

Technical Report 790

DTIC FILE COPY



The Army 2-Year Enlistment Option: Measuring Its Cost-Effectiveness

David K. Horne, Rebecca M. Pliske,
and Curtis L. Gilroy

AD-A197 081

Manpower and Personnel Policy Research Group
Manpower and Personnel Research Laboratory



U. S. Army

Research Institute for the Behavioral and Social Sciences

May 1988



Approved for public release; distribution unlimited.

U. S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the
Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

WM. DARRYL HENDERSON
COL, IN
Commanding

Technical review by

Paul A. Gade
Curtis L. Gilroy

NOTICES

DISTRIBUTION: Primary distribution of this report has been made by ARI. Please address correspondence concerning distribution of reports to: U.S. Army Research Institute for the Behavioral and Social Sciences, ATTN: PERIPOT, 5001 Eisenhower Ave., Alexandria, Virginia 22333-5600.

FINAL DISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The findings in this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a REPORT SECURITY CLASSIFICATION Unclassified			1b RESTRICTIVE MARKINGS --		
2a SECURITY CLASSIFICATION AUTHORITY --			3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.		
2b DECLASSIFICATION/DOWNGRADING SCHEDULE --			4 PERFORMING ORGANIZATION REPORT NUMBER(S) ARI Technical Report 790		
4 PERFORMING ORGANIZATION REPORT NUMBER(S) ARI Technical Report 790			5 MONITORING ORGANIZATION REPORT NUMBER(S) --		
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Research Institute		6b OFFICE SYMBOL (if applicable) PERI-RG	7a NAME OF MONITORING ORGANIZATION --		
6c. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600			7b ADDRESS (City, State, and ZIP Code) --		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION --		8b OFFICE SYMBOL (if applicable) --	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER --		
8c. ADDRESS (City, State, and ZIP Code) --			10. SOURCE OF FUNDING NUMBERS		
	PROGRAM ELEMENT NO 6.37.31.A	PROJECT NO 2Q263 731A792	TASK NO. 2.1.2	WORK UNIT ACCESSION NO H.1	
11. TITLE (Include Security Classification) The Army 2-Year Enlistment Option: Measuring Its Cost-Effectiveness					
12. PERSONAL AUTHOR(S) David K. Horne, Rebecca M. Pliske, and Curtis L. Gilroy					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM 11/86 TO 11/87	14. DATE OF REPORT (Year, Month, Day) 1988 May		15. PAGE COUNT 29
16. SUPPLEMENTARY NOTATION --					
17. COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Two-year recruiting incentives Enlistment term		
			Enlistment Tour		
			Army		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) Data from the U.S. Army Research Institute's Survey of Army Recruits was examined to assess the effectiveness of the 2-year enlistment tour. Cross-tabulation and cost-benefit analyses were conducted, indicating that in the 1986 sample of new Army recruits, more than one-half (54%) of the male, 2-year recruits would not have enlisted in any service without the 2-year option. Furthermore, this percentage was even larger for the higher AFQT category recruits, indicating that the 2-year option is particularly useful for attracting recruits from the highest AFQT categories. The substitution effect from the other services is relatively small. The 2-year option was also found to be a valuable allocation tool that attracts recruits to MOS that would otherwise be difficult to fill. The cost-benefit analysis, taking into account training and differential attrition and retention rates across tours, indicates that the 2-year option is cost-effective and saves the Army nearly \$178 million per year when compared with pay incentives.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL David K. Horne			22b TELEPHONE (Include Area Code) (202) 274-5610		22c OFFICE SYMBOL PERI-RG

Technical Report 790

The Army 2-Year Enlistment Option: Measuring Its Cost-Effectiveness

**David K. Horne, Rebecca M. Pliske,
and Curtis L. Gilroy**

Manpower and Personnel Policy Research Group
Curtis L. Gilroy, Chief

Manpower and Personnel Research Laboratory
Newell K. Eaton, Director

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

Office, Deputy Chief of Staff for Personnel
Department of the Army

May 1988

Army Project Number
2Q263731A792

Manpower and Personnel

Approved for public release; distribution unlimited.

FOREWORD

The 2-year enlistment option is one of a number of incentives offered to potential Army recruits. This report, which investigates the effectiveness of the 2-year option as an enlistment incentive and provides estimates of its cost-effectiveness, presents data on the importance of this enlistment option from the Army's Survey of New Recruits, administered by the Army Research Institute (ARI). ARI conducts research on the enlistment decision to help the Army more effectively manage recruiting resources.

This work was requested by the United States Army Recruiting Command (USAREC) and the Office of the Deputy Chief of Staff for Personnel (ODCSPER). The research, conducted as part of Research Task 2.1.2, was briefed to USAREC and the ODCSPER in August 1987 and was used to defend the Army's 2-year enlistment option before the Office of the Secretary of Defense and the Congress.



EDGAR M. JOHNSON
Technical Director



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Code	
Dist	Special
A-1	

ACKNOWLEDGMENTS

This paper benefited from discussions with LTC Frame, Office of the Deputy Chief of Staff, U.S. Army, and staff at the U.S. Army Recruiting Command.

THE ARMY 2-YEAR ENLISTMENT OPTION: MEASURING ITS
COST-EFFECTIVENESS

EXECUTIVE SUMMARY

Requirement:

The 2-year enlistment option is known to attract high-quality recruits. However, the shorter tour length also increases turnover and the recruiting mission to maintain a constant force structure. This research investigates the cost-effectiveness of the 2-year enlistment option compared to that of two other options: increases in total compensation and targeted enlistment bonuses.

Procedure:

The impact of the 2-year option on enlistment is estimated from survey data, using the U.S. Army Research Institute's Survey of Army Recruits. After adjusting for training time, training and recruiting costs of a trained man-year for soldiers in the 2-year program are generated. Econometric calculations of pay elasticities are used to estimate the recruiting costs for longer tours if pay or enlistment bonuses are used to attract a sufficient number of recruits to maintain force structure without the 2-year option.

Findings:

This analysis has demonstrated some significant advantages to the program. First, the program is a market expander. Second, the 2-year enlistment option appears to be cost-effective. Assuming a pay elasticity of 1.0 and combined recruiting and training costs of \$30,000 per soldier, the 2-year option saves the Army \$177.73 million per year compared to an increase in compensation for all first-term soldiers, and \$11.9 million compared to a program targeting enlistment bonuses to high-quality (Graduate 1-3A) males only.

Utilization of Findings:

The 2-year enlistment option has been criticized as too costly and ineffective as an enlistment incentive. However, there has been little research on the cost-effectiveness of

the program. This research supports the enlistment option as cost-effective relative to several alternative enlistment incentives.

THE ARMY 2-YEAR ENLISTMENT OPTION: MEASURING ITS
COST-EFFECTIVENESS

CONTENTS

	Page
INTRODUCTION	1
EFFECT OF NO 2-YEAR OPTION	1
THE IMPACT OF THE 2-YEAR OPTION	7
SUMMARY AND CONCLUSIONS	19
REFERENCES	21

LIST OF TABLES

Table 1. Equations: Cost-benefit analysis	13
2. Variable list and assumptions used in analysis	14

LIST OF FIGURES

Figure 1. Effects of no service offering 2-year tour .	3
2. Two-year accessions, 1981-86	4
3. Effects of no service having 2-year tour by AFQT category	5
4. Percent of recruits indicating they "Definitely" or "Probably" will attend college following their enlistment tour . . .	6
5. Effect of no 2-year option for MOS	8
6. What if a Navy/Air Force/Marine recruiter offered you a 2-year tour?	10
7. Savings from the Army 2-year option: Comparison of pay increase	16
8. Savings from the Army 2-year option: Comparison of GMA bonuses	17

THE ARMY 2-YEAR ENLISTMENT OPTION: MEASURING ITS COST-EFFECTIVENESS

INTRODUCTION

The Army's 2-year enlistment option is a valuable incentive that attracts high quality recruits. To youths who are uncertain of their career orientations, or to youths who plan to attend college and are enlisting to take advantage of educational benefits, a 3- or 4-year tour commitment is often too long. Young adults consider even two years to be a long commitment.¹ By offering a 2-year tour, the Army captures a large market of youths who otherwise would not have enlisted for military service.

This paper addresses the effectiveness of the 2-year enlistment tour as an enlistment incentive using data from the Army Research Institute's Surveys of New Recruits. We consider potential drawbacks to the 2-year option, but argue that these are minor effects and that the 2-year option is both cost effective and expands the market from which the Army draws its high quality recruits.

EFFECT OF NO 2-YEAR OPTION

Several questions included in ARI's New Recruit Survey address the effectiveness of the 2-year option.² The particular question addressing the market expansion effect of the 2-year option asks new recruits: "Suppose no military service had a 2-year enlistment option. What would you have done?"³ The possible responses are:

1. Signed up for the same job anyway
2. Signed up for a different job in the Army
3. Tried to join a different service

¹See McTeigue, Kralj, Adelman, Zirk and Wilson (1986) for a summary of focus group discussions with high school seniors and recent high school graduates on career decision making.

²ARI has surveyed new Army recruits at reception stations annually since 1982. For a summary of the survey methodology see Westat (1984, 1985, 1986).

³This question is preceded by a screening question that asks for the length of the recruit's enlistment tour. Only recruits indicating they enlisted for a 2-year tour were instructed to complete the series of questions about the 2-year enlistment incentive.

4. Not enlisted at all

Figure 1 illustrates responses for males who signed a 2-year contract according to enlistment records,⁴ for 1984 through 1986.

The data illustrated in Figure 1 indicate that more than half (54 percent) of the 2-year recruits would not have enlisted in any service without the option. Moreover, that number has risen steadily since 1984. Recent increases in enlisted manpower quality in the Army can be at least partially attributed to the popularity of the 2-year option which has been directed towards the high-quality market. Figure 2 demonstrates that the number of recruits taking the 2-year tour has grown considerably over the past few years, even though a limited number of slots is available in specified MOS's.

An illustration of the effectiveness of the 2-year option in attracting high-quality recruits is provided by Figure 3. The 2-year option is only available for AFQT category I-III A high school graduate recruits. However, even within this group there is a quality differential in the response to the survey question about no service offering a 2-year tour. Whereas 48 percent of AFQT III A recruits respond that they would not have enlisted without the 2-year option, 56 percent of the AFQT II recruits and 62 percent of the AFQT I recruits reply that they would not have enlisted. Thus, the 2-year option is particularly useful for attracting recruits in the highest AFQT categories.

The 2-year enlistment option is also particularly effective in attracting youths who plan to attend college after completion of their tour. Figure 4 illustrates the proportion of recruits who indicate that they will "definitely" or "probably" attend college after their enlistment by length of tour. Over 80 percent of recruits in the 2-year tour intend to pursue a college education, whereas 57 percent of 3-year and 52 percent of 4-year recruits indicate such an intention. It is likely that youths who plan to attend college are less likely to commit themselves to longer tours of duty.

The 2-year option is also a valuable allocation tool. Recruits responding to the New Recruit Survey were also asked "Suppose the job you signed up for did not offer a 2-year

⁴It is important to note that a small percent (less than 1%) of the recruits who enlisted for a 2-year tour according to enlistment records indicated in the screening question in the survey that they signed up for a longer tour and did not respond to the survey questions on the 2-year option.

GMA RECRUITS

N(84) = 472 N(85) = 645 N(86) = 886

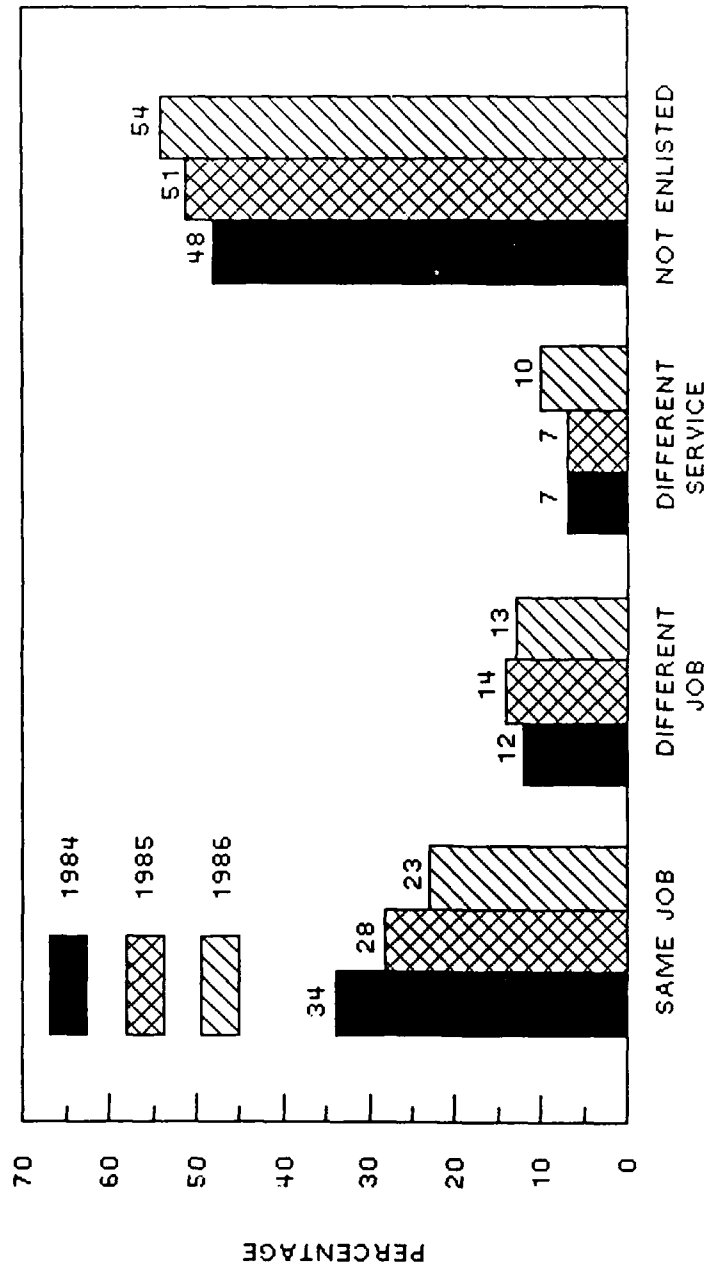


FIGURE 1. Effects of no service offering 2-year tour.

Note: Respondents are tabulated on if ORMF records indicate they enlisted for 2 years.

Source: 1984-86 New Recruit Surveys (Jun-Aug).

GMA: High school graduate male scoring in the top 50th percentile on the Armed Forces Qualification Test.

GMA RECRUITS

TWO-YEAR ACCESSIONS

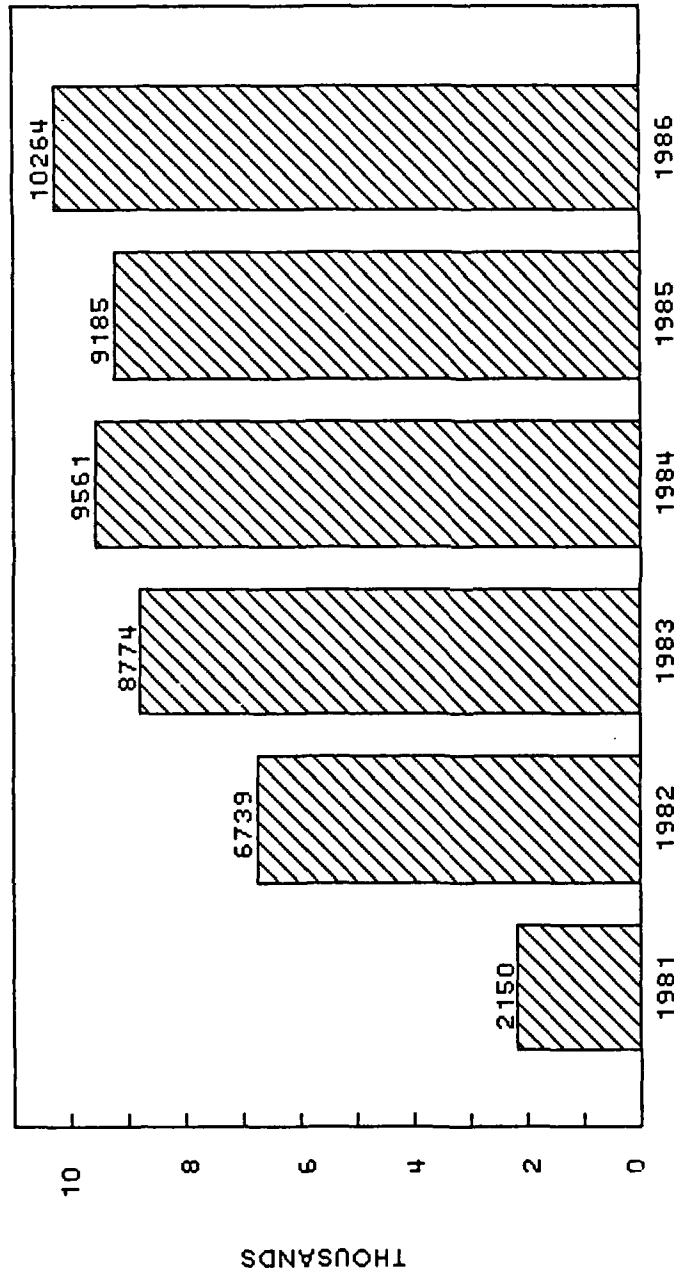


FIGURE 2. Two-year Accessions, 1981-86

Source: Recruiting Management Information System on FORECAST, (an extract from The Keystone/Request Active Army Recruit File). Data for 1981 are from USAREC.

GMA: High school graduate male scoring in the top 50th percentile on the Armed Forces Qualification Test.

GMA RECRUITS

N(IIIA) = 350 N(II) = 545 N(I) = 69

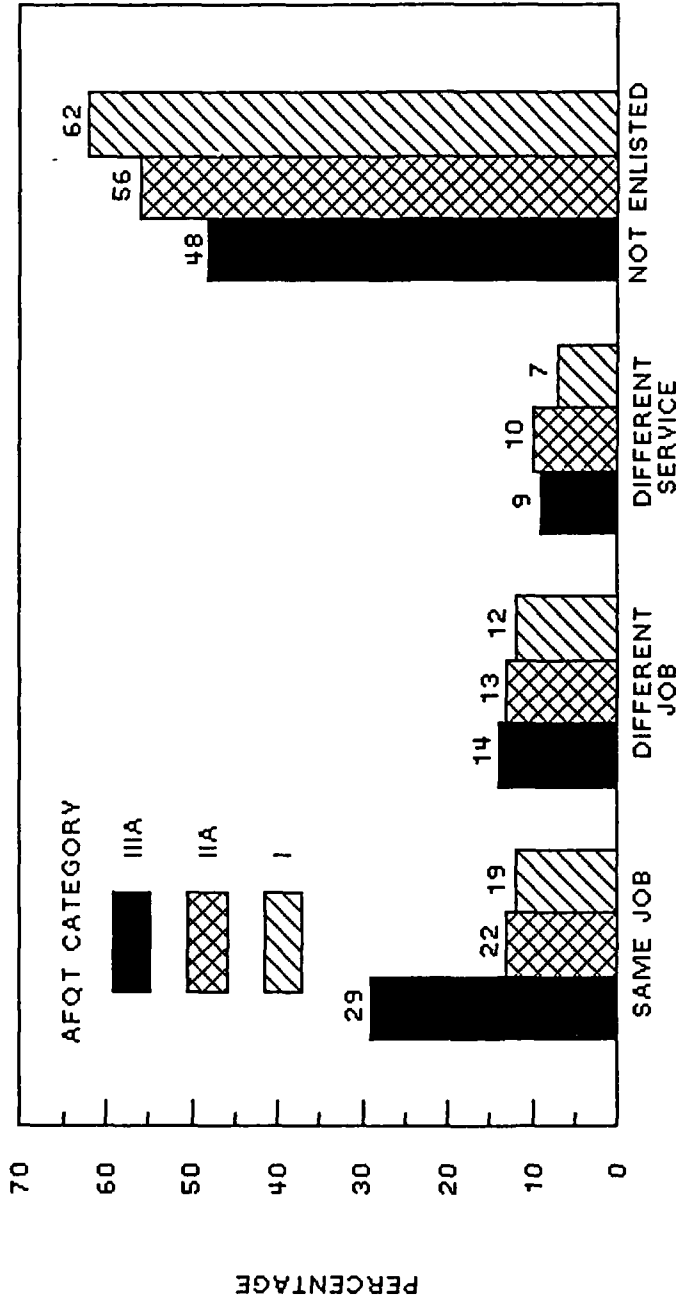


FIGURE 3. Effects of no service having 2 year four by AFQT category.

Note: Respondents are tabulated only if ORMF records indicate that they enlisted for 2 years.

Source: 1986 New Recruit Survey.

GMA: High school graduate male scoring in the top 50th percentile on the Armed Forces Qualification Test.

GMA RECRUITS

N(2-YR) = 877 N(3-YR) = 1650 N(4-YR) = 1951

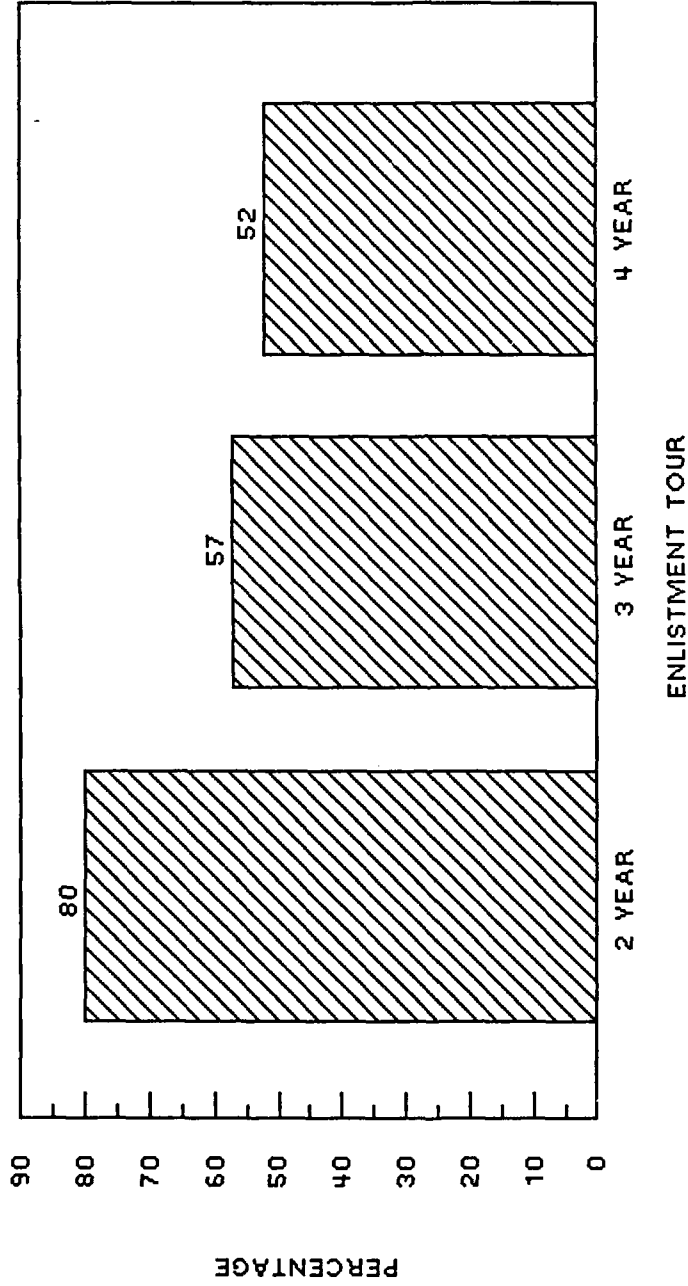


FIGURE 4. Percent of recruits indicating they "Definitely" or "Probably" will attend college following their enlistment tour.

Source: 1986 New Recruit Survey.

GMA: High school graduate male scoring in the top 50th percentile on the Armed Forces Qualification Test.

enlistment option. What would you have done?" The response alternatives are:

1. Signed up for the same job anyway
2. Signed up for a different job in the Army whether or not it had a 2-Year Enlistment Option
3. Signed up for a different job in the Army only if it had a 2-Year Enlistment Option
4. Tried to join a different service
5. Not enlisted at all

Figure 5 presents responses to this question from the 1984 through 1986 surveys for male recruits who enlisted for a 2-year tour of duty according to enlistment records. The data indicate that in 1986, 54% of the recruits would have enlisted in a different MOS offering the 2-year tour if the MOS they signed up for did not have the option. Only 16% of the recruits in 1986 would have enlisted in the same MOS (this percentage has decreased since 1984). These data clearly indicate the value of the 2-year tour as an allocation tool.

The New Recruit Survey is a valuable source of data to address the policy issue of the cost-effectiveness of the 2-year option for two reasons. First, the survey is conducted annually. Changes in the recruiting environment and in recruiting incentives occur with sufficient frequency that an analysis of current policy requires relatively recent survey data. Secondly, one of the major parameters in the model presented below is the impact on enlistments of eliminating the 2-year option program. Therefore, the correct population to survey on this issue is new recruits. The question is not the impact on the general population, but how many who did enlist would not have enlisted without the program.

THE IMPACT OF THE 2-YEAR OPTION

There are two potential drawbacks to the 2-year enlistment option: (1) The program might simply allow recruits to substitute shorter tours for longer tours (to the degree that shorter tours are substitutes for longer tours, recruiting and training costs increase as more youths need to be accessed to maintain a constant force structure); and (2) The 2-year program may attract youths who otherwise would enlist in other services. This section of the paper argues that these are not significant effects, and addresses each of these in turn.

GMA RECRUITS

N(84) = 473 N(85) = 647 N(86) = 890

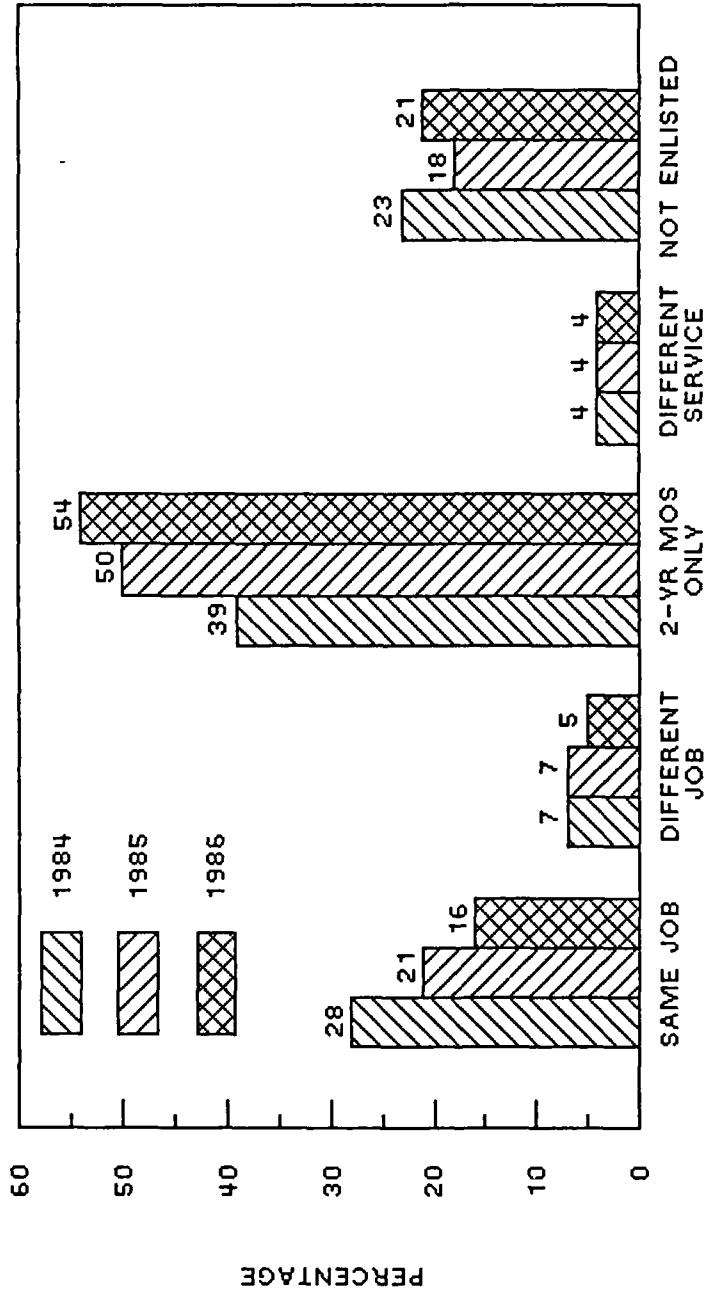


FIGURE 5. Effect of no 2-year option for MOS.

Note: Respondents are tabulated only if ORMF records indicate that they enlisted for 2 years.
 GMA: High school graduate male scoring in the top 50th percentile on the Armed Forces Qualification Test.

Substitution to Shorter Tours

According to the 1986 New Recruit Survey, 23% of recruits who enlisted in a 2-year tour would have enlisted in the same MOS even if the 2-year option were unavailable. For these recruits, the 2-year option imposes a cost on the Army because a shorter tour is simply substituted for a longer tour. From the numbers in Figure 1 one cannot ascertain whether this substitution effect is offset by the Army's net gain of 64 percent of the 2-year recruits who said they would have either not enlisted at all or enlisted in another service. The trade-off can be viewed as follows. Suppose the 2-year option were eliminated. The Army would lose some recruits, while others would still enlist in the Army for longer tours.

Substitution from Other Services

Because the Army is the only service currently offering a 2-year enlistment option, some recruits may be drawn away from the other services. As was shown in Figure 1, this substitution from other services is relatively small. In 1986, for example, only 10 percent of the 2-year recruits responded that they would have tried to enlist in another service if no 2-year option was available in any service. The number of recruits who would have actually enlisted (or been accepted) in the other services is likely to be significantly smaller than 10 percent, thereby lessening the detrimental impact on other services' recruiting.

Another question in the 1986 New Recruit Survey specifically addresses the issue of interservice competition. Recruits were asked "What if a Navy (or Marine or Air Force) recruiter had offered a 2-year tour?" The sample was split into three groups to respond to the option alternative for a specific service. Possible responses are:

1. Signed up with the Army anyway
2. Signed up for 2 years with the Navy (Air Force, Marines) only if a specific job had a 2-year enlistment option
3. Signed up for 2 years with the Navy (Air Force, Marines) for any job that had a 2-year enlistment option

The responses to this question are shown in Figure 6. The results demonstrate that if the other services were to compete in the 2-year market, the impact on the Army would be quite detrimental. Only 46% of the 2-year recruits respond that they would remain in the Army if the Air Force offered a 2-year option, while 64% would remain if the Navy had such a program and 73% if the Marines offered the option. If all the other services had 2-year options, the results

GMA RECRUITS

N(NAVY) = 279 N(AF) = 275 N(MC) = 316

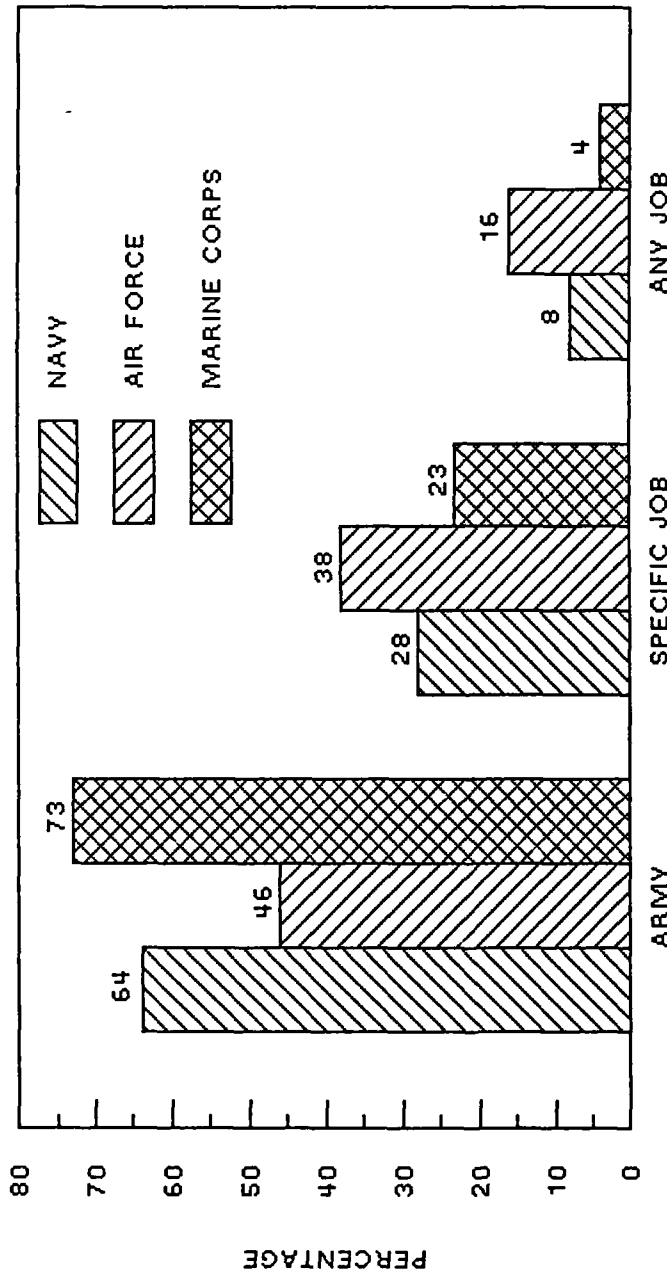


FIGURE 6. What if a Navy/Air Force/Marine recruiter offered you a 2-year tour?

Note: Respondents are tabulated only if ORMF records indicate that they enlisted for 2 years.

Source: 1986 New Recruit Survey.

GMA: High school graduate male scoring in the top 50th percentile on the Armed Forces Qualification Test.

suggest that the Army would lose over half of its 2-year recruits.

Cost-Effectiveness of the 2-Year Option

The Army's 2-year option is a market expander. What this term means, operationally, is that the option is an enlistment incentive: individuals who would not otherwise enlist for a longer tour (given other things equal) may consider enlisting for a shorter tour. Therefore the cost of 2-year option may be compared to the cost of attracting recruits using other enlistment incentives.

To illustrate the manpower gain from the 2-year option program, we assume the Army eliminates all 10,000 2-year positions. The Army would lose 64 percent of the 2-year recruits times two years of service, for a loss of 12,800 man-years. At the same time, 36 percent would stay for longer tours (those who indicated they would sign up for the same job or a different job as shown in Figure 1), so the loss would be offset by a gain of 1.5 years of service (assuming an average of 3.5 year tours) for those who remain, or 5,400 (3,600 x 1.5) man-years. Thus the gain in man-years associated with the 2-year program in this example would be (12,800 - 5,400 =) 7,400 man-years.

This is a very simple example. The gain of 7,400 man-years from the 2-year program might be overstated if "trained" man-years are compared, because a larger proportion of the 2-year tour is spent in training exercises. An extension from two to three years yields an additional year in trained man-years since much of the formal training occurs early in the first term. However, higher attrition rates are associated with longer tours, so adjustments must be made for the probability of not completing the tour. A third complication is that additional incentives would be required to attract 3- and 4-year recruits to replace the manpower lost if the 2-year program were eliminated. We have calculated the cost of eliminating the 2-year program and attracting a sufficient number of 3- and 4-year recruits to maintain a constant number of trained man-years. The differential attrition rates are incorporated into the cost-benefit analysis, as are training and recruiting costs, as well as the pay increase necessary to attract additional 3- and 4-year recruits. The model also accounts for differential reenlistment rates and adjusts for changes in manpower associated with both first and second terms. It is implicitly assumed that the changes in policy do not affect the number of soldiers reenlisting beyond the second tour.

The intuitive explanation of the cost-benefit analysis is illustrated in Table 1 (with the list of variables and assumptions provided in Table 2) and is as follows: after accounting for training and differential attrition and

retention across tours, the net manpower gain associated with the 2-year option (net of the substitution effect from longer terms) is 7,228 man-years. One alternative recruiting policy would be to replace the 2-year option with a pay increase to attract more 3- and 4-year enlistments. Given the attrition and retention rates associated with the 3-year tour, it would take 2,651 additional 3- to 4-year accessions to replace the lost 2-year accessions. Assuming a pay elasticity of 1.0, a pay increase of \$2,211 over 3.5 years (about \$631.71 per year) would be sufficient to attract the additional number of 3- and 4-year enlistments. Because fewer accessions are needed, some training and recruiting costs are saved. With combined (assumed) training and recruiting costs of \$30,000 per recruit (consistent with the marginal costs of an average recruit generated by the Army Manpower Cost System (AMCOS)), the savings from fewer accessions associated with eliminating the program would be \$112.5 million per year, while the cost of the increase in compensation to all accessions (135,000 - 6,400 + 2,651, or 135,000 net of the change after eliminating the 2-year option) would be \$290.2 million per year. Thus, given the above assumptions, the 2-year program would save the Army \$177.7 million per year in recruiting and training costs.

This cost is a point estimate. For policy purposes it is also useful to generate a range of costs because (a) many of the parameters of the model are imprecise and (b) a number of assumptions used for the analysis may be varied depending upon the purpose of the analysis. For example, if an increase in compensation could be targeted to GMAs alone, perhaps in the form of bonuses, the cost of the increase in compensation would be equal to the number of GMAs (60,000 - 6,400 + 2,651) x \$2,211, or \$124.37 million per year.⁵ Under this assumption, the 2-year option would save the Army (\$124.37 - \$112.47) \$11.9 million per year. However, it is not clear whether a compensation differential determined strictly on the basis of GMA status could be implemented.

To investigate the sensitivity of the cost-benefit analysis to the parameter, the pay elasticity was varied from

⁵The combined recruiting (exclusive of training) marginal cost estimates in the bonus example are also consistent with the cost estimate of 16,000 (1982 dollars) derived in a Rand study (Polich et al., 1986). The marginal recruiting cost estimate generated by AMCOS is approximately \$19,000 in 1987 dollars or about two-thirds of the \$30,000 combined recruiting and training cost assumed in the base case.

TABLE 1. Equations: Cost-Benefit analysis.

1. Manpower associated with the two year program:

$$\begin{aligned} NM &= P \times M_2 \times (1 - At_2) \times [1.67 + (4 \times Re_2)] + (1 - P) \\ &\{M_2(1 - At_2)[1.67 + (4 \times Re_2) - (1 - At_3)[3.17 + (4 \times Re_3)]]\} \\ &= 7,228 \text{ manyears} \end{aligned}$$

2. Additional accessions required to replace two year program:

$$AM_3 = NM / (1 - At_3) [3.17 + (4 \times Re_3)] = 2,651 \text{ per year}$$

3. Bonus required to attract AM_3 accessions:

$$\begin{aligned} B_S &= AM_3 / 60,000 \times RMC/E_p \times 3.5 \\ &= \$2651 \text{ (over 3.5 year tour)} \end{aligned}$$

4. Training and Recruiting Savings from eliminating option:

$$S = (P \times M_2 - AM_3) \times \$30,000 = \$112.5 \text{ M}$$

5. Cost of bonus program to attract GMA accessions:

$$C = (60,000 - PM_2 + AM_3) B_S = \$290.2 \text{ M}$$

6. Net cost of replacing the two year enlistment option:

$$\$290.2 - \$112.5 = \$177.7 \text{ million}$$

Variable list and values on next page.

TABLE 2. Variable list and assumptions used in analysis.

<u>Variables and Assumptions</u>	<u>Value</u>
P Proportion of 2-yr recruits who would not have enlisted without option	.64
M ₂ Number of 2-yr recruits	10,000
Re ₂ Reenlistment rate, 2-yr soldiers	.094
Re ₃ Reenlistment rate, 3-yr soldiers	.184
At ₂ Attrition rate, 2-yr soldiers	.167
At ₃ Attrition rate, 3-yr soldiers	.302
RMC Regular Military Compensation	\$14,300
E _p Pay elasticity	1.0
Training and Recruiting Cost per recruit:	\$30,000
Average tour of additional accessions:	3.5 years
Average training time:	4 months
Training manpower: 2-yr tour	1.67 years
3-yr tour	3.17 years
Level of GMA accessions per year in analysis:	60,000
Reenlistment tour:	4 years

Note: Attrition and reenlistment rates from ELIM-COMPLP

0.5 to 1.5 in line with the findings of a number of studies.⁶ In addition, training and marginal recruiting costs were varied from \$20,000 to \$40,000 per recruit. Training costs vary across MOS, and \$20,000 might be appropriate for an MOS with relatively little training. The higher number could reflect higher training costs in some MOSs. In addition, the marginal recruiting cost of a high-quality individual would exceed the marginal cost of an average individual implicit in the \$30,000 combined recruiting and training cost figure. It should be clear that higher recruiting and training costs will make the 2-year program appear to be less cost-effective. Shorter tours obviously require higher annual recruiting quotas.

The results are illustrated in Figures 7 and 8. Figure 7 demonstrates the savings of the 2-year option compared to a pay increase; Figure 8 demonstrates the savings compared to a bonus program targeted to GMAs only. When compared to the general pay increase, the 2-year option appears cost-effective under a wide range of assumptions. In the comparison of the 2-year option against bonuses, the 2-year option is cheaper given a pay elasticity of 0.5, but is more expensive if the pay elasticity increases to 1.5. If the pay elasticity is assumed to be 1.0, the 2-year program is cheaper for recruiting and training costs of \$30,000 or less. At recruiting and training costs of \$40,000, the bonus program becomes a more cost-effective method of increasing enlistments.

Educational benefits are not included in this analysis, but to the extent that the 2-year recruits are more likely to plan to use these benefits (which increase with length of tour but at a decreasing rate), the cost of the 2-year option may be understated. Information on the likely usage rates of the new GI Bill, particularly by term of service, is unavailable so educational benefits have not been explicitly included in the cost-benefit formula. But the equation can easily be modified to reflect different assumptions on the costs of the program.

Another consideration that is difficult to include in the cost equations is differential retirement rates. One argument supporting the 2-year option is that because 2-year

⁶Brown (1985) obtains pay elasticities of 0.5 to 0.8 from pooled cross-sectional data. However, Daula and Smith (1985) correct for demand and supply constrained observations in pooled cross-sectional data and find pay elasticities in the range of 1.5 to 1.9, depending upon the model. Time-series models in the literature usually generate pay elasticities in the upper ranges, but these models are not appropriate for estimating precise parameter values although they may be useful for forecasting purposes.

SAVINGS FROM THE ARMY 2-YEAR OPTION:

Comparison of Pay Increase

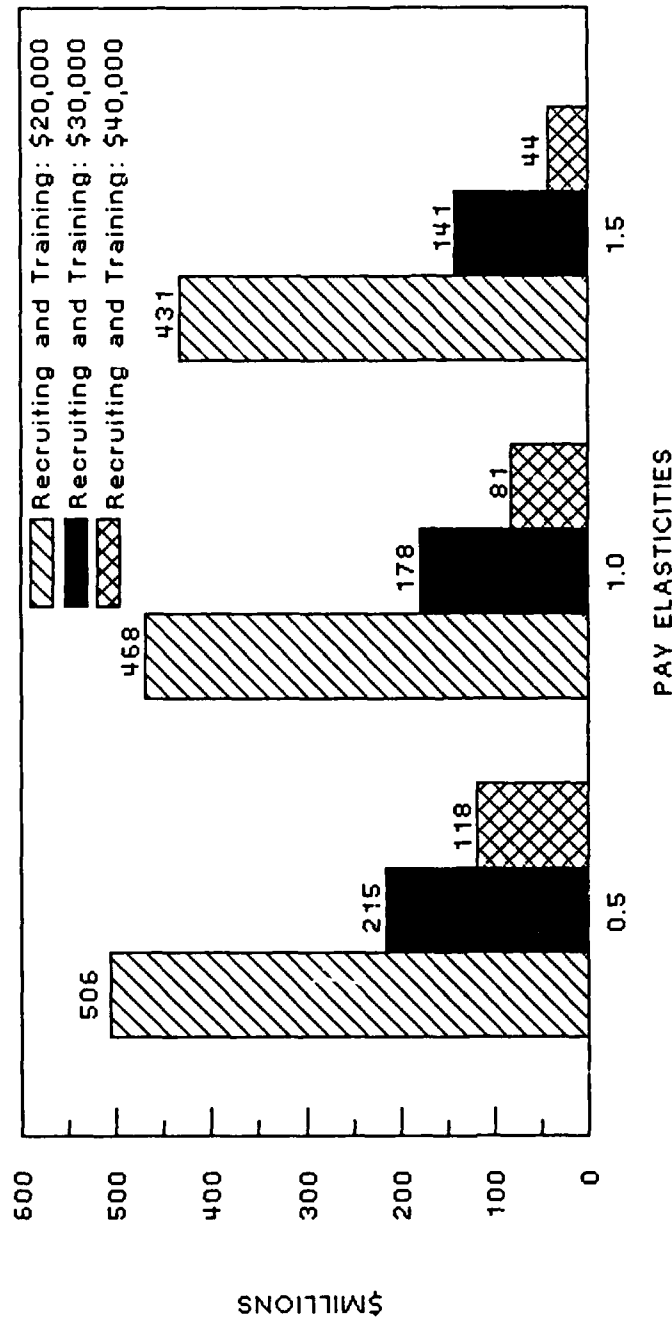


FIGURE 7. Savings from the Army 2-year option: Comparison of pay increase.

SAVINGS FROM THE ARMY 2-YEAR OPTION: Comparison of GMA Bonuses

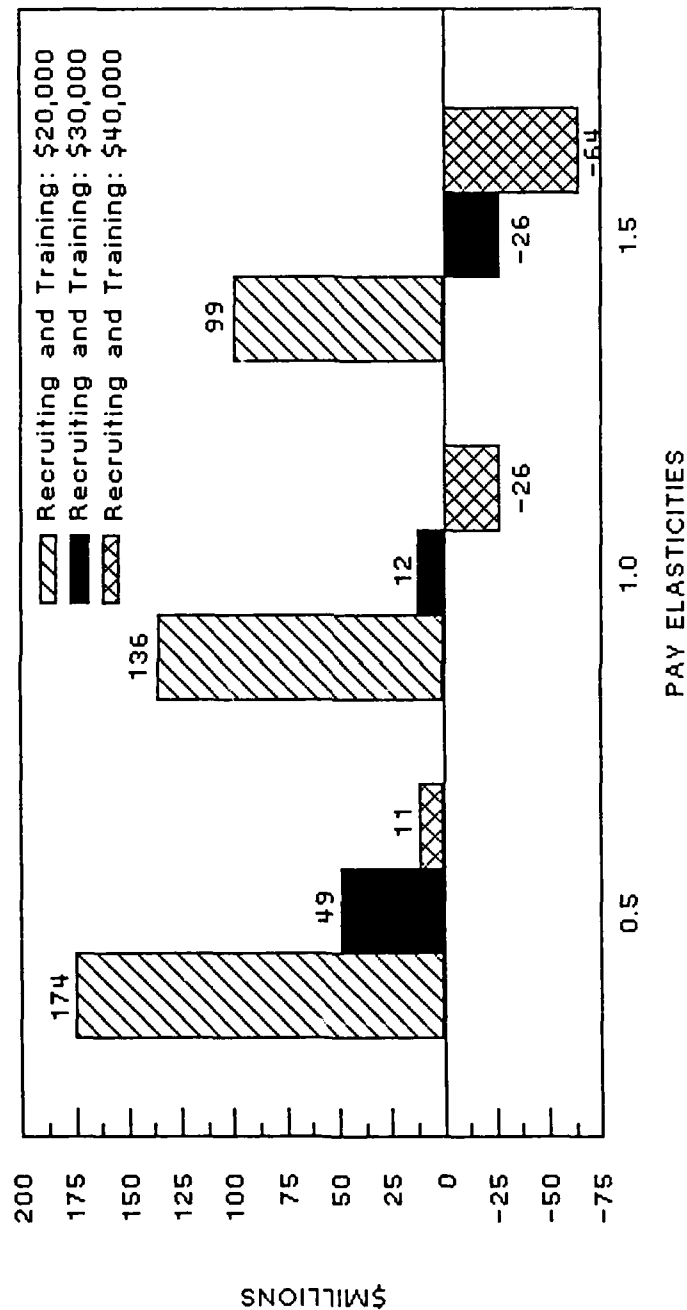


FIGURE 8. Savings from the Army 2-year option: Comparison of GMA bonuses.

recruits are less likely to reenlist than recruits with longer tours, and therefore are less likely to become career soldiers and collect retirement benefits, this is a source of savings that should be included in the model. There are two potential flaws in this line of reasoning. The first is that the lower retention rates are a function of several variables. Higher AFQT scores are associated with lower reenlistment rates. The brighter or more talented soldiers will have better civilian opportunities, on average, than will other soldiers. In addition, if increased compensation is used to attract 3- and 4-year recruits, those recruits at the margin are likely to have lower propensities for reenlistment than average recruits. It can be demonstrated that these "marginal" recruits are likely to have a lower preference for military service than the average recruit.

The second problem with arguing that 2-year recruits save the Army money because of lower retention rates is that the Army devotes resources (including selective reenlistment bonuses) towards encouraging higher reenlistment rates, particularly for soldiers who demonstrate higher performance. To some extent the low reenlistment rates in combat MOSs, in which many of the 2-year recruits are assigned, impose costs on the Army rather than savings.

To some extent, the 2-year program also provides a benefit in terms of reserve manpower. This can be illustrated using approximate numbers for recruiting costs for the selected reserves. The budget for Army Reserve (USAR) recruiting appears to be on the order of magnitude of \$100 million annually, recruiting approximately 70,000 individuals per year. This comes to about \$1,400 per recruit. If, for illustrative purposes, training costs are assumed to be another \$5,000 per recruit, each active soldier entering the selected reserve reduces USAR recruiting requirements by one recruit, saving \$6,400. The elimination of the 2-year program, replaced by an increase in compensation, reduces accessions by 2,651 per year. If, for example, 10% of these 2-year soldiers would have chosen the selected reserves (either USAR or Army National Guard (ARNG), assuming equal costs), then recruiting for selected reserves would fall by 265 persons per year. The total savings based on the USAR recruiting and training cost of \$6,400 per year would be $265 \times \$6,400$ or \$1.7 million per year. This number is quite small compared to the cost estimates generated by the previous analysis, but it does make the 2-year enlistment option more cost effective.

SUMMARY AND CONCLUSIONS

The analysis of the effectiveness of the 2-year enlistment option has demonstrated some significant advantages to the program. First, the program is market

expander. The enlistment option attracts many high quality youths who otherwise would not have enlisted in any service. Fifty-five percent of recruits responding to the 1986 New Recruit Survey who have taken the 2-year option indicate they would not have enlisted without it. An additional ten percent of the respondents suggest that they might have tried to enlist in another service. Although this inter-service competition effect is small, the number of Army recruits who actually would have enlisted in another service is likely to be even smaller.

Secondly, the 2-year enlistment option appears to be cost-effective. Assuming a pay elasticity of 1.0 and combined recruiting and training costs of \$30,000 per soldier, the 2-year option would save the Army \$177.73 million compared to an increase in compensation for all first-term soldiers (holding the pay of all others constant), and \$11.9 million when compared to a program targeting bonuses to "high quality" males (GMAs) only.

Unfortunately, the data are not available to determine the optimal size of the 2-year option program. The New Recruit Survey data allow us to generate average costs and benefits, not marginal costs and benefits. Thus, it is not possible to generate the changes in the size of the program. However, the New Recruit Survey can be used in a post hoc manner to evaluate the effectiveness soon after changes in the size of the program have been implemented. The trend over the past several years indicates that the growth of the program may be contributing to an increased effectiveness as knowledge of the program becomes more widespread in the general public.

Recent improvements in the quality of Army accessions may be partially attributed to the expansion and marketing of the 2-year enlistment option in addition to effective recruiting management. The survey data demonstrate that a large proportion of high quality recruits participating in the 2-year program would not have enlisted in any service if the Army's program had not been available. This market expansion effect is particularly valuable for recruiting high quality recruits.

The New Recruit Survey data suggest that it would be counterproductive for the other services to offer a similar program. The Army's program currently draws very few of its 2-year recruits from the other services. However, a 2-year program offered by other would induce over half of the two-year Army recruits to enlist elsewhere. Continuation of the Army's 2-year enlistment option could ensure access to an additional source of high quality manpower for military service while minimizing the interservice competition effects.

REFERENCES

- Benedict, M. E. (1987). The 1986 ARI Survey of U.S. Army Recruits: Technical manual (ARI Technical Report 735). Alexandria, VA: U.S. Army Research Institute. (AD A182 738)
- Brown, C. (1985). Military enlistments: What can we learn from geographic variation. American Economic Review, 75, 228-234.
- Celested, J. F., Wilson, M. J., Ramsey, V. F., Elig, T. W., & Pliske, R. M. (1986). The 1984 and 1985 ARI Survey of Army Recruits: Methodology and recommendations for future administrations (ARI Technical Report 706). Alexandria, VA: U.S. Army Research Institute. (AD A180 291)
- Daula, V., & Smith, D. A. (1985). Estimating enlistment models for the U.S. Army. In R. G. Ehrenberg (Ed.), Research in labor economics, Volume 7 (pp. 257-309). Greenwich: JAI Press Incorporated.
- McTeigue, R. J., Kralj, M. M., Adelman, L., Zirk, D. A., & Wilson, M. J. (1986). Predecisional processes involved in the enlistment decision. Alexandria, VA: U.S. Army Research Institute.
- Polich, J. M., Dertouzos, J. N., & Press, S. J. (1986). The enlistment bonus experiment (Report R-3353-FMP). Santa Monica, CA: Rand Corporation.
- Westat, Inc. (1986). The 1984 ARI Survey of Army Recruits: User's manual (ARI Research Note 86-46). Alexandria, VA: U.S. Army Research Institute. (AD A181 919)
- Westat, Inc. (1986). The 1985 ARI Survey of Army Recruits: User's manual (ARI Research Note 86-50). Alexandria, VA: U.S. Army Research Institute. (AD A172 624)

END

DATE

FILMED

DTIC

9-88