The Supply Price of Commitment:

Evidence from the Air Force Enlistment Bonus Program*

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ABSTRACT

In FY 1999, the Air Force introduced a bonus program designed to channel recruits into longer enlistment terms. This regime shift provides a unique opportunity to estimate the elasticity of labor supply at a new margin: the length of the employment contract. A $5,000 6-YO-4-YO bonus differential is estimated to increase the probability of choosing a 6-year enlistment by 30 percentage points. The program is cost-effective relative to other policies to increase man-years. The high elasticity of labor supplied likely reflects a combination of the taste for military service and the imperfect nature of capital markets faced by youth just embarking on their careers.

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Introduction

A central tenet of human capital theory is that firms that make specific investments in their workers must, to make such investments profitable, design compensation schemes so as to induce longer tenure. Perhaps best-known is Becker's (1965) sharing rule, but, as is well known, this solution is not unique. For example, firms could require workers to pay an up-front bond to the firm in return for a promise of employment at a given wage. However, workers, particularly younger workers, face imperfect capital markets and a high degree of uncertainty that would render such a strategy too costly. Alternatively, firms could bear the costs of investment, or even pay the worker up front in return for a worker's commitment to remain with the firm for a given period of time. Such bonuses would be particularly attractive to younger workers, who have less access to capital markets and high preferences for current consumption. However, such contracts have, since the days of indentured servitude, generally not been enforceable.

One exception is the U. S. military, which, for many years has offered up-front bonuses in return for a commitment to enter specific occupations for specified terms of enlistment.[1] An alternative way to generate longer tenure, also used by the U.S. military, is to pay reenlistment bonuses targeted to specific military occupations and experience levels. The military could prefer up-front bonuses for two reasons. First, they induce greater certainty. Secondly, because young enlistees are likely to have high rates of discount (Warner and Pleeter 2001), new recruits' supply prices for incremental future years of service are likely to be below the military's willingness to pay. The cost-effectiveness of up-front bonuses versus re-enlistment bonuses depends on the sensitivity of labor supply at the start and end of a term of enlistment.

This paper examines the sensitivity of recruits' labor supply using data from a quasi-natural experiment: the Air Force's Enhanced Initial Enlistment Bonus (EIEB) program of the late 1990s. Historically, the Air Force has had little need for up-front bonuses in order to achieve its enlistment goals in most occupations, and has found it cost-effective to achieve its retention goals with reenlistment

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[1] The Navy, for example, requires a minimum (active) enlistment term of six years of enlistees into the nuclear (submarine) program. The Army has offered minimum enlistment terms as short as two years, but generally requires a four-year minimum.

bonuses. Starting in the late 1990s, perhaps due in part to the economic boom at the time, the Air Force introduced the EIEB program, covering a broad range of skills. Although small bonuses were awarded to four-year enlistees (4-YOs) in some skills, the lion's share of bonuses was used to channel recruits into six-year terms (6-YO) of enlistment. This change in Air Force policy generated a stark regime change that provides an opportunity to examine the willingness of new hires to commit to longer contracts in return for higher remuneration.[2]

Our analysis of this quasi-natural experiment has two components. First, we estimate the responsiveness of 6-YO enlistments to the 6-YO-4-YO bonus spread. This analysis accounts explicitly for the "quasi" character of the experiment, that is, that the bonus spread is potentially endogenous, using instrumental variables techniques. Secondly, we examine the cost-effectiveness of the EIEB program by comparing it with the next-best alternative: paying reenlistment bonuses. Despite recruits' high rates of discount, up-front bonuses may not be cost-effective if there is too high a level of initial recruit uncertainty, making them unwilling to commit to longer terms of service at terms profitable to the military. Indeed, such bonuses could induce higher rates of attrition by attracting less stable individuals to join the Air Force. Our analysis of cost-effectiveness analyzes attrition patterns for such negative selection, and accounts, as well, for the possibility that (1) recruits may have been willing to enlist for six years even in absence of the EIEB program and that (2) 4-YO enlistees sometimes reenlist even in the absence of a reenlistment bonus.

The paper is organized as follows. Section 2 presents a simple model of enlistment term choice. Section 3 describes the EIEB program. Section 4 describes the data. The analysis of term choice is contained in Section 5, and Section 6 addresses the issue of cost-effectiveness. We conclude with a brief summary.

[2]The Army and Navy have long used enlistment bonuses, college benefits, or both in order to expand overall enlistment supply and to channel recruits into specific skills (see Polich, Dertouzos, and Press 1986; Buddin 1991; and Warner, Simon, and Payne 2001). The Air Force's EIEB program offers a cleaner environment within which to measure the responsiveness of contract length to remuneration.

A Model of Enlistment Term Choice

We use the model in Asch and Warner (2001) to briefly outline recruits' choice of term of enlistment. A recruit who enlists into Air Force specialty (AFSC) j for a T-year enlistment enjoys utility given by

$$E(U_{T,j}) = B_T + M_{T,j} + \beta^{T+1} E(V_{T+1,j}) \qquad (1)$$

where B_T is the value of the bonus, $M_{T,j}$ is the expected present value of military compensation (including non-pecuniary benefits and costs), β is the personal discount factor, and $E(V_{T+1,j})$ is the expected value of the optimal stay-leave decision at the end of the first enlistment. Enlistment occurs if there exists at least one (T, j) combination for which $E(U_{T,j}) > E(C_0)$, where the latter term is the payoff to civilian employment. The expected value of the optimal decision at the end of the first enlistment is

$$E(V_{T+1,j}) = \alpha_{T+1} E(U_{T+1,j}) + (1-\alpha_{T+1}) E(C_{T+1}) \qquad (2)$$

where α_{T+1} is the probability that the individual will reenlist after the first enlistment, $E(U_{T+1,j})$ is the expected present value of future payoff to staying in the military, $E(C_{T+1})$ is the expected present value of civilian earnings if the individual separates after the initial enlistment. [3] Adding a random error term, the realization of period T+1 utility is equal to:

$$U_{T+1,j} = E(U_{T+1,j}) + \varepsilon_T \qquad (3)$$

where it is assumed (for convenience) that the random error $\varepsilon_T \sim N(0, \sigma_\varepsilon^2)$.

Consider the problem of choosing between enlistment terms of T = 4 and T = 6. The individual enlists for six years if $U_{6,j} > U_{4,j}$, or:

$$B_6 - B_4 + (M_6 - M_4) + \beta^7 E(V_{7,j}) - \beta^5 E(V_{5,j}) > \varepsilon_4 - \varepsilon_6 \qquad (4)$$

[3] The expected value of all future payoffs beyond the initial enlistment is a weighted average of the payoffs from reenlisting and leaving, where the weight is the probability of staying. This probability, in turn, depends upon the strength of the individual's taste for military service (a component of $M_{T,j}$).

Assuming that ε_4 and ε_6 are drawn from the same distribution and are uncorrelated, the probability of a 6-year enlistment is given by

$$\Pr(T=6)=\Phi\left(\frac{\left(B_6-B_4\right)+\left(M_6-M_4\right)+\beta^7E(V_{7,j})-\beta^5E(V_{5,j})}{\sqrt{2}\sigma_\varepsilon}\right) \qquad (5)$$

where $\Phi(\bullet)$ denotes the standard normal distribution function. The probability of a six-year enlistment is increasing in the 6-YO-4-YO bonus spread, $B_6 - B_4$., and is inversely related to the standard deviation of the random influences on the utilities of term choices (σ_ε). A reduced-form version of equation (5) forms the core of our empirical analysis. First, however, we describe the EIEB program.

The EIEB Program

Prior to fiscal year (FY) 1999, the Air Force offered very few recruits enlistment bonuses. Responding to challenges in retaining experienced personnel in certain occupations, the Air Force began the EIEB program in FY 1999.[4] EIEB bonuses initially ranged from $1,000 for a 4-year enlistment in selected 5-digit AFSCs up to $9,000 for 6-year enlistees in highly critical specialties.[5] These bonuses were available to individuals who scored 31 or better on the Armed Forces Qualification Test (AFQT) and who enlisted in eligible Air Force specialties. All bonuses of $2,000 or greater were tied to 6-year contracts, and every specialty that offered a $1,000 bonus for a 4-year enlistment also offered a higher bonus for a 6-year enlistment. The specialties that offered bonuses were grouped into five tiers with the bonus amount varying by tier. Six-year enlistments in Tier-1 specialties (e.g., combat control and linguists) were eligible for $9,000. Six-year enlistees in Tier-2 specialties, which involve costly and lengthy training (e.g., air traffic control) were eligible for $6,000. Six-year enlistees in hard-to-fill specialties (e.g., security forces) fell into Tier-3 and were eligible for a $4,000 bonus. Six-year enlistees in specialties that offered first-term reenlistment bonuses fell into Tier 4 and were eligible for a $3,000 bonus. Finally, 6-year enlistees in specialties with overall manning less than 90 percent were grouped in

[4] Information about the bonus program was taken from Air Force Recruiting Service Release 98-10-06 and the Air Force's own web site http://www.afpc.randolph.af.mil/enlskills/specact.htm, but is no longer posted.
[5] Bonuses are typically paid early in the enlistment, usually upon completion of initial skill training.

Tier 5 and were eligible for a $2,000 enlistment bonus. Later on, recruits who signed up for "open fields" in each of the four aptitude areas (general, administrative, mechanical, and electrical/electronic) were from time to time eligible for enlistment bonuses.

Data

The data set for our analysis contains information on every AF enlistment contract between FY 1998 and FY 2001.[6] The enlistment contract data were collected by the Military Entrance Processing Command (MEPCOM). The data were supplied by Defense Manpower Data Center (DMDC), the repository of MEPCOM data. MEPCOM data include information on date of enlistment, date of accession, AFQT score, age, education, state of residence, and usually a 5-character AFSC.[7] Unfortunately, MEPCOM does not contain information on whether an individual received an enlistment bonus. Instead, information on the Air Force bonus program was downloaded from the Air Force's web site in the form of spreadsheets that listed each eligible Air Force Specialty Code (AFSC) or open field aptitude area, along with the amounts available by term of enlistment. Each enlistment contract record in the MEPCOM data was matched to the four and 6-year bonus amounts for which it was eligible. There were thirteen program changes between the start of the Air Force enhanced initial enlistment bonus program in FY 1999 (the first spreadsheet is dated 21 October 1998) and the end of FY 2001.

Air Force enlistment bonuses were also sometimes awarded to recruits who, rather than enlisting in a specific AFSC, agreed to postpone their assignment of a specific AFSC until after completion of basic training, and instead sign up for training in one of the four broad fields into which each AFSC falls: Administrative, Mechanical, Electrical, and General. The bonus amounts for open-field recruits could be substantial, even on occasion exceeding the bonuses in guaranteed AFSCs. Unfortunately, MEPCOM

[6] Prior to FY 1998, the Air Force initial enlistment bonus program was limited to just a few AFSCs. Unfortunately, we have no information on the bonus program prior to FY 1998.

[7] Four types of records are collected by MEPCOM and stored by DMDC. The contract record is completed at the time a recruit signs a contract to enlist in the military. Most such recruits do not ship to duty immediately, instead entering what is known as the Delayed Entry Program (DEP). An accession record is generated when the recruit actually ships to duty, and updates information on education, marital status, and term of enlistment. Our records combine information from these two types of records. A third type of record, the career record, contains running

data do not indicate the aptitude area for recruits who enlisted in an open field. Rather, such individuals appear as Basic Airman on the contract record. The occupations of such individuals who enter service were ascertained using data from in-service career records maintained by DMDC. These career records consist of annual snapshots as of September 30 of each year (that is, the last day of each fiscal year) on variables such as rank, AFSC, and a variety of other information. We have annual snapshots on Air Force entrants from the year of entry through September 2004. We merged the information from the contract record with the career records to assign open fields to such individuals.

An additional wrinkle in the assignment of enlistment bonuses emerged during preliminary examination of the data, which revealed that the proportion of individuals enlisting for 6-year terms as of a given contract date seemed to foreshadow changes in the bonus program that occurred shortly thereafter. Discussions with individuals at the Air Force Recruiting Command revealed that this pattern resulted from a unique (relative to other Services) aspect of Air Force personnel policy at the time.[8] Most recruits enter what is called the Delayed Entry Program (DEP) for a specific period of time prior to entering active duty.[9] Between the time of entry into DEP and the time a recruit reports to duty, enlistment bonuses may increase or decrease, or be offered in previously ineligible AFSCs, or removed from previously eligible AFSCs. Air Force policy was to offer recruits in DEP when the bonus program changed the same options as newly signed recruits. We therefore assigned recruits two sets of possible bonus amounts, one based on their enlistment *contract* date and one based on their *accession* date. Six-year enlistees were assigned the larger of the two 6-year bonus amounts and a corresponding 4-year bonus amount (to permit construction of a variable measuring the bonus spread); likewise, 4-year enlistees were assigned the larger of the two 4-year bonus amounts along with the corresponding 6-year bonus amount.[10]

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accounts of rank, tenure, occupation, duty station, and so on until separation. Finally, a separation record is generated when an individual leaves military service.

[8] We thank MSgt Tim Clarke and his colleagues at Randolph AFB for taking the time and trouble to help us better understand the operation of the enlistment bonus program.

[9] Peculiarities of the data made it infeasible to analyze attrition from DEP. In particular, the information on term of enlistment is collected from the accession record. Because DEP losses do not access, no information on initial enlistment term is available for them.

[10] This procedure could give rise to errors in assignment. Such errors will tend to bias our estimates of the sensitivity of 6-YO enlistment to the bonus spread toward zero.

Two plots with our data suggest that the term of enlistment is in fact related to the bonus spread. **Figure 1** shows the average bonus spread between 6-year and 4-year enlistment contracts by month over the sample period along with the percentage of recruits who chose 6-year terms. At the start of our data period, October 1997, only a small number of skills were eligible for 6-year enlistment bonuses. As the EIEB program expanded, the fraction of recruits choosing a 6-year enlistment rose along with the bonus spread. In a cross-section look at the data, **Table 1** shows and **Figure 2** graphs the average proportion of recruits choosing a 6-year term of enlistment and the mean 6-YO-4-YO bonus spread for 35 large (500 or more observations) 5-digit AFSCs over the 48-month period of our data. AFSCs with larger average bonus spread over the period clearly had larger fractions of recruits selecting 6-year enlistments.

Information from the MEPCOM career record was used to ascertain, through September 2004, whether recruits attrited from the Air Force. The data therefore allow us to track the FY 1998 cohort through as many as six years, the FY 1999 cohort for as many as five years, on through the FY 2001 cohort, which can be tracked for up to three years.[11] Because the majority of first-term attrition occurs during initial training and falls rapidly after the first two years of service, any effects of the EIEB program should be readily apparent in the data.

Analysis of Term Choice

Methods

Figures 1 and **2** strongly suggest that Air Force recruits' term choices were sensitive to the 6-YO-4-YO bonus spread. This section estimates the magnitude of the effect econometrically. Before estimating individual-level probit models of term choice suggested by equation (5), we examined the sensitivity of term choice to the bonus spread using simpler, linear models using data aggregated by Air Force occupation (AFSC).

[11]Recruits who sign a contract in a given fiscal year – say 2000 – may ship to duty up to one year thereafter, thus reducing the "apparent" number of potential years by one.

Empirical Models

Let ***Term6$_i$*** denote the mean fraction of recruits enlisting into the i[th] 5-digit AFSC during the 48-month period from 1 October 1997-30 September 2001, and ***Bspread$_i$*** the average 6-YO-4-YO bonus spread in that AFSC. We estimated models of the form:

$$Term6_i = \beta_1 + \beta_2 Bspread_i + \beta_3 X_i + \varepsilon_i \qquad (6)$$

where ***X$_i$*** denotes the mean value of selected personal attributes of recruits and ε_i is a random error.[12] The estimated value of β_2 in equation (6) is a "between" estimator because it makes use of only cross-sectional variation in term choice and bonus spread. Alternatively, the data can be grouped by AFSC (*i*) and time period (*t*) and a two-way fixed effects model specified:

$$Term6_{i,t} = \beta_1 + \beta_2 Bspread_{i,t} + X_{i,t}\beta_3 + \alpha AFCSC + \tau TIME + v_{i,t} \qquad (7)$$

Here the time period is the t^{th} month of the sample period, so there are 48 time periods in this analysis.[13] Estimation of equation (7) including the vectors of AFSC and time effects yields a "within" estimator of β_2, using information both variation over time and across AFSCs to estimate β_2.

The most important econometric issue in estimation of equations (6) and (7) is potential endogeneity of ***Bspread***. Although there are other possibilities, the most likely scenario is one in which the Air Force, in response to a negative shock to ε or v, increases the bonus spread, and vice versa, generating a negative correlation between ***Bspread*** and the error term. The result is that least-squares estimates of β_2 are most likely biased downward.

Regardless of the direction of bias, we developed two sets of instruments. Recall that one motivation for the Air Force's implementation of the EIEB program was to encourage longer enlistments in AFSCs with high training costs. We were able to collect data on two measures of training costs: days of initial skill training (***TDays***) and the dollar cost of training (***TDollars***) for 124 of the 133 5-digit AFSCs

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[12] X_i included (1) the fractions of the recruits in the AFSC who were high school graduates, male, married, Black, Hispanic, and Other Race, and (2) the average age and the average Armed Forces Qualification Test (AFQT) score of the recruits in the AFSC.

[13] $X_{i,t}$ included (1) the fractions of the recruits in a 2-digit AFSC in a time period who were high school graduates, male, married, Black, Hispanic, and Other Race, and (2) the average age and the average Armed Forces Qualification Test (AFQT) score of the recruits in the 2-digit AFSC in the month.

in our dataset.[14] These training cost variables, constructed in 1999 (the mid-point of our data period), should be correlated with ***Bspread*** but uncorrelated with the error term, and hence should be suitable instruments.

The training cost instruments vary only in the cross section and not over time. This is not a problem if all we wish to estimate is between-type models (equation 6), but estimation of within-type models such as (7) requires finding an instrument that varies over time. Our second instrument is based on the fact that the Air Force's EIEB program was designed to reduce turnover among experienced personnel in certain AFSCs. The usual policy tool used by the Air Force is the reenlistment bonus, which is expressed in terms of a so-called multiplier.[15] The multiplier is a number between 0 and 8, and the reenlistment bonus is equal to number of years of reenlistment times monthly pay times the multiplier. Our second instrument is ***Zone-A***, the multiplier in effect for individuals in a given AFSC reaching the end of their initial enlistment contract. Of course, ***Zone-A*** might not be a valid instrument; fluctuations in v (equation 7) could cause the Air Force to respond by varying the Zone-A multiplier. Ultimately, this issue can be resolved empirically.

The variables ***TDays*** and ***TDollars*** cannot serve as instruments in equation (7) as specified because they do not vary over time within a 5-digit AFSC. We therefore grouped the 124 5-digit AFSCs into 44 2-digit AFSCs, and included 2-digit AFSC effects in the model. Inspection of **Table 2** suggests that AFSCs within 2-digit groups are reasonably closely related and are likely to have similar working conditions, and should therefore do a reasonably good job of picking up the effects of AFSC-specific unobservables on enlistment term choice.

Finally, we estimated probit and linear probability models (LPM) using individual-level data. In addition to including controls for 2-digit AFSC and time, the models included a vector of personal

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[14]The data were taken from http://usmilitary.about.com/library/milinfo/blaftrainingenlcost2.htm.

[15] Briefly, when enlistees reach the end of their initial enlistment of 3-6 years, they may reenlist. Reenlistees for 3 or more years are eligible to receive a first-term (zone A) reenlistment bonus equal to m_A*monthly basic pay*years of reenlistment where m_A is the zone A bonus multiplier. Multipliers can range from 0 to 8, so a multiplier of 1 indicates that the reenlistee receives 1 month of current basic pay for each year of reenlistment.

characteristics: education status, gender, race, marital status, age, and AFQT. [16] Also, the individual-level models included controls for economic factors that might affect enlistment term choice.[17]

First-Stage Results

Table 2 contains first-stage estimates of ***Bspread*** on various combinations of the excluded instruments, ***Tdays, Tcost, and Zone-A***. The regressions control for the other covariates in the model, but we suppress these other coefficients to reduce clutter. Consider first the regressions using cross-section averages on the 124 5-digit AFSCs, corresponding to the model given by equation (6), shown in **Part A**. The estimated coefficient on ***Zone-A*** is consistently positive and statistically significant, indicating that larger bonus spreads were set in skills with higher first-term reenlistment bonuses. When ***TDays*** or ***TDollars*** were added to the model individually, each variable had a positive and, statistically speaking, highly significant estimated coefficient, indicating higher bonus spreads in skills with higher training costs. However, entering both ***Tdays*** and ***TDollars*** resulted in a negative and statistically insignificant estimated coefficient on ***TDollars***. This is not entirely surprising because the two training cost instruments had a correlation of 0.91.[18] In the first-stage estimates for the panel data (equation 7) and individual-level data (equation 5), all instruments entered with positive estimated coefficients.

The finite sample bias in instrumental variables estimation has been shown to be inversely proportional to the partial F-statistic for the instruments in a reduced form regression (Staiger and Stock, 1997). F-statistics for tests of the joint significance of the excluded instruments were significant at the

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[16] About 95 percent of Air Force recruits are high school graduates. We estimated models including a binary dummy variable for high school graduate versus non-high school graduate as well as models with finer educational distinctions. The finer educational breakdown included non-high school graduate, high school senior at time of contract, high school diploma graduate, GED holder, Associate degree, and college graduate. Specifying a finer breakdown of education had no impact on estimated bonus effects. We therefore present results using the simpler formulation to reduce clutter.

[17] The economic factors included a the level of military pay relative to the earnings of 18-35 year-old male high school graduates living in the recruit's home state in the year of enlistment, the unemployment rate in the state of residence at the time of enlistment, the percentage of the male population over the age of 35 in the state who are military veterans in the year of enlistment, and the percentage of the state's 17-21 year-old population enrolled in college at the time of enlistment.

[18] Recruit pay is a component of training costs and pay in training is a linear function of training days, so these variables are bound to have a high correlation. ***Tdollars*** varies, aside from training days, due to the costs of other inputs. The highest training cost ($191K) is for Loadmasters, personnel who load cargo planes, due to the high cost of aircraft.

0.01 level in all cases, and more importantly, were larger than the threshold value of 10 recommended by Cameron and Trevedi (2005, p. 109), indicating that the instruments are robust.

Term Choice Estimates

Estimates of equations for term choice are reported in **Table 3**. Estimates based on the cross- (equation 6) are contained in the first panel. The first regression was estimated using OLS and used the full sample of 133 observed 5-digit AFSCs. Each $1,000 increase in ***Bspread*** is estimated to increase the fraction of recruits selecting a 6-year enlistment by 0.0775, or by 7.75 percentage points, with a standard error of just 0.0053. As already noted, we have data on ***TDays*** or ***TDollars*** for just 124 of these AFSCs. Estimating the model using OLS on this sample yields an almost identical bonus coefficient of 0.0778, with a standard error of 0.008. Three sets of 2SLS estimates are reported using various combinations of the instruments, resulted in estimated coefficients (standard errors) of 0.0668 (0.013), 0.0764 (0.0127), and 0.0766 (0.0126), all of which are statistically identical to the estimated effects using OLS. None of these 2SLS estimates is significantly different from the OLS estimates. Probability values for overidentification are reported in the last column on the right, all of which exceed 0.10, suggesting that the instruments are uncorrelated with the error term in equation (6).

Panel data estimates based on equation (7) are reported in the middle panel of **Table 3**. The OLS estimates of 0.0544 (0.0072) and 0.0613 (0.0082) are somewhat smaller than those obtained in the pure cross-section, but are statistically highly significant. The various 2SLS estimates fell in between, but were not statistically different than these 2 “extremes,” with slightly higher standard errors, but highly statistically significant all the same. Although somewhat smaller, the estimates from the panel models continue to indicate that recruits’ term choices are highly sensitive to the spread between 4 and 6-year bonuses.

Individual-level estimates of equation (5) are reported in the bottom panel of **Table 3**. The OLS-LPM estimates are 0.0592 (0.0072) and 0.0700 (0.0059). The various 2SLS estimates are slightly, but not statistically higher than those based on OLS. The overidentification tests again support our exclusion restrictions. Probit estimates are marginally higher than the corresponding OLS-LPM estimates, but generally of the same order of magnitude. Although IV-Probit estimation in *Stata* does not produce an overidentification test statistic, there appears little reason to suspect that such tests would yield different results than those reported.

In conclusion, the Air Force's EIEB program was estimated to have a significantly positive impact on term choice decision, with each $1,000 increase in the bonus spread increasing the fraction willing to enlist for six years by 5-7 percentage points. Thus, a $5,000 bonus spread – not atypical -- is estimated to increase the fraction choosing a 6-year enlistment by about 30 percentage points.

We now turn to the question of whether the EIEB program is cost-effective.

Cost-Effectiveness

The cost effectiveness of the EIEB depends on individuals who initially chose 6-year terms of enlistment actually serving for longer than those who initially chose 4 years. Some who choose 4-year terms will wish to remain longer, either re-enlisting or extending their existing enlistment contract. Alternatively, if not carefully administered, the EIEB program might generate adverse selection in which bonus recipients are more likely to regret their enlistment decisions and hence attrite in service.[19]

Attrition

Information on enlistees' military careers is available through the end of FY 2004. Although we cannot track attrition of most of the recruits in our data through the entire initial enlistment, we can track all enlistees through two years of service and those who entered prior to the start of FY 2002 through three full years of service. Most attrition occurs early on -- about 13 percent of all recruits in our sample attrited within one year of entry, 19 percent attrited within two years, and 25 percent of pre-FY 2002 entrants attrited within the first three years of service; any adverse effects of the bonus program will reveal itself in these periods.[20]

[19] Since the implementation of the volunteer force in 1973, the armed forces have expeditiously discharged malcontent or poorly-performing recruits rather than compelling them to remain in service.

[20] Comparisons with turnover of civilian youth help put these figures in perspective. Topel and Ward (1992) found that about two-thirds of all new jobs among new workers ended in the first year (p. 442). By the tenth year after entry into the labor market, more than half of young workers had held more than six jobs, and only one in twenty had held a single job for ten years (p. 448). Air Force attrition, while substantial, is significantly lower than youth turnover in the civilian labor market and it is also lower than attrition from the other services.

To determine whether attrition and term choice are related, we estimated three bivariate probit models of term choice and attrition, one for attrition within the first year of service, one for attrition within the first two years of service, and one for attrition within the first three years of service. The term choice equation was specified as before. The attrition equation contains the same covariates as the term choice equation with the exception of the bonus, which is included in levels instead of as a 6-YO-4-YO spread. Because there was no evidence that the bonus was endogenous, both the bonus spread and bonus levels are treated as exogenous.

Table 4 reports bivariate probit model estimates. Estimates are reported for the model based on one-year attrition (full sample) and three-year attrition (pre-FY 2002 entrants). Estimates based on two-year attrition are virtually the same as those based on three-year attrition and are therefore not reported. As before, all models included 2-digit AFSC effects and time effects for period of enlistment contract. Standard errors and t-statistics are clustered on AFSC except for variables measured at the state level (unemployment rate, relative military pay, percent veteran, and percent of 17-21 year-old population enrolled in college), which are clustered on state.

The choice of a 6-year term of enlistment is positively related to AFQT scores, and is higher among males, recruits who are married at the time of enlistment, younger recruits, and high school graduates, and not significantly related to race. Demographic factors associated with longer enlistments tend to be associated with lower attrition. For example, male recruits and high school graduate recruits are less likely to attrite than females and non-high school graduates. Although term choice was not related to race, blacks, Hispanics, and other nonwhites have lower attrition than white recruits.

Recruits from states for which military pay is higher relative to civilian wages are more likely to opt for a 6-year term, but attrition is not significantly related to relative pay. A state's unemployment at the time of enlistment does not appear to be related to term of enlistment, but is negatively related to attrition. Finally, while the percentage of a state's male population over the age of 35 that are military veterans and the percentage of a state's 17-21 year-old population enrolled in college at the time of enlistment do not appear to be related to term choice, both factors are estimated to exert negative (albeit small) influences on attrition.

The estimated effect of ***bspread*** on term choice is virtually the same as the estimate from the univariate model, as are the estimated effects of other regressors. Again, each $1,000 increase in the bonus spread is estimated to increase the likelihood of a 6-year enlistment by about 6 percentage points. The level of a recruit's bonus is estimated to have positive effects on one and three-year attrition, but the estimated marginal effects are small (less than 0.5 percentage points per $1,000 of bonus payment) and statistically in significant. The estimates of ***rho***, the correlation between the error terms in the term choice and attrition equations, are negative, although only the estimate in the one-year attrition equation is statistically significant.

Taken as a whole, these results suggest little evidence of adverse selection in the EIEB program.

Relative Cost of Initial Enlistment and Reenlistment Bonuses

This section calculates the marginal cost of man-years generated by the EIEB program through the first six years of service. [21] Although we do not model the retention decision formally, our analysis does account for the fact that some 4-YO enlistees indeed decide to serve more than their initial term of enlistment, either by extending their existing contract or signing a re-enlistment contract.[22]

We started by computing survival rates using data on enlistment contracts signed between FY 1988 and FY 2001, shown in **Panel A** of **Table 5**. About 86 percent of 4-YO recruits and 89 percent of 6-YO recruits survived until September 30 of the fiscal year after entering active duty, dropping to 79 and 82 percent after 2 years. The 9-percentage point drop in 4-YO survival between years 3 and 4 is due mostly to recruits reaching the end of their initial enlistment commitment, but drops (as expected) more sharply between years 4 and 5, from 65 to 40 percent. The key point is that survival to the 6th year is 36 percent among 4-YOs compared with 57 percent for 6-YOs.

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[21] A back-of-the-envelope estimate can be quickly calculated using contract FY 1998 as a benchmark. The 6,951 6-YO enlistees each received, on average, $1,239, so bonus payments totaled about $8.6 million. In contract FY 1999, bonus payments to the 15,641 6-YO enlistees were $52.1 million. Attributing the 8,690 increase in 6-YO enlistments to the $43.5 million increase in enlistment bonuses, the estimated marginal cost per 6-YO recruit is $5,008. If each 6-YO enlistee serves 2 years of service more than otherwise, the estimated marginal cost per man-year is $2,504. This back-of-the envelope estimate is optimistic because it does not account for (1) attrition and (2) the fact that some 4-YO enlistees will eventually decide to reenlist for 3 years or more (often receiving a reenlistment bonus). Both of these factors will tend to reduce the man-year difference between the 4-YO and 6-YO cohorts.

[22] Warner and Asch (1995) survey models of the reenlistment decision.

We consider a total enlistment cohort of 10,000. Using estimated time effects from the individual-level models of term choice, we estimated the probability of choosing a 6-year term of enlistment at 32% after FY 1998, independently of the EIEB.[23] We use this figure in **Table 5**, which shows 3,200 recruits enlisting for 6-year terms and the remaining 6,800 for 4-year terms in absence of a bonus. Using the survival rates in the first 2 rows, 2,429 4-YO enlistees remain after 6 years, compared with 1,818 6-YO enlistees. A total of 25,807 man-years are served by 4-YO enlistees, and 13,977 by 6-YO enlistees through the first 6 years.[24]

Our estimates imply that a $1,000 enlistment bonus for a 6-year term would conservatively raise the fraction of 6-YO enlistees to 38 percent.[25] Through the first 6 years, 4-YOs serve 23,530 man-years, and 6-YOs, 16,597. Thus, it costs $3.8 million to increase man-years served by 344, for a marginal cost of $11,061 per man-year. If we assume that those who fail to complete their term of enlistment must pay back the bonus in proportion to time not served, the estimated marginal cost is 73% $(16,597/6\times 3,800)$ of this figure, or $8,052.

For perspective, we compare these marginal cost estimates with the marginal cost of generating an additional 288 man-years of service using the Selective Reenlistment Bonus (SRB), which is targeted to specific skills and experience groups.[26] As noted in our discussion of our instrumental variables, the SRB is equal to the product of three factors: monthly basic pay, years of reenlistment, and an SRB multiplier that ranges between 0.5 and 8.0 depending on skill and time period.[27] Because we focus on the first 6 years of enlistment, we compute the SRB marginal cost based on a 2-year reenlistment.[28]

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[23] This figure is considerably higher than observed prior to the EIEB program. One possible explanation for this finding is that our assignment of bonuses is too conservative, in which case the year dummy variables are picking up unmeasured bonus effects. Another possibility is that after FY 1998, recruiters focused more on enlisting 6-YO recruits with or without a bonus. The cost-effectiveness estimates are not sensitive to the 6-YO benchmark.

[24] Recruits who attrite prior to the end of the first year contribute nothing to military end strength.

[25] We say “conservatively” because we are assuming an initial bonus of zero; the estimated marginal effect increases at higher bonus levels.

[26] Policies such as increased basic pay or expanded recruiting resources increase force size at lower as well as higher levels of experience, and therefore are a poor substitute for the SRB.

[27] The simple unweighted average across AFSCs of the reenlistment bonus for recruits with between 2 and 6 years of completed service (that is, the Zone A reenlistment bonus) in 1999 was about 1.3, meaning that a typical enlistee would receive 1.3 times their monthly basic pay for each additional year served, provided they agree to serve at least three additional years. In 2004, a typical E-3 with four years of service earned about $22,000 in basic pay, or about $1,833 per month. The “typical” reenlistee would therefore be eligible for a bonus of $5,500.

[28] Reenlistment bonuses are not paid for re-commitments of fewer than 3 years.

Previous research (see Table 5 of Warner and Asch, 1995) suggests that each unit increase in the SRB multiplier – using 2004 pay tables, about $1,833 per year of reenlistment -- increases reenlistment by about 3 percentage points. Increasing man-years served by 344 would require increasing 4-YO survival in the 5th period from 0.401 to 0.428, which in turn would require raising the SRB multiple by (0.428- 0.401) / 3 = 0.893. The total cost for a 2-year re-enlistment (cf. footnote 28) is 2 x $1,833 x 0.893 x 2,910 = $9.5 million, or $27,670 per additional man-year served. Assuming that the reenlistment bonus is paid back *in full* by those who do not survive to the end of the 6th year, the estimated marginal cost is $22,147 per man-year.

Conclusion

The Armed Forces have long used enlistment bonuses, college benefits, and other incentives (for example, repayment of college loans) to channel recruits into difficult-to-fill occupations and longer terms of enlistment. The Air Force Enhanced Initial Enlistment Bonus Program that started in FY 1999 and was designed to channel recruits into 6-year terms of enlistment provides an opportunity to examine changes in behavior in a fairly stark setting. The estimates in this paper suggest that the marginal cost of an additional man-year of service was on the order of $9,000. Neglecting discounting, it therefore costs about $18,000 – a 12.5 percent increase in pay over a 6-year career -- to obtain a 50 percent increase in the expected duration of the initial commitment. This implies an elasticity of commitment duration of about 3.3.

Ideally, one would like to compare the estimated effects of the Air Force bonus program with those in other fields. Signing bonuses have long been used in the nursing and teaching fields, but statistical analysis is rare, possibly because systematic information on such bonuses has rarely been collected and such bonuses tend to be awarded on a relatively small scale. For example, the Massachusetts teacher signing bonus program was implemented in the summer of 1998 in response to high failure rates on its teacher licensure exam (Liu et. al 2003). The state established a $60 million endowment fund that would pay $8,000 in the first year of teaching and $4,000 for the three subsequent years, to be awarded to “deserving candidates” in “subject matters most needed by the Commonwealth” (Liu et. al 2003., p. 7). There were just 59 recipients in the first year of the program, and Fowler (2003) calculated that approximately 200 additional teachers had been attracted by 2001. Evaluation of the sensitivity of labor supplied on such a small scale would appear to be problematic.

Typical estimates of the elasticity of military enlistment supply to relative military pay are around unity (Warner, Simon, and Payne 1996). Such estimates are not far off from Carrington's (1996) estimated elasticity of employment to wages on the Alaska Oil Pipeline of around 0.6 or Oettinger's (1999) estimate of the elasticity of participation of stadium vendors to wages of around 0.6. There are at least two reasons why the elasticity of the duration of the enlistment contract might be higher than the elasticity of overall supply to an occupation. First, the sample here is a select group that has already committed at least 4 years of their career. Considering the high rates of job turnover among youth as a whole (Topel and Ward 1993), it is not entirely surprising to find such an elastic response of contract duration to earnings among a highly motivated and relatively homogeneous group.

Second, Air Force recruits average around 19-20 years of age. Warner and Pleeter (2001) found that younger individuals have relatively high discount rates. During the 1/3 downscaling of military forces in the early 1990s, the Department of Defense offered military personnel the option of retiring voluntarily in return for either an immediate cash separation payment or a stream of payments in the form of annuity. Despite the relative generosity of the annuity, younger enlistees were particularly enticed by the prospect of an immediate cash payment. The elastic response of labor supply to an up-front cash bonus may indicate the imperfect nature of the capital markets faced by youth embarking on their careers.

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Table 1. Average Real Bonus Spread by Air Force Specialty

AFSC	Occupation	Frequency	%6YO	Real 4YO Bonus (000s)	Real 6YO Bonus (000s)	Real 6YO-4YO Bonus Spread
1C1X1	Air Traffic Control	2,527	57.3%	$ 1.0	$ 5.3	$ 4.3
1C3X1	Command Post	540	49.3%	$ 1.1	$ 2.3	$ 1.2
1C5X1	Aerospace Control and Warning Systems	547	71.1%	$ 1.1	$ 5.3	$ 4.1
1N0X1	Intelligence Applications	638	45.9%	$ 1.1	$ 2.9	$ 1.8
1N2X1	Signals Intelligence Production	700	63.1%	$ 1.2	$ 5.0	$ 3.8
1W0X1	Weather	818	64.2%	$ 1.5	$ 6.4	$ 4.9
2A1X7	Electronic Warfare Systems	858	73.5%	$ 1.8	$ 6.6	$ 4.9
2A3X2	Avionics Systems--F-16	509	71.3%	$ 1.5	$ 6.8	$ 5.3
2A3X3	Tactical Aircraft Maintenance	4,347	69.2%	$ 1.4	$ 5.9	$ 4.5
2A4X1	Aircraft Guidance and Control	753	65.7%	$ 1.4	$ 6.0	$ 4.6
2A4X2	Aircraft Communications and Navigation Systems	878	73.8%	$ 1.9	$ 6.8	$ 4.9
2A5X1	Aerospace Maintenance	4,109	65.3%	$ 1.5	$ 6.5	$ 5.0
2A6X1	Aerospace Propulsion	2,577	70.3%	$ 1.4	$ 6.2	$ 4.7
2A6X2	Aerospace Ground Equipment	2,032	64.3%	$ 1.9	$ 5.7	$ 3.8
2A6X6	Aircraft Electrical and Environmental Systems	1,502	50.0%	$ 1.4	$ 3.7	$ 2.3
2A7X3	Aircraft Structural Maintenance	974	62.6%	$ 1.4	$ 5.1	$ 3.6
2E1X1	Satellite and Wideband Communications Systems	699	49.8%	$ 1.4	$ 4.4	$ 3.0
2E1X3	Ground Radio Communications	525	68.8%	$ 1.1	$ 4.4	$ 3.3
2E2X1	Electronic Computing and Switching Systems	597	53.3%	$ 1.0	$ 4.5	$ 3.5
2F0X1	Fuels	1,249	71.7%	$ 2.3	$ 7.4	$ 5.2
2S0X1	Supply Management	993	16.4%	$ -	$ -	$ -
2T1X1	Vehicle Operations	648	43.2%	$ 1.0	$ 2.5	$ 1.4
2T2X1	Air Transportation	1,041	57.6%	$ 1.3	$ 4.7	$ 3.4
2W0X1	Munitions Systems	2,097	66.2%	$ 1.8	$ 6.6	$ 4.8
2W1X1	Aircraft Armament Systems	3,062	80.5%	$ 2.0	$ 7.8	$ 5.8
3A0X1	Information Management	1,216	13.2%	$ -	$ -	$ -
3C0X1	Communication - Computer Systems Operation	2,471	39.6%	$ 1.0	$ 2.2	$ 1.2
3C2X1	Communication - Computer Systems Control	762	49.6%	$ 1.1	$ 4.3	$ 3.1
3E0X1	Civil Engineering -- Electrical Systems	610	44.4%	$ 1.2	$ 3.0	$ 1.8
3E0X2	Civil Engineering -- Electrical Power Production	613	69.3%	$ 1.4	$ 7.0	$ 5.5
3E1X1	Civil Engineering -- Heating, Ventilation, A/C, and Refri	804	56.6%	$ 1.2	$ 4.7	$ 3.5
3E2X1	Civil Engineering -- Pavements & Construction Equipm	724	70.6%	$ 1.4	$ 6.9	$ 5.5
3E3X1	Civil Engineering -- Structural	656	69.7%	$ 1.5	$ 7.5	$ 6.0
3E7X1	Civil Engineering -- Fire Protection	1,250	6.4%	$ 0.3	$ 0.3	$ -
3E8X1	Civil Engineering -- Explosive Ordnance Disposal	782	69.8%	$ 2.3	$ 9.0	$ 6.7
3M0X1	Services	1,016	7.0%	$ 0.3	$ 0.3	$ -
3P0X1	Security Forces	13,593	52.0%	$ 1.2	$ 3.5	$ 2.3
3S0X1	Mission Support--Personnel	805	18.5%	$ 0.2	$ 0.2	$ -
4N0X1	Medical--Medical Services	828	24.3%	$ 0.2	$ 0.7	$ 0.5
9T0X0	Basic Airman	14,266	29.1%	$ -	$ -	$ -
ADM	Administrative	3,803	2.6%	$ -	$ -	$ -
ELE	Electrical and Electronic	4,120	49.3%	$ 1.4	$ 3.2	$ 1.9
ELM	Electrical and Electronic/Mechanical	2,191	45.6%	$ 1.8	$ 4.1	$ 2.3
GEN	General Purpose Vehicle Maintenance	15,644	18.4%	$ 0.2	$ 0.6	$ 0.4
MEC	Mechanical	6,711	48.1%	$ 2.0	$ 4.5	$ 2.5

Table 2
Reduced Form Regressions for Bonus Spread

	Parm Est	**t-Stat**	**Parm Est**	**t-Stat**	**Parm Est**	**t-Stat**	**Parm Est**	**t-Stat**
Cross-Section Data (124 Obs)								
Zone A Bonus Mult	0.597	3.81	0.608	3.77			0.596	3.79
Training Days	0.069	5.02			0.077	1.89	0.072	1.82
Training Dollars			0.052	4.34	-0.011	-0.34	-0.003	-0.10
R^2	0.627		0.605		0.561		0.628	
F test for Instruments	29.54		20.06		10.44		20.98	
Panel Data (5,388 Obs)								
Zone A Bonus Mult	0.319	1.35	0.376	1.55			0.338	1.42
Training Days	0.082	5.16			0.059	1.28	0.045	1.07
Training Dollars			0.063	6.20	0.027	1.00	0.000	1.35
R^2	0.647		0.646		0.641		0.650	
F test for Instruments	19.72		20.30		45.63		32.57	
Micro Data (81,217 Obs)								
Zone A Bonus Mult	0.352	1.54	0.411	1.76			0.367	1.60
Training Days	0.085	4.48			0.0625	1.25	0.047	1.04
Training Dollars			0.066	5.81	0.0283	0.98	0.033	1.33
F test for Instruments	17.19		19.13		37.52		26.39	

Notes: All models are weighted by cell size and included demographic controls. Standard errors on estimates in cross-section models are robust. Standard errors in panel and micro models are clustered on 2-digit AFSC. Panel and micro models included fixed effects for 2-digit AFSC and month of enlistment.

Table 3
Regressions for Term Choice

		Instruments	Marginal Effect	Std Error	t-Stat	N	Overid Test (p)
XS	OLS		0.0775	0.0053	14.57	133	
	OLS		0.0778	0.0080	9.71	124	
	2SLS	*TD, T$*	0.0668	0.0130	5.12	124	0.204
	2SLS	*TD, A*	0.0764	0.0127	6.01	124	0.168
	2SLS	*TD, T$, A*	0.0766	0.0126	6.08	124	0.228
Panel	OLS		0.0544	0.0072	7.54	5806	
	OLS		0.0613	0.0082	7.48	5388	
	2SLS	*TD, T$*	0.0585	0.0103	5.70	5388	0.241
	2SLS	*TD, A*	0.0622	0.0123	5.07	5388	0.348
	2SLS	*TD, T$, A*	0.0630	0.0122	5.17	5388	0.597
Micro	OLS		0.0592	0.0072	8.23	131,692	
	OLS		0.0700	0.0059	11.88	82,589	
	2SLS	*TD, T$*	0.0621	0.0084	7.37	82,589	0.573
	2SLS	*TD, A*	0.0657	0.0112	5.87	82,589	0.307
	2SLS	*TD, T$, A*	0.0634	0.0093	6.81	82,589	0.678
	Probit		0.0615	0.0223	7.06	131,692	
	Probit		0.0786	0.0176	11.21	82,589	
	IV-Probit	*TD, T$*	0.0754	0.0294	6.44	82,589	
	IV-Probit	*TD, A*	0.0777	0.0337	5.79	82,589	
	IV-Probit	*TD, T$, A*	0.0785	0.0333	5.93	82,589	

Notes:
TD = Training days, T$ = Training dollars, *A*=Zone-A bonus multiplier. Cross-section and panel models are weighted by cell size and included demographic controls for average cell attributes. Standard errors in cross-section models are robust; standard errors in panel and micro data models are clustered on 2-digit AFSC. Panel and micro data models include fixed effects for 2-digit AFSC and year/month of enlistment. Micro data models include controls for personal attributes. Standard errors and t-statistics for probit models are for probit coefficients, not standard errors. Probit coefficients not reported to save space, but may be computed by multiplying t-statistics and standard errors.

Table 4
Bivariate Probit Models of Term Choice and Attrition

		Term Choice			One-Year Attrition		
Variable	**Variable Mean**	**Parm Est**	**Marg Eff**	**t-Stat**	**Parm Est**	**Marg Eff**	**t-Stat**
Bonus Spread ($1K)	$2.30	0.1588	0.062	7.19			
Bonus ($1K)	$2.54				0.0174	0.003	1.48
AFQT Score	63.0	0.0033	0.001	2.13	-0.0068	-0.001	-11.33
Male	0.74	0.1419	0.055	1.77	-0.2259	-0.040	-8.37
Married	0.07	0.3722	0.148	10.04	-0.0720	-0.011	-4.26
Black	0.18	0.0186	0.007	0.37	-0.0632	-0.010	-4.03
Hispanic	0.06	-0.0163	-0.006	-1.02	-0.1548	-0.023	-5.94
Other Race	0.08	-0.0168	-0.007	-0.46	-0.1978	-0.029	-13.29
Age at Contract	19.6	-0.0309	-0.012	-5.91	0.0227	0.004	1.57
High School Grad	0.95	0.1203	0.046	4.97	-0.0760	-0.013	-3.89
Unemployment	4.35	0.0023	0.001	0.11	-0.0218	-0.004	-2.03
Rel Mil Pay	1.06	0.6316	0.247	2.71	0.0172	0.003	0.11
Percent Veteran	33.5	0.0062	0.002	1.12	-0.0065	-0.001	-2.76
Percent in College	35.4	-0.0063	-0.002	-1.65	-0.0080	-0.001	-2.56
Rho		-0.1166		-2.10			
DEP Mean					0.130		
Sample Size		131,692					

		Term Choice			Three-Year Attrition		
Variable	**Variable Mean**	**Parm Est**	**Marg Eff**	**t-Stat**	**Parm Est**	**Marg Eff**	**t-Stat**
Bonus Spread ($1K)	$2.30	0.1598	0.063	6.92			
Bonus ($1K)	$2.54				0.0110	0.003	1.22
AFQT Score	63.0	0.0033	0.001	2.15	-0.0057	-0.002	-7.35
Male	0.74	0.1202	0.047	1.82	-0.1956	-0.062	-5.28
Married	0.07	0.3704	0.147	10.42	-0.0526	-0.016	-3.01
Black	0.18	0.0379	0.015	0.75	0.0054	0.002	0.2
Hispanic	0.06	-0.0190	-0.007	-1.12	-0.1528	-0.045	-9.26
Other Race	0.08	-0.0049	-0.002	-0.13	-0.2102	-0.060	-12.29
Age at Contract	19.6	-0.0309	-0.012	-7.14	-0.0002	0.000	-0.01
High School Grad	0.95	0.1259	0.049	4.34	-0.0825	-0.026	-3.34
Unemployment	4.35	0.0068	0.003	0.32	-0.0112	-0.003	-1.59
Rel Mil Pay	1.06	0.5725	0.225	2.32	-0.0051	-0.002	-0.05
Percent Veteran	33.5	0.0070	0.003	1.23	-0.0064	-0.002	-3.84
Percent in College	35.4	-0.0068	-0.003	-1.81	-0.0054	-0.002	-2.66
Rho		-0.0258		-0.63			
DEP Mean					0.331		
Sample Size		117,289					

Notes: Estimates based on full sample of 131,692 observations. Models included 2-digit AFSC effects and time effects. Unemployment, relative military pay, percent veterans, and percent of 17-21 year-old population in college measured at the state level. Standard errors and t-statistics of effects of these variables are clustered on state. All other standard errors and t-statistics are clustered on 2-digit AFSC.

Table 5. Cost Effectiveness

A. Surival by Term of Enlistment									Bonus Cost or Marginal Cost	
		Years of Service						Man-years	No Payback	Payback
	Initial	1	2	3	4	5	6			
4-YO		0.857	0.792	0.740	0.648	0.401	0.357			
6-YO		0.894	0.822	0.764	0.688	0.631	0.568			
B. Number of Enlistees Surviving (Benchmark: 32% 6-YO)										
4-YO	6,800	5,828	5,386	5,032	4,405	2,728	2,429	25,807		
6-YO	3,200	2,861	2,630	2,445	2,203	2,020	1,818	13,977		
Total	10,000	8,688	8,016	7,477	6,608	4,748	4,247	**39,784**		
C. Number of Enlistees Surviving with $1,000 Initial Enlistment Bonus for 6-YOs										
4-YO	6,200	5,313	4,910	4,588	4,016	2,487	2,214	23,530	$-	$-
6-YO	3,800	3,397	3,124	2,903	2,616	2,398	2,159	16,597	$3,800,000	$6,215
Total	10,000	8,711	8,034	7,491	6,632	4,886	4,373	**40,127**	Marginal Cost per Man-year	
Change								**344**	$11,061	$8,052
D. Number of Enlistees Surviving with SRB										
4-YO survival		0.857	0.792	0.740	0.648	0.428	0.381			
4-YO	6,800	5,828	5,386	5,032	4,405	2,910	2,591	26,151	$ 9,529,519	$7,627,612
6-YO	3,200	2,861	2,630	2,445	2,203	2,020	1,818	13,977		
Total								**40,128**	Marginal Cost per Man-year	
Change								**344**	$27,670	$ 22,147
Change in 4-YO survival								0.027		
Number SRB Points Required (3% survival per point)								0.893		

Figure 1. Fraction of Air Force Recruits Enlisting for Six Year Term and Mean 6YO-4YO Bonus Spread

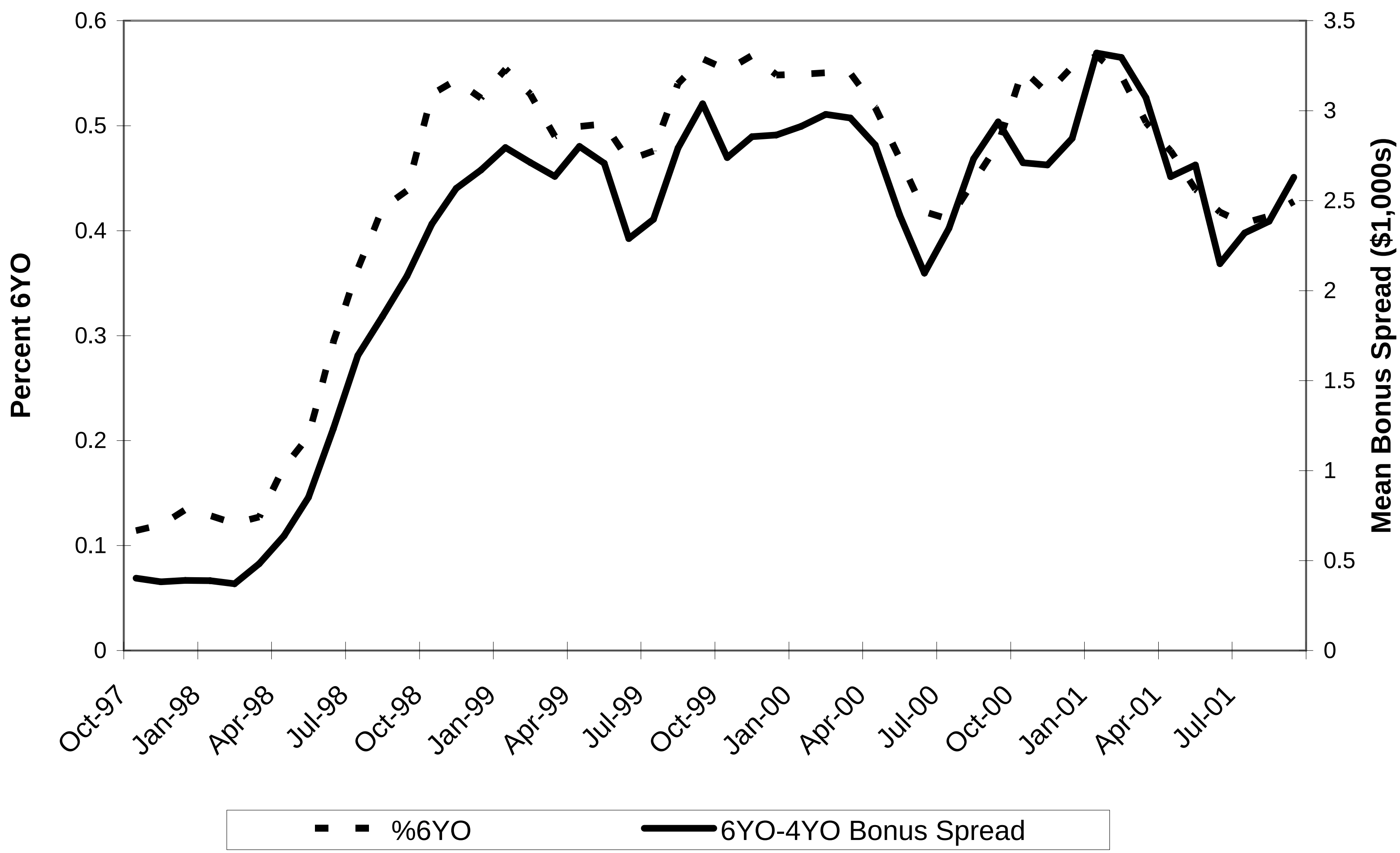

Figure 2. Average %6YO versus 6YO-4YO Real Bonus Spread in Large AFSCs