19950302 072

RAND

Educational Benefits Versus Enlistment Bonuses

A Comparison of Recruiting Options

Beth J. Asch, James N. Dertouzos

National Defense
Research Institute

The research described in this report was sponsored by the Office of the Secretary of Defense (OSD) under RAND's National Defense Research Institute, a federally funded research and development center supported by the OSD, the Joint Staff, and the defense agencies, Contract No. MDA903-90-C-0004.

Library of Congress Cataloging in Publication Data

Asch, Beth J.
Educational benefits versus enlistment bonuses : a comparison of recruiting options / Beth J. Asch, James N. Dertouzos.
p. cm.
MR-302-OSD.
Includes bibliographical references.
ISBN 0-8330-1603-2
1. United States—Armed Forces—Recruiting, enlistment, etc.
2. Bounties, Military—United States—Cost effectiveness.
3. Veterans—Education—United States—Cost effectiveness.
I. Dertouzos, James N., 1950– . II. Title.
UB323.A768 1994
355.2´23´0973—dc20 94-39723
CIP

Published 1994 by RAND
1700 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
To order RAND documents or to obtain additional information, contact Distribution Services: Telephone: (310) 451-7002; Fax: (310) 451-6915; Internet: order@rand.org.

RAND

Educational Benefits Versus Enlistment Bonuses

A Comparison of Recruiting Options

Beth J. Asch, James N. Dertouzos

Prepared for the
Office of the Secretary of Defense

National Defense Research Institute

Approved for public release; distribution unlimited

PREFACE

This report presents an analysis of the relative cost-effectiveness of two incentive programs for recruitment: enlistment bonuses and educational benefits. In comparing these alternative recruiting resources, this research considers the effects of such programs on the service history of recruits, including reserve component accessions, as well as their costs. The issue of what mix of recruiting resources should be used must be addressed in the context not only of a buildup of the military but also of a drawdown, such as the one that is occurring. The results should be of interest to policymakers, personnel managers, and manpower researchers concerned with the relative efficiency of recruiting resources.

This research was conducted for the Under Secretary of Defense (Personnel and Readiness) within the Defense Manpower Research Center of RAND's National Defense Research Institute (NDRI). NDRI is a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, and the defense agencies.

CONTENTS

TABLES

SUMMARY

Effective management of recruiting resources requires information on the relative cost-effectiveness of alternative methods of enhancing enlisted supply. Two key recruiting policy options are enlistment bonuses and post-service educational benefits.[1] While numerous studies have examined the effects of these programs on enlistment outcomes, less is known about how these options affect the service history of recruits. The incentives embedded in the programs, the structure of the programs, and the types of recruits systematically drawn in by these programs may result in these benefits' significantly altering the attrition, retention, and reserve component accession rates of recruits. Such effects could dramatically influence estimated per-man-year costs of these recruiting programs. As a result, cost-effectiveness comparisons based on the enlistment effects of each program could provide only a partial picture of the programs' effects. For example, educational benefits could induce enlistees to leave after their first term but could also induce them to become part of the reserve force later. An examination of enlistment effects only rather than total force effects would provide a misleading comparison between educational benefits and bonuses.

This report extends previous analyses on the enlistment effects of educational benefits and enlistment bonuses by evaluating the effects of two specific recruiting programs on the service history of recruits. We analyze the effect of each program on the attrition, reten-

[1]Educational benefits can be used to pay for a variety of educational services, including college and vocational education.

tion, and reserve component accession rates of personnel, and on the active duty man-years contributed. Further, we evaluate the relative cost-effectiveness of these programs in terms of *additional manpower*, i.e., enlistments and man-years, generated. This latter analysis incorporates cost savings to reserve recruiting associated with enhanced reserve component accessions resulting from these programs. Thus, our analysis provides a more complete picture of the relative cost-effectiveness of bonuses and educational benefits.

TOTAL FORCE EFFECTS

To estimate the total force effects of enhanced bonuses and educational benefits (i.e., the effect on the service history of recruits), we tracked the service histories of individuals joining the Army during two recruiting experiments conducted in the early 1980s: the Enlistment Bonus Test and the Educational Assistance Test Program. Under each experiment, individuals were offered varying levels of benefits according to their location: Specific geographic regions were assigned to "experimental" or "control" groups. The specific structures of these programs do, to some extent, limit the generalizability of empirical results in the evaluation of all feasible program designs. In particular, the financial benefits were, in each case, linked with term of service requirements and a limited set of eligible skills. Since there was no way to isolate the independent effects of each of these program attributes, we had to be cautious in interpreting the results.

Still, two major advantages were gained by using data on these experimental cohorts. First, sufficient time had passed since the experiments were conducted, which made it possible to compare the completion, retention, and reserve component accession rates of recruits who entered under significantly different terms of enlistment. Second, the experimental designs automatically controlled for systematic regional and behavioral differences, such as previous enlistment rates, that were unrelated to the effects of educational benefits or bonuses. All enlistment cohorts were tracked until September 1988.

MARGINAL COST OF EACH PROGRAM

To estimate the *marginal cost* of each program, that is, the increment in cost due to recruiting an additional enlistee or an additional man-year, we combined the enlistment effects and total force effects of each program with estimates of the incremental cost of each program. The incremental cost was derived using various cost factors, such as the actuarial cost of educational benefits, together with the changes in the number of recruits and in the term-of-service and skill distributions that resulted under each program.

We found that offering educational benefits is an extremely effective method of recruiting, especially in comparison with offering enlistment bonuses, for a variety of reasons. First, educational benefits are very attractive to prospective recruits and lead to a significant expansion in enlistment supply. Second, educational benefits increase the incentives of enlistees to complete their first term, thereby enhancing the man-year value of this program; on the other hand, enlistees are also more likely to separate upon completion of their first term, presumably to use their educational benefits. This reduction in average service time is offset by the expansion in enlistments; therefore, total man-years increase significantly. Third, relative to the bonus program, educational benefits greatly enhance the probability that an individual who enters service later joins the Selected Reserves.

On the cost side, the actual cost of educational benefits is reduced because payments are deferred for several years, eligibility to claim benefits depends on the completion of a portion of the first term obligation, and eligible individuals choose not to utilize the full amount of benefits available. Further, educational benefits create a potential cost savings associated with increasing reserve component accessions. This cost savings is large, further enhancing the relative cost-effectiveness of educational benefits.

Specifically, we estimated that the marginal program cost of an additional high-quality recruit is $6,900 in educational benefits. In contrast, the cost is $18,700 in enlistment bonuses. This advantage of the educational assistance program is reduced when total costs per man-year, including training costs and the incremental costs in the benefit programs, are considered. However, the reduction is not due to lower average man-years per enlistment attributable to incentive effects of educational benefits to separate after the first term. Rather, it is due primarily to the longer term of service requirements in the design of the bonus program. Thus, including training costs in the comparison could very well overstate the relative efficiency of bonuses. Even so, when one nets out the potential cost savings associated with increased reserve component accessions, it is clear that educational benefits dominate bonuses as a recruiting option on a cost-per-man-year basis.

A PREFERRED POLICY ALTERNATIVE

Although the total force implications of other policy options, such as increases in recruiters or in advertising expenditures, have not been analyzed, our results suggest that educational benefits compare favorably with these alternatives as well. The computed cost of $6,900 per additional enlistment is quite similar for these alternatives, and it is not probable that the other options would generate the same increased flow of reserve component accessions. Thus, educational benefits emerge as the preferred policy alternative, especially in the current manpower environment of active-force reductions and emphasis on building reserve capacity for future contingencies.

ACKNOWLEDGMENTS

We would like to thank the numerous individuals who provided invaluable input into this research. The efforts of Edward Schmitz, formerly of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), who provided the ARI database on educational benefits and who answered innumerable questions about the data, are greatly appreciated. We thank Les Willis at the Defense Manpower Data Center for providing data that enabled us to track the service histories of recruits. We appreciate the thoughtful reviews of RAND colleagues Bruce Orvis and Jacob Klerman. Robert Young provided outstanding computer programming assistance. We also express our gratitude to Steven Sellman, director of Accession Policy (OASD [FMP] [MPP]), and to Ronald Liveris of the Accession Policy Directorate for their support and guidance.

Chapter One

INTRODUCTION

A primary goal of the military's recruitment effort is to enlist high-quality youth into the services.[1] In past years, educational benefits and enlistment bonuses have been key elements of the recruiting campaign in support of this goal.[2] Under the educational benefits program on behalf of eligible youth, the government contributes funds that can later be used to pay for educational expenses at approved institutions. Under the bonus program, the government pays out cash to eligible youth.

WHAT MIX OF RESOURCES?

An important question facing policymakers who manage the military's recruiting resources, including the educational benefits and the enlistment bonus programs, is: What mix of resources should be used? That is, should greater emphasis be placed on one resource over another? The answer to this question is essential not only during a buildup period when recruiting resources expand, such as during the 1980s, but also during a drawdown, such as the one currently occurring. In the context of the drawdown, policymakers must decide which resources must be cut and in what proportion.

---

[1] *High-quality youth* are those youth who are high school diploma graduates and whose score on the Armed Forces Qualification Test (AFQT) is in the upper half of the distribution for all youth.

[2] For example, the FY 1990–1991 Budget of the President allocated over $60 million for educational benefits (accrual charges for future obligations) and about $85 million for enlistment bonuses.

To answer the question, the policymaker must know the relative cost-effectiveness of different recruiting resources. In measuring the effectiveness of a recruiting program, account must be taken of both the enlistment effect and the effect of the program on a recruit's career—the *total force effect*—including his or her attrition, retention, and, if the recruit separates from active service, his or her propensity to join the reserve components. In measuring the costs of expanding a program, the policymaker must account not only for the costs associated with the new recruits drawn in by a recruiting program but also for the additional costs associated with recruits who would have enlisted at a lower resource level.

Since educational benefits and enlistment bonuses are two primary recruiting resources, the relative cost-effectiveness of these programs is of obvious interest. The enlistment effects of bonuses and educational benefits have been the subject of many research analyses.[3] Such studies typically find that these two recruiting programs expand the market and can channel recruits into designated skills and longer enlistment terms. However, they fall short of evaluating the efficiency, in both relative and absolute terms, of the two recruiting alternatives. To begin with, little is known about the actual cost of the two programs because, for example, eligible veterans may not utilize all available benefits. In addition, even though the enlistment effects of these programs are well documented, little is known about how the programs alter the service history of recruits.

RECRUITMENT BENEFITS AND SERVICE HISTORY

Enlistment bonuses and educational benefits may alter the service history of recruits in a variety of ways. The most obvious way is through the terms of the enlistment contract, which often tie the benefits to specific tour lengths, occupations, and post-service reserve-duty commitments. Another way is through the benefits' structures and/or eligibility requirements, embedded in which are incentives for attrition, reenlistment, and reserve accession. Specifically, earning an educational benefit is contingent on completing some portion of the first enlistment term; it produces an incentive to

[3]For example, see Fernandez (1982), Polich, Dertouzos, and Press (1986), and Buddin (1991), among many others.

increase first-term man-years contributed. On the other hand, fully using the educational assistance usually requires that an individual separate from service; it produces an incentive to reduce man-years. Bonuses also embed a positive incentive to complete the first term; an individual who attrites must repay the portion of the bonus corresponding to the uncompleted portion of his or her enlistment term. However, since unearned bonus amounts are worth less than future educational benefits monetarily, the incentive to complete the first term will be weaker.

Yet another way that these benefits can change the total force contributions of a recruit is through their selection effects. Educational benefits and bonuses may draw individuals into the military who have different propensities to attrite, reenlist, and join the reserve components. These effects can occur totally independently of the incentive effects described above. For example, individuals who are just induced by a bonus or educational benefit to take a less desirable option may be more likely to attrite, more likely to separate after the first term, and less likely to join the Reserves or National Guard. On the one hand, such selection effects may reduce both active duty man-years and reserve component accessions and the incentive effects described above that work in the opposite direction. On the other hand, these selection effects may have positive total force implications. For example, educational benefits may attract goal-oriented youths who are more productive and more committed to completing their first term. Further, as college students with monetary concerns, they may join the Reserves or National Guard to supplement their income while in school.

Because of the different ways that bonuses and educational benefits alter recruit behavior, the direction of their total force effects is indeterminant theoretically; we must evaluate and compare those effects empirically. Two previous efforts have attempted to examine how educational benefits have affected recruit attrition and retention. Schmitz and Drisko (1988) found that educational benefits under the Army College Fund (ACF) did not have a statistically significant effect on either the attrition rate or the reenlistment rate of recruits relative to the Army College Fund's predecessor (called Super-VEAP, an enhanced version of the Veterans Educational Assistance Program, or VEAP, described in Chapter Two). On the other hand, Hogan, Smith, and Sylwester (1991) found that educational benefits had no effect on attrition but that such benefits reduced eligible soldiers' likelihood of reenlisting at the end of their first enlistment term. While these studies provide some insight into how educational benefits affect recruits' active duty service histories, they ignore how they affect reserve accessions. Further, neither study takes advantage of the experimental nature of the data on educational benefits. The experimental nature of data enables the analyst to net out structural differences across areas, such as interregional differences in propensity to enlist, and structural differences over time. The Schmitz and Drisko study ignores the base period in its analysis, and the Hogan, Smith, and Sylwester study uses the FY 1982 entry cohort in its analysis. Also, both studies ignore how enlistment bonuses affect recruits' military careers. Enlistment bonuses and educational benefits may have different implications for active duty man-years and reserve accessions.

TOTAL FORCE EFFECTS AND MARGINAL COSTS

In this report, we extend earlier analyses by examining the total force effects of both the enlistment bonus and educational benefits programs. We then evaluate the programs' relative effectiveness by comparing the *marginal costs* of additional manpower (i.e., the increase in cost due to recruiting an additional high-quality recruit). Our analysis estimates program marginal costs of additional recruits as well as of additional obligated and actual man-years. Further, we account for any cost savings to reserve recruiting resulting from these programs.

The approach we take is to track the service histories of individuals joining the Army during two recruiting experiments conducted in the early 1980s: the Enlistment Bonus Test (EBT) and the Educational Assistance Test Program (EATP). Because enlistment benefits were linked with specific term-of-service and occupational requirements, it was impossible to assess the independent effects of different program attributes; therefore, the generalizability of results is somewhat limited to alternative policy designs. However, since the eligibility restrictions served to reduce the attractiveness of the enhanced benefits, the observed program effects can be interpreted as conservative lower-bound estimates for less restrictive packages having the same benefit levels. Although we were unable to quantify the empirical significance of eligibility requirements for the two programs, we do consider the likely effect, at least in qualitative terms, of these design differences. Thus, the estimates provide a valuable benchmark for judging the relative efficiency of bonus and educational benefit programs.[4]

ORGANIZATION OF REPORT

This report is organized as follows. In Chapter Two, we discuss our methodology for estimating the total force effects of enhanced bonuses and educational benefits, first providing an overview of the data we used, then discussing how we linked the service histories of individuals entering the Army with the varying levels of enlistment incentives that were provided during two recruiting experiments conducted in the early 1980s. In Chapter Three we present our total force results, discussing the effects of previous bonus and educational benefit programs on active duty completion, retention rates, and man-years, as well as on Selected Reserve accession rates. Further, in a series of simulations, we combine these average man-year effects and the *market-expansion results* (i.e., increased enlistments) from earlier studies to illustrate the aggregate effects of bonuses and educational benefits. In Chapter Four, we introduce the cost side of these programs into our comparison, deriving and comparing each program's marginal costs, using different definitions of enlisted *output,* i.e., enlistments or man-years. We also incorporate the effect of each program on reserve recruiting costs. This analysis provides the basis of our evaluation of relative cost-effectiveness. In Chapter Five, we conclude by summarizing our findings and discussing the policy implications of our analyses.

---

[4]The alternative to our approach would be to analyze nonexperimental data. Such an analysis would be subject to concerns about endogenous selection and is thus also not without potential pitfalls.

Chapter Two

METHODOLOGY

To analyze how educational benefits and enlistment bonuses affect the service histories of recruits, we tracked the accession cohorts associated with each experiment over time. In this chapter, we describe our tracking method. In the process, we review the main features of the Enlistment Bonus Test and the Educational Assistance Test Program.

DEFINING THE RECRUIT COHORTS

Our analysis compares the enlistment, attrition, retention, and Army Reserve and National Guard accession behavior of several high-quality recruit cohorts by tracking them over time. This task required obtaining data on recruits who enlisted sufficiently far in the past to have had time to complete their enlistment term, reenlist, and join the reserve components. Therefore, we used the data generated by two experiments that were conducted in the early 1980s to estimate the enlistment effects of Army educational benefits and enlistment bonuses: the EBT and the EATP.

These data provide a sufficiently long history to measure total force effects. Another advantage of using these data is that outcomes can be standardized for effects that are unrelated to the programs. Both experiments enabled us to compare test group behavior with control group behavior and to measure both control and test group effects relative to a base period. Thus, we were able to control for systematic regional and behavioral differences over time and between the test and control groups.

Several caveats must be made regarding the cohort selections. First, the experiments were conducted over ten years ago under economic conditions, recruiting missions, and force requirements that differ from today's. For example, recruiting missions are smaller today because of the drawdown. Second, the dimensions of the programs differ from those in operation today. For example, the eligibility criteria for skills and tour lengths were specific to the programs tested and have changed regularly since the tests. The program designs did not permit a decomposition of independent effects of compensation level from term of service and skill eligibility. Further, the structures of the benefits differ. For example, the Montgomery GI Bill significantly altered the Army College Fund in 1985. Under the new GI bill, the government's contribution rose and the maximum contribution of the service member fell, but any unused portion of the member's contribution became nonrefundable.

Unfortunately, these are the inherent problems with relying on the historical data necessary for tracking military career paths. Strictly speaking, therefore, our cost-effectiveness measures must be interpreted as being comparisons of specific program designs. However, these comparisons clearly demonstrate the importance of total force effects and should be viewed as lower-bound estimates of the potential effects of alternative benefits packages. The eligibility restrictions serve only to diminish the attractiveness of the enlistment options offered. Thus, the experiments provide valuable information concerning the probable magnitude of such effects, even for more recent versions of these programs.

EXPERIMENTAL DESIGNS

The Educational Assistance Test Program was conducted between December 1980 and September 1981; its base period was December 1979 through September 1980. The basic attributes of this program, as well as those of a subsequent bonus experiment, are summarized in Table 2.1. In the control cell, high-quality recruits in eligible skills received the basic contributory educational benefits (called the Veterans Educational Assistance Program, or VEAP), whereby the government matched contributions on a 2-for-1 basis and con-

Table 2.1

Summary of Experimental Programs: Incremental Benefits Offered

Program	Enhanced Benefits by Term[a] 2-Year	3-Year	4-Year	Percentage Eligible
Educational Benefits	$6,000	$8,000	$6,000	60
Enlistment Bonus	0	$4,000	$3,000	28

[a]These enhanced benefits represent differences between the control and test cells.

tributed enhanced benefits, called *kickers*.[1] The control-cell kickers were $2,000 for a 2-year enlistment, $4,000 for a 3-year enlistment, and $6,000 for a 4-year enlistment. In the Ultra-VEAP Kicker (UVK) test cell, high-quality recruits in eligible skills, mostly combat arms and combat support, received the basic contributory VEAP plus more-generous kickers: $8,000 for a 2-year enlistment and $12,000 for either a 3- or 4-year enlistment.[2]

Eligible recruits in either cell could choose when to start contributing; the amount of the kicker they actually earned was proportional to the amount they contributed and the number of months they served on active duty. However, to receive any educational benefits, individuals must have completed most of their enlistment tour and attended an approved institution of higher education. Enlistments in eligible skills constituted about 60 percent of all enlistments. In FY 1982, the Ultra-VEAP was adopted nationwide and was called the Army College Fund.[3]

[1]The VEAP-plus-kicker program was called Super-VEAP.

[2]Fernandez (1982), Appendix A, lists the Army occupations that were eligible for the Ultra-VEAP Kicker. Test-eligible occupations were primarily in the combat-arms area.

[3]Technically speaking, all our educational-benefit results are for the Ultra-VEAP Kicker test cell. However, in our subsequent discussion, we use the terms UVK and ACF interchangeably. It should be remembered that our usage of the term "ACF" refers to the ACF of the early 1980s, not to the more recent Montgomery GI Bill/ACF benefit. Further, although the program is called Army College Fund, individuals can, in fact, use the benefits to pay for a wide range of educational services including college, vocational or technical schooling, apprenticeship programs, and other approved on-the-job-training programs.

The bonus test was conducted between July 1982 and July 1984; its base period was July 1981 through June 1982.[4] In the control cell, a $5,000 bonus was offered to high-quality recruits in eligible skills. In the test cell, an $8,000 bonus was given to these recruits for a 4-year enlistment, and a $4,000 bonus was offered to those choosing a 3-year term. Enlistments in eligible skills constituted 28 percent of total high-quality contracts. For recruits in either cell, bonuses were payable up to $5,000 upon completion of training. Any remaining amount was paid in four equal installments every three months. Those who did not complete their enlistment term were required to refund the percentage of the bonus that corresponded to the time remaining in their term.[5]

TRACKING THE COHORTS OVER TIME

For each experiment, recruits in the control and test cells,[6] in both the base and test periods, were followed over time[7] by matching enlistment data to the Defense Manpower Data Center's (DMDC's) active duty cohort files.[8] Reserve component accessions were determined by matching our file on enlistments during these periods

[4]To maximize the amount of time between the enlistment date and the present for tracking recruit behavior over time, we limited the test data we analyzed to those between July 1982 and September 1983.

[5]The test-eligible skills in the bonus experiment were entirely combat-arms-related specialties. Polich, Dertouzos, and Press (1986), Appendix A, list the test-eligible occupations.

[6]The databases used to analyze the service history of recruits had somewhat different test- and control-cell sizes from those reported by the original studies. For example, in our data for the EATP, 58 percent of high-quality enlistments were in test-eligible skills rather than the 60 percent reported in the Fernandez study. Similarly, in our data for the EBT, 24 percent of high-quality enlistments were in eligible skills rather than the 28 percent reported in the Polich, Dertouzos, and Press study. Although the match between our data and those used by the original researchers is not perfect, the differences are not large.

[7]Specifically, our analysis focuses on the Ultra-VEAP Kicker test cell in the EATP and the "C" test cell in the EBT, which offered a bonus to 3- and 4-year-term enlistees. The other test cells were ignored because they were not subsequently implemented by the Army.

[8]The exception was the data on the service history of recruits enlisting during the EATP's test period, which were graciously provided by Edward Schmitz of the Army Research Institute. ARI had matched the EATP data to DMDC's cohort file as well as to Veterans Administration records on benefits usage.

to DMDC's Reserve Master File. For the purposes of this analysis, we define a *reserve component accession* as someone who joined the Selected Reserves as either an Army Reservist or an Army National Guardsman after leaving active duty.[9]

The service history of each recruit group in the base and test periods for each experiment was tracked until the end of FY 1988.[10] To compute first term man-years, we summed month-to-month continuation rates for each term of service after netting out the average number of months devoted to basic and occupation-related training.[11] In the process of computing man-years, we estimated completion, retention, and reserve accession rates. We define the *completion rate* as the fraction of the initial cohort that survived to the reenlistment decision point. *Retention rate* is defined as the fraction of the initial cohort who reenlisted or extended. *Reserve accession rate* is defined as the fraction who joined the Army's Selected Reserve components (after we double-checked that recruits were no longer on active duty). Because these definitions are not always straightforwardly applied to the DMDC data, Appendix A discusses how we determined whether individuals attrited or separated at the end of their enlistment term. Appendix A also presents the average training times for each experiment.

We estimated *average man-years*, i.e., the total man-years contributed by a recruit on average. This calculation poses a problem because it requires information on the military career of each recruit. Since our data stop at the end of FY 1988, we were unable to follow all individuals through the end of their careers. We therefore

---

9Our analysis will underestimate total reserve (and National Guard) accessions insofar as those separating from the active Army join the reserve components of the other branches of service. However, the fraction of active Army separatees who join a reserve component other than the Army Reserve and the Army National Guard is small relative to the fraction who join the two Army components. Thus, any biases will be small.

10The exception was the data set provided by ARI, which tracked the EATP test group until the end of FY 1986. This group was "aged" to the end of 1988, using RAND's Policy Screening Models (POSM) (Francisco, Grissmer, Eisenman, and Kawata, unpublished draft). For each fiscal year, this model provides the attrition and retention rates for Army personnel by year of service.

11Average training months for eligible and ineligible skills were computed using 1982 Army data on occupation-qualification requirements.

supplemented the completion data with estimates of the future man-years contributed by those still in service at the end of FY 1988. To calculate the latter figure, we estimated the future continuation rates by year of service (until year 30), using data from RAND's Policy Screening Models, inventory-projection models developed at RAND.

The POSM provides the FY 1988 Army active duty personnel inventory, stratified by year of service. We estimated yearly continuation rates as the ratio of the number of individuals in each year of service to the number in year of service *T*, where *T* is defined as the years of service that the enlistees in the EBT and EATP would have accumulated by FY 1988. We then summed these annual continuation rates to estimate the man-years contributed by those still in service at the end of FY 1988.

Clearly, this method produces only proxy measures of future-man-year contributions. On the one hand, the 1988 inventory is a cross section, whereas we require time-series data; unfortunately, clean data back to 1958, the cohort required to produce accurate estimates, are unavailable. On the other hand, the contribution of an individual's senior years of service to his or her total man-years is strongly correlated with first term retention rates, rates that may differ substantially by recruiting program and that are estimated with far more accuracy. While the absolute magnitude of our estimates of total man-years may be subject to some error, the relative size of these estimates across recruiting programs is likely to be more accurate.

Chapter Three

TOTAL FORCE RESULTS

In this chapter, we summarize our findings on the manpower effects of educational benefits and enlistment bonuses. We first review the enlistment effects found by past studies, then show the effects of the two recruitment programs on the service history of the average recruit enlisting under the enhanced bonus program and under the Army College Fund. To illustrate the aggregate result of these programs, we combine the enlistment effects with total force effects by way of simulation. The results of our simulations are discussed last.

ENLISTMENT EFFECTS

Past results on the enlistment effects of bonuses and educational benefits are summarized in Table 3.1.

Enlistment Bonuses

During the enlistment bonus experiment, bonuses increased *all* high-quality enlistments—expanded the market—by 5 percent (Polich, Dertouzos, and Press, 1986). And in the subset of occupations for which bonuses were offered to recruits—the test-eligible skills—enlistments rose by 48.6 percent. This 48.6-percent effect also reflects the 5-percent market-expansion effect of bonuses. Holding the market-expansion effect constant, we see that the *skill-channeling effect of bonuses,* i.e., the effect of bonuses on enlistments in test-eligible skills, was 41.5 percent (1.486/1.05). Thus, bonuses had a sizable effect of inducing individuals to switch toward the test-

Table 3.1

Overview of Enlistment Bonus Test and Educational Assistance Test Program Results

	Estimated Increase (%)	
	All Skills	Test-Eligible Skills
High-Quality Contracts		
Enlistment Bonus Test[a]	5.0	48.6
Educational Assistance Test Program[b]	8.7	17.0
High-Quality Obligated Man-Years		
Enlistment Bonus Test[a]	8.4	52.7
Educational Assistance Test Program[b]	3.8	9.2

[a]Polich, Dertouzos, and Press (1986).

[b]Fernandez (1982).

eligible skills. Bonuses also increased *obligated man-years*, i.e., the number of man-years contracted by the Army and the recruit. Obligated man-years rose by 8.4 percent because the bonus program shifted the term of service distribution toward longer tour lengths.

Educational Benefits

The Army College Fund increased high-quality enlistments by 8.7 percent.[1] In test-eligible skills, enlistments rose by 17 percent. This 17-percent figure overestimates the skill-channeling effect of the educational benefits program because it includes the market-expansion effect. Unfortunately, the methodology used by Fernandez (1982) does not permit calculation of an estimate that is net of the market-expansion effect. The ACF also shifted the term of service distribution toward shorter terms: the 2-year ACF option was relatively more popular than the 2-year option in the control cell.

[1]The 8.7-percent figure underestimates the ACF market-expansion effect because recruiter-management effects were not incorporated into the original analysis of the experimental data. Analyses of the recruiter's role in attracting enlistments suggests that market-expansion effects can be as much as 30 percent greater if recruiters are induced, via higher quotas, to maintain levels of effort. See Polich, Dertouzos, and Press (1986).

Comparing the enlistment effects of the two policies, we can see that the ACF was more effective at expanding the market, whereas the bonus program appeared more effective at channeling enlistees into eligible skills.

TOTAL FORCE EFFECTS

The positive enlistment effects discussed above may be offset by negative total force effects. As noted earlier, enlistment bonuses and educational benefits may draw *marginal recruits*, individuals who are barely induced by these programs into the Army and into eligible skills and therefore have increased attrition and lowered retention. Further, while eligible recruits enlisting under the ACF have an incentive to complete their first term, they also have an incentive to separate to claim their benefits.

Table 3.2 shows the effects of enlistment bonuses on completion, retention, man-years, and reserve component accessions by comparing the behavior of high-quality individuals in the test cell with that of individuals in the control cell after netting out cell-specific effects. The results in Table 3.2 are for the entire population of high-quality enlistees, regardless of whether they entered an eligible skill. However, because skill-channeling is also important, we also present the findings for the recruits in only the test-eligible skills (Table 3.3). In Tables 3.4 and 3.5, we present the comparable results for educational benefits. All the tables show the estimated conditional probabilities for retention rates, which are conditional upon completing the first term, and for the reserve accession rates, which are conditional upon separation. The tables showing the unconditional rates are provided in Appendix B.

Enlistment Bonuses

The first column in Table 3.2 lists the completion, retention, man-year, and reserve component accession rates in each Enlistment Bonus Test cell during the test period. The second column lists them for the base period. To compute the service-history effect of

Table 3.2

Enlistment Bonus Total Force Effects: High-Quality Recruits (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (Test/Control) (4)
First Term Completion				
Control cell	0.714	0.716	0.997	
Test cell	0.715	0.714	1.002	0.005 (0.40)
Retention Conditional upon Completion				
Control cell	0.430	0.402	1.068	
Test cell	0.432	0.411	1.050	–0.017 (–0.74)
Total Active Man-Years				
Control cell	4.656	4.488	1.038	
Test cell	4.811	4.573	1.052	0.014
Reserve Component Accession Conditional upon Separation				
Control cell	0.611	0.522	1.171	
Test cell	0.601	0.542	1.109	–0.053* (–3.18)

*Statistically significant at the 1% level.

bonuses, we first took the ratio of the rates during the test period to those during the base period. This calculation, shown in column 3, nets out any cell-specific effects that could otherwise confound our results. Then we took the ratio of the column 3 results for the test cell to those for the control cell, as shown in column 4, which lists the programmatic effects. For example, the first category in the table shows the calculations for estimating the effect of bonuses on completion. Since the completion rates for the control cell during the test and base periods were 0.714 and 0.716, respectively, the completion rate for the control cell fell by 0.3 percent (or 1 – 0.997). For the test cell, completion rates rose from 0.714 to 0.715 between the two periods, representing a 0.2-percent increase. Comparing the test to the control results, we see that completion rates rose by 0.5 percent as a result of the bonus test. This effect, however, is not statistically significant, as shown by the t-statistic in parentheses.[2]

The results in Table 3.2 indicate little difference between the EBT test and control groups in the completion, separation, and retention rates of recruits. Bonuses increased completions by only 0.5 percent and reduced conditional retention by 1.7 percent. Since the retention rate equals one minus the separation rate for those completing their first term, the small reduction in the conditional retention rate implies a small increase in separations conditional upon completion. None of these effects is statistically significant. Since the changes in completion and separation are slight and offset one another, the enhanced bonuses in the test cell had little effect on the active duty man-years contributed by the average recruit. Thus, the main effect of bonuses on the active duty force is to increase the number of enlistments.

At the bottom of Table 3.2 is our estimate of the effect of bonuses on the probability that an individual who separated from active duty after completing the first term will subsequently join the Army National Guard or Army Reserves. This probability fell by 5.3 percent. Thus, prior-service personnel enlisting under the enhanced bonus program were less inclined to join the Army Reserves or National Guard. However, offsetting this effect is the slight increase in the pool of prior-service personnel: The separation rate under the bonus program is slightly greater. Thus, the unconditional probability of joining the reserve components is not statistically significant even though the conditional one is. (The unconditional probabilities

---

[2]These are approximate t-statistics. To compute them, we first calculated the standard errors of the completion rates in each EBT cell for the test and base periods. If completion is assumed to be distributed binomially, the standard error equals the square root of $R(1 - R)/N$, where R is the completion rate and N is the number of observations. Then, we computed a t-statistic for the null hypothesis that the deviation of the test-cell completion rate in the test period from its rate in the base period is the same as that for the control cell, or that $(R_t^1 - R_t^2)$ equals $(R_c^1 - R_c^2)$, where t indicates the test cell, c indicates the control cell, 1 indicates the test period, and 2 indicates the base period. Because of the large sample sizes, we tested the null hypothesis assuming a normal distribution. The t-statistics are only proxies because they test for absolute differences in means rather than for relative (or percentage) differences. We do not show the t-statistics for our man-year calculations because the man-years were derived using two separate data sources, the experimental data plus data from the POSM.

are shown in Appendix B.) Put differently, bonuses have little effect on the probability that a recruit will later join the reserves but have a statistically significant effect on the probability that a separatee will join.

Turning to the results for high-quality recruits in test-eligible skills, i.e., the skills eligible for the bonus dollars, we find (in Table 3.3) that bonuses increased the fraction of eligible recruits to complete their first term and reduced the fraction to be retained once they completed their first term. However, they did not change the active duty man-years that each contributed.

More specifically, completion rates in eligible skills rose by 4 percent. However, this effect is only marginally statistically significant. Ap-

Table 3.3

Enlistment Bonus Total Force Effects: Test-Eligible Skills (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (Test/Control) (4)
First Term Completion				
Control cell	0.680	0.661	1.029	
Test cell	0.697	0.652	1.070	0.040*** (1.66)
Retention/Completion				
Control cell	0.409	0.376	1.088	
Test cell	0.412	0.417	0.988	−0.092** (−2.26)
Total Active Man-Years				
Control cell	4.672	4.335	1.078	
Test cell	4.860	4.504	1.079	0.001
Reserve Component Accession/Separation				
Control cell	0.593	0.519	1.141	
Test cell	0.603	0.558	1.079	−0.054*** (−1.71)

Statistically significant at the 5% level; * Statistically significant at the 10% level.

parently, the positive incentive effect embedded in the repayment feature of bonuses slightly dominated the negative effect of drawing recruits into less preferred skills. The retention rate fell by 9.2 percent, and the separation rate of test-eligible recruits who completed their first term rose by 6.4 percent (not shown). Although both effects are statistically significant, the negative effect on retention offsets the positive effect on completion. Total man-years per recruit were unchanged; therefore, a recruit enlisting in an eligible skill supplied the same number of man-years on average despite the larger bonus offering. However, these man-years were more concentrated in the first term, on average.

Prior-service personnel who had enlisted in a test-eligible skill were less likely to join the Army Reserves or National Guard: The conditional reserve accession rate fell by 5.4 percent. On the other hand, more recruits separated from active duty, implying that the pool of prior-service personnel increased. Consequently, the unconditional probability—or the probability that a test-eligible recruit (rather than a test-eligible separatee) will later join the reserve components—is not statistically significant (Appendix B).

Educational Benefits

The results for educational benefits are quite different. Educational benefits have a significant effect on attrition and retention, and the direction of these effects accords with general expectations. For the entire population of enlistees, the ACF increased completion rates by 4.6 percent and reduced retention (conditional upon completion) by nearly 11 percent (Table 3.4).

The positive completion effect only partially balances the negative retention effect; average man-years fall slightly. We also found that educational benefits have a negligible effect on the conditional probability of joining the Army Reserves or Army National Guard; prior-service personnel in the test cell were no more likely to join the reserves than those in the control cell. However, once we accounted for the larger pool of separations that educational benefits create (since retention falls), the (unconditional) probability that an active duty recruit joins the reserve components increases (Appendix B).

Table 3.4

Educational Benefits Total Force Effects: High-Quality Recruits (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (ACF/ Control) (4)
First Term Completion				
Control cell	0.717	0.716	1.001	
ACF cell	0.719	0.687	1.046	0.046* (2.65)
Retention/Completion				
Control cell	0.450	0.471	0.956	
ACF cell	0.396	0.464	0.853	−0.108* (−3.67)
Total Active Man-Years				
Control cell	5.173	5.258	0.984	
ACF cell	4.739	4.899	0.967	−0.017
Reserve Component Accession/Separation				
Control cell	0.543	0.567	0.957	
ACF cell	0.538	0.565	0.952	−0.004 (−0.19)

*Statistically significant at the 1% level.

For recruits enlisting in test-eligible skills, results are similar but the effects are even larger (Table 3.5). For qualified recruits, the completion rate rises by 5.4 percent and the retention rates fall by almost 16 percent. This enormous drop in the retention rate reduces average man-years by 4.1 percent, despite the increase in completion rates. Educational benefits have a neutral effect on the conditional probability that a test-eligible prior-service individual will join the Army Reserves or Army National Guard. On the other hand, since the ACF also increases the pool of prior-service personnel, a larger fraction of recruits joins the reserves (the unconditional rates, which are shown in Appendix B, are statistically significant).

Table 3.5

Educational Benefits Total Force Effects: Test-Eligible Skills (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (ACF/ Control) (4)
First Term Completion				
Control cell	0.710	0.711	0.999	
ACF Cell	0.717	0.681	1.052	0.054** (2.38)
Retention/Completion				
Control cell	0.434	0.456	0.952	
ACF cell	0.359	0.448	0.801	–0.158* (–4.04)
Total Active Man-Years				
Control Cell	5.000	5.143	0.972	
ACF Cell	4.393	4.713	0.932	–0.041
Reserve Component Accession/Separation				
Control cell	0.560	0.550	1.018	
ACF cell	0.560	0.543	1.031	0.013 (1.005)

*Statistically significant at the 1% level; ** Statistically significant at the 5% level.

SUMMARY OF TOTAL FORCE EFFECTS

The results above suggest that the effects of the Enlistment Bonus Test program on the service history of the average recruit were minor. Although the man-years contributed by the average test-eligible recruit were more likely to occur in the initial years of service, the man-years contributed by the average recruit, including both test-eligible and -ineligible recruits, were unaffected by bonuses. The reason for this lack of effect is that eligible skills were only 24 percent of all enlistments; the increase in the average completion rate for eligible recruits did not change the average completion rate of all enlistees in the bonus test cell. Bonuses slightly increased separations and, therefore, the pool of prior-service personnel. Although small, this effect offsets the reduced probability that a given prior-service individual will join the reserve components. Thus, bonuses had little effect on the reserve accession rate of an active duty recruit. Consequently, the initial analytical conclusions about the bonus test made by Polich, Dertouzos, and Press (1986) remain unchanged, even after their total force effects were accounted for. Enlistment bonuses influence mainly the Army's ability to expand the market and channel recruits into priority skills.

In contrast, the educational benefits program affected more than just the initial flow of enlistments. Our results imply that the enlistment effects of the Army College Fund come at a man-year cost, and this cost is greater for enlistments in test-eligible skills. It is critical to recognize, however, that this result is inherent in the structure of the ACF program, which provided substantial benefits, even for those enlisting in the shorter terms of service. The bonus program, on the other hand, was structured to provide substantial benefits for longer enlistment terms. Thus, the structure of the ACF benefit would imply shorter man-years in comparison with the structure of the bonus program, even if the ACF had no effect on completion and retention incentives.

We also found that educational benefits have a salutary effect on reserve component accessions. Relative to the control cell, ACF benefits generate more separations among those who complete their first term (in addition to increasing the number of individuals who complete their first term) because retention falls. The larger number of separations increases Army Reserve and Army National Guard accessions, even though the probability of any one prior-service individual joining the reserve components does not appear to increase.

AGGREGATE TOTAL FORCE EFFECTS' SIMULATION RESULTS

The results presented above indicate the effects of bonuses and educational benefits on the service history of a given recruit. However, to evaluate the aggregate effect of these programs across all recruits, we must combine the *per-recruit* effects with the enlistment effects. We quantify these cumulative total force effects by way of simulation. Specifically, we assume that a representative baseline, or *control group*, consists of 100 recruits. Given the estimated expansion effects (5 and 9 percent for bonuses and educational benefits, respectively), one would expect 105 enlistments following the enhanced bonus offering and 109 enlistments following the enhanced educational benefits offering. Using these totals, we can illustrate, in a simple numerical way, the relative skill-channeling, term-of-service channeling, active duty total force, and reserve accession effects of each program. In Table 3.6, we show how the simulated force under each experiment would be distributed across skill categories and terms of service. The values in the table were derived using the distributions that prevailed in the relevant control and program cells during the experiments. In Table 3.7, we report each program's simulated effects on enlistments, completions, reenlistments, reserve component accessions, and alternative measures of man-years.

For the last, we report first term man-years,[3] total man-years, and an adjusted total that is computed under the assumption that the

Table 3.6

Simulations: Distribution of Enlistments in Each Program and Cell

	Bonus Test		Educational Benefits Test	
Output Category	Control	Test	Control	Test
All Enlistments	100	105	100	109
2-year	18	12	11	20
3-year	34	37	36	41
4-year	48	56	53	48
Obligated Man-Years	330	359	342	355
per Recruit	3.30	3.42	3.42	3.26
Skill Eligible	24	36	58	68
2-year	4	3	11	20
3-year	3	7	15	19
4-year	17	26	32	29
Obligated Man-Years	85	131	195	213
per Recruit	3.54	3.64	3.36	3.13

NOTE: Obligated man-years equal the sum of the number of enlistees for each term length times the number of years.

[3]First term man-years equal the number of man-years contributed by recruits during their initial tour length.

Table 3.7

Enlistment and Man-Year Effects, for Comparison: Bonuses Versus ACF

Output Category	Control	Bonus	ACF
Enlistments	100	105	109
Completions	71	75	81
Reenlistments	31	32	31
Reserve Accessions	25	26	31
First Term Man-Years	208	230	221
Total Man-Years	466	496	499
Total Man-Years (adjusted)[a]	466	484	505

[a]Adjustment assumes that control and program cells have the same number of first term man-years per recruit.

distributions by term of service were identical across programs. The adjusted total serves to isolate the man-year differences that are due to program-related retention effects.

In the bonus test case in Table 3.6, recruits in eligible skills account for 24 enlistments (or 24 percent) in the control cell and 36 enlistments (or 34 percent) in the bonus test cell. Given these assignments, we worked through the total force implications of each experiment, finding, for example, that under the ACF, obligated man-years fell: That program had increased 2-year enlistments.

Our focus in Table 3.7 is on comparing the effects of bonuses and educational benefits. To facilitate the comparison, we must measure the incremental effects of the bonus and educational benefits programs with respect to the same control group. The results for each program must be based on the same baseline. Therefore, our simulation results below measure the effects of both programs relative to the control group for the bonus test. For the educational-benefit results, we therefore apply the results in Tables 3.4 and 3.5 to the bonus test baseline.[4]

---

[4]For example, to derive the number of people who complete terms of service under the ACF when the control group of the bonus test is used, we first note that the effect of the ACF on completions is 4.6 percent (see Table 3.4). Since the completion rate is 71.4 percent for the control group under the bonus test (see Table 3.2), the implied completion rate under the ACF relative to the control group under the bonus test is

As Table 3.7 shows, the educational benefits program had more enlistments and higher numbers successfully completing the first term of service. Although retention rates were higher for the bonus, the larger pool of those eligible for reenlistment meant that the flows into the senior force were virtually the same. In contrast, the higher number of separations under the ACF resulted in increased accessions into the Army Reserve and Army National Guard. The bonus program resulted in only a single reserve component accession; under the ACF, 6 additional people joined the reserve components after separating from the regular Army.

The changes in first term man-years reflect changes in enlistments and in the term of service distribution, as well as changes in first term completion and attrition rates. Since bonuses had little effect on completion rates, the increase from 208 to 230 in first term man-years is primarily due to the increased number of enlistments and the longer obligated enlistment terms under the bonus program (see Table 3.6). Despite their greater propensity to complete their first term, recruits under the educational benefits program were able to enter for shorter periods. Still, total first term man-years rose from 208 to 221 because more recruits enlisted under the ACF program. However, the effect of educational benefits on first term man-years fell short of the effect for bonuses.

Table 3.7 also presents, for comparison, the effects of educational benefits and bonuses on total actual man-years. Both programs increased the actual man-year contribution of recruits by a similar amount, 30 and 33 for the bonus and educational benefit programs, respectively. However, the process by which the increase occurs differs significantly across programs. Since the total force effects of bonuses are neutral, the main effect of bonuses on man-years occurs through longer terms of enlistment. In contrast, educational benefits reduced the man-years contributed by a recruit; however, because of the significantly greater market-expansion effect, the increase in total man-years was slightly larger under educational benefits than under bonuses.

74.7 percent (71.4 × 1.046). Since 109 individuals enlist under the ACF (see Table 3.6), this 74.7-percent completion rate represents 81 individuals (0.747 × 109).

Generally, educational benefits would tend to favor junior over senior man-years because of their effects on market expansion, completion, and retention: More people enter, complete their term, then separate. However, note that the special design of the educational benefits test tended to reduce the relative importance of first term man-years to a second term and beyond because enlistees were able to receive educational benefits while choosing shorter terms of service. While one might argue that the significant market expansion was partially due to the link between shorter terms of service and educational benefits, it is clear that the average man-year contribution of first-termers was significantly reduced by the design of the educational benefits program.

To separate the term of service effects from the retention differences, we made an *adjusted* man-year calculation, assuming that the average number of first term man-years was identical across programs.[5] These man-year totals reflect the market-expansion and retention effects of the programs only. Under these assumptions, educational benefits have enhanced man-year effects. These numbers should be regarded as an upper bound on the potential man-year effects of redesigned bonus and educational benefits programs that did not promote an "unfavorable" term of service redistribution. Under such assumptions, the total man-years contributed by the bonus and educational benefits program would have been 484 and 505, respectively. Clearly, this comparison favors educational benefits.

---

[5]To illustrate, the control program's 100 enlistees generated 208 years of service by the end of their first term, or 2.08 years on average. If the bonus program resulted in the same average, then its 105 recruits would have generated 218 man-years (105 × 2.08). The 208 figure represents 12 fewer man-years than were actually provided by the bonus program's first-termers. Thus, the bonus program's recruits were more likely, on average, to be drawn into longer terms of service. We therefore adjusted the man-year total down by 12 from 496 to 484. An alternative assumption that favors educational benefits even more would be that first term man-years per completion remained constant.

Chapter Four

COMPARING THE COST-EFFECTIVENESS OF BONUSES AND EDUCATIONAL BENEFITS

The preceding analyses provide the output effects of enlistment bonuses and educational benefits. However, to compare relative cost-effectiveness, we must also consider the cost side of the equation. Clearly, an enlistment program that has limited enlisted output (i.e., number of recruits or number of man-years) but is also inexpensive can be a more cost-effective program than an expensive one that results in greater output. In this chapter, we measure and compare the relative cost-effectiveness of the bonus and educational benefits in producing enlistments and man-years.

Our cost analysis below proceeds in several steps. For each recruiting policy, we first estimate the change in costs due to the policy in question. This change represents the incremental cost of the program relative to the control group and is derived by multiplying the change in benefits by the number of eligible recruits. Next, we consider changes in training costs per man-year that result from the programs' effects on average length of service. We then account for the programs' effects on reserve component recruiting by subtracting any savings of recruiting and training resources made possible by the increased flow of separations into the Army Reserve and National Guard. Finally, we convert costs to a per-unit basis for both enlistments and man-year measures. These cost ratios can be viewed as "average marginal costs" of recruiting high-quality manpower by expanding the bonus and/or educational benefits program.

INCREMENTAL PROGRAM COSTS OF THE BONUS AND THE ARMY COLLEGE FUND

Cost of Bonuses

As discussed above, the EBT test cell offered a $4,000 bonus for 3-year enlistments and an $8,000 bonus for 4-year enlistments. Relative to the control cell, these bonuses represent a $4,000 bonus increase for 3-year enlistees and a $3,000 bonus for 4-year enlistees. However, these per-recruit changes in raw bonus costs do not reflect actual cost changes because they fail to account for the fact that individuals who separate in the first year do not receive the full bonus amount.[1] Multiplying the raw bonus amounts by first-year completion rates gives an EBT test cell bonus of $3,437 for a 3-year enlistment and $6,963 for a 4-year term. For the control cell, the bonus cost is $4,300 for a 4-year term. Thus, the EBT test cell represents a $3,437 bonus increase and a $2,663 bonus increase for 3- and 4-year enlistments, respectively. As shown in Table 4.1, we multiplied these per-recruit cost changes by the simulated number of eligible recruits

Table 4.1

Computing the Incremental Program Cost of the Enlistment Bonus

	Incremental Program Cost ($)	
	Control Cell	Test Cell
Expected Bonus Cost per Recruit (adjusted for first-year attrition)		
3-year	0	3,437
4-year	4,300	6,963
Change in Bonus per Recruit		
3-year		3,437
4-year		2,663
Bonus Cost Change (eligible enlistments × bonus change)		
3-year	24,100	
4-year	69,200	
TOTAL	93,300	

[1]Enlistment bonuses usually are paid out to enlistees in several installments over their first year of service.

in each term of service (from Table 3.6). The total change in bonus costs is $93,300 in our simulation.

Cost of Educational Benefits

Estimating the marginal cost of educational benefits is more complex because we must compute their actuarial costs. These calculations involve a host of other estimates and assumptions. Further, we must determine the actuarial cost of the benefits offered in both the EATP test cell and control cell. However, once we calculate the actuarial cost change, we can use the methodology above to estimate the marginal costs for the ACF.

Several studies have estimated the actuarial cost of the Army College Fund. Here, we follow ARI's methodology (Schmitz, Dale, and Drisko, 1987). Our estimates differ in two ways from ARI's. First, we based our calculations exclusively on the behavior of those enlisting during the EATP, whereas ARI based some of their calculations on the behavior of later enlistment cohorts. Second, the inputs to our estimates account for the programmatic effects of the ACF. Put differently, they are measured relative to the base period and the control cell (as in Tables 3.4 and 3.5).

Actuarial cost A is given by the following formula:

$$A = \sum_{t=1}^{T} \beta^t \delta \alpha \theta \pi B \, , \tag{4.1}$$

where t denotes year, B is the amount of the educational benefit, π is the probability that a recruit enlists in a test-eligible skill, θ is the fraction of the recruits who meet the requirements for claiming the benefit, α is the fraction of the benefit the recruit earns, δ is the amount of the earned benefit that the recruit actually uses, and β is the factor used to discount the actuarial cost to the present. The benefit amounts B were defined by the EATP. Since the only difference between the UVK and the control cells was the kicker amounts, we ignored the actuarial cost of the basic VEAP and considered only the kickers.[2] The likelihood that a high-quality recruit in a test-eligible skill meets all the requirements for claiming the ACF θ equals the probability of contributing, completing the required months of service, separating from active duty, and attending an approved institution. For recruits who reenlist for a second term, this likelihood also accounts for the probability of reenlistment.

The fraction of the benefit that a recruit earns α depends on his or her length of service. For example, under the EATP, an eligible 2-year enlistee who separates after 22 months of service qualifies for the 2-year ACF kicker but earns only $7,400 instead of $8,000, or 92.5 percent of the full amount. The amount of benefit usage δ depends on how long he or she attends school and the monthly ACF payouts. ACF payouts are equal installments that are related to the individual's contributions to the fund. Appendix C shows how we calculated each component of actuarial cost.

Once we computed the *usage rate*, or how much of the earned benefits are used by the average recruit who meets all the requirements, we had to calculate its discounted present value. We followed ARI's assumption and estimated that the length of time between accession and the midpoint of benefit usage was 5 years for a 2-year enlistment, 6 years for a 3-year term, and 7 years for a 4-year term.[3] These assumptions are necessary because the data do not track individuals sufficiently long to observe all users of educational benefits. We then discounted the benefit costs using a nominal discount rate of 8 percent.[4]

Both discounting and the low usage rates reduce substantially the present value of educational benefit costs. For example, although the 3-year Ultra-VEAP kicker was $12,000, its actuarial cost was only

[2]We excluded basic VEAP because our interest was in the relative efficacy of the alternative options (the control-cell kickers versus the ACF kickers) when each is added to the basic VEAP program.

[3]These lengths of time are based on information on the average length of time between separation and benefit usage of Vietnam-era GI Bill benefit users. See Schmitz, Dale, and Drisko (1987).

[4]Our sensitivity analyses indicated that our qualitative findings regarding the relative cost-effectiveness of the ACF remained unchanged under alternative assumptions about the discount rate.

Table 4.2

Computing the Incremental Program Cost of the Ultra-VEAP Kicker

	Incremental Program Cost ($)	
	Control Cell	Test (UVK) Cell
Actuarial Cost per Recruit (discount rate = 8%)		
2-year	380	2,075
3-year	280	1,144
4-year	350	741
Change in Actuarial Cost per Recruit		
2-year	1,695	
3-year	864	
4-year	391	
ACF Cost Change (eligible enlistments × cost change)		
2-year	33,900	
3-year	16,400	
4-year	11,300	
TOTAL	61,700	

$1,144 by our estimates (Table 4.2). Consequently, the incremental cost of the UVK is reduced as well.

INCREMENTAL TRAINING COSTS

Our calculations suggest that the incremental program cost of the enlistment bonus, equal to $93,300, was about 50 percent higher than that of the educational benefits program, equal to $61,700. In addition to the direct costs of the enhanced recruiting benefits, training costs were affected as well. In particular, the bonus and UVK brought in 5 and 9 additional recruits, respectively. Given the occupational specialties that were eligible for the two programs, we computed the average per-person training cost for the relevant occupational groupings. These costs were approximately $9,100 for the occupational specialties that were eligible for the enhanced bonus and $10,400 for those specialities eligible for the educational benefits. Thus, the incremental training cost was about $45,500 for the bonus (5 × $9,100) and $93,600 for the UVK (9 × $10,400).

Clearly, these incremental costs would not be relevant for comparing recruiting costs on a per-accession basis: Training costs per recruit (at least by occupational specialty) are fundamentally invariant with respect to enlistment supply. However, to the extent that average man-years vary as a direct function of the terms of the enlistment contract, this fixed training cost must be allocated over man-years. For the bonus, the program generated 30 additional man-years (Table 3.7). Thus, the incremental training cost per man-year is about $1,500 ($45,500/30). For the UVK, the incremental cost per man-year is higher, about $2,800 ($93,600/33).

It is critical to note that the higher training costs associated with the ACF are due to the respective designs of the bonus and educational benefits programs rather than to the differing retention patterns across the two programs. More specifically, the Army College Fund offered substantial benefits to 2-year enlistees, whereas the bonus program offered substantial benefits to 3- and 4-year enlistees. However, if one assumes, to the contrary, that the term of service distribution was unaffected by the programs, then the man-year increments (holding the market-expansion effect constant) would have been 18 and 39 under the bonus and educational programs, respectively (rather than 30 and 33). In this situation, the respective training costs per man-year would be about $2,500 under both programs. Thus, the major training-cost advantage of the bonus was due to shifting the term of service distribution to longer terms, not to the higher retention rate.

THE VALUE OF RESERVE COMPONENT ACCESSIONS

In addition to the active duty enlistments and man-years, we have seen that educational benefits significantly enhance the flow of Army Reserve and Army National Guard accessions. In our simulation, we saw that the ACF added 6 additional reservists, a 25-percent increase; in contrast, the bonus program added only 1 reservist. Clearly, these 6 represent a net benefit of the ACF program that should be considered.

To make comparisons possible without having to make a precarious judgment concerning the relative "value" of a reserve accession, we assume that personnel planners wish to maintain the size of the Army Reserve and National Guard forces. As a result, the increased potential flow of reservists because of educational benefits is offset by a reduction in recruiting resources allocated to attract an equivalent number of non–prior-service (NPS) Reserve and Guard enlistees. If we assume that it costs about $7,000 to recruit an NPS reservist and an additional $10,400 to train a new reserve enlistee in an eligible skill, it is possible that each prior-service accession could save the Army as much as $17,400.[5] On the other hand, about 60 percent[6] of prior-service individuals require additional training upon entering the reserves. Thus, the total savings would be less, or about $13,500 per recruit under the educational benefits program.[7] For the bonus program, the total is approximately $13,000 (the recruiting and basic-training savings plus 40 percent of the nonbasic portion of training, $5,100).

COMPARING MARGINAL COSTS OF BONUSES AND EDUCATIONAL BENEFITS

Table 4.3 summarizes the incremental costs associated with our simulated bonus and educational benefit programs. These costs represent the additional costs associated with offering an enhanced bonus or educational benefits package identical to those offered as

---

[5]Little documentation exists of the marginal cost of reserve recruiting. Work by Tan (1991) suggests that recruiter elasticities, roughly representing the resource cost of recruiting, are the same for regular Army and NPS reserve enlistments. This suggests that the cost of recruiting an NPS reservist is about $7,000. On the other hand, our own exploratory work on the achievement of missions by individual recruiters suggests that prior-service personnel may be even more difficult to recruit than individuals with no record of earlier service. Thus, we view the $7,000 estimate as a lower-bound estimate of the per-accession savings in required recruiting resources.

[6]See Marquis and Kirby (1989) for evidence. More recent work indicates that this number has fallen significantly, with only about 40 percent requiring additional training. By using the earlier estimates, we are understating the cost savings attributable to reserve accessions and, as a result, are understating the efficiency of educational benefits in comparison with bonuses.

[7]Because of manpower policies mandated under Title 11, Section 11 of the 1992 Appropriations Act, an increased flow of PS accessions can be assumed to displace NPS reservists.

An amount equal to $4,000 in basic-training costs can be saved for each of the new PS accessions (see Palmer and Osbaldeston, 1988). In addition, for 40 percent of the PS reservists, additional technical training (averaging $10,400 in total costs minus $4,000 in basic-training costs) of $6,400 will be saved, for an average savings of about $2,500 ($0.4 \times \$6,400$). This saving totals over $6,500 for each new reserve accession.

Table 4.3

Incremental Costs of the Simulated Bonus and Educational Benefits Programs

Incremental Cost	Bonus Program	Educational Benefits
Program Costs	$ 93,300	$ 61,700
Training Costs	45,500	93,600
TOTAL	$138,800	$155,300
Reserve Component Savings	−13,000	−81,000
Total Net Costs	$125,800	$74,300

part of the enlisted experiments of the early 1980s. For these costs to be meaningful, they need to be compared with the enlistment and man-year benefits summarized in Table 3.7.

In Table 4.4, incremental costs are converted to measures of marginal cost per unit of output for both the bonus program and educational benefits. For example, the additional cost of bonuses was computed to be $93,300. Since 5 additional enlistees were attracted by this package, the marginal benefit cost is estimated to be $18,700 ($93,300/5). In contrast, the marginal cost of an enlistment attracted by the educational benefits package was $6,900 ($61,700/9). For man-years, the respective marginal program costs are $3,100 and $1,900 for bonuses and educational benefits.

For man-years, the incremental changes in training costs must be considered as well. Alternative programs can alter the average training expenses per man-year when enlistees have significantly dif-

Table 4.4

Marginal Costs for Enlistments and Man-Years, for Comparison

Marginal Cost	Bonus Program	Educational Benefits
Benefit Costs per Enlistment	$18,700	$ 6,900
Benefit Costs per Man-Year	$ 3,100	$ 1,900
Total Costs per Man-Year (benefit plus training)	$ 4,600	$ 4,700
Net Marginal Costs per Man-Year (total costs – reserve component savings)	$ 4,200	$ 2,300

NOTE: Net marginal cost per man-year equals (total net cost)/30 for the bonus program and (total net cost)/33 for the educational benefits program.

ferent years of service. Indeed, individuals entering under the bonus program had longer terms of service than under the educational benefits program. As a result, training costs that are fixed per enlistment are reduced when allocated on a per-man-year basis. Thus, the wedge between the per-enlistment cost of the bonus and the ACF is eliminated when the full cost, including training, per man-year, is considered. In fact, the per-man-year cost of the bonus program is slightly lower at $4,600.

On the other hand, the man-year advantage of the bonus program resulted primarily from the linkage between the bonus and longer required terms of service. As we have seen, average training cost would have been virtually identical had the distribution of service terms been the same for both programs. Interestingly, the effect of differing retention incentives played a minor role and, in terms of total man-year costs, was entirely dominated by program differences in market-expansion effects. Thus, the importance of training costs is most likely overstated in light of the designs of the experimental programs.

These comparisons understate the value of educational benefits because they ignore the increased accessions into the reserve components. As we have seen, educational benefits increase the pool of eligible prior-service individuals by increasing enlistments, completions, and separation rates. As a result, reserve accessions rose by 25 percent. Such an increase would permit significant savings in the resources ordinarily allocated to recruiting and training non–prior-service Army Reserve and Army National Guard enlistees. When we take this cost savings into account, the ACF becomes far more cost-effective than the bonus program; the net marginal costs per man-year under the ACF and bonus program become $2,300 and $4,200, respectively.

Chapter Five

CONCLUSIONS

The raw enlistment effects of bonus and educational benefit programs of the early 1980s have been well documented. However, the relative efficiency of the two programs has remained unknown, partly because the actual cost of the ACF could not be determined in the absence of accurate information about how the benefits were utilized by eligible veterans following active duty, and partly because it took several years before the total force experience of program cohorts could be analyzed. If benefit options induced differential patterns of attrition, retention, and reserve component accession behavior, conclusions based on raw enlistment totals could have been quite misleading. In particular, educational benefits, because they are earned only upon leaving active duty and enrolling in an institution of higher learning, are believed to induce early separation. As a result, their efficacy in providing man-years is likely to be overstated by merely looking at numbers of enlistments.

The specific eligibility requirements of the two enlistment experiments, the EBT and the EATP, limit the generalizability of our findings. However, our analysis of actual costs and the total force experience of individuals entering under these programs provides persuasive evidence that educational benefits are an extremely cost-effective recruiting option compared with bonuses.[1] To begin with, the actual cost of the educational benefits program is reduced

[1]In general the eligibility requirements probably dampen the market-expansion effects of both programs to some degree. Thus, less restrictive programs might well be even more cost-effective. However, it is not possible to evaluate how alternative program designs might affect the efficiency of bonuses relative to educational benefits.

because payments are deferred for several years, usually pending completion of active duty service. Real payments are further reduced because eligible beneficiaries may choose not to utilize the full sum of available benefits. On a per-enlistment basis, the marginal cost of a high-quality recruit is only $6,900 in educational benefits compared with $18,700 in bonus expenditures.

The relative value of the enhanced educational benefits program is somewhat lower if training costs are taken into account in addition to the payments to individuals: The average tenure of those attracted by the educational benefits was significantly lower than for those receiving the enhanced enlistment bonus, which obligated a recruit to choose longer terms. As a result, training costs were higher on a per-man-year basis (since training costs are fixed per enlistment). The lower retention rate for higher-education-bound enlistees played a much less significant role; partially offset by higher completion rates, it did not alter average training costs in any meaningful way. Thus, we believe that our comparison of full (benefits plus training) costs per man-year understates the value of educational benefits. Even so, the marginal costs per man-year were virtually identical.[2] Furthermore, when the potential cost savings associated with increased Army Reserve and National Guard accessions are netted out, it is clear that educational benefits dominate bonuses.

Our analysis implies that when output is defined in terms of high-quality enlistments, educational benefits compare favorably with alternative recruiting resource options as well. The computed cost per high-quality enlistment of $6,900 is similar to the estimated marginal cost using other options, such as more recruiters or advertising expenditures. And, although the total force implications of these program alternatives have not been studied, it is difficult to imagine that they would generate the equivalent flows of reserve component ac-

[2]It is also important to note that the different statistical methods utilized to obtain market-expansion effects favored the bonus estimate. For the bonus estimate, the method controlled for the allocation and magnitude of recruiter effort. See Polich, Dertouzos, and Press (1986). Such methods, if they were used in a reanalysis of educational benefits, would inflate the estimated expansion effect by between 30 and 40 percent. Therefore, our comparisons are clearly biased in favor of bonuses.

cessions that so enhance the ultimate efficiency of educational benefits. In the current manpower environment of active force drawdowns, increased reserve capacity takes on added importance.

Appendix A

ESTIMATING ATTRITION, SEPARATION, RETENTION, AND TRAINING TIMES

For the most part, determining from the Defense Manpower Data Center's (DMDC's) tapes whether service members attrited, separated, or reenlisted was straightforward. We first checked whether individuals were still in service. Generally, those who had an estimated time of separation (ETS) date greater than the end of the data period and who had an interservice separation code (ISC) equal to zero were still in service. Generally, those who had an ETS and a separation date less than the end of the data period and who had an ISC greater than zero had separated. For those who had separated before the end of the data period, we determined whether and when they had attrited, separated at the end of their enlistment term, or reenlisted/extended. Individuals for whom total active federal military service (TAFMS) as of the end of the data period was less than their term of service (minus three months to account for early reenlistment), were *attriters*. Those who had TAFMS within three months of their expiration of service were *separators*. And those with TAFMS greater than their term of service expiration date were *reenlistees*, or *extenders*.

This categorization of individuals worked for most observations in our data. However, problems arose in some cases because the ETS date or separation date were missing or the ISC equalled zero (suggesting that the individual was still in service), yet the ETS, TAFMS, and separation date suggested that the individual had separated before the end of the data period. In these odd cases, we inferred individual behavior from the information contained in the other variables. When it was impossible to make any inferences, we deleted the observation. Deleted observations accounted for less than 2 percent of the total in each data source we used.

Average training times for each experiment are shown in Table A.1. These averages were derived from 1982 Army data on training length (AIT plus basic) for each Army occupation, or MOS. Each experiment offered benefits to specific, or eligible, occupations. Other occupations were considered ineligible. We computed average training time for each occupational grouping (eligible or ineligible) in each experiment.

Table A.1

Average Training Times of Test-Eligible and -Ineligible MOS Groups

Program	MOS Group	Average Training Weeks
Enlistment Bonus Test	Eligible	9
	Ineligible	16
Educational Assistance Test Program	Eligible	10
	Ineligible	17.4

Appendix B

TOTAL FORCE EFFECTS: UNCONDITIONAL PROBABILITIES

The tables below correspond to Tables 3.2 through 3.5 in the text. The text tables show the effects of each program on retention rates, conditional on completion, and the effects on reserve accessions, conditional on separation. These tables show the unconditional effects. Thus, they indicate the effect of each program on completion, retention, and reserve accession probability of a recruit.

Table B.1

Enlistment Bonus Total Force Effects: All High-Quality Recruits (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (Test/Control) (4)
First Term Completion				
Control cell	0.714	0.716	0.997	
Test cell	0.715	0.714	1.002	0.005
				(0.40)
Retention				
Control cell	0.307	0.288	1.065	
Test cell	0.309	0.293	1.052	–0.012
				(0.40)
Total Active Man-Years				
Control cell	4.656	4.488	1.038	
Test cell	4.811	4.573	1.052	0.014
Reserve Accession				
Control cell	0.249	0.223	1.113	
Test cell	0.245	0.228	1.072	–0.037
				(–1.10)

Table B.2

Enlistment Bonus Total Force Effects: Test-Eligible Skills (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (Test/Control) (4)
First Term Completion				
Control cell	0.680	0.661	1.029	
Test cell	0.697	0.652	1.070	0.040*** (1.66)
Retention				
Control cell	0.278	0.248	1.120	
Test cell	0.287	0.271	1.058	–0.055 (–0.92)
Total Active Man-Years				
Control cell	4.672	4.335	1.078	
Test cell	4.860	4.504	1.079	0.001
Reserve Accession				
Control cell	0.239	0.214	1.112	
Test cell	0.247	0.212	1.165	0.047 (0.076)

***Statistically significant at the 10% level.

Table B.3

Educational Benefits Total Force Effects: All High-Quality Recruits (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (ACF/Control) (4)
First Term Completion				
Control cell	0.717	0.716	1.001	
ACF cell	0.719	0.687	1.046	0.046* (2.65)
Retention				
Control cell	0.323	0.337	0.957	
ACF cell	0.284	0.319	0.893	–0.067*** (–1.61)
Total Active Man-Years				
Control cell	5.173	5.258	0.984	
ACF cell	4.739	4.899	0.967	–0.017
Reserve Accession				
Control cell	0.214	0.215	0.995	
ACF cell	0.230	0.208	1.106	0.111** (2.13)

*Statistically significant at the 1% level; **Statistically significant at the 5% level; ***Statistically significant at the 10% level.

Table B.4

Educational Benefits Total Force Effects: Test-Eligible Skills (t-statistics in parentheses)

	Test Period (1)	Base Period (2)	Ratio (Test/Base) (3)	Relative Increase (ACF/Control) (4)
First Term Completion				
Control cell	0.710	0.711	0.999	
ACF cell	0.717	0.681	1.052	0.054** (2.38)
Retention				
Control cell	0.308	0.324	0.950	
ACF cell	0.257	0.305	0.843	–0.112** (–2.07)
Total Active Man-Years				
Control cell	5.000	5.143	0.972	
ACF cell	4.393	4.713	0.932	–0.041
Reserve Accession				
Control cell	0.225	0.213	1.056	
ACF cell	0.251	0.204	1.230	0.165 (2.50)

**Statistically significant at the 5% level.

Appendix C

CALCULATING THE ACTUARIAL COST OF EDUCATIONAL BENEFITS

As mentioned in Chapter Four, the actuarial cost of an educational benefit is (the amount of the benefit) × (the probability that a high-quality recruit in a test-eligible skill meets the qualifications for claiming the benefit) × (the fraction of the benefit earned) × (the fraction of the discounted benefit actually used).

Tables C.1 and C.2 show how we calculated the probability that a control-cell high-quality recruit in a test-eligible skill will qualify for claiming his or her educational benefit. Table C.1 shows this calculation for those who complete only their first term, and Table C.2 shows it for those who reenlist. Tables C.3 and C.4 show these calculations for recruits in the UVK test cell. The bottom of each table indicates the estimated fraction of the benefit that recruits earned on average and the estimated fraction that they actually use. These latter estimates are those derived by ARI. Multiplying the probability of qualification by the fraction of the earned benefit used gives an estimate of the usage rate. The usage rates are shown in the last two rows of each table.

Once we had the usage rates, the next step was to multiply them by the amount of the benefits. This calculation is shown in Tables C.5 and C.6 for the EATP test cell and control cell, respectively. Then we computed the discounted present value of the benefits (adjusted for usage) for each EATP cell and for single-term enlistees and reenlistees. As mentioned in the text, we assume that a single-term 2-year enlistee takes 5 years between enlisting and claiming his or her benefit. For a 3-year enlistee, we assume that it takes 6 years; for a 4-year enlistee, we assume that it takes 7 years. Tables C.5 and C.6 also

Table C.1

Computing Control-Cell Usage Rates for Single-Term Enlistees

	Enlistment Term		
Eligible High-Quality Recruits	2-Year	3-Year	4-Year
Probability of:			
Contributing	0.644	0.518	0.617
Completing first term			
Conditional on contributing	0.884	0.806	0.723
Unconditional[a]	0.569	0.418	0.490
Separating			
Conditional on completing	0.684	0.551	0.536
Unconditional[a]	0.389	0.230	0.263
Attending approved institution[b]			
Conditional on separating	0.738	0.645	0.448
Unconditional[a]	0.287	0.148	0.118
Fraction of maximum benefit earned[b]			
Conditional on attending	0.979	0.986	0.937
Unconditional[a]	0.281	0.146	0.110
Fraction of kicker actually used[b]			
Conditional on earning kicker	0.903	0.564	0.564
Unconditional[a]	0.254	0.083	0.062

[a]Percentage of recruits in eligible skills.

[b]Obtained from Schmitz, Dale, and Drisko (1987).

show the discounted present values, assuming an 8-percent discount rate. To derive the figures in Table 4.2 in the text, we summed, for each EATP cell, the discounted present values for single-term recruits and for those who reenlist.

Table C.2

Computing Control-Cell Usage Rates for Reenlistees

Eligible High-Quality Recruits	Enlistment Term 2-Year	3-Year	4-Year
Probability of:			
Contributing	0.644	0.518	0.617
Completing first term			
Conditional on contributing	0.884	0.806	0.723
Unconditional[a]	0.569	0.418	0.490
Reenlisting			
Conditional on completing	0.315	0.449	0.464
Unconditional[a]	0.179	0.188	0.227
Attending approved institution[b]			
Conditional on separating	0.505	0.505	0.505
Unconditional[a]	0.091	0.095	0.115
Fraction of maximum benefit earned[b]			
Conditional on attending	1.000	1.000	1.000
Unconditional[a]	0.091	0.095	0.115
Fraction of kicker actually used[b]			
Conditional on earning kicker	1.000	1.000	1.000
Unconditional[a]	0.091	0.095	0.115

[a]Percentage of eligible recruits.

[b]Obtained from Schmitz, Dale, and Drisko (1987). Figures are for all recruits and are not enlistment-term-specific.

Table C.3

Computing UVK-Cell Usage Rates for Single-Term Enlistees

Eligible High-Quality Recruits	Enlistment Term 2-Year	3-Year	4-Year
Probability of:			
Contributing	.815	.680	.730
Completing first term			
Conditional on contributing	.901	.833	.721
Unconditional[a]	.735	.566	.526
Separating			
Conditional on completing	.739	.558	.574
Unconditional[a]	.543	.316	.302
Attending approved institution[b]			
Conditional on separating	.738	.645	.448
Unconditional[a]	.401	.204	.135
Fraction of maximum benefit earned[b]			
Conditional on attending	.979	.986	.937
Unconditional[a]	.392	.201	.127
Fraction of kicker actually used[b]			
Conditional on earning kicker	.903	.564	.564
Unconditional[a]	.354	.113	.072

[a]Percentage of recruits in eligible skills.

[b]Obtained from Schmitz, Dale, and Drisko (1987).

Table C.4

Computing UVK-Cell Usage Rates for Reenlistees

	Enlistment Term		
Eligible High-Quality Recruits	2-Year	3-Year	4-Year
Probability of:			
Contributing	0.815	0.680	0.730
Completing first term			
Conditional on contributing	0.901	0.833	0.721
Unconditional[a]	0.735	0.566	0.526
Reenlisting			
Conditional on completing	0.259	0.435	0.394
Unconditional[a]	0.190	0.247	0.207
Attending approved institution[b]			
Conditional on separating	0.505	0.505	0.505
Unconditional[a]	0.096	0.125	0.105
Fraction of maximum benefit earned[b]			
Conditional on attending	1.000	1.000	1.000
Unconditional[a]	0.096	0.125	0.105
Fraction of kicker actually used[b]			
Conditional on earning kicker	1.000	1.000	1.000
Unconditional[a]	0.096	0.125	0.105

[a]Percentage of eligible recruits.

[b]Obtained from Schmitz, Dale, and Drisko (1987). Figures are for all recruits and are not enlistment-term-specific.

Table C.5

Control Cell Discounted Present Value of Benefits

Enlistment Term (years)	Kicker Amount	Usage Rate	Time Before Usage (years)	Present Value
First Term Recruits				
2	$2000	.254	5	$345
3	$4000	.083	6	$208
4	$6000	.062	7	$218
Reenlistees				
2	$2000	.091	21.5	$ 35
3	$4000	.095	21.5	$ 72
4	$6000	.115	21.5	$132

Table C.6

UVK Cell Discounted Present Value of Benefits

Enlistment Term (years)	Kicker Amount	Usage Rate	Time Before Usage (years)	Present Value
First Term Recruits				
2	$ 8,000	.354	5	$1,928
3	$12,000	.113	6	$ 858
4	$12,000	.072	7	$ 501
Reenlistees				
2	$ 8,000	.096	21.5	$ 147
3	$12,000	.125	21.5	$ 287
4	$12,000	.105	21.5	$ 240

Schmitz, Edward J., "The Army College Fund and Military Manpower: A Review of Existing Research," Alexandria, Va.: United States Army Research Institute for the Behavioral and Social Sciences, Working Draft, June 1988.

Schmitz, Edward J., and Alan F. Drisko, "Retention and Educational Benefits: The Retention Behavior of the Educational Assistance Test Program Participants," Alexandria, Va.: United States Army Research Institute for the Behavioral and Social Sciences, Working Paper, June 1988.

Schmitz, Edward J., Charles Dale, and Alan F. Drisko, "Estimating the Costs of the Army College Fund," Alexandria, Va.: Unites States Army Research Institute for the Behavioral and Social Sciences, Working Paper 87-28, 1987.

Tan, Hong W., *Non-Prior Service Reserve Enlistments: Supply Estimates and Forecasts*, Santa Monica, Calif.: RAND, R-3786-FMP/RA, 1991.

Tannen, Michael B., "Is the Army College Fund Meeting Its Objectives?" *Industrial and Labor Relations Review*, Vol. 41, No. 1, 1987, pp. 50–62.