As mentioned, the predicted changes on high-quality contracts from the combined effects of military/civilian pay, unemployment rate, family income, and college attendance were all negative.

### Predicted Versus Actual Changes in High-Quality Contracts

Table 2.8 draws from Tables 2.4 to 2.7 to summarize the predicted and actual changes in high-quality contracts by service from FY95–97. The *predicted* values account for the explanatory variables discussed above, and the *actual* values reflect the influence of those variables as well as omitted variables and random factors. Because of randomness, one expects predictions to be below actual values in some years and above them in other years, and that is the case for the Army and the Navy. This is also true for the Air Force, although the surprisingly tight fit between predicted and actual values is unusual. The story for the Marine Corps appears different.

<sup>18</sup>In some cases, the subtotals in Tables 2.4 to 2.7 do not add to the total because of rounding.

**Table 2.8**  
**Percentage Change in High-Quality Contracts**  
**from FY95–97: Predicted Versus Actual**

Service	FY98	FY99	FY00	FY01
Army				
Predicted	3.1	0.0	-4.9	-8.2
Actual	-5.3	-16.3	-9.9	-10.1
Navy				
Predicted	-8.1	5.3	-3.9	-1.3
Actual	-8.0	-6.6	-3.5	-3.3
Air Force				
Predicted	-6.8	-9.7	-8.9	5.6
Actual	-9.3	-12.6	-5.7	8.1
Marine Corps				
Predicted	-7.7	-11.8	-19.4	-23.9
Actual	0.9	-4.4	-4.9	-1.3

While recognizing that Table 2.8 compares only four years, we find that the Marine Corps' actual changes in high-quality contracts were increasingly better than the model predicted. For example, in FY01 the Marine Corps was predicted to have 23.9 percent fewer high-quality contracts than in FY95–97 (or 12.7 percent fewer if the advertising effect is zeroed out), but it had only 1.3 percent fewer high-quality contracts. This suggests the presence of a systematic but unaccounted for factor in the Marine Corps recruiting success over this period (FY98–01). In other words, the structure of the model may have changed.<sup>19</sup>

<sup>19</sup>Warner et al. (2001) include year-indicator variables in their model and find that the coefficients on these indicators rise over time for the Marine Corps but not for the other services. The rise is consistent with the notion that the Marine Corps became more effective in recruiting high-quality youth. John Warner said that when he discussed this with Carole Minter, a retired Marine Corps general, she noted that the Marine Corps began to focus on recruiting in 1993 or 1994 much more than it had prior to then. It began emphasizing high-quality recruiting and implemented new procedures for selecting and training recruiters. Consistent with this, over the FY87–97 period, average Marine Corps recruiter productivity shows no apparent trend, whereas the trend was down in the other services due to lower unemployment, lower relative pay, more college attendance, etc.

## REENLISTMENT

To predict how TRIAD affected retention, we needed estimates of the reenlistment elasticity with respect to pay and the size of the pay increase. We drew upon past studies to define a reasonable range for the pay elasticity and chose upper and lower bounds of 2.5 and 0.5, and as discussed below, we estimated the size of the pay increase. In work not reported here, we estimated the elasticity of reenlistment with respect to unemployment.

### Estimating Perceived Pay Changes from the Pay Legislation

The effect of TRIAD on reenlistment depends in part on how large the pay increases are perceived to be by the members. The legislation provided basic pay increases of ECI + 0.5 percent for FY00 through FY06, and a \$30,000 bonus at YOS 15 for members who elected to remain under REDUX and complete 20 YOS. For members making a reenlistment decision in zone A (YOS 3 to 6) or zone B (YOS 7 to 10) in FY00 or FY01, much of the pay increase mandated by the legislation materializes in future years. The value of future increases should be recognized as part of the perceived increase in pay. Because the increases come in the future and because a member may be uncertain about his or her future retention, it is necessary to discount future pay. The discounting recognizes that a dollar tomorrow is worth less than a dollar today and that the probability of staying in the military is less than one.

Table 2.9 gives the equivalent increase in annual pay resulting from the TRIAD relative to what it would have been without it. The increase ranges from around 3 percent to 5.5 percent. These values are five to ten times larger than the single-year additional gain from TRIAD of 0.5 percent, relative to a military pay increase equal to ECI alone. The increase was computed under the conservative but defensible assumption that enlisted members have a personal discount rate of 20 percent. This is the rate found in the study by Warner and Pleeter (2001). A lower rate, 10 percent, makes the increases one-and-a-half to two times greater. The increase is greater for people making zone B reenlistment decisions primarily because they are closer in time to the \$30,000 retirement bonus. The Marine Corps and Air Force have larger increases for zone B because they have

**Table 2.9**  
**Estimated Additional Percentage Increase**  
**in Military Pay from TRIAD**

	Army	Navy	Marine Corps	Air Force
Reenlisting January 2000				
Zone A	3.45	2.70	3.13	3.34
Zone B	4.45	3.97	5.34	5.29
Reenlisting January 2001				
Zone A	3.70	2.99	3.42	3.61
Zone B	4.72	4.25	5.56	5.51

higher reenlistment probabilities for later in the career, thereby increasing the likelihood that a member will earn the retirement bonus. The pay increases are larger for January 2001 reenlistment because another of the increases over and above ECI was implemented.

Table 2.10 shows the actual military/civilian pay ratio changes and the counterfactual military/civilian pay ratio changes (what they would have been without TRIAD). The ratios are indexed so the average for FY96–97 is equal to 1.0. The civilian pay estimate used in the calculation for zone A is the median weekly wage for males aged

**Table 2.10**  
**Actual and Counterfactual Military/Civilian Pay**  
**Ratio Changes Relative to FY96–97**

	FY96–97	FY98	FY99	FY00	FY01
<b>Zone A</b>					
Army	1.000	0.974	0.982	1.053	1.056
Navy	1.000	0.974	0.982	1.045	1.048
Marine Corps	1.000	0.974	0.982	1.049	1.052
Air Force	1.000	0.974	0.982	1.051	1.054
Counterfactual	1.000	0.974	0.982	1.018	1.018
<b>Zone B</b>					
Army	1.000	1.020	1.003	1.101	1.104
Navy	1.000	1.020	1.003	1.096	1.099
Marine Corps	1.000	1.020	1.003	1.109	1.113
Air Force	1.000	1.020	1.003	1.109	1.112
Counterfactual	1.000	1.020	1.003	1.054	1.054

22 to 31, and for zone B it is the median wage for males aged 27 to 36. The wages are tabulated from the Current Population Survey.

The counterfactual pay ratio changes equal the ECI change relative to the civilian pay change for years FY98–00. For FY01, we assume that members expect the ECI and civilian wages to grow at the same rate. This means that the counterfactual pay ratio is the same for FY01 as it is for FY00. The actual and counterfactual pay changes are the same through FY99 but differ in FY00 and FY01 as the TRIAD increases are implemented.

With a strong economy, civilian wages grew faster than military pay in FY98 and FY99 and the pay ratio fell. For zone B, however, military pay grew slightly faster for FY98 and FY99 than civilian pay. For FY00, counterfactual military/civilian pay rose in zone A and zone B, but TRIAD made the increase greater still. For example, in zone A the counterfactual rose from 0.98 in FY99 to 1.02 in FY00, whereas TRIAD boosted the increase to 1.05 or so, depending on the service.<sup>20</sup> In zone B, the counterfactual grew from 1.00 in FY99 to 1.05 in FY00, and TRIAD increased it further to 1.10.

### **Predicted Changes in Reenlistment**

We combined the pay change with the military/civilian pay elasticity to predict the change in reenlistment. As mentioned, we used upper and lower bounds for the pay elasticity, which produced a high and low predicted effect on the reenlistment probability. We first describe the predicted effects of the actual and counterfactual pay changes on reenlistment (Table 2.11), and then we discuss the effects of the pay changes and the unemployment rate on reenlistment (Tables 2.12 to 2.15).

As Table 2.11 shows, the decline in military/civilian pay in zone A led to a predicted decrease in reenlistment in FY98 and FY99 relative to

---

<sup>20</sup>For FY00 and FY01, the actual pay ratios for the services are the counterfactual values multiplied by the pay increases resulting from the FY00 legislation (from Table 2.10). The pay changes vary across the services in FY00 and FY01 due to the differences in reenlistment rates and promotion speed.

**Table 2.11**  
**Predicted Effect on Reenlistment Rates of Actual and Counterfactual**  
**Military Pay Changes Relative to FY96–97**

		Elasticity	FY98 (%)	FY99 (%)	FY00 (%)	FY01 (%)
<b>Zone A</b>						
Army	Lower bound	0.5	-1.3	-0.9	2.7	2.8
	Upper bound	2.5	-6.5	-4.5	13.4	14.0
Navy	Lower bound	0.5	-1.3	-0.9	2.3	2.4
	Upper bound	2.5	-6.5	-4.5	11.3	12.1
Marine Corps	Lower bound	0.5	-1.3	-0.9	2.5	2.6
	Upper bound	2.5	-6.5	-4.5	12.4	13.1
Air Force	Lower bound	0.5	-1.3	-0.9	2.6	2.7
	Upper bound	2.5	-6.5	-4.5	12.9	13.6
Counterfactual	Lower bound	0.5	-1.3	-0.9	0.9	0.9
	Upper bound	2.5	-6.5	-4.5	4.4	4.4
<b>Zone B</b>						
Army	Lower bound	0.5	1.0	0.1	5.0	5.2
	Upper bound	2.5	5.1	0.7	25.2	26.0
Navy	Lower bound	0.5	1.0	0.1	4.8	4.9
	Upper bound	2.5	5.1	0.7	23.9	24.7
Marine Corps	Lower bound	0.5	1.0	0.1	5.5	5.6
	Upper bound	2.5	5.1	0.7	27.3	28.2
Air Force	Lower bound	0.5	1.0	0.1	5.5	5.6
	Upper bound	2.5	5.1	0.7	27.3	28.0
Counterfactual	Lower bound	0.5	1.0	0.1	2.7	2.7
	Upper bound	2.5	5.1	0.7	13.4	13.4

FY96–97. This would have reversed in FY00 with the ordinarily expected increase in military pay, seen by the counterfactual. Under TRIAD, with its larger increase in military/civilian pay, the increase in reenlistment from FY99 to FY00 is larger. The story is the same for zone B, except that predicted reenlistment did not decline prior to TRIAD.

**Table 2.12**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on Reenlistment Probability: Army**

	Elasticity FY96-97	FY98	FY99	FY00	FY01
<b>Zone A</b>					
Variables					
Military pay	1.000	0.974	0.982	1.053	1.056
Unemployment rate	5.3	4.6	4.3	4.1	4.4
Reenlistment rate	50.5	53.6	54.3	55.7	
Percentage change from FY96-97					
Military pay		-2.6%	-1.8%	5.3%	5.6%
Unemployment rate		-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate		6.2%	7.6%	10.4%	
Predicted percentage change in reenlistment probability due to					
Military pay—lower bound	0.5	-1.3%	-0.9%	2.7%	2.8%
Military pay—upper bound	2.5	-6.5%	-4.5%	13.4%	14.0%
Unemployment rate	0.14	-1.9%	-2.6%	-3.3%	-2.5%
Total change—lower bound	0.5	-3.2%	-3.5%	-0.6%	0.3%
Total change—upper bound	2.5	-8.5%	-7.0%	10.1%	11.6%
<b>Zone B</b>					
Variables					
Military pay	1.000	1.021	1.003	1.101	1.104
Unemployment rate	5.3	4.6	4.3	4.1	4.4
Reenlistment rate	72.7	74.8	78.0	76.3	
Percentage change from FY96-97					
Military pay		2.1%	0.3%	10.1%	10.4%
Unemployment rate		-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate		2.9%	7.3%	5.0%	
Predicted percentage change in reenlistment probability due to					
Military pay—lower bound	0.5	1.0%	0.1%	5.0%	5.2%
Military pay—upper bound	2.5	5.1%	0.7%	25.2%	26.0%
Unemployment rate	0.41	-5.6%	-7.5%	-9.7%	-7.2%
Total change—lower bound	0.5	-4.6%	-7.4%	-4.6%	-2.0%
Total change—upper bound	2.5	-0.5%	-6.8%	15.6%	18.8%

**Table 2.13**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on Reenlistment Probability: Navy**

	Elasticity	FY96-97	FY98	FY99	FY00	FY01
<b>Zone A</b>						
Variables						
Military pay		1.000	0.974	0.982	1.045	1.048
Unemployment rate		5.3	4.6	4.3	4.1	4.4
Reenlistment rate		31.9	30.5	27.7	31.5	
Percentage change from FY96-97						
Military pay			-2.6%	-1.8%	4.5%	4.8%
Unemployment rate			-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate			-4.2%	-13.0%	-1.1%	
Predicted percentage change in reenlistment probability due to						
Military pay—lower bound	0.5		-1.3%	-0.9%	2.3%	2.4%
Military pay—upper bound	2.5		-6.5%	-4.5%	11.3%	12.1%
Unemployment rate	1.01		-13.8%	-18.6%	-23.8%	-17.8%
Total change—lower bound	0.5		-15.1%	-19.5%	-21.6%	-15.4%
Total change—upper bound	2.5		-20.4%	-23.0%	-12.5%	-5.7%
<b>Zone B</b>						
Variables						
Military pay		1.000	1.021	1.003	1.096	1.099
Unemployment rate		5.3	4.6	4.3	4.1	4.4
Reenlistment rate		48.7	46.3	45.2	45.0	
Percentage change from FY96-97						
Military pay			2.1%	0.3%	9.6%	9.9%
Unemployment rate			-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate			-4.8%	-7.1%	-7.5%	
Predicted percentage change in reenlistment probability due to						
Military pay—lower bound	0.5		1.0%	0.1%	4.8%	4.9%
Military pay—upper bound	2.5		5.1%	0.7%	23.9%	24.7%
Unemployment rate	0.43		-5.9%	-7.9%	-10.1%	-7.6%
Total change—lower bound	0.5		-4.9%	-7.8%	-5.4%	-2.6%
Total change—upper bound	2.5		-0.7%	-7.2%	13.8%	17.1%



**Table 2.14**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on Reenlistment Probability: Air Force**

	Elasticity	FY96-97	FY98	FY99	FY00	FY01
<b>Zone A</b>						
Variables						
Military pay		1.000	0.974	0.982	1.049	1.052
Unemployment rate		5.3	4.6	4.3	4.1	4.4
Reenlistment rate		57.5	21.8	25.1	26.2	
Percentage change from FY96-97						
Military pay			-2.6%	-1.8%	4.9%	5.2%
Unemployment rate			-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate			0.5%	15.7%	20.7%	
Predicted percentage change in reenlistment probability due to						
Military pay—lower bound	0.5		-1.3%	-0.9%	2.5%	2.6%
Military pay—upper bound	2.5		-6.5%	-4.5%	12.4%	13.1%
Unemployment rate	0.09		-2.6%	-3.5%	-4.5%	-3.3%
Total change—lower bound	0.5		-3.9%	-4.4%	-2.0%	-0.7%
Total change—upper bound	2.5		-9.1%	-7.9%	7.9%	9.8%
<b>Zone B</b>						
Variables						
Military pay		1.000	1.021	1.003	1.109	1.113
Unemployment rate		5.3	4.6	4.3	4.1	4.4
Reenlistment rate		73.5	47.1	56.0	55.8	
Percentage change from FY96-97						
Military pay			2.1%	0.3%	10.9%	11.3%
Unemployment rate			-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate			2.1%	21.3%	20.9%	
Predicted percentage change in reenlistment probability due to						
Military pay—lower bound	0.5		1.0%	0.1%	5.5%	5.6%
Military pay—upper bound	2.5		5.1%	0.7%	27.3%	28.2%
Unemployment rate	0.67		-8.5%	-11.4%	-14.6%	-10.9%
Total change—lower bound	0.5		-7.5%	-11.3%	-9.2%	-5.3%
Total change—upper bound	2.5		-3.4%	-10.7%	12.7%	17.3%

**Table 2.15**  
**Values of Variables, Percentage Change in Variables, and**  
**Predicted Effect on Reenlistment Probability: Marine Corps**

	Elasticity	FY96-97	FY98	FY99	FY00	FY01
<b>Zone A</b>						
Variables						
Military pay		1.000	0.974	0.982	1.051	1.054
Unemployment rate		5.3	4.6	4.3	4.1	4.4
Reenlistment rate		57.5	54.0	50.3	52.0	
Percentage change from FY96-97						
Military pay			-2.6%	-1.8%	5.1%	5.4%
Unemployment rate			-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate			-6.1%	-12.5%	-9.6%	
Predicted percentage change in reenlistment probability due to						
Military pay—lower bound	0.5		-1.3%	-0.9%	2.6%	2.7%
Military pay—upper bound	2.5		-6.5%	-4.5%	12.9%	13.6%
Unemployment rate	0.19		-1.2%	-1.7%	-2.1%	-1.6%
Total change—lower bound	0.5		-2.5%	-2.5%	0.4%	1.1%
Total change—upper bound	2.5		-7.8%	-6.1%	10.7%	12.0%
<b>Zone B</b>						
Variables						
Military pay		1.000	1.021	1.003	1.109	1.112
Unemployment rate		5.3	4.6	4.3	4.1	4.4
Reenlistment rate		73.5	69.0	70.4	68.6	
Percentage change from FY96-97						
Military pay			2.1%	0.3%	10.9%	11.2%
Unemployment rate			-13.7%	-18.4%	-23.6%	-17.6%
Reenlistment rate			-6.1%	-4.2%	-6.7%	
Predicted percentage change in reenlistment probability due to						
Military pay—lower bound	0.5		1.0%	0.1%	5.5%	5.6%
Military pay—upper bound	2.5		5.1%	0.7%	27.3%	28.0%
Unemployment rate	0.62		-9.2%	-12.3%	-15.8%	-11.8%
Total change—lower bound	0.5		-8.2%	-12.2%	-10.3%	-6.2%
Total change—upper bound	2.5		-4.0%	-11.6%	11.5%	16.2%

For zone A, predicted reenlistment rates are higher in FY01 than in FY96–97 by 0.9 to 4.4 percent under the counterfactual pay increase. Under TRIAD, zone A reenlistment is about 2 to 14 percent higher, i.e., several times higher than the counterfactual. For zone B, reenlistment is 2.7 to 13.4 percent higher under the counterfactual and 5 to 28 percent higher under TRIAD—twice as high a percentage increase.

The predicted impacts shown in Table 2.11 are only those attributable to the pay changes, but there were also changes in other factors. One factor for which we can predict the effect on reenlistment is the unemployment rate. Tables 2.12 to 2.15 show the predicted impacts from changes in the unemployment rate and military/civilian pay. The tables have three panels each for zone A and zone B reenlistment. The top panel contains the values for military/civilian pay, the unemployment rate, and the official reenlistment rate. The second panel shows the percentage change in these variables relative to FY96–97, and the third panel has the reenlistment predictions.

The decrease in the unemployment rate after FY96–97 reduced reenlistment. In FY98 and FY99, the lower unemployment rate combined with a lower relative military pay to cause a predicted decrease in reenlistment rates for zone A. For zone B, a small increase in relative military pay was outweighed by the effect of lower unemployment, producing a negative overall predicted impact on reenlistment. For FY00, the range of predicted reenlistment covers negative and positive territory. The one notable exception is the Navy for zone A, where the predicted range is negative.

The main finding appears to be that in all services the TRIAD pay increases and the increase in the unemployment rate produced a significant increase in predicted reenlistment from FY00 to FY01. As the tables show, the lower and upper bounds of the predictions are higher for FY01 than for FY00. Furthermore, compared to FY96–97, in many cases the predicted impact of TRIAD and the unemployment rate is large and positive under the high pay elasticity (except for Navy zone A) and negative but often near zero under the low pay elasticity. If we had used a 10 percent discount rate rather than a 20 percent rate, the impact of TRIAD on reenlistment would have been even larger. The only anomalous case appears to be Navy zone A.

Here, the estimated unemployment elasticity is 1.01, which is much higher than the other services' unemployment elasticity values. The large percentage decline in the unemployment rate from FY95–97 through the end of the decade led to a large predicted decrease in Navy zone A reenlistment—probably too large. If the Navy unemployment elasticity were in line with the other services, the Navy's reenlistment predictions would be similar to theirs.

When we compared actual changes in reenlistment to predicted changes, we found that in most cases the actual changes did not fall within the predicted range (Table 2.16). Changes in other factors might account for this, e.g., bonuses, deployment, options affecting a member's choice of location or chance to retrain for a different specialty, and spouse earnings opportunities. Another possible reason is that the changes are computed relative to a base period of FY96–97, a time when reenlistment rates may have been relatively low as part of the services' drawdown strategies. If so, the increase in actual reenlistment rates, seen in Table 2.16, may be a rebound effect. If FY96–97 is a questionable base period, perhaps the year-to-year percentage changes are more useful. But even under this approach, there are a number of times when the predicted change in reenlistment is opposite the actual change. Again, other factors may be at play, and future work will be needed to bring predicted and actual reenlistment into closer accord.

## SUMMARY

We found that TRIAD increased high-quality contracts in FY00 and FY01 above what they would have been under an ordinary military pay increase. More generally, high-quality contracts were negatively affected in the late 1990s by supply-side factors, including declines in military/civilian pay and the unemployment rate, and increases in median family income and college attendance rates. The services responded by increasing their recruiting efforts and recruiting resources. This response, along with a softening unemployment situation, enabled the services to cope with and reverse the downward trend in high-quality contracts. Thus, the FY00 military pay increases were an integral part of the response, but other changes made by the services also contributed to the ground gained.

**Table 2.16**  
**Comparing the Range of Predicted Effects on Reenlistment Rates**  
**with Actual Changes (Percent)**

	FY98	FY99	FY00	FY01
<b>Zone A</b>				
Army				
Predicted total effect—lower bound	-3.2	-3.5	-0.6	0.3
Predicted total effect—upper bound	-8.5	-7.0	10.1	11.6
Actual change in reenlistment rates	6.2	7.6	10.4	
Navy				
Predicted total effect—lower bound	-15.1	-19.5	-21.6	-15.4
Predicted total effect—upper bound	-20.4	-23.0	-12.5	-5.7
Actual change in reenlistment rates	-4.2	-13.0	-1.1	
Air Force				
Predicted total effect—lower bound	-3.9	-4.4	-2.0	-0.7
Predicted total effect—upper bound	-9.1	-7.9	7.9	9.8
Actual change in reenlistment rates	0.5	15.7	20.7	
Marine Corps				
Predicted total effect—lower bound	-2.5	-2.5	0.4	1.1
Predicted total effect—upper bound	-7.8	-6.1	10.7	12.0
Actual change in reenlistment rates	-6.1	-12.5	-9.6	
<b>Zone B</b>				
Army				
Predicted total effect—lower bound	-4.6	-7.4	-4.6	-2.0
Predicted total effect—upper bound	-0.5	-6.8	15.6	18.8
Actual change in reenlistment rates	2.9	7.3	5.0	
Navy				
Predicted total effect—lower bound	-4.9	-7.8	-5.4	-2.6
Predicted total effect—upper bound	-0.7	-7.2	13.8	17.1
Actual change in reenlistment rates	-4.8	-7.1	-7.5	
Air Force				
Predicted total effect—lower bound	-7.5	-11.3	-9.2	-5.3
Predicted total effect—upper bound	-3.4	-10.7	12.7	17.3
Actual change in reenlistment rates	2.1	21.3	20.9	
Marine Corps				
Predicted total effect—lower bound	-8.2	-12.2	-10.3	-6.2
Predicted total effect—upper bound	-4.0	-11.6	11.5	16.2
Actual change in reenlistment rates	-6.1	-4.2	-6.7	

It is difficult to predict with certainty how the FY00 military compensation legislation affected reenlistment. This is due to uncertainty about the responsiveness of reenlistment to pay and the effective size of the pay increase. Because TRIAD commits to above-normal pay increases for six years, we found that it did increase military/civilian pay substantially. The TRIAD pay increases, along with a softening economy, led to a sizeable predicted increase in reenlistment from FY00 to FY01. In addition, the range of predicted increases for FY01 relative to FY96–97 leaned toward the positive side, implying that TRIAD had helped to restore reenlistment to its earlier level.

---

**CONTEXTUAL INFORMATION ON RECRUITING**

---

Military recruiting has undergone tremendous change in the past decade. Prior to the end of the cold war, there was general agreement that the All-Volunteer Force was a resounding success and that the services had a firm handle on how to recruit and man its forces. With the end of the cold war, military recruiting dropped off precipitously. Not only did the recruiting mission or goal in terms of number accessions fall dramatically in the early 1990s as the nation reduced the size of its military forces, but recruit quality and the level of resources devoted to recruiting fell as well, as shown below. By FY94, it was becoming clear to policymakers and to analysts that military recruiting was in trouble. Although all the service branches were able to meet their recruiting mission at the time, more resources and effort were required to do so. By the late 1990s, recruiting was in crisis. The services (with the exception of the Marine Corps) began to miss their recruiting missions for the first time in nearly 20 years, even despite considerable increases in the level of resources devoted to recruiting. Furthermore, recruit quality had continued to decline since the high mark established in FY92. With these outcomes as a backdrop, the FY00 pay legislation was adopted in 1999.

This chapter reviews how recruiting outcomes in terms of number and quality of accessions changed during the 1990s, with special attention to how they have changed since the pay legislation was passed in 1999. It also reviews how recruiting resources have changed, how the services' recruiting strategies have changed, and what new programs have been adopted by the services with respect to recruiting in the past five years. The chapter also discusses impor-

tant trends in external factors that affect recruiting, such as civilian earnings, college enrollment rates, and financial aid opportunities. The individual effect of these trends on recruiting outcomes, holding other changes constant, is discussed in Chapter Two. Most of the review focuses on trends for the Army and Navy, the two services that provided us with the most information. Where information was available to us for the Marine Corps and Air Force, we include it in the discussion.

The key theme of this chapter's review is that the services have made substantial and widespread changes in their recruiting methods and have devoted substantially more resources and attention to recruiting in recent years. The result of these efforts is an indication that military recruiting has been improved in the past year or so. While not all of the results are available, the recruiting picture is cause for cautious optimism overall. However, the recent success is at the cost of substantially greater levels of resources being devoted to military recruiting.

## **RECRUITING GOALS**

Following the large drop in the Department of Defense (DoD) recruiting accession mission following the end of the cold war, the mission began to rise modestly in FY95 (Figure 3.1). In FY01, the DoD accession mission, though higher than in FY95, was still below the mission in 1989, when the cold war ended. Despite the smaller mission, military recruiting became significantly more difficult and expensive in recent years. The Army and Navy failed to meet their recruiting objectives in FY98 and the Army and Air Force failed to meet their objectives in FY99. Figure 3.2 shows the percent of the mission achieved minus 100 percent. Furthermore, recruit quality, measured as the percent of accessions who are high school diploma graduates who score in the top half of the AFQT distribution, dropped precipitously between 1995 and 1999. The percent of recruits who were high quality fell from 67 percent in 1995 to 59 percent in 1999 (Table 3.1). In the case of the Army, the drop was particularly sharp, with a decline in recruit quality from 65 percent in FY95 to 53 percent in FY99.

One way to track the health of military recruiting is to examine youth attitudes toward the military. Those attitudes reflect both youth



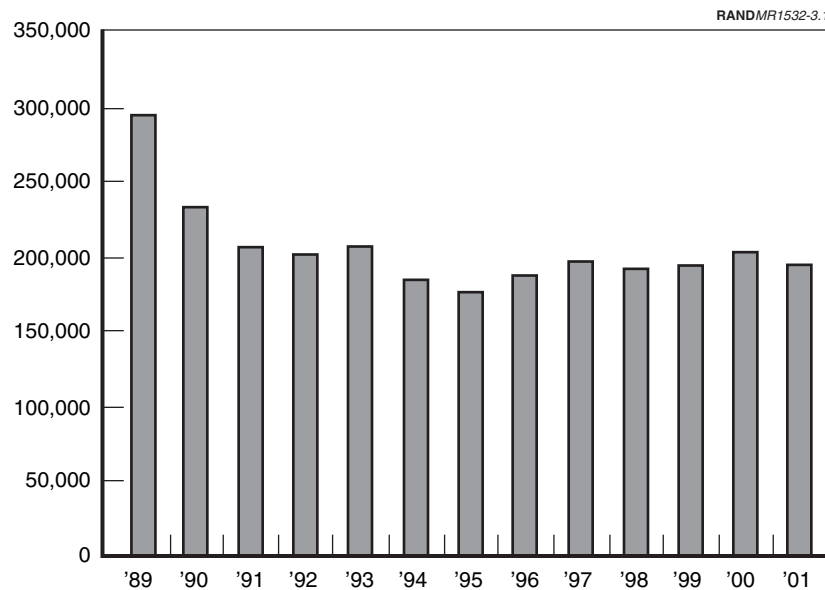
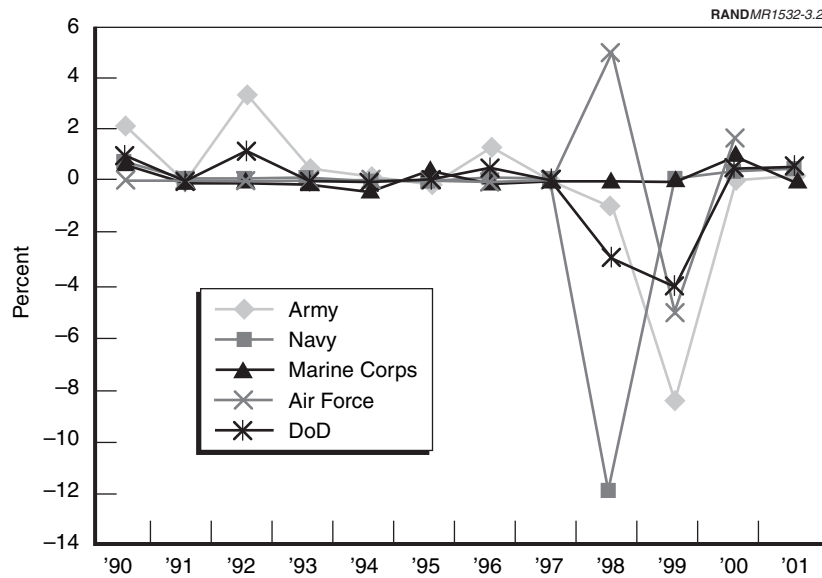


Figure 3.1—Total DoD Accession Objective

tastes toward military service as well as their response to external opportunities (such as civilian job opportunities) relative to the opportunities offered by the military. Each year, until 2000, the military fielded the Youth Attitudinal Tracking Survey (YATS) that surveyed American youth aged 14 to 24 about their interest in the military. The survey queried individuals about their future plans and about how likely they would be to serve in the military or in a particular service branch or component. The usual measure of youth attitudes toward the military is the fraction of youth who respond with a positive propensity to serve in the military. Positive propensity is measured as the fraction who say “definitely” or “probably” to the question, “How likely is it that you will serve in the military in the next few years?” As Figure 3.3 shows, the fraction of 17- to 21-year-old males expressing a positive propensity fell markedly during the 1990s. In 2000, YATS was replaced by a more frequent but shorter survey instrument.



**Figure 3.2—Percent of Total Recruiting Accession Mission Achieved Minus 100 Percent**

Since 1999, the year the pay legislation was enacted, the recruiting picture seems to have improved, although some areas still appear challenging. All four services met their overall recruiting missions in FY00 and FY01 (Figure 3.2). On the other hand, across DoD, the percentage of accessions who were high quality fell slightly in FY00 to 58 percent from 59 percent in FY99 (Table 3.1). In the case of the Army, the fraction declined in FY00 relative to FY99, to 52 percent, in large part because of the Army's GED Plus Program.<sup>1</sup> If these participants

<sup>1</sup>The GED Plus Program permits the Army accession of up to 4,000 non-high school graduates in the active component annually. These individuals must have scored in the top half of the AFQT distribution and in the top 75 percent on the Assessment of Individual Motivation test. The Army sponsors these individuals in their completion of their General Educational Development (GED) degree while they are in the Army's delayed entry pool. Because these individuals are not traditional high school diploma graduates, they are not deemed high quality by the standard definition. As a result, the fraction of Army accessions with a high school diploma fell from 90.1 percent in FY99 to 86.2 percent in FY00 and 85.4 percent in FY01. However, as shown in Table 3.1 and as discussed in the text, the percent of Army recruits who were high quality rose

**Table 3.1**  
**Percent of Accessions Who Are High Quality**

	Army	Navy	Marine Corps	Air Force	DoD
1990	62	55	62	85	64
1991	78	62	67	85	72
1992	78	66	70	85	74
1993	66	64	66	79	67
1994	66	63	68	80	68
1995	65	61	63	83	67
1996	63	61	63	82	65
1997	58	61	62	78	63
1998	58	60	62	77	63
1999	53	55	61	75	59
2000	52	54	60	72	57
2000 (exclude GED+) <sup>a</sup>	54	54	60	72	58
2001	55	53	62	74	59
2001 (exclude GED+) <sup>a</sup>	59	53	62	74	61

SOURCE: Office of the Under Secretary of Defense (Personnel and Readiness), Accession Policy.

<sup>a</sup>GED Plus is an Army program. Not applicable for Navy, Marine Corps, or Air Force.

in the GED Plus Program are excluded, the percent of Army recruits who were high quality in FY00 actually rose relative to FY99 to 54 percent.

In FY01, the improvement was even better for the Army. Relative to FY99, recruit quality in the Army rose in FY01 to 59 percent from 53 percent. Thus the Army experienced a marked improvement in recruit quality beginning in FY99. As for the other services, both the Air Force and Marine Corps experienced improvements in recruit quality in FY01 relative to FY99, while the Navy experienced a slight decline.

The declines in recruit quality that occurred during the 1990s have important implications for the performance of military personnel on military related tasks in the future. Studies by Winkler, Fernandez, and Polich (1992), Orvis, Childress, and Polich (1992), Junor and Oi

---

slightly in FY00 once the participants in GED Plus were excluded. The increase was even greater in FY01 as a result of an increase in the fraction who scored in the top half of the AFQT distribution.



SOURCE: YATS data from 1984 to 1999. Question: “How likely is it that you will be serving in the military in the next few years?” Answer: “Definitely/probably.”

**Figure 3.3—Fraction of Males, Aged 17 to 21, with Positive Propensity to Join the Military**

(1996) and others show that personnel quality, and AFQT score in particular, is positively related to individual and unit performance and readiness. For example, Orvis et al. (1992) conducted an experiment using junior Patriot Air Defense operators that involved giving operators tactical scenarios in computer-driven simulators and in written tests. The study found that those with higher AFQT scores were able to kill more hostile aircraft in accordance with tactics in the simulations than those with lower scores. Those with higher AFQT scores also performed better on other mission related tasks. As another example, Junor and Oi (1996) found that Navy personnel quality, of which AFQT score is a key component, strongly affected ship readiness scores. The research findings imply that a decline in personnel quality will translate into a decline in performance among military personnel.

The likely reduction in military performance associated with declines in recruit quality is likely to be felt for some years to come. Past research shows that the quality of personnel the military recruits is the average quality that it retains over the career of a given cohort. For example, if the average AFQT score of a cohort of new recruits is 70, the average quality of those same individuals who are still in service at YOS 5 is still 70. The average AFQT is still 70 when those same individuals who stay in service reach YOS 10, and it is still 70 when those individuals who are still in service reach YOS 15 (Asch and Warner, 1994). In other words, the military seems to retain the same quality of personnel it recruits. Therefore, declines in recruit quality are not overcome within a given cohort. If that recruit quality is lower, then so is the quality, and therefore the expected performance, of an entire generation of enlisted personnel. Thus, declines in recruit quality are of particular concern.

### **ENVIRONMENTAL FACTORS**

Several factors outside the control of military recruiting made attracting high-quality recruits more difficult during the 1990s. The most obvious factor and the one that changed the most dramatically was the strength of the civilian economy. The civilian economy underwent an unusually robust and long-lasting growth period in the second half of the 1990s that saw the civilian unemployment rate fall to its lowest level in 30 years—from 7 percent in 1992 to 4 percent in 2000. The strong civilian economy led to massive expansion in the civilian employment opportunities for high-quality youth, as is discussed in greater detail later in this chapter. The strong economic growth has now abated, and the unemployment rate has risen. Economic analysis of enlisted supply consistently shows that high-quality enlistments are positively affected by increases in the civilian unemployment rate and by increases in military pay relative to civilian pay. Thus, the recent weakening in economic growth will have a salutary effect on military recruiting.

### **TRENDS IN MILITARY AND CIVILIAN PAY**

During the second half of the 1990s, a period of tremendous economic growth, real wages in the U.S. economy rose steadily for many

groups (Hosek and Sharp, 2001). Although military pay also grew, civilian pay grew at a faster rate than did military pay between 1994 and 1999. Over this five-year period, enlisted pay grew about 6 percent less quickly than civilian pay of similar civilian high school graduates, and officer pay grew about 8 percent less quickly than the civilian pay of similar civilian college graduates (Hosek and Asch, forthcoming).

In the comparison of civilian pay with military pay, it is important to distinguish between pay levels and pay trends. It is always possible to find people in jobs that pay more or less than the military pays, controlling for age and education. Therefore, differences in military/civilian pay levels, even large differences, do not necessarily imply problems with the military compensation system. This is because pay is not the only factor influencing enlistment and reenlistment decisions. Other factors include the value of military training and experience and the individual's "taste" for military service, a catchall term for patriotism, pride, and other factors related to one's preference for military service and the military lifestyle, such as a desire for new experiences, travel, and adventure. Nevertheless, as military pay declines relative to civilian pay, more people are disinclined to enter or stay in the military.

Comparisons of military pay levels<sup>2</sup> with civilian pay levels invariably show that military pay exceeds civilian pay. For example, recent research shows that FY00 enlisted Regular Military Compensation (RMC) tracks the 80th to 90th percentile of civilian earnings of male high school graduates early in the enlisted career, and tracks the 70th percentile of civilian earnings from the 8th to 20th YOS (Asch, Hosek, and Warner, 2001). Traditionally, average military pay has exceeded civilian pay to enable the services to attract and retain high-quality personnel given the hazards and hardships of military duty relative to those of civilian life. However, that military pay levels generally exceed civilian pay levels says little about the adequacy of military compensation. That determination must be based on whether the services' personnel goals are being met. These goals include meeting recruiting and retention goals, motivating high-quality personnel,

---

<sup>2</sup>A military pay level is usually defined as Regular Military Compensation (RMC), which is the sum of basic pay, the basic allowance for housing, the basic allowance for subsistence, and the tax advantage associated with getting tax-free allowances.

and inducing them to sort themselves efficiently into the positions where they are the most productive.

Although we cannot make determinations about the adequacy of military pay based on comparisons of pay levels, it is noteworthy to recognize that the level of military pay relative to civilian pay has fallen in recent years. For example, a comparison of FY00 enlisted RMC with the civilian earnings of males with some college shows that RMC tracks along the 50th percentile of civilian earnings (rather than the 70th percentile for high school graduates). This downward shift from the 70th to the 50th percentile occurred as a result of growth in the educational attainment of military personnel and the dramatic increase in the relative civilian pay of those with four or more years of college (Asch, Hosek, and Warner, 2001).

Table 3.2, drawn from Asch, Hosek, and Warner (2001), shows the fraction of enlisted personnel with some college, by YOS group, as reported by service members in a 1985 and 1999 survey of enlisted personnel. The growth in the educational attainment of enlisted personnel has increased dramatically. In 1985, 23 percent of those in their first term had some college. That fraction had grown to over 50 percent by 1999. Furthermore, 21 percent of E-8s and 27 percent of E-9s in the 1999 survey reported having a college degree or an advanced degree. The rise in the educational attainment of the enlisted does not appear to be due to increases in the number of recruits with some college. The fraction of recruits with some college actually fell from 7 percent in 1987 to 4 percent in 2000. Rather, it appears to be due to the better opportunities for increasing one's education while members are in a service. (Some of the opportunities are described later in this chapter.) While it is difficult to quantify, the increase in

**Table 3.2**  
**Percent DoD Enlisted with**  
**Higher Education**

	1985	1992	1999
YOS 1-4	23	38	55
YOS 5-10	30	61	79
YOS 11-20	44	71	86
YOS 21-30	43	81	89

SOURCE: Asch, Hosek, and Warner (2001).

the educational attainment of the enlisted force has no doubt contributed to an improved capability of the enlisted force.

One reason college attainment has risen among the enlisted force is that the incentive to go to college has increased dramatically in recent years. Asch, Hosek, and Warner (2001) show average weekly civilian wages for white males, aged 27 to 31, in professional and technical occupations. Although the real weekly civilian wages for high school graduates and those with some college have steadily risen over the past two decades, the growth in the real weekly wages of those with a four-year college degree has been enormous. Consequently, the gap between the civilian pay of a high school graduate and the civilian pay of a college graduate has increased. This gap represents the incentive to a high school graduate to attend college. For a high school senior deciding whether to go to college immediately following graduation or to enlist in the military and defer the college degree until later, the incentive to attend college immediately has increased. Not surprising, recruiting (and to some extent retention) has become more difficult.

As the incentive to attend college has increased, it is also not surprising that college enrollments among the military's prime recruiting market—high school seniors and graduates aged 17 to 21—have increased as well (Asch, Kilburn, and Klerman, 1999; Asch, Hosek, and Warner, 2001). The fraction of high school graduates attending college within 12 months of graduation has increased from 49.3 percent in 1980 to 65.6 in 1998 (U.S. Census Bureau, 2000, p. 182, Table 295). The percentage of the population aged 18 to 24 enrolled in a postsecondary educational institution has increased from 25.7 percent in 1980 to 36.5 in 1998 (U.S. Census Bureau, 2000). Therefore, the competition that the military experiences from postsecondary institutions for recent high school graduates has increased in recent years.

The U.S. economy has weakened in the past year and an obvious question is whether the trends in civilian pay witnessed during the boom will continue in the near future. Real growth in civilian weekly earnings falls when the unemployment rate rises and overall economic growth softens. In other words, civilian earnings have a cyclical component that is sensitive to changes in overall economic growth. However, civilian earnings also have a structural component that persists over time. The factors that have led to the large relative



earnings growth for those with a four-year college degree are part of this structural component. Research points to technological changes, such as computers and communication technology, that are biased toward better-educated and more highly skilled workers as the source of the relative earnings growth for college educated workers (Jorgenson, 2001). These changes will not disappear as the economy weakens. Although civilian earnings may shift with the economic slowdown, these structural factors will persist. Furthermore, the military's requirement for skilled and educated personnel and its need to draw and retain them from the civilian labor market are likely to grow in the coming years, even without a booming economy.

## **TRENDS IN RECRUITING RESOURCES**

In an effort to improve recruiting success in light of these external trends, the services have devoted substantially more resources to recruiting in recent years. As a consequence, the cost per recruit has risen, as shown in Figure 3.4. On the other hand, as the discussion in the previous chapter makes clear, the addition of these resources was expected to improve high-quality recruiting and help offset the adverse effects of the strong economy and rising college enrollments. These additional resources included military recruiters, advertising, enlistment bonuses, and educational benefit programs.

In addition to these changes in resource levels, the services made efforts to improve the effectiveness of recruiters. They changed the incentive programs they use to motivate recruiters to work effectively and successfully. They also sought to improve the technology and communication methods available to recruiters. Particularly important to improved productivity has been access to computer hardware and software as well as cell phones and pagers. The following discussion highlights these changes.

### **Recruiters**

Past research consistently shows that recruiters are an effective means of improving high-quality enlistments. Estimates generally show that a 10 percent increase in military recruiters generates about

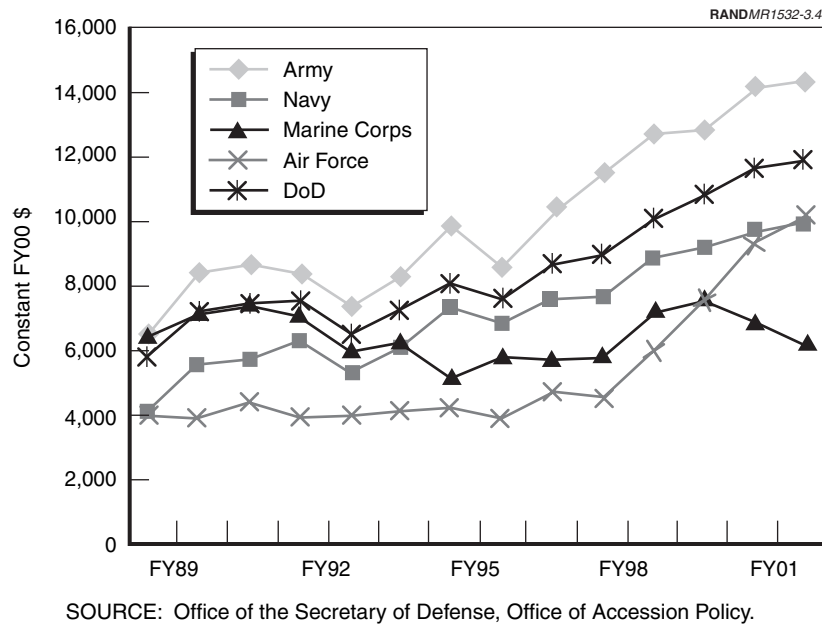


Figure 3.4—Recruiting Cost Per Recruit

a 5 percent increase in high-quality enlistments (Warner et al., 2001; Warner and Asch, 1995). Furthermore, past research shows that recruiters are a cost-effective resource. That is, the marginal cost of achieving an additional high-quality recruit by means of a recruiter is less than it is by most other means, especially military pay. Available estimates also indicate that recruiter productivity, measured as the percent change in high-quality enlistments due to a 1 percent change in the number of recruiters, has changed in recent years. Murray and McDonald (1999) find that the productivity of Air Force and Army recruiters fell between the mid-1980s and the early 1990s. Warner et al. (2001) find that Army recruiter productivity fell between the early 1990s and the mid-1990s.

In the past several years, all services except the Marine Corps substantially increased their recruiter force. Table 3.3 shows the recent trend in recruiters by service. In addition, several services made changes to the incentive programs they use to motivate recruiters to

**Table 3.3**  
**Active-Duty Enlisted Production Recruiters**

	FY95	FY96	FY97	FY98	FY99	FY00	FY01
Army	4,895	5,319	5,538	6,098	5,813	6,208	6,194
Navy	3,501	3,770	3,832	3,630	4,514	4,492	4,588
Air Force	880	956	990	831	850	1,108	1,384
Marine Corps	2,563	2,664	2,655	2,754	2,325	2,650	2,650

SOURCE: Office of the Secretary of Defense, Office of Accession Policy. Current as of April 2001.

be productive. These programs are generally point-and-reward schemes whereby recruiters accumulate points for achieving different missions and their point accumulations can lead to different rewards, such as badges, certificates, promotion points, and other special benefits. Past research has shown that these incentive schemes can exert an important influence on recruiter productivity (Dertouzos, 1985; Asch, 1990; Asch and Karoly, 1993; Oken and Asch, 1997).

The Army increased its number of active-duty enlisted production recruiters by 27 percent between 1995 and 2001 (Table 3.3). The Army also introduced changes to its recruiter incentive program. Until 1995, the Army used a recruiter incentive plan that rewarded recruiters based on their individual achievements in reaching their recruiting mission. That plan was called "Program 300" because it required the recruiter to accumulate 300 points before he or she could obtain a reward. Program 300 had been in place for many years but was replaced in 1995 by a new incentive plan called "Success 2000." Rather than focusing on individual achievement, this new plan focused on the achievement of the recruiting station in meeting its mission. Recruiting stations are generally small in number, even as small as one individual, although they usually have two or three recruiters manning them. Their purpose is to establish a military recruiting presence in different communities throughout the United States and to reduce mobility and traveling costs, including traveling time for recruiters. Thus, under Success 2000, recruiters could only obtain a reward if their recruiting station performed well. However, the U.S. Army Recruiting Command (USAREC) found that the focus on only station achievements was not effective, and in 1997 USAREC reverted back to a plan that focused on individual achieve-

ments. In 2001, USAREC adopted a “mixed” incentive plan that rewards both team effort or station accomplishments as well as individual recruiter achievements. Furthermore, the new plan awards additional points to recruiters when their recruits graduate from basic training. In the past, recruiters faced no penalty if the recruit left basic training before completion.

The Navy made even greater increases in its recruiter manpower. Between FY95 and FY01, the number of Navy production recruiters increased by 31 percent. The Navy also expanded its number of recruiting stations substantially in the past six years. The number of Navy stations increased from 1,280 to 1,413 between FY95 and FY96, and again increased in FY99 from 1,475 to 1,662. The number of stations increased further in FY00 to 1,725. There were no further increases in FY01. Like the Army, the Navy also uses an incentive plan to reward recruiters for their achievements. Between 1995 and 1996, the Navy moved from a plan that focused on individual achievements to one that focused on team or station achievements. Prior to doing so, individuals could earn medals based on individual productivity goals. Upon replacing individual goals with stationwide goals, recruiters of a particular station team earned medals based on their collective productivity.

The Air Force expanded its recruiter force by 57 percent over the past six years, increasing the number of active-duty enlisted production recruiters from 880 in FY95 to 1,384 in FY01. Most of this growth occurred in FY00 and FY01. To accommodate this increase, the Air Force also increased the number of Air Force recruiting stations to a current total of 1,075 stations.

The Marine Corps did not significantly alter its recruiter force in recent years. The number of enlisted production recruiters increased by only 3 percent over the FY95 to FY01 period.

### **Access to New Technologies for Recruiters**

In addition to the use of incentive plans and goals, the recruiting commands have also taken steps to improve recruiter productivity through the use of new and better technology. The changes have mostly involved improving communication (through cell phones, pagers, and e-mail), reducing paperwork (through e-mail and the In-

ternet), and increasing the recruiters' ability to organize information (through information management software).

**Army.**<sup>3</sup> The Army has endeavored to improve automation and communications throughout its recruiting command. In 1996, USAREC issued station desktop computers and printers to replace its earlier systems. This step was also seen as a way to update its "lagging technical image." USAREC began issuing laptop computers in 1999 and claims that everyone currently in the command who requires a computer now has one. USAREC has transferred to a common operating system (Windows NT 4), common e-mail system (MS Exchange), and common office automation software (MS Office 97). This software has such capabilities as a personal information manager and electronic records preparation and sharing through e-forms and e-publications.

Beginning in FY98, USAREC fielded electronic mail and Internet access to each of its 1,800 recruiting stations and began prospecting leads through the Internet. The Army also developed and employed an external Internet marketing presence for recruiting. In FY00, it established a "cyber" recruiting cell, which is manned seven days a week to answer questions in a chat-room environment, and it distributed over 1,221 pagers and 900 cell phones for command and control. In the first half of FY01, every recruiter was provided with a cell phone.

According to USAREC, the Army has provided recruiters a variety of new resources as part of its larger efforts to improve automation and communications. Some of these resources include

- a road-mobile sales presentation intended to facilitate communication to potential applicants, parents, and other influencers
- electronic leads that have been integrated from multiple sources
- a recruiter web portal (Recruiter Central) that provides information tailored to the relevant recruiting communities of interest and provides links that enable recruiters to share strategies and

---

<sup>3</sup>This section draws heavily from written communications provided by USAREC, the Naval Recruiting Command, and the Air Force Recruiting Service.

experiences via web locations, such as the Center for Army Recruiting Lessons Learned

- the ability to forward applicant data electronically to the military entrance processing station.

**Navy.** The Navy began issuing laptop computers to recruiters in FY96. This effort facilitated the ability of recruiters to reach potential applicants quickly, especially in locations far from the recruiting station. In recent years, improvements in Navy computer software and hardware have enabled an automation of its “enlistment kit.” Local area networks have been implemented in many of the larger stations to enable more efficient data sharing and printing functions. In addition, the Navy began “Smart Recruiter Initiatives” in FY00 that included issuing cell phones and a government vehicle to every recruiter. Many but not all recruiters now have cell phones.

The Navy is developing a new operational system for recruiting. This system, called Navy Recruiting and Accessions Management System (NRAMS), is expected to enable one-time data entry throughout the recruiting process and is scheduled for delivery in May 2002. NRAMS is intended to replace the legacy classification and reservation systems and the extant officer and enlisted accession management systems. The Navy anticipates that this system will facilitate future process improvements.

**Air Force.** According to the Air Force, all recruiters now have laptops and cell phones.

### **Advertising**

Advertising expenditures by the services since the late 1980s have followed a pattern similar to that of other recruiting resources. Expenditures dropped substantially during the military drawdown of the early 1990s. As shown below, that period was followed by sustained and relatively low expenditures in the mid-1990s, which was then followed by substantial growth during the past several years. Past research shows that advertising has traditionally been a cost-effective recruiting resource for improving high-quality accessions. That research tends to focus on the effect of advertising impressions—the number of individuals in the target market reached

by the advertising—rather than on advertising expenditures. As discussed in Warner et al. (2001), impressions may deviate from expenditures if the unit cost of advertising changes or if the habits and tastes of the target market change. Furthermore, the timing of expenditures and impressions may deviate substantially. For example, the Army may buy advertising time for the January Super Bowl during the previous summer. Consequently, expenditures that occur in one fiscal year may not translate into impressions during the same fiscal year.

Recent research (Dertouzos and Garber, 2001) has argued that the recruiting effectiveness of traditional advertising media, such as print, radio, and national television, has likely changed in recent years. Communication technologies and media markets have been transformed over the past decade. Advertising agencies are using new and different marketing strategies, such as direct marketing, targeted television, and infomercials. Technology has become more diffuse with the decline of network television, the greater role of cable and satellite services, and the enormous increase in web-based and Internet marketing. Adding to this mix, as shown earlier, youth attitudes toward the military have declined. Thus, the impression made by a given type of advertising has likely shifted in recent years. All these changes in the advertising and marketing landscape have put pressure on the services to rethink their entire advertising and marketing strategies. The following discussion highlights some of the major changes in military advertising in the past several years.

**Army.** According to USAREC, the Army has made significant changes in its advertising allocations and overall advertising strategy. The total advertising budget has increased tremendously since FY93, as shown in Figure 3.5, which shows actual advertising expenditures through FY00 and advertising budgets in FY01 and FY02.

The Army is also targeting new markets. In FY97, for instance, the Army began advertising on Spanish-speaking television stations in an effort to improve recruiting success among Hispanic youth. Since then, the expenditures and budget for this effort, as well as its strategic significance, have increased enormously. Outlays rose from less than \$2 million in FY97 to \$10 million in FY01, consonant with the strategic decision to elevate the importance of the Hispanic market.

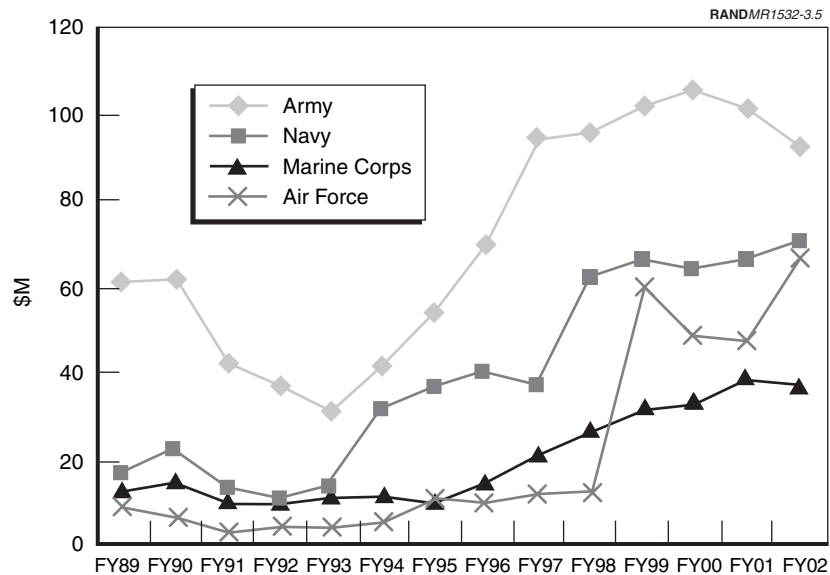


Figure 3.5—Total Annual Advertising Expenditures (FY89 to FY00) and Budget (FY01 and FY02)

The Army began exploring direct response television (DRTV) in FY96. According to USAREC, DRTV was used tactically until FY01 whenever the command needed to generate leads quickly. However, in FY01 the Army used it throughout the year to generate a steady flow of leads. Consistent with the increased focus on the Hispanic market, the Army also made use of Spanish-language DRTV to generate Hispanic leads in FY01. In addition, since FY95 the Army has made substantial investments in web advertising. The budget for web advertising has risen from \$24,000 in FY95 to nearly \$5 million in FY01.

The Army stopped advertising in the print media in FY98, with the exception of those magazines that go into high schools and colleges, and shifted to national network radio to target the college market more intensively. But the Army abandoned this strategy in FY01, marking a reentry into print media and a reliance on radio on a local basis only.



Generally, in USAREC's assessment, between the mid-1990s and the present, the Army has moved away from broad-reach media, such as network primetime television, and toward targeted media, such as specific youth-oriented cable channels like MTV and Comedy Central. Such strategic changes are consistent with overall trends in marketing and advertising. In addition, since 1999 the Army has moved advertising out of high school programs (with the exception of Channel One) and into media that seek to penetrate the college market (e.g., the College Television Network).

**Navy.** According to the Commander, Navy Recruiting Command (CNRC), media expenditures averaged \$32 million between FY95 and FY01 (Table 3.4). The highest expenditure was \$45 million in FY98; the lowest outlay was \$23 million in FY97. Television accounted for the largest share of these outlays (56 percent of all media expenditures) over the period shown in Table 3.4. Expenditure on magazine advertising has dropped recently. For most of the years in question, magazine expenditures were \$3 million to \$4 million, but they fell to \$620,000 in FY01. Like the Army, the Navy has increased its advertising and marketing presence on the web. Internet expenditures were under \$40,000 in FY95–97, increased to over \$1 million in FY98, and jumped to about \$7 million in FY01.

**Air Force.** Air Force advertising expenditures also increased dramatically in recent years, although the increases were not evident in

**Table 3.4**  
**Navy Advertising Expenditures FY95–01 (Current \$ Thousand)**

Medium	FY95	FY96	FY97	FY98	FY99	FY00	FY01
TV	14,471	15,157	14,003	31,931	19,403	16,295	14,389
Radio	3,449	2,839	4,099	4,303	4,933	2,999	3,028
Magazine	2,877	3,069	2,489	2,995	3,766	3,490	620
Internet	30	35	39	1,020	1,422	6,384	7,304
Newspaper	1,466	1,883	8	2,052	1,936	2,086	2,000
Direct mail and postage	3,196	4,481	2,917	2,855	4,018	4,555	3,250

SOURCE: CNRC in written communication during September 2001.

NOTE: Table excludes some expenditure categories and most local and regional expenditures. Consequently, the figures in this table and in text differ from the Navy figures reported in Figure 3.5.

every year: FY98, \$16.6 million; FY99, \$74.0 million; FY00, \$59.0 million; and FY01, \$70.4 million. Television advertising expanded from \$0 in FY98 to \$51.5 million spent over FY99 and FY00. Paid television expenditures leveled off at \$30.0 million for FY00 (which correlates to purchasing airtime for FY01).

### **Enlistment Bonuses**

The enlistment bonus program is another critical resource that has been shown to expand high-quality enlistment supply and to channel recruits into hard-to-fill occupational specialties. The use of enlistment bonuses involves several decisions, such as which specialties will be eligible for a bonus; which commitment lengths or terms of service will be eligible; and what will be the dollar amount of the bonus, given eligibility. The use of enlistment bonuses by the services fell significantly during the defense drawdown, as shown in Figure 3.6, but began to increase significantly beginning in FY97. Figure 3.6 shows the annual expenditures for FY89 to FY00 and the annual budget for enlistment bonuses by service for FY00 and FY02. All services except the Marine Corps greatly expanded their enlistment bonus expenditures/budgets. The Air Force went from \$0 in FY97 to \$130 million in FY02, for instance.

**Army.** The Army increased the conditional bonus dollar amount that can be offered to an individual entering a given specialty. It also increased the number of eligible specialties that could receive the bonus. Specifically, in FY97, the maximum enlistment bonus that an individual enlisting in a given specialty could receive was increased from \$8,000 to \$12,000. In FY00, the maximum was again increased from \$12,000 to \$20,000, as allowed under the FY00 pay legislation.

The Army made several changes in its “Quick Ship” bonus program, a program that offers a bonus to individuals who can leave for basic training and become an accession within a short time frame. The program is intended to boost accessions in certain months to either assist in meeting monthly accession goals or move an accession to months when the training base has uncommitted capacity. This bonus was increased from \$1,000 to \$3,000 in FY97, not available in FY98, and brought back in FY99 with two levels of \$6,000 and \$4,000. In FY00, the bonus amounts were reduced to \$5,000 and \$3,000.

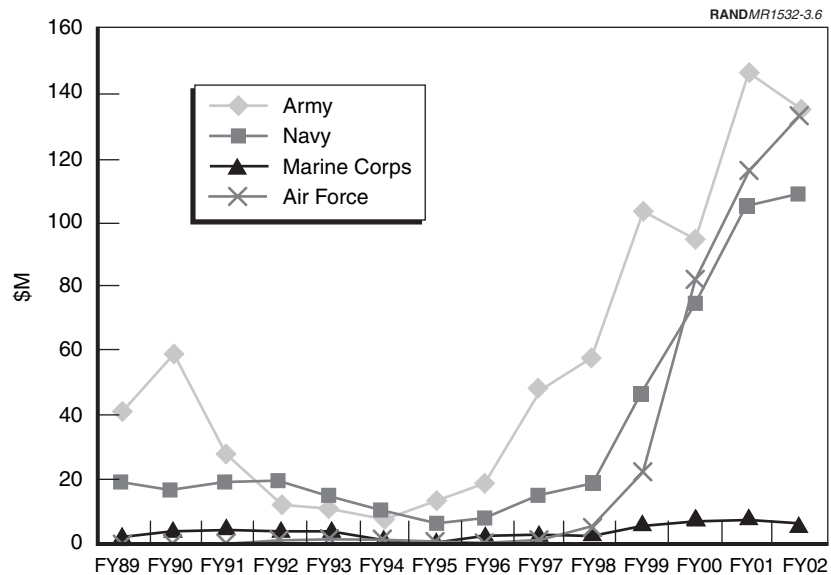


Figure 3.6—Enlistment Bonus Expenditures (FY89 to FY00) and Budgets (FY01 and FY02)

The Army changed the bonus dollar amounts for different commitment lengths. Prior to FY96, the enlistment bonus for a two-year commitment was \$0, the bonus for a three-year commitment was \$4,000, and the bonus for a commitment of four or more years was up to \$8,000. After 1996, these maximums changed to \$6,000 and \$20,000, respectively.

Another change with respect to enlistment bonuses is that legislation authorized the commingling of enlistment bonuses and the Army College Fund (ACF) in FY00. With commingling, a high-quality recruit enlisting in a hard-to-fill occupational area could get the ACF and an enlistment bonus.

**Navy.** According to the CNRC, enlistment bonuses underwent major changes after FY95. As Figure 3.6 shows, the enlistment bonus budget rose tenfold, from approximately \$10 million in FY95 to \$98 million in FY02. Prior to FY99, enlistment bonuses were offered to a dozen or so critical or hard-to-fill occupational specialties or ratings.

In FY99, CNRC obtained approval for a \$3,000 “Sign-On” bonus. This bonus was changed after two months to allow individuals entering some ratings to receive a \$4,000 bonus. The enlistment budget for FY99 reached \$44.6 million. While the enlistment bonus budgets increased in recent years, the Navy opted not to take advantage of the FY00 increase on the federal cap on enlistment bonuses from \$12,000 to \$20,000.

Another important policy change was the ability to offer enlistment bonuses and the Navy College Fund (NCF) simultaneously to the same recruit. This combination is available for only a few ratings. The Navy also initiated a new program during the summer of FY00 that offers enlistment bonuses to recruits who have accumulated some college credits.

The Navy implemented additional changes to its enlistment bonus program in FY01. It introduced an enlistment bonus for recruits who enlist for two- and three-year terms of service. It removed the requirement of a GED or high school diploma to be eligible for an enlistment bonus. It also removed the requirement that enlistment bonuses be offered only to ratings categorized as “critical.”

**Air Force.** Initial enlistment bonuses have grown to cover 92 skills and exceed \$100 million per year in expenditures. Thus, the Air Force made increasing use of bonuses during FY98–01. Although the Warner, Simon, and Payne model (Warner et al., 2001) used in Chapter Two could not estimate a bonus effect because the Air Force made little use of bonuses during their data period, one would expect the application of bonuses to increase high-quality recruits. Moreover, bonuses and College Fund awards probably contributed to a sharp increase in the number of six-year enlistment contracts. In FY98, the Air Force had 29,039 four-year recruits and 2,452 six-year recruits; in FY99, there were 18,115 four-year recruits and 13,953 six-year recruits; and in FY00, there were 17,819 four-year recruits and 16,550 six-year recruits. The Army and Navy, too, appeared to be using bonuses and educational benefits to increase average term length.<sup>4</sup>

---

<sup>4</sup>Terms of enlistment range from two to six years. Using Defense Manpower Data Center (DMDC) accession reports, we calculate that the average term length for the Army grew from 3.6 years in FY95 to 3.8 years in FY00. In addition to bonuses and

## Military Educational Programs

Military personnel have numerous opportunities to improve their educational level before, during, and following their military service. These opportunities have become increasingly relevant to potential recruits as the military's target market has become more interested in enrolling in college than enlisting in the military following high school graduation. Past research shows that improving educational benefits, and specifically the GI Bill and the kicker programs such as the Army College Fund, positively affects high-quality enlisted supply. Given the changes in the financial aid landscape and in college enrollments in recent years, coupled with a strong civilian economy that especially rewards such individuals, DoD and Congress have focused on improving the educational opportunities and financial aid opportunities available to current service members and new recruits. This section presents an overview of some of the recent changes in military educational programs.

**Tuition Assistance.** Tuition assistance (TA) is a program that provides college financial aid to service members to take courses during their off-duty hours. TA is available to members in all four branches of service. The current program provides active-duty personnel a percentage of tuition costs for courses taken while off duty at an accredited institution of higher education. Beginning in FY99, members can receive 75 percent of their tuition costs and fees (not to exceed \$187.50 per semester hour [or equivalent], with an overall cap of \$3,500 in any given year). Prior to FY99, the benefit level varied substantially across the services, with some services offering a considerably smaller benefit than 75 percent of tuition costs.

**The Montgomery GI Bill.** The Montgomery GI Bill (MGIB) is an educational program that offers service members and veterans a benefit while they are enrolled in college. The MGIB requires individuals to complete a certain amount of military service (see below). Consequently, most members who use the benefit end up doing so after they have left the military. Indeed, the MGIB was originally con-

---

benefits, part of this increase is attributable to less use of two-year enlistment contracts. By comparison, the Navy term length grew from 4.1 to 4.5 years, the Air Force from 4.1 to 5.0 years—nearly a full year—and the Marine Corps from 4.1 to 4.2 years. We thank John Warner for drawing our attention to the increase in Air Force term length.

ceived as a veteran's benefit and is, in fact, administered by the Department of Veterans Affairs. The program requires recruits to enroll in the program at the time of enlistment, and they are required to contribute \$1,200 during their first year of military service. These contributions are nonrefundable. To qualify for the MGIB benefit, service members must fulfill the following requirements:

- Serve 24 months in a two-year enlistment or 36 months in a three-year or greater commitment
- Receive a high school diploma (or equivalent) prior to completing the initial period of obligation
- Receive a fully honorable discharge.

The actual dollar benefit individuals receive depends on the term length of their enlistment contract and the length and intensity of their college attendance. Those who complete three or more years of service and who attend college full time are qualified for the maximum benefit (see Table 3.5). The maximum benefit is paid out for up to 36 months.

Table 3.5 shows how the maximum amount that a qualified veteran or service member may receive has changed since FY95. Between FY95 and FY98, the program underwent little or no real growth. However, the maximum benefit was increased substantially in FY99 and again FY01. Overall, the maximum benefit has experienced 38 percent real growth since FY95.

**Table 3.5**  
**Maximum MGIB Benefit Paid**  
**over 36 Months (2000 \$)**

FY	Maximum MGIB Benefit
1995	\$16,466
1996	\$16,462
1997	\$16,520
1998	\$16,725
1999	\$19,649
2000	\$19,296
2001	\$22,768

Many of the more recent improvements to the MGIB were spurred by calls for reform made by the Congressional Committee on Service Members and Veterans Transition Assistance, a commission chaired by the current secretary of Veterans Affairs, Anthony J. Principi (Principi, 1999). The “Principi Report” recommended numerous changes to the MGIB, including restructuring the benefit to cover fully all tuition costs, fees, and books; and to provide a subsistence allowance of \$400 per month for up to 36 months. It recommended that the subsistence allowance be indexed for inflation and that the current \$1,200 required member contribution be eliminated. It also recommended that the MGIB benefit be transferable to members of the service member’s immediate family. Following the publication of the report, numerous pieces of legislation were introduced in Congress aimed at restructuring and improving the MGIB along the lines recommended by the report. An analysis of the enlistment effects of some of these recommendations is provided in Asch, Fair, and Kilburn (2000). Although the program has yet to be restructured by Congress, the maximum benefit level has been increased substantially, as Table 3.5 demonstrates.

**Army-Specific Educational Programs.** The Army has two additional programs that enable members to pursue postsecondary education: the ACF and the Loan Repayment Program (LRP). The ACF is in practice a “kicker” that augments the funds available through the MGIB. Thus, to qualify for the ACF, the soldier must first qualify for the MGIB, as described above. The maximum ACF benefit was \$30,000 in FY95 and was raised from \$40,000 to \$50,000 in FY97. Prior to FY00, a recruit could not opt to take both an enlistment bonus and the ACF at the time of enlistment. However, as of November 1999, recruits can opt for both. To be eligible for the ACF, an individual must be a high-quality non-prior service accession who trains in a critical occupational specialty.

Figure 3.7 shows the Army’s annual expenditures (for FY89 to FY00) and budget (for FY01) for the ACF by fiscal year. ACF expenditures dropped during the drawdown and rose during the late 1990s. Both the maximum benefit per recruit and the overall dollar expenditures for the ACF were raised in nominal terms in FY97. On the other hand, the fraction of high-quality recruits who received the ACF fell

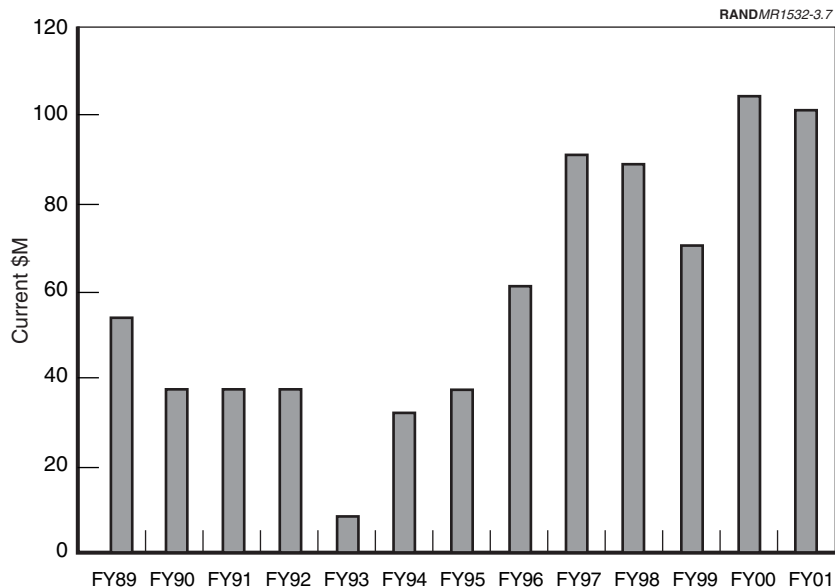


Figure 3.7—The ACF Budget

in FY97. Thus, the average award increased (as shown in Warner et al., 2001).

The Army’s loan repayment program helps enlistees repay their federal student loans. The program, therefore, targets individuals who already have some college and who have federal student loans to repay. As in the ACF and enlistment bonus programs, individuals must be high-quality non-prior service accessions enlisting in a critical occupational specialty to qualify for the benefit. In FY95, the maximum loan repayment amount was \$55,000. In FY97, the maximum amount increased to \$65,000. Despite the large dollar amount available to a given recruit, the Army has traditionally not funded this program at a high level relative to other programs, such as the ACF and the enlistment bonus program. For example, the budget for the LRP was \$0 in FY95–97. It increased to \$22.9 million in FY98 and to \$32.9 million in FY01, and is projected to increase to \$45 million in FY02. Thus, the program is becoming increasingly important in the Army’s overall recruiting budget.



The Army is testing the recruiting effectiveness of two experimental educational benefit programs. One program is the “College-First” plan that allows high-quality individuals to attend two-year college prior to enlistment. Qualified individuals receive the LRP as well as a \$150 per month stipend while they are enrolled in college. One test cell of the experiment also requires individuals to join the Selected Reserves while in college; consequently, these individuals also receive reserve drill pay. The other experimental program is the Concurrent Application (CONAP) program. This program allows recruits to apply to colleges but defer college admission while they fulfill their service commitment. Furthermore, credit hours attained while in service are accepted by the participating institutions.

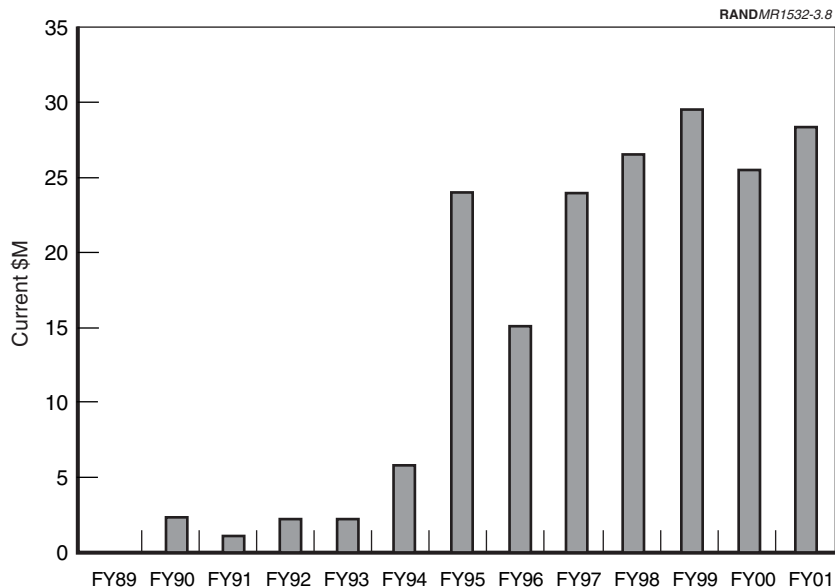
**Navy.** The Navy offers the NCF and an LRP. As described in Warner, Simon, and Payne (2001), the NCF started as a pilot program in FY90 with only 2,000 openings. It expanded to 4,700 openings in FY94 and to 10,800 openings in FY95. The program has continued to expand. According to Warner et al. (2001), 30 percent of Navy high-quality enlistments between FY95 and FY97 received the NCF. Figure 3.8 shows how the Navy’s NCF budget has changed since FY90.

Like the ACF, individuals are eligible for the NCF only if they are high quality and enlist in critical occupations or ratings, as described below. Unlike the ACF, the NCF tends to target longer enlistment terms, primarily four-year terms in FY90–93 and five- and six-year enlistment terms since FY94 (Warner et al., 2001).

NCF benefit levels generally differ from ACF levels. In FY95, there were two maximum NCF levels: \$25,000 awarded to a general detail recruit with a three-year term of service; and \$30,000 awarded to a general detail recruit enlisting in a hard-to-fill rating with a four-year obligation. In FY98, another NCF program was added with a maximum benefit of \$40,000. This NCF amount was available to nuclear-field recruits with at least a four-year commitment. In FY99, the Navy made another NCF available with a maximum award of \$50,000 for recruits who enlist for a six-year obligation in a submarine or nuclear-field-related rating.<sup>5</sup> Unlike the Army, where a recruit can

---

<sup>5</sup>In FY00, according to the CNRC, take rates for the NCF declined steeply from 25 percent in FY99 to 15 percent in FY00. The CNRC believes that this decline can be attributed in part to the expansion of the enlistment bonus program.



**Figure 3.8—The Navy College Fund Expenditures (FY89 to FY00) and Budget (FY01)**

simultaneously opt for the ACF and enlistment bonus, the Navy requires that the recruit choose between the two programs.

The Navy has a modest LRP, which was initiated in July 1998. At the program’s inception, \$1 million of NCF funds was set aside to fund 100 LRP quotas at \$10,000 per LRP. The Navy’s LRP was offered in a handful of critical skills where it was felt that college experience would be useful. The Navy is seeking to expand this program beyond its current budget of \$100,000.

**Air Force.** While the Air Force does not have a college fund, the Air Force offers its recruits educational opportunities at the Community College of the Air Force.

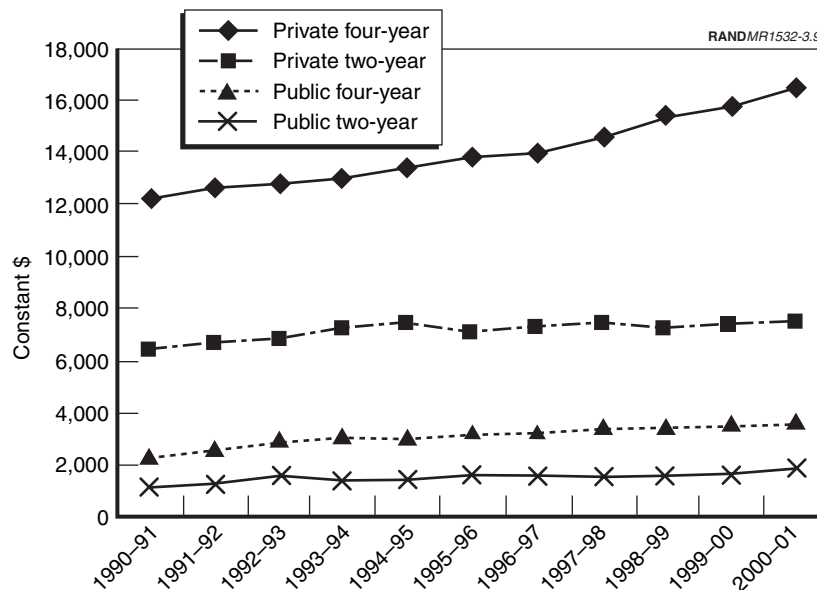
**Marine Corps.** The Marine Corps College Fund (MCCF) program offers recruits \$30,000 for a three- or four-year enlistment. The Marine Corps has not changed the maximum dollar amount of MCCF

available since FY95. The budget for the program has risen steadily from \$0.9 million in FY93 to \$29.4 million in FY01.

### Trends in Civilian College Costs and Financial Aid Opportunities

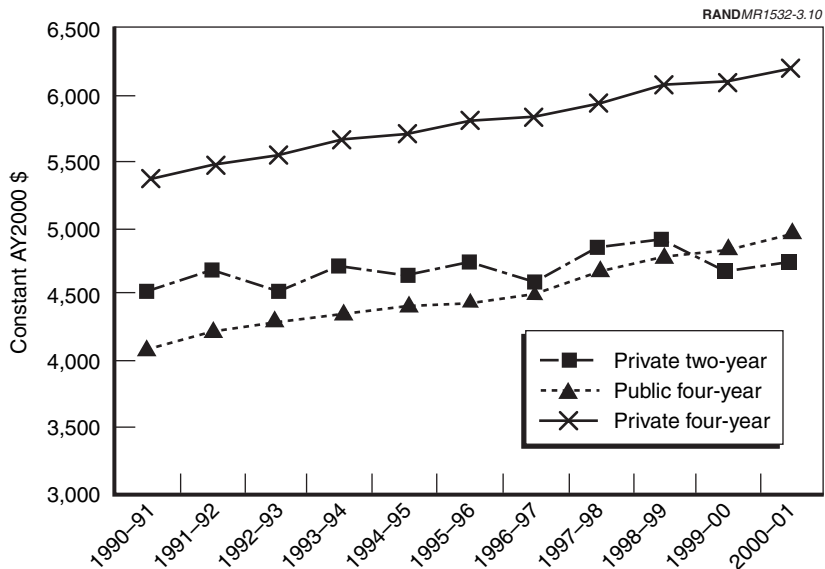
The attractiveness of the military educational programs described above depends in part on how their benefits compare to the direct costs of attending college as well as how they compare with other financial aid opportunities that might be available to potential recruits. The discussion below describes recent changes in college costs and civilian financial aid opportunities.

The real direct cost of a college education was relatively stable during the 1970s but began to skyrocket in the 1980s. Figure 3.9 shows the trend over the past decade in average real tuition costs and fees, while Figure 3.10 shows the trend in average real room and board



SOURCE: The College Board, 2000, Table 5.

**Figure 3.9—College Tuition and Fees by Length of Program and Institutional Control**



SOURCE: The College Board, 2000, Table 6a.

Figure 3.10—Room and Board College Costs

costs, by type of institution.<sup>6</sup> The real tuition and fee cost of a public four-year college education increased by more than 50 percent, rising from about \$2,300 in academic year (AY) 1990/1991 to about \$3,500 in AY 2000/2001. The real tuition and fee cost of a private four-year college education rose by about 35 percent over this period, from about \$12,000 to over \$16,000. Real room and board costs also rose dramatically over the past decade, as shown in Figure 3.10.

Despite the real increases in the MGIB and Army and Navy College Fund benefits discussed earlier, those increases have lagged behind the real growth in tuition costs at four-year private and public colleges. The real growth in four-year tuition costs between 1985 and 1999 was 65 percent at public institutions and 66 percent at private

<sup>6</sup>Two-year public schools do not have boarding facilities for students.

institutions. During the same period, the MGIB increased by 16.2 percent and the ACF benefit rose by 31.1 percent (Asch, Fair, and Kilburn, 2000). As discussed earlier, the MGIB benefit has been increased since 1999, but those increases are insufficient to cause the real growth in MGIB benefits to catch up with the real growth in tuition costs.

Comparisons of the levels (rather than the growth rates) of MGIB benefits and tuition costs in 1999 indicate that MGIB benefits cover the average real cost of attending a public four-year institution in the vast majority of states (Asch, Fair, and Kilburn, 2000). Therefore, MGIB benefits compare favorably with the direct average cost of a public education even without accounting for the recent increases in the MGIB benefit in 2000 and 2001. The benefits also cover average total costs (i.e., tuition costs plus room and board costs) in about half the states. However, MGIB benefits do not generally cover the average total cost of a private four-year institution, despite the recent increases in MGIB benefits that occurred in 2000 and 2001.

---

**CONTEXTUAL INFORMATION ON RETENTION AND  
CONTINUATION**

---

Like recruiting, military retention has been under duress in recent years. Several of the services failed to meet their first- and second-term enlisted retention objectives in the second half of the 1990s, and retention problems arose among some of the officer communities, particularly among junior officers. The services pointed to three sources for these problems. The first was the robust civilian economy that provided attractive opportunities to military personnel, especially to well-educated individuals and individuals in highly technical areas. Demand for trained workers was unusually strong in certain sectors of the civilian economy, such as the airline industry, and that demand had an adverse effect on military retention. The second was the large post-cold war increase in peacetime deployments that required personnel to separate from their families and perform hostile duty. The final reason offered by the services was the management of the defense drawdown of the early 1990s. Active duty endstrength was reduced by a third, primarily by means of reducing accessions and the retention of junior personnel. However, to man midcareer positions after the drawdown, a larger fraction of these smaller cohorts had to be retained. Therefore, in the late 1990s retention rates had to rise, not fall, to meet endstrength.

To address the retention challenges, the services dramatically increased their Selective Reenlistment Bonus (SRB) budgets in FY98 and pursued other retention and quality-of-life initiatives, as described below. However, retention continued to be a problem in some areas, particularly in the Air Force and Navy. An important impetus for the passage of the FY00 pay legislation in FY99 was to

improve retention in these areas (Asch and Hosek, 1999). As described below, retention improved in FY00, but the overall retention picture was mixed. In FY01, retention continued to improve, but problems still seemed to persist among some junior officer communities and among second-term and career Air Force enlisted personnel. Nonetheless, the Navy now claims that it has achieved a real, but fragile, victory over its retention problems (Ryan, 2001), and the Army says that it has now met all of its enlisted retention goals for three years in a row (Maude, 2001). The Marine Corps continues to manage its retention situation effectively (Parks, 2001), and even the Air Force met its retention goal for first-term personnel, an achievement not attained since FY97 (Peterson, 2001). Thus, the overall retention picture now gives more cause for optimism, although retention continues to be a concern.

#### **ENLISTED RETENTION TRENDS<sup>1</sup>**

The discussion that follows focuses on retention and reenlistment, information that pertains to the continuation of personnel at reenlistment decision points. We do not have separate information on the reenlistment or retention goals (or targets) of the services, which together with continuation information would indicate whether the supply of personnel is adequate to meet the demand for personnel. However, the Air Force stated that it missed its first-term retention goal from the last quarter of FY98 until the second quarter of FY01, and second-term reenlistment still remained below goal at that point. Therefore, the downward trends in retention and reenlistment reported in the tables for the Air Force below appear to be borne out as outcomes that were generally below goals. The Navy has stated that it needs to increase retention rates among its junior and midcareer personnel because these cohorts are smaller as a result of the drawdown. Despite increases in retention in the second half of the 1990s, as reported below, the Navy still considered retention to be a serious challenge. In the case of the Marine Corps and Army, enlisted retention appeared to be less a problem for these services than it is for the Air Force and Navy.

---

<sup>1</sup>The discussion on enlisted retention trends and officer continuation draws from the discussion in Hosek and Asch (forthcoming).

The retention rate is a commonly tracked indicator of enlisted retention. The Defense Manpower Data Center (DMDC) defines “retention rate” as the percentage of personnel who reenlist or extend among those who reach a reenlistment or extension decision date within the 18-month period that begins at the start of the fiscal year. Extensions typically represent short obligations of additional service, often a year or less, whereas reenlistment reflects a longer commitment of service. We obtained first- and second-term retention rates from DMDC, and we also separately computed reenlistment rates for first-term personnel. We defined reenlistment rate as the percentage of personnel who make a new obligation of 25 months or more, relative to the population nearing the end of a service obligation and not extending. The service obligation could be either the end of a term of service or the end of a previous extension. Extensions are defined here as 1 to 24 months long. A reenlistment term is typically 48 to 60 months long, sometimes even longer in the Navy.

From FY95 to FY99, the Air Force experienced a decline in first-term retention (Figure 4.1): its retention rate fell by 5 percentage points (a 12 percent decline), and the Air Force reported that its first-term retention rate was below target between FY97 and FY99.<sup>2</sup> Further, as Figure 4.2 shows, the Air Force first-term reenlistment rate fell by more than the retention rate fell by. The reenlistment rate dropped 17 percent, from 52 to 43 percent, between FY96 and FY99, with much of the change occurring in FY98–99. Thus, a growing segment of those who were still enlisted a year after the end of their service commitment had obtained extensions rather than reenlisting.<sup>3</sup>

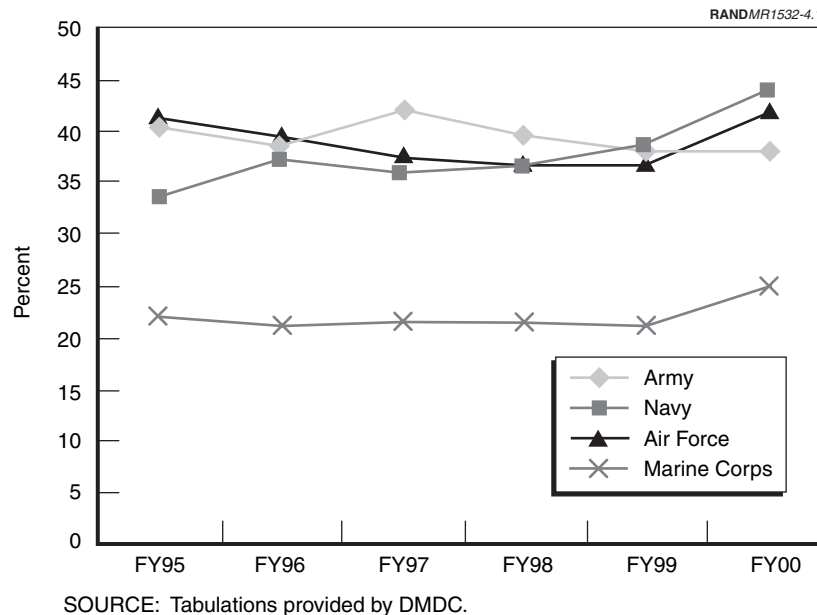
As shown in Figure 4.1, the Marine Corps’ first-term retention rate held steady at around 21 percent in FY95–99, then spurted to 25

---

<sup>2</sup>Tables showing the underlying data in Figures 4.1–4.3 are shown in the Appendix.

<sup>3</sup>Air Force data on reenlistment show a trend similar to that reported in Figure 4.1. The Air Force excludes personnel deemed ineligible to reenlist, whereas the rates in Figure 4.1 use data that do not indicate eligibility. The Air Force’s first-term reenlistment rates declined steadily from about 63 percent in FY95 to about 50 percent in FY99, then rose to 52 percent in FY00. The Air Force’s second-term reenlistment rates show a similar decline. Although we do not define reenlistment rate the same way as the Air Force, we find that the trend was nearly identical. Air Force rates are from Peterson (2001).

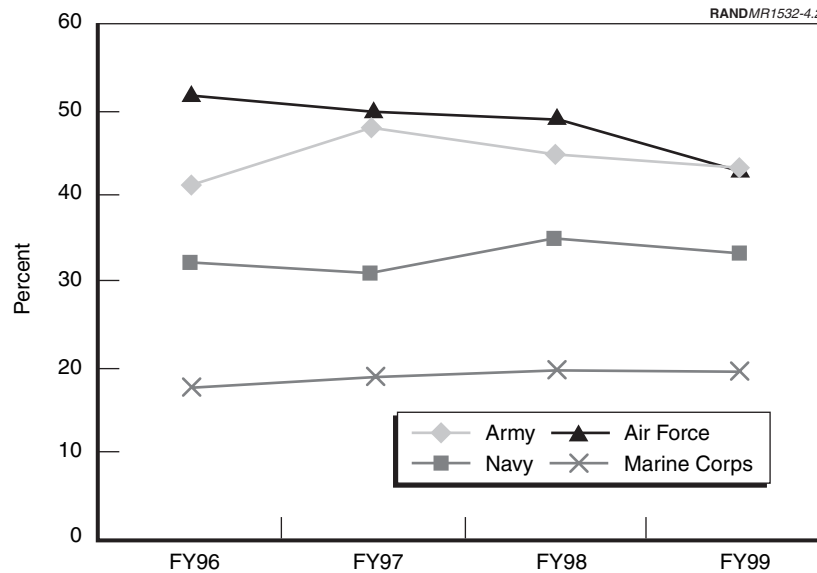




**Figure 4.1—First-Term Retention Rates**

percent in FY00. The Army's rate was around 40 percent in FY95–97 and declined to 38 percent in FY99 and FY00. The Navy's rate was 33 percent in FY95, rose to around 37 percent in the late 1990s, and rose again to 43 percent in FY00. The rise in the Navy retention rate reflects the effects of an expanded Navy SRB program in the late 1990s (see below). It might also reflect rising attrition rates, which would decrease the total pool of personnel who could choose to reenlist but increase the proportion who would be likely to reenlist. Like the first-term retention rate for the Navy, the first-term reenlistment rate held fairly steady over FY95–99, though with an increase from 31 to 32 percent in FY96–97 to 35 percent in FY98 and to 33 percent in FY99 (Figure 4.2). The Navy reported in FY99 that enlisted retention was still below the level required to reach its steady state and characterized this as a serious concern (Oliver, 1999).

Between FY95 and FY99 the Air Force also had a decline in second-term retention wherein presumably most stay/leave decisions did



SOURCE: Authors' tabulations, replicated from Hosek and Asch (forthcoming).

Figure 4.2—First-Term Reenlistment Rates

not involve extensions. Its second-term retention rate fell from 61.7 to 51.2 percent, or 16 percent (Figure 4.3), and the Air Force consistently reported missing its second-term reenlistment objective for each year, starting in FY96. By comparison, the Army's second-term rate seesawed in FY95–97, then declined from its FY97 value of 54.9 percent to 50.5 percent in FY00. In FY98 and FY99, the Army moved to reduce the noncommissioned officer (NCO) content in its force, resulting in fewer reenlistment opportunities. This policy was reversed in late FY99 and early FY00. The Navy and Marine Corps rates improved from FY95 to FY97, then declined from FY97 to FY99 to above their FY95 levels. The rates rose slightly from FY99 to FY00, but despite this increase, the Navy rate was below the steady-state target according to Navy testimony.

In sum, perhaps as a result of the pay increases contained in the FY00 National Defense Authorization Act, *first-term* retention improved for the Air Force, Navy, and Marine Corps in FY00 and held steady for

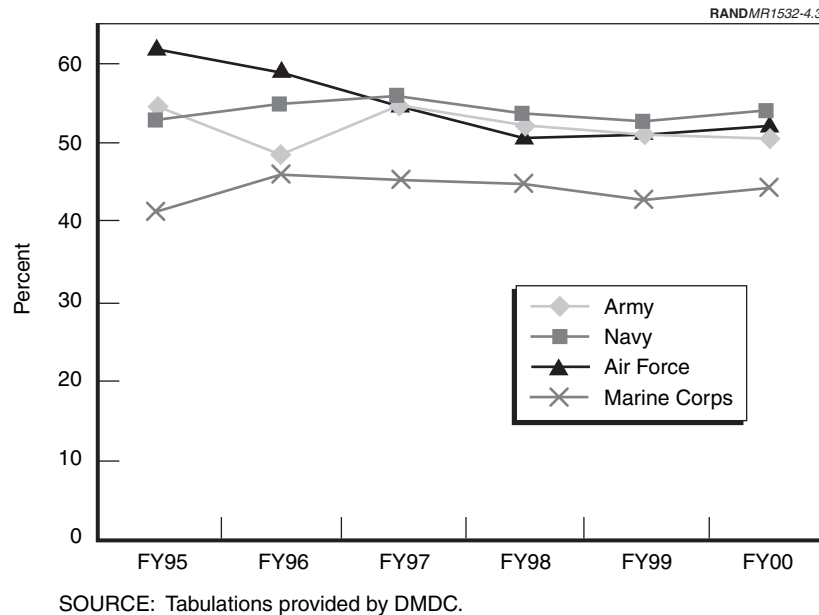


Figure 4.3—Second-Term Retention Rates

the Army. Service members followed the pay debate closely, judging from the many articles on pay in the *Services Times*, and may have been well aware of the strength of the FY00 pay action. Further, as discussed later in this chapter, selective reenlistment bonus budgets were increased dramatically between FY99 and FY00 and the number of skills eligible for these bonuses expanded. As for *second-term* retention rates, the rates for FY00 show some evidence of improvement from FY99 for the Air Force, Navy, and Marine Corps.

Unfortunately, DMDC retention data are not yet available for FY01. However, testimonies by the service representatives before the Personnel Subcommittee of the Senate Armed Services Committee in April and July 2001 suggest that enlisted retention had improved for all service branches. The Navy indicated that it had made significant retention improvements and, indeed, Vice Admiral Ryan stated in April 2001 that the Navy's endstrength would approach 376,000, above the authorized strength of 372,642 (Ryan, 2001). On the other

hand, the Navy noted that it still faced an “at-sea billet gap” and that its retention improvements were real yet “fragile.” The Air Force also indicated improvements. The Air Force met its first-term reenlistment rate goal, its second-term reenlistment rate increased, and the career reenlistment rate held steady. But its second-term and career reenlistment rates still fell below the targets, and the Air Force reported that first-term reenlistment rates were still below target in several critical and war-fighting skill areas. The Army and Marine Corps continued to report that enlisted retention was under control. Therefore, although problem areas still exist, the picture has been improved from FY00.

### **OFFICER CONTINUATION RATES**

We next review recent data on officer continuation rates obtained from DMDC. As with enlisted personnel continuation rates, officer continuation rates in the Air Force have declined in recent years, especially for those in their midcareer with 6 to 13 YOS, i.e., those who are O-3s and O-4s. On the other hand, continuation rates among senior officers, those with over 20 YOS, increased from FY94 to FY95 and then held fairly steady.

Figures 4.4–4.8 show annual officer continuation rates since FY89 by YOS groupings. The data from the figures, obtained from DMDC, include both commissioned and warrant officers.<sup>4</sup> The continuation rate is defined as the fraction of individuals who were officers at the beginning of the fiscal year who were still officers at the end of the year. YOS for members is defined as of the beginning of the fiscal year.

The figures show that continuation rates declined sharply during the 1992–1993 drawdown then rebounded sharply, especially in the Army and Air Force and in year groups 6–9, 10–13, and 20 and above. The rates held fairly steady between FY93 and FY95, but they generally declined between FY95 and FY99 among those in their midcareer for the Army, Navy, and Air Force. The Air Force continuation rate declined by over 5 percent between FY95 and FY99 for those in years

---

<sup>4</sup>Tables in the Appendix provide the data presented in these figures.

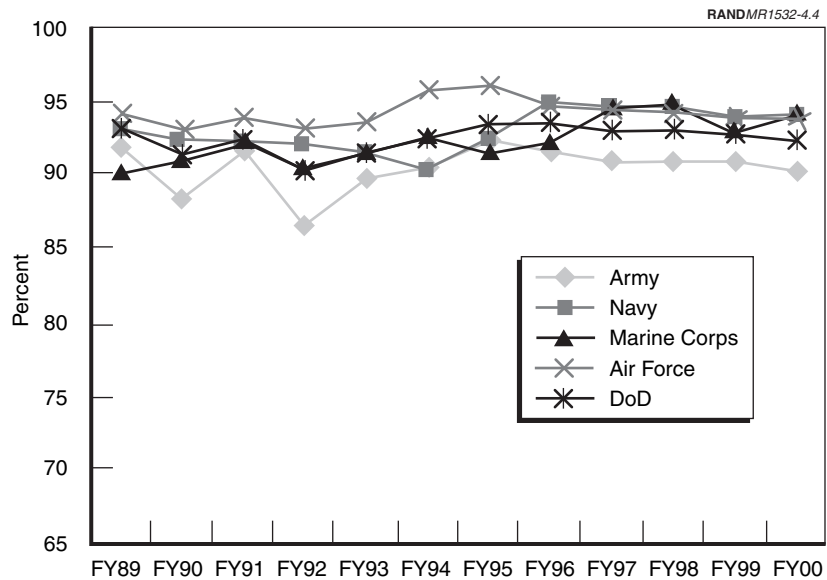


Figure 4.4—Annual Officer Continuation Rates, YOS 0–5

6–9 and 10–13. The Army and Navy midcareer continuation rates also fell during this period, although the percent decline is small.

Although the magnitudes of continuation rate declines were small for any given year, changes in the rates can accumulate over time if intervening actions are not taken. For example, based on the continuation rate of those in years 6–9 in FY94 shown in Figure 4.5 for the Air Force, the likelihood that a new officer who is in service at YOS 6 will still be in service by year 9 is 0.794, or 0.952<sup>4</sup>. Based on the rate for FY00, which is 5.2 percent smaller, the likelihood that an officer at YOS 6 will still be in service by year 9 is 0.662, a figure 16.6 percent smaller than the FY94 figure. Thus, small changes in continuation rates can have noticeable effects over time, and moderate declines, such as those shown in the figures, can have important ramifications for meeting manning requirements.<sup>5</sup>

<sup>5</sup>Continuation rates must be combined with information on the inventory of personnel in order to project the number of personnel on hand in the future. An example of how small declines in continuation rates can have large effects on the experience mix

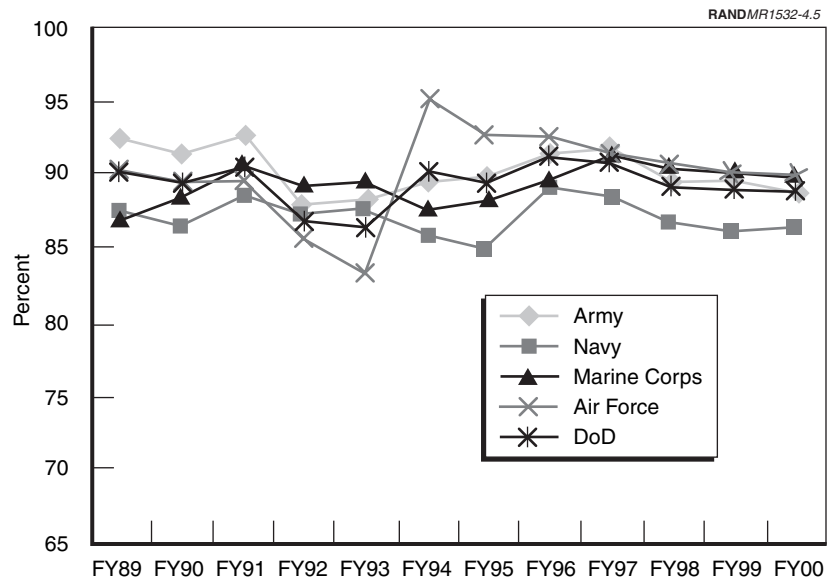


Figure 4.5—Annual Officer Continuation Rates, YOS 6–9

In addition, as argued by the Navy, higher, not stable, continuation rates of a given cohort are now needed because of reduced accessions and low continuation rates during the drawdown. Consequently, the Navy reported in 1999 that midcareer officer retention was a serious concern in the surface warfare community, aviation warfare community, and elsewhere, despite the apparent stability of the annual continuation rates. Furthermore, small changes in aggregate continuation rates can mask larger problems in specific skill areas. All services faced severe retention problems among pilots. The Air Force reported shortages in 1999, not only among pilots but also among navigators, nonrated operation officers, and mission support officers. The Army reported retention problems among officers, especially captains. To some extent, the captain shortage was offset by an overage of lieutenants, in aggregate, although the experience levels of the two groups are not the same.

of personnel if sustained for five years may be found in Asch, Hosek, and Warner (2001).

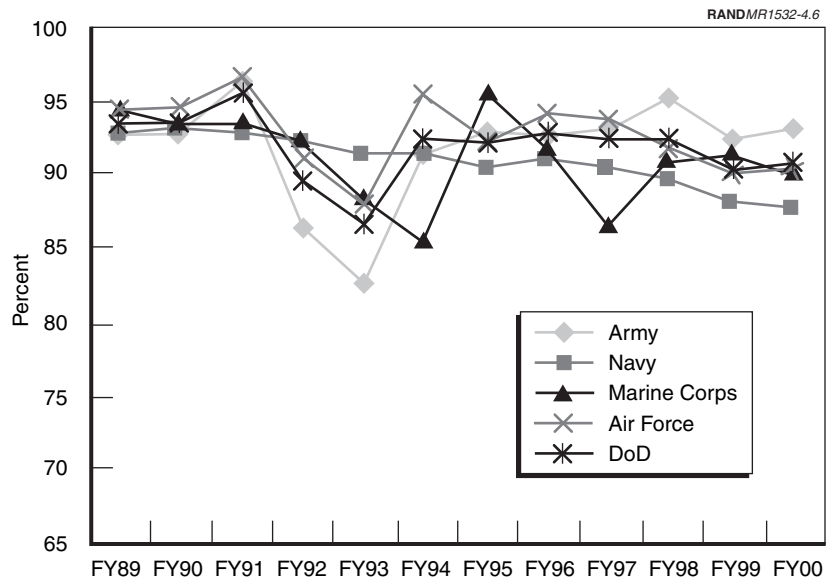


Figure 4.6—Annual Officer Continuation Rates, YOS 10–13

The declines in midcareer retention during the second half of the 1990s were areas of major concern because they can result in undermanned or unmanned positions, potentially harming readiness and increasing the workload for the rest of the force. Furthermore, the services' future leaders are drawn from these pools of midcareer officers. Reductions in retention reduce the size and depth of the talent pool from which future leaders can be drawn. The result is a reduction in current and future capability.

A key purpose of the FY00 TRIAD pay legislation was to address these retention problems. In addition to this pay action, numerous special and incentive pays were increased, as discussed below. The continuation rates shown in Figures 4.4–4.8 end in FY00.<sup>6</sup> (FY01 continuation rates are not yet available from DMDC.) Among those in years 6–9, the Air Force FY00 continuation rate was about the same

<sup>6</sup>The continuation rate for FY00 indicates the percentage of officers on October 1, 1999, who were officers on October 1, 2000.

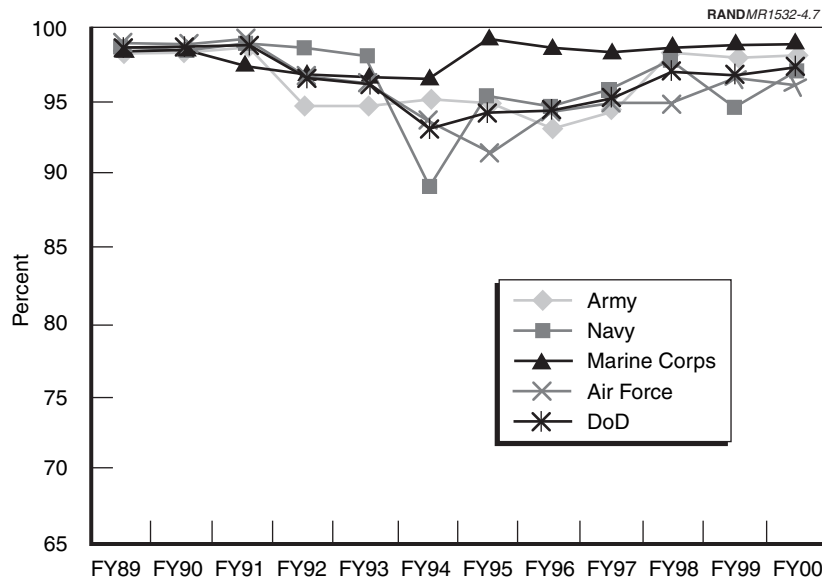


Figure 4.7—Annual Officer Continuation Rates, YOS 14–19

as its FY99 rate, the Navy rate rose slightly, and the Army rate continued its decline. However, the Navy reported considerable improvement in overall officer retention rates for 2000 and 2001 (Ryan, 2001). Particularly notable was the reported increase in retention among Navy aviators between FY99 and FY00, although retention fell between FY00 and FY01. Retention among surface warfare officers was also reported to increase in FY00. The Air Force reported improvements in retention among navigators and air battle managers between FY99 and FY00 and again between FY00 and FY01.

Despite these improvements in officer retention, the service personnel chiefs still reported problem areas in their testimonies before the Personnel Subcommittee of the Senate Armed Services Committee in July 2001. The Army reported shortages of about 1,700 officers, with the shortage of Army competitive captains reaching 2,776 (Maude, 2001). The shortage of captains has been offset by an overage of lieutenants. The Air Force reported continued retention difficulties in some skill areas and specifically mentioned that officer



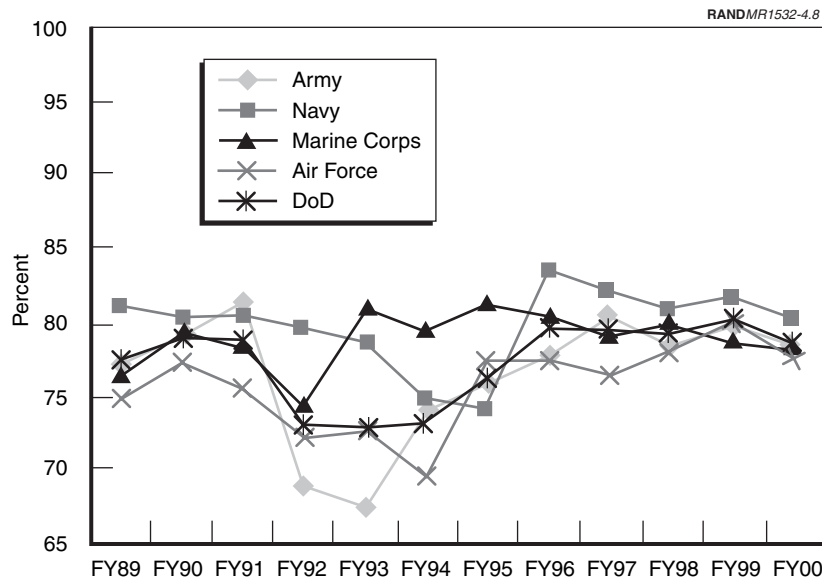


Figure 4.8—Annual Officer Continuation Rates, YOS 20+

continuation rates between years 4 and 11 were below target among scientists, engineers, and communication and computer system officers (Peterson, 2001). The Navy reported that it needed to continue its improvements in retention if it was to meet its officer manning requirements among the unrestricted line communities (i.e., aviation, submarine, and surface and special warfare). These problem areas indicate that although progress was made, the retention problems of the late 1990s are not entirely solved.

## CHANGES IN RESOURCES

In addition to the FY00 pay legislation, many other steps were taken by Congress and DoD to address the retention problems of the past six years. This section reviews some of the key resource changes that were made, especially with respect to special and incentive pays.

Traditionally, the purpose of SRBs is to provide the services with the flexibility to respond to temporary changes in reenlistment rates,

such as those resulting from cyclical changes in the civilian economy that alter the flow of personnel to the midcareer and senior ranks. Like enlistment bonuses, SRBs often vary across occupational areas. Further, the dollar amount of a bonus varies with the length of the service obligation.

Special pays have traditionally been used to compensate groups of service members for permanent differences in their duty or skill area. These differences might be due to unusual or hazardous duty, separation from one's family, or differences in skill or training. Special pays for aviators, physicians, and lawyers are examples of skill-related special pays, while special pays for flight-deck duty, hazardous material handling, or diving duty are examples of hazardous-duty-related special pays. Sea pay is a good example of a special pay meant to compensate members for extended separations from their family and home. Special pays help to maintain the stock (or inventory) of personnel in different occupational areas by recognizing important differences in their duty requirements, skill requirements, or other requirements that serve to reduce the supply of personnel to these areas.

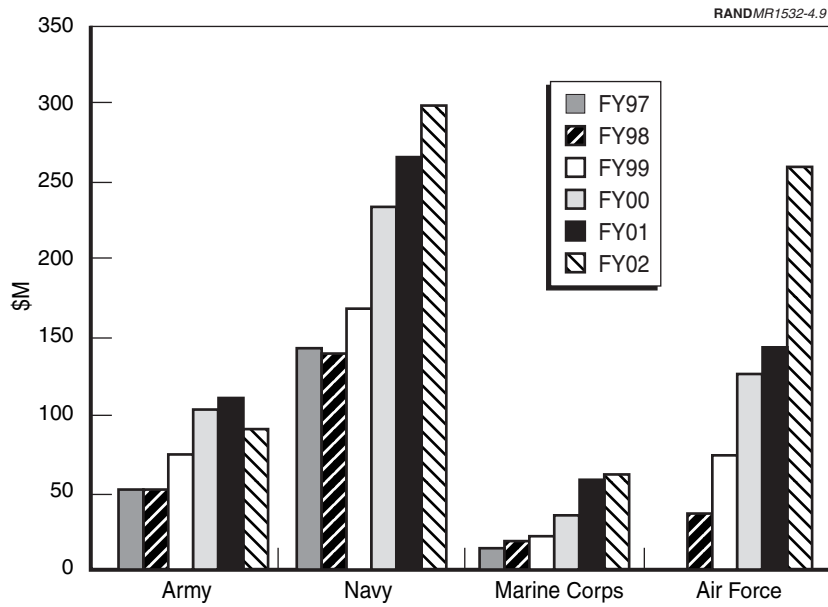
Although some specific special and incentive pays may be large, their average dollar value across all service members is small. Consequently, their average value explains a small fraction of average total cash compensation for members. Table 4.1, drawn from an extensive analysis of military cash compensation (Asch, Hosek, and Martin, forthcoming), shows the average annual cash compensation of members, by service, in FY99 and the average special pay and average bonus. Cash compensation includes regular military compensation, special and incentive pays, enlistment and reenlistment bonuses and miscellaneous allowances, and cost-of-living adjustments for active-duty service members. Despite the large dollar values associated with some special pays and bonuses, the average value of these pay components is about 8 percent of average cash compensation, at most. Past research shows that despite their relatively small value across all military personnel, SRBs and special pays have a positive effect on retention.

As with the budgets for enlistment bonuses, the budgets for SRBs have grown tremendously in recent years and are projected to continue to grow in all services but the Army. Figure 4.9 shows the SRB

**Table 4.1**  
**Average Amounts of Enlisted and Officer Cash Pay, 1999 (\$)**

	Army	Air Force	Marine Corps	Navy
<b>Officer</b>				
Average RMC	62,689	61,599	58,707	59,761
Average special pays	927	2,810	1,889	3,134
Average bonus	673	1,695	756	2,172
Average annual pay	64,125	66,883	62,161	65,940
<b>Enlisted</b>				
Average RMC	30,509	31,398	28,241	30,655
Average special pays	482	301	317	1,345
Average bonus	372	381	11	777
Average annual pay	32,195	33,095	29,355	33,743

SOURCE: Asch, Hosek, and Martin (forthcoming).



**Figure 4.9—Selective Reenlistment Bonus Budgets**

budget by service in nominal millions of dollars from FY97 until FY02. Between FY97 and FY00, the Army's budget more than doubled in nominal terms, from \$51 million to \$105 million. The Air Force went from \$0 to \$126 million over this period. The Navy and Marine Corps also had sizable increases. These increases were used to increase not only the dollar bonus amounts for skill areas that were already eligible for bonuses but also the number of skills that were eligible for bonuses. Since FY97, the Army has increased the number of skills eligible for a reenlistment bonus from 33 to 56.<sup>7</sup> Eligible skills have risen from 129 to 176 in the Marine Corps since 1997. In addition to expanding the skills eligible for SRBs, the services began offering them to individuals with more than 10 YOS. Historically, SRBs have been offered mostly to those facing their first or second reenlistment decision, i.e., those in years 3 to 8.

Numerous changes to special pays have been made as well. In some cases, the dollar amount of the pays was increased, such as with diving duty pay, in which the bonus was raised to \$240 per month for officers and to \$340 per month for enlisted personnel in FY00. In other cases, the legislative limit for the special pay was increased, as with the special pay for nuclear-qualified officers who extend their service. Specifically, as part of the National Defense Authorization Act of FY00, the nuclear officer incentive pay rate was increased to \$25,000; aviator continuation pay was restructured and increased to \$25,000 per year, and the length of the bonus program was extended to 25 years of aviation service. Further restructuring occurred in FY01. The upfront payment cap was raised from \$100,000 to \$150,000 for those who extend their careers for longer periods. The dollar amount of the aviator career incentive pay was also increased in FY99 and FY00. In addition, several new special pays were introduced. In FY00, the surface warfare officer continuation pay and the special warfare officer continuation pay were implemented. These pays are targeted toward midcareer officers at sea. Another major change beginning in FY02 is the expansion and restructuring of sea pay. Career sea pay has been expanded to include E-1 to E-3 personnel and officers with fewer than three years of sea duty; E-1 to

---

<sup>7</sup>Since skills vary in size, an increase in the percentage of skills offering a bonus does not necessarily reflect an equal increase in the percentage of personnel receiving a bonus.

E-3s will now receive \$100 per month and O-1 to O-6s with fewer than three years of sea duty will receive \$100 per month. Furthermore, existing career sea pay rates were increased. While the effectiveness of these new initiatives is yet to be determined, estimates on the effects of other special pays (such as sea pay) on retention, suggest that these changes will produce positive and cost-effective improvements.

### **OTHER RETENTION INITIATIVES**

The services have sought other changes to improve retention, most notably quality-of-life improvements and changes in personnel policies regarding eligibility for reenlistment. All services use high-year-of-tenure (HYT) rules, or “up-or-out” promotion policies. These rules require members to achieve promotions by specific years of service. If they have not, they must leave. For example, during and for several years following the drawdown, an E-6 Army soldier had to achieve the paygrade E-7 by 20 YOS or leave. One way the services can increase the flow of personnel to the middle and senior career force is to relax these HYT rules. Conversely, one way the services can reduce the flow is by tightening the rules. For example, during its drawdown, the Army tightened the HYT rule for E-7s, requiring soldiers to achieve an E-8 promotion by 22 YOS rather than by 24 years. This flexibility exists only for the enlisted force because the Defense Officer Personnel Management Act of 1980 sets the rules for officers.

One way the services have achieved improvements in enlisted retention in recent years has been by relaxing enlisted HYT rules. In 1999, the Army relaxed its HYT gates. The HYT point for E-4s was moved from 8 YOS to 10 YOS and for E-5s from 13 YOS to 15 YOS. In other words, before 1999, an individual who had not achieved a promotion to E-5 by YOS 8 would have been required to leave the Army, but that individual can now stay until YOS 10. The Navy also recently expanded the gates for E-4s and E-6s. In addition, the Navy has expanded the fraction of the enlisted force in the top six grades. During the drawdown, enlisted promotions to the top six grades were constrained to ensure that the limit of 69.9 percent of the force in the top six grades was not exceeded. However, since the drawdown, the requirements for personnel in the top six enlisted grades have in-

creased to 75 percent as older ships are decommissioned and newer ships favor more skilled and experienced sailors. In FY01, the Navy grew the fraction to 70.6, and the fraction is projected to grow further in FY02 to 71.5 percent.

---

**CONCLUDING THOUGHTS**

---

The military pay increases mandated by the FY00 National Defense Authorization Act stemmed the tide of decline in military/civilian pay ratio. However, the early effects of the pay increase were small, i.e., the predicted increases in high-quality recruits and retention were small relative to what would have been expected if only usual-sized pay increases had occurred. Because the higher-than-usual military pay increases are mandated to continue through FY06, the effect is expected to cumulate. In the meantime, because of the continuing difficulties in recruiting and retention as well as a desire to improve the career incentives of officers and enlisted personnel, a large military pay increase was passed in 2001 and implemented on January 1, 2002. This increase calls for a 5 percent average overall increase along with higher percentage increases for some higher-ranking and more experienced enlisted personnel. The FY02 increase will accelerate the rise in military pay relative to civilian pay and thereby further assist in recruiting and retention. By increasing the upward skewness of the pay table, it can also be expected to create stronger incentives for effort and for the retention of high-quality personnel, as shown in previous analyses (Asch and Warner, 1994; Asch and Hosek, 1999).

Although military compensation is a formidable element in achieving manning success, other factors also exert powerful influences. The rise in college attendance has permanently altered the traditional recruiting market, and the services will probably need several more years of initiatives and exploratory activities to learn how best to recruit from the college market. The increases in family income and federal- and college-based financial aid have made it easier to

attend college. The military, therefore, faces the ongoing challenge of attracting young men and women from, on average, increasingly affluent families, a challenge that must be met if the nation wants to maintain the social representativeness of the armed forces, or prevent further erosion of the existing representativeness. Revising the image, educational support, and career opportunities of the military in step with the growing importance of higher education in the economy and society is likely to be the preferred way forward, as the services recognize.

We have discussed the importance of advertising, enlistment bonuses, and educational benefits as enlistment incentives. We have also described the increase in recruiters, recruiter stations, changes in recruiter incentive plans, and diffusion of new technology to recruiters. These changes are likely to complement one another and result in a recruiting establishment that is more capable than it has been in a decade.

It is speculative to observe that the military drawdown resulted in a weakened recruiting establishment. Lower accession goals in effect allowed recruiters to coast, and as advertising budgets declined, the advertising capital (images, values, and attitudes delivered by an advertising campaign) dissipated. Recruiter management may have slackened as well. The late 1990s was a period of rebuilding, and today's recruiting establishment has the resources, tools, incentives, and geographic presence necessary to compete in the market for high-quality, college-oriented youth. Judging from this recent history, one lesson would be to prevent future lapses in recruiting level of effort; it may take several years to rebuild a capacity that can be weakened in a stroke. A second, simpler lesson is to encourage (and monitor) the services to keep changes in the number of production recruiters in line with changes in recruiting goals.

As for reenlistment, the increases in military pay relative to civilian pay in FY00 and FY01 improved reenlistment over what would have occurred with the usual increase in military pay, i.e., an increase equal to the ECI. Reenlistments were also helped by the recent softening of the civilian economy. Nonetheless, the services still report pockets of retention problems. Particularly troublesome are second-term and career reenlistments for the Air Force, continuation among Army captains, and retention of midcareer Air Force officers in areas



that are in demand in the civilian sector, such as computer system officers. The Navy has experienced improvements in retention in FY00 and FY01 but reports that those improvements are fragile. Thus, while the overall picture is cause for optimism, retention continues to be an area of concern.

One way for the Office of the Secretary of Defense to ensure that it can effectively monitor important military personnel outcomes, such as recruiting, retention, and pay, on an ongoing basis is to improve the quality and timing of some of the data input it obtains from the services and their recruiting advertising agencies. Although the services track personnel outcomes of interest to them, their definitions of outcomes, such as reenlistment rates, often differ across the services, making comparisons across DoD difficult. Furthermore, some information is not always obtained in a timely manner. Many of the tables and graphics shown in this report did not include recent information on recruiting and retention because of these data limitations. To improve the timeliness and usefulness of future reports on recruiting, retention, and pay, OSD and the services should strive to improve their data quality and the timeliness of their reporting.

---

**TABLES OF ENLISTED RETENTION RATES AND  
OFFICER ANNUAL CONTINUATION RATES**

---

This appendix provides the data underlying Figures 4.1–4.3 on enlisted retention and reenlistment rates and Figures 4.4–4.8 on annual officer continuation rates by YOS groupings. The definitions of “retention” and “continuation” are provided in the relevant sections in the text.

**Table A.1**

**First-Term Enlisted Retention Rates (Figure 4.1)**

	FY95	FY96	FY97	FY98	FY99	FY00
Army	40.2	38.7	41.8	39.6	38.2	38.3
Navy	33.5	37.4	36.2	36.3	38.6	43.5
Air Force	41.5	39.6	37.5	36.8	36.9	41.9
Marine Corps	21.9	21.3	21.5	21.6	21.3	25.2

SOURCE: Tabulations provided by DMDC.

**Table A.2**

**First-Term Enlisted Reenlistment Rates (Figure 4.2)**

	FY96	FY97	FY98	FY99
Army	41	48	45	43
Navy	32	31	35	33
Air Force	52	50	49	43
Marine Corps	18	19	20	20

SOURCE: Authors' tabulations, replicated from Hosek and Asch (forthcoming).

**Table A.3**  
**Second-Term Enlisted Retention Rates (Figure 4.3)**

	FY95	FY96	FY97	FY98	FY99	FY00
Army	54.5	48.7	54.9	52.1	50.9	50.5
Navy	52.8	54.6	55.8	53.7	52.8	53.5
Air Force	61.7	58.9	54.5	50.7	51.2	52.0
Marine Corps	41.4	46.1	45.3	44.9	42.8	44.6

SOURCE: Tabulations provided by DMDC.

**Table A.4**  
**Annual Officer Continuation Rates, YOS 0–5 (Figure 4.4)**

	Army	Navy	Marine Corps	Air Force	DoD
1989	92	92.9	90.3	94.3	92.9
1990	88.5	92.4	90.8	93.2	91.2
1991	91.6	92.3	92.5	93.7	92.5
1992	86.5	91.9	90.6	93.1	90.3
1993	89.7	91.7	91.1	93.6	91.6
1994	90.6	90.6	92.3	95.5	92.3
1995	92.5	92.3	91.4	95.9	93.4
1996	91.7	94.8	92	94.7	93.4
1997	91	94.5	94	94	93
1998	90.9	94.4	94.7	94.3	93.1
1999	91	93.9	92.8	93.7	92.7
2000	90	93.9	93.8	93.9	92.5

SOURCE: Tabulations provided by DMDC.

**Table A.5**  
**Annual Officer Continuation Rates, YOS 6–9**  
**(Figure 4.5)**

	Army	Navy	Marine Corps	Air Force	DoD
1989	92.4	87.3	87.2	90.6	90.2
1990	91.6	86.5	88.5	89.6	89.5
1991	92.9	88.5	90.4	89.6	90.5
1992	88	87.1	89.3	85.7	87
1993	88.4	87.6	89.6	83.3	86.5
1994	89.6	85.8	87.8	95.2	90.2
1995	90	85	88.2	92.6	89.5
1996	91.2	89.3	89.9	92.6	91.1
1997	91.8	88.7	91.1	91.6	90.9
1998	89.7	86.8	90.4	90.8	89.4
1999	89.6	86	90.2	90.1	88.9
2000	89	86.5	90	90.2	88.9

SOURCE: Tabulations provided by DMDC.

**Table A.6**  
**Annual Officer Continuation Rates, YOS 10–13**  
**(Figure 4.6)**

	Army	Navy	Marine Corps	Air Force	DoD
1989	92.9	92.7	94.3	94.5	93.5
1990	92.8	93.1	93.4	94.4	93.5
1991	96.3	93	93.7	96.7	95.6
1992	86.5	92.2	92.1	91.2	89.7
1993	82.8	91.4	88.5	88	86.9
1994	91.5	91.6	85.4	95.6	92.6
1995	92.9	90.6	95.7	92.1	92.2
1996	92.6	91	91.7	94.1	92.7
1997	93.2	90.5	86.5	93.9	92.4
1998	95.2	89.9	91.1	91.8	92.6
1999	92.4	88	91.6	90.1	90.6
2000	93.3	87.7	90.3	90.6	90.9

SOURCE: Tabulations provided by DMDC.

**Table A.7**  
**Annual Officer Continuation Rates, YOS 14–19**  
**(Figure 4.7)**

	Army	Navy	Marine Corps	Air Force	DoD
1989	98.3	98.5	98.5	98.8	98.5
1990	98.3	98.5	98.1	98.8	98.5
1991	98.6	98.6	97.3	99.2	98.7
1992	94.4	98.5	96.8	96.4	96.2
1993	94.5	97.8	96.4	96.1	96
1994	94.8	88.9	96.5	93.6	93.1
1995	94.7	95.2	99.1	91.6	94.1
1996	93.1	94.6	98.4	94.2	94.2
1997	94.2	95.7	98.1	94.8	95.1
1998	98.2	97.9	98.6	94.9	97.1
1999	97.7	94.6	98.8	96.3	96.6
2000	98	97	98.7	95.9	97.2

SOURCE: Tabulations provided by DMDC.

**Table A.8**  
**Annual Officer Continuation Rates, YOS 20+**  
**(Figure 4.8)**

	Army	Navy	Marine Corps	Air Force	DoD
1989	77.2	81	76.6	74.9	77.4
1990	78.9	80.6	79.2	77.3	78.8
1991	81.4	80.6	78.5	75.7	79.1
1992	69	79.6	74.3	72.3	73.2
1993	67.4	78.8	81	72.5	73
1994	74.1	74.8	79.6	69.7	73.2
1995	75.6	74.2	81.4	77.3	76.2
1996	77.9	83.5	80.4	77.6	79.5
1997	80.4	81.9	79.2	76.7	79.6
1998	78.7	80.9	79.9	78.2	79.3
1999	79.5	81.8	78.6	80.1	80.2
2000	78.7	80.3	78.1	77.5	78.7

SOURCE: Tabulations provided by DMDC.

---

**METHOD FOR COMPUTING AN EFFECTIVE INCREASE  
IN MILITARY PAY**

---

Arkes used the following approach to compute the effective increase in military pay due to TRIAD relative to what it would have been in the absence of TRIAD:

- Assume the member perceived the military pay changes in years FY96–99 to equal the increase in ECI relative to the increase in civilian pay. The same applies for the first three months of FY00, the months before the first TRIAD change went into effect. Further assume that the increase in ECI was expected to be the same as the civilian pay increase for FY01, so that there was no expected change in relative military pay in FY01 in the absence of the FY00 military pay legislation.
- Assume that the perceived incremental increase in relative military pay under the period covered by the FY00 legislation, i.e., FY00–06, is 0.5 percent per year. This assumes that, for FY01–06, the growth in ECI is expected to be the same as the growth in civilian pay, so the growth in military pay relative to civilian pay equals 0.5 percent in a given future year.
- The member’s expected speed of promotion is unaffected and equal to the speed observed during FY96–99. The member’s pay growth depends on promotion speed and annual pay increases. The pay increases compound in the sense that the absolute size of a 0.5 percent increase in relative pay for an E-5 with six YOS will be larger in FY06 than it is in FY01, for example.

- Apply a discount rate of 20 percent. Warner and Pleeter (2001) found this discount rate to be consistent with the behavior of enlisted personnel.
- Assume that for each service, the reenlistment rates in FY00 for various years of service can be used to approximate a member's expected probability of continuing in the service over future years (and, subsequently, earning the higher pay that comes in the future).
- Convert the \$30,000 retirement bonus into an equivalent annualized percentage change in pay. Assume everyone takes the bonus.
- Deflate the basic pay changes to obtain the change in RMC. The reason is that past elasticity estimates appear to be based on military pay as measured by RMC, but the above computation aims at basic pay. Basic pay is about 0.6 of RMC, so an estimate of the increase in RMC is equal to 0.6 times the increase in basic pay. This assumes the other components of RMC (namely, basic allowance for subsistence, basic allowance for housing, and the tax advantage from the nontaxability of the allowances) are not increased in a special way. That is, their increase, like the usual increase in basic pay, is assumed to equal ECI, and since ECI is assumed to equal Consumer Price Index (CPI), there is no real increase in these components of RMC. Hence, the increase in real RMC is derived from the increase in basic pay alone.

---

## REFERENCES

---

- Asch, Beth J., *Navy Recruiter Productivity and the Freeman Plan*, Santa Monica, Calif.: RAND, R-3713-FMP, 1990.
- Asch, Beth J., and James R. Hosek, *Military Compensation: Trends and Policy Options*, Santa Monica, Calif.: RAND, DB-273-OSD, 1999.
- Asch, Beth J., and Lynn A. Karoly, *The Role of the Guidance Counselor in the Military Enlistment Process*, Santa Monica, Calif.: RAND, MR-315-FMP, 1993.
- Asch, Beth J., and John T. Warner, *A Policy Analysis of Alternative Military Retirement Systems*, Santa Monica, Calif.: RAND, MR-465-OSD, 1994.
- Asch, Beth J., C. Christine Fair, and M. Rebecca Kilburn, *An Assessment of Recent Proposals to Improve the Montgomery G.I. Bill*, Santa Monica, Calif.: RAND, DB-301-OSD/FRP, 2000.
- Asch, Beth J., James R. Hosek, and Craig W. Martin, *A Look at Cash Compensation for Active Duty Military Personnel*, Santa Monica, Calif.: RAND, MR-1492-OSD, forthcoming.
- Asch, Beth J., James R. Hosek, and John T. Warner, *An Analysis of Pay for Enlisted Personnel*, Santa Monica, Calif.: RAND, DB-344-OSD, 2001.
- Asch, Beth J., M. Rebecca Kilburn, and Jacob A. Klerman, *Attracting College-Bound Youth into the Military: Toward the Develop-*



*ment of New Recruiting Policy Options*, Santa Monica, Calif.: RAND, MR-984-OSD, 1999.

The College Board, *Trends in College Pricing 2000*, New York: The College Board, 2000.

Dertouzos, James N., *Recruiter Incentives and Enlistment Supply*, Santa Monica, Calif.: RAND, R-3065-MIL, 1985.

Dertouzos, James, and Steven Garber, "Estimating Advertising Effectiveness: Methodology and Applications to Military Recruiting Effectiveness in the 1980s and 1990s," Santa Monica, Calif.: RAND, unpublished research, November 2001.

Hosek, James R., and Beth J. Asch, *Changing Air Force Compensation: A Consideration of Some Options*, Santa Monica, Calif.: RAND, MR-1566-AF, forthcoming.

Hosek, James R., and Jennifer Sharp, *Keeping Military Pay Competitive: The Outlook for Civilian Wage Growth and Its Consequences*, Santa Monica, Calif.: RAND, IP-205, 2001.

Jorgenson, Dale W., "Information Technology and the U.S. Economy," *American Economic Review*, Vol. 91, No. 1, March 2001, pp. 1-32.

Junor, Laura J., and Jessica S. Oi, *A New Approach to Modeling Ship Readiness*, Alexandria, Va.: Center for Naval Analyses, CRM 95-239, April 1996.

Maude, Timothy, Lieutenant General, U.S. Army Deputy Chief of Staff for Personnel, Testimony before the Personnel Subcommittee of the Senate Armed Services Committee, July 18, 2001.

Murray, Michael P., and Laurie L. McDonald, *Recent Recruiting Trends and Their Implications for Models of Enlistment Supply*, Santa Monica, Calif.: RAND, MR-847-OSD/A, 1999.

Oken, Carole, and Beth J. Asch, *Encouraging Recruiter Achievement: A Recent History of Military Recruiter Incentive Programs*, Santa Monica, Calif.: RAND, MR-845-OSD/A, 1997.

Oliver, D. T., Vice Admiral, U.S. Navy Deputy Chief of Navy Operations, Manpower and Personnel, Testimony before the Person-

nel Subcommittee of the Senate Armed Services Committee, February 24, 1999.

Orvis, Bruce R., Michael T. Childress, and J. Michael Polich, *Effect of Personnel Quality on the Performance of Patriot Air Defense System Operators*, Santa Monica, Calif.: RAND, R-3901-A, 1992.

Parks, Garry, Lieutenant General, U.S. Marine Corps Deputy Commandant, Manpower and Reserve Affairs, Testimony Before the Personnel Subcommittee of the Senate Armed Services Committee, July 18, 2001.

Peterson, Donald L., Lieutenant General, Air Force Deputy Chief of Staff, Personnel, Testimony before the Personnel Subcommittee of the Senate Armed Services Committee, July 18, 2001.

Principi, Anthony J., *Congressional Commission on Servicemembers and Veterans Transition Assistance*, Report to the Committees on Veterans' Affairs, Armed Services, The Senate and House of Representatives, January 14, 1999.

Ryan, N. R., Vice Admiral, U.S. Navy Deputy Chief of Navy Operations, Manpower and Personnel, Testimony before the Personnel Subcommittee of the Senate Armed Services Committee, July 18, 2001.

U.S. Census Bureau, *Statistical Abstract of the United States*, Washington, D.C.: U.S. Census Bureau, 2000.

Warner, John T., and Beth J. Asch, "The Economics of Military Manpower," in Keith Hartley and Todd Sandler, eds., *Handbook of Defense Economics*, Vol. 1, New York: Elsevier Science, 1995.

Warner, John T., and Saul Pleeter, "The Personal Discount Rate: Evidence from Military Downsizing Programs," *American Economic Review*, Vol. 91, No. 1, March 2001, pp. 33–53.

Warner, John T., Curtis J. Simon, and Deborah M. Payne, *Enlistment Supply in the 1990s: A Study of the Navy College Fund and Other Enlistment Incentive Programs*, Arlington, Va.: Defense Manpower Data Center, DMDC Report No. 2000-015, April 2001.

Winkler, John D., Judith C. Fernandez, and J. Michael Polich, *Effect of Aptitude on the Performance of Army Communications Operators*, Santa Monica, Calif.: RAND, R-4143-A, 1992.