Technical Report 587

The Economic Determinants of Military Enlistment Rates

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Continued success of the all-volunteer force depends upon the ability of the military services to meet consistently their enlistment goals. This paper measures the effects of the business cycle on enlistments of nonprior service high school graduates. The authors use a multiple regression, macroeconomic time-series model to measure Army enlistments by mental category. They conclude that unemployment and pay are important variables in the enlistment decision. They forecast future enlistment rates under alternative economic scenarios, and conclude that it is important to maintain educational benefits

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and pay comparability, if the all-volunteer force is to enjoy continued success as the economy improves.

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The Economic Determinants of Military Enlistment Rates

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FOREWORD

This report on "The Economic Determinants of Military Enlistment Rates" is an extension of the authors' previous work "The Effects of the Business Cycle on the Size and Composition of the U.S. Army." The senior author presented the latter report at the Atlantic Economic Conference, "Impact on the Future," Miami Beach Florida, October 7-10, 1982, and it was subsequently published in the Atlantic Economic Journal, Vol, XI, No. 1, March 1983, pp. 42-53. The present work is an updated and greatly expanded edition of the authors' continuing research efforts related to the effects of the economy on the Army.

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THE ECONOMIC DETERMINANTS OF MILITARY ENLISTMENT RATES

EXECUTIVE SUMMARY

Requirement:

The US Army Research Institute conducts research on manpower, personnel, and training issues of particular significance and interest to the U.S. Army. Recently, economic issues in recruitment have become extremely important as the Army faces increased competition from the private sector for a declining pool of qualified manpower. The authors have examined the economic variables that may affect enlistment decisions and therefore affect the continued success of the all-volunteer force.

Procedure:

The authors use a multiple regression, macroeconomic time series model, including pay, unemployment, recruiter targeting, seasonal factors, and educational benefits, as independent variables. This work represents a significant improvement over earlier research, because the authors have the requisite data to concentrate their empirical research on the period since the inception of the all-volunteer force.

Findings:

Enlistments of nonprior service male high school graduates are affected very strongly by the national unemployment rate and the ratio of military to civilian pay. In addition, high mental category individuals are also very significantly affected by levels of educational benefits. The Army has had success in recruiting high school graduates when special targeting efforts have been instituted. The unemployment effect found in the present work is larger than that found in much of the earlier research, partly due to very high recent unemployment rates, and partly due to the improved specification of the estimating equations.

Utilization of Findings:

The present work shows that high quality enlistees are especially affected by pay rates. It is important for the Army to maintain military-civilian pay comparability and attractive educational benerits, to insure the continued success of the all volunteer force.

THE ECONOMIC DETERMINANTS OF MILITARY ENLISTMENT RATES

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I. INTRODUCTION

Continued success of the all-volunteer force depends upon the ability of the military services to meet consistently their enlistment goals. In a recent Army study, Dale and Gilroy (1983) examined the effects of the business cycle on enlistments of nonprior service high school graduates. This paper extends that earlier work to include results for enlistments by mental category. We again conclude that unemployment is a significant, but not all-important, determinant of Army enlistment rates, and that military pay and benefits must keep pace with civilian wages for military service to be an attractive alternative to employment in private industry.

There has been a close relationship between Army enlistments of nonprior service (NPS) high school graduates and the business cycle, and a principal focus of the present research is to quantify this relationship. The high correlation between Army accessions and unemployment is shown in Chart 1.[1] In a recent survey of 800 enlistees into the Regular Army, over 40 percent mentioned unemployment as a factor (see Elig et al., 1982, and Elig, 1983).

In attempting to isolate the effects of cyclical and other factors on enlistments, Cooper (1977), Fechter (1978), Withers (1978), Grissmer (1978), Fernandez (1979), McNown et al. (1980), D. Segal (1982), and Ash et al. (1983) have discussed or conducted empirical tests of the standard neoclassical model of labor supply. Daula et al. (1982), Baldwin et al. (1982), and Kim (1982) extend the literature with choice-theoretic models of enlistment behavior. The results of these studies with respect to the effects of **unemployment** are mixed, with most finding either low, statistically insignificant, or even impacts opposite in sign to what economic theory or intuition would suggest. Although

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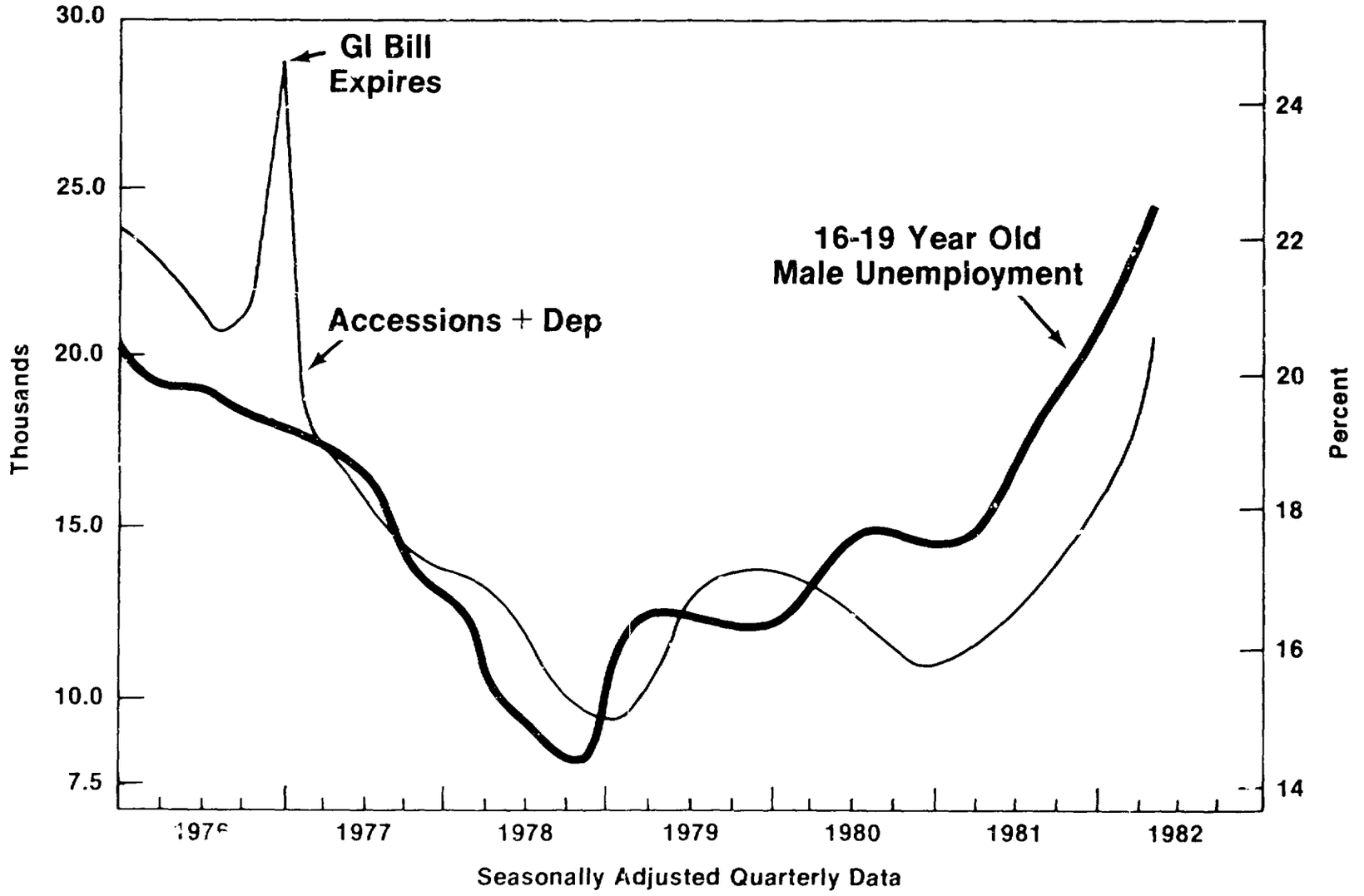
[1] Participation in paid Army Reserve drills also appears to be sensitive to unemployment. See Dale (1983).

CHART 1

ENLISTMENTS OF MALE HIGH SCHOOL GRADUATES CLOSELY FOLLOW THE UNEMPLOYMENT RATE



most studies have been able to identify a statistically significant relationship between military pay and enlistments, these estimates differ considerably, as well. Differences in specification of the estimating equations and the form of the variables included are the primary sources of these varied results.

The purpose of this research is to review the empirical literature and to specify a more robust macroeconomic time-series enlistment model. Sections II and III offer such a specification, and present the results of the empirical analysis. Section IV compares our research to previous work. Section V provides projections of future Army enlistment rates under alternative economic scenarios, while Section VI summarizes the major findings.

II. MODELS OF ENLISTMENT BEHAVIOR

Time-series studies which estimate the effect of pay and unemployment on military accessions have most often utilized a single equation model of the form

$$Y = f(U, P, T, X_1 \cdots X_n)$$

where the dependent variable Y is a measure of military enlistments. Independent variables include U as a proxy for the business cycle -- an estimate of alternative civilian employment opportunities; P as a measure of military relative to civilian pay; T as a time-trend; and $X_1 \cdots X_n$ as a host of other exogenous variables such as educational benefits, the number of recruiters, and advertising expenditures. The present work uses variations of this basic model.

To measure the enlistment effect, the ratio of military enlistments to the civilian noninstitutional population has been traditionally used as the dependent variable. In this study, however, the total number of contracts signed -- accessions plus delayed entry program contracts (DEP) -- in a given month, rather than the actual month in which a recruit began active duty, was used as the numerator of the dependent variable, in order

to measure enlistee responsiveness to current economic conditions. Monthly data were obtained for the period October 1975 to March 1982 for the number of new contracts of NPS high school graduates into the military services.[2]

Since we were interested in ultimately making projections of future Army enlistments, demographic trends were important to consider. Data show that the number of high school graduates is expected to decline sharply in future years, concurrent with a decline in the population of young people (Charts 2 and 3). Taking these population trends into account, the dependent variable in the regression equation is the enlistment **rate** rather than an enlistment **level**, i.e., total contracts signed (A) divided by the relevant civilian population of 16 to 19 year olds (P).

The basic equations were estimated with a linear functional form using generalized least squares (GLS), correcting for the presence of first order autocorrelation with the Cochrane-Orcutt method. The results using Army data, and a description of all variables, are presented in Table 1. The current rate of teenage unemployment (UM), as well as unemployment lagged two months (UM-2) and four months (UM-4), were used as key independent variables. The lagged terms capture the effect of extended unemployment on enlistment rates with the unemployment elasticity for all males estimated at .94.[3]

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[2]Although data were available for all enlistees on a monthly basis for the entire All-Volunteer Force period, data disaggregated by sex and race were only readily available beginning October 1975. We estimated total male NPS high school graduate enlistments from 1973, when the All-Volunteer Force began, to the present, and achieved consistent results. Using monthly data since 1975 provided 78 data points; using quarterly data would have provided less than 30 data points.

[3]End-point elasticities were calculated which, in a linear equation, equal the regression coefficient of the independent variable in question times the ratio of the most recent values of that independent variable to the dependent variable. End-point elasticities are most appropriate for forecasting purposes. By comparison, our **average** unemployment elasticity was estimated at .69 (see Table 6). Although lower than the end-point elasticity, it is still larger than those obtained from most other studies.

CHART 2

THE NUMBER OF HIGH SCHOOL DIPLOMAS AWARDED WILL FALL SHARPLY

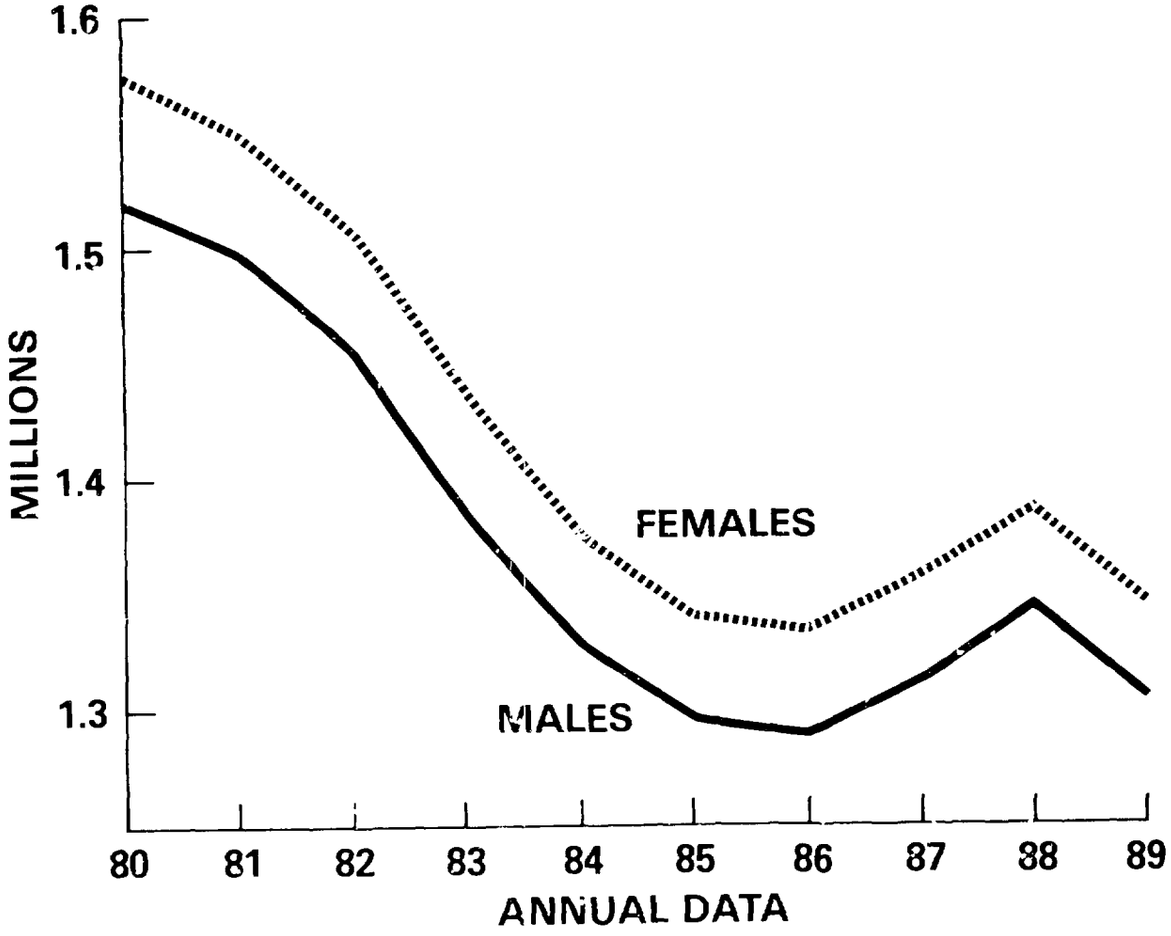

CHART 3

PROJECTED MALE POPULATION AGES 16-19 AND 20-24

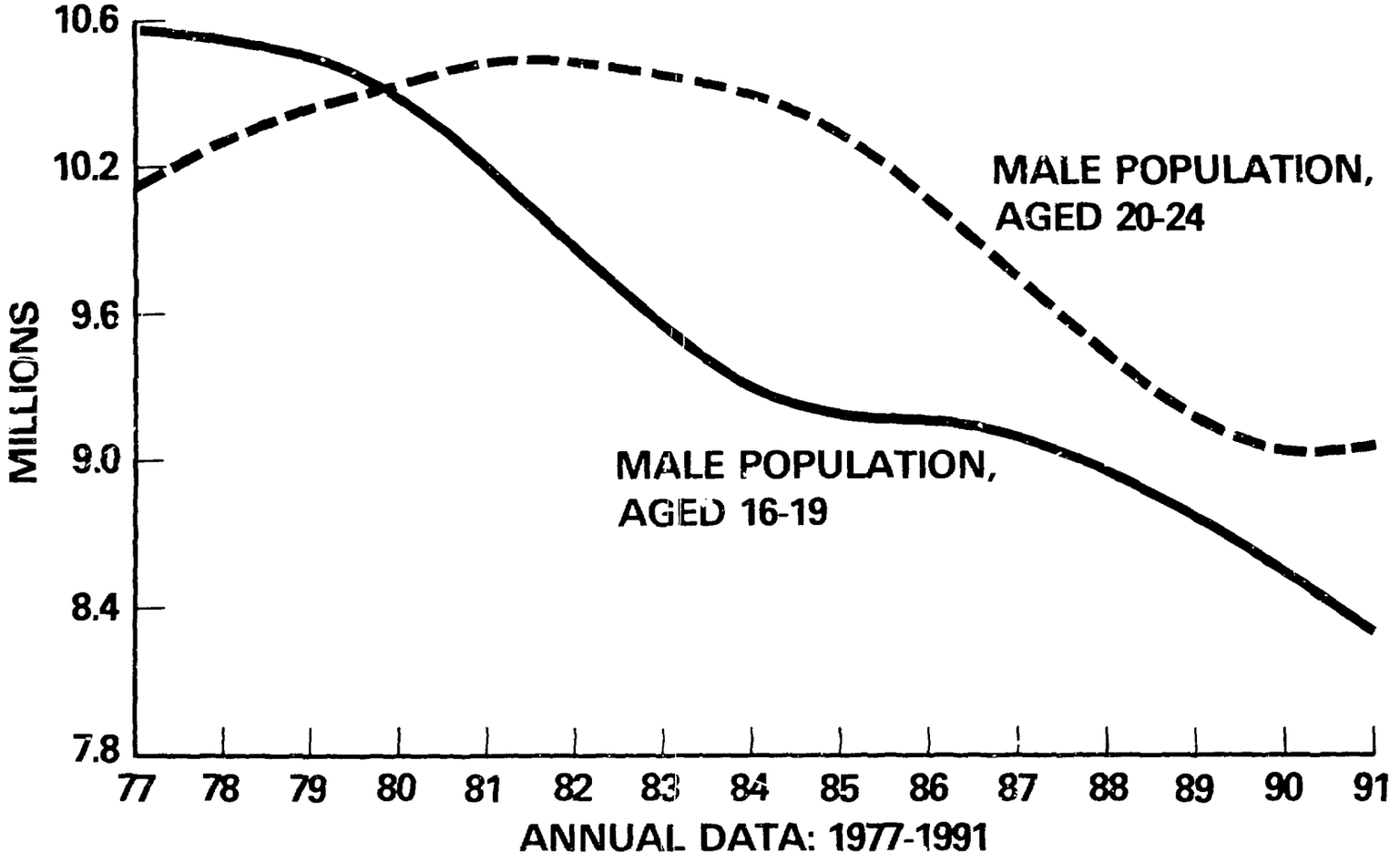

TABLE 1

GLS REGRESSION RESULTS FOR ARMY ENLISTMENTS OF HIGH SCHOOL GRADUATES
Monthly Data, October 1975 to March 1982

Variable	All Males		White Males	Black Males
	With RECRTR	Without RECRTR		
INTERCEPT	-1968.90 (-2.75)***	-1980.16 (-3.00)***	-2000.10 (-5.09)***	-1134.64 (-4.49)***
UM	16.39 (2.41)**	16.30 (2.47)**	12.77 (3.23)**	0.84 (0.32)
UM-2	7.77 (1.40)**	7.74 (1.47)**	7.59 (2.41)**	-1.27 (-0.6)
UM-4	4.59 (0.73)**	4.55 (0.74)**	5.47 (1.50)**	2.90 (1.21)
W1	40.89 (3.02)***	40.84 (3.09)***	30.80 (3.90)***	19.91 (3.87)***
BILL	313.07 (1.76)*	313.18 (1.78)*	397.29 (3.80)***	278.80 (4.20)***
VEAP	408.40 (1.38)	407.95 (1.88)*	572.34 (3.27)***	434.65 (3.90)***
KICK	6.26 (2.24)*	6.25 (2.26)*	3.16 (1.93)***	1.43 (1.37)
Q3	84.65 (2.22)*	54.501 (2.23)*	51.87 (2.29)*	58.18 (3.89)***
GI	819.73 (8.18)***	818.18 (8.37)***	622.51 (10.60)***	222.37 (5.69)***
TARGET	148.38 (2.59)***	148.01 (2.61)***	89.26 (2.65)***	44.64 (2.09)*
RECRTR	-.00 (-.04)			
$\bar{R}^2$	.79	.79	.84	.75

t-ratios in parentheses.

*Significant at .05 level.
**Jointly significant at .01 level.
***Significant at .01 level.

TABLE 1 (continued)

Data Sources: Defense Manpower Data Center, Bureau of Labor Statistics

Dependent Variable: A/P where

A = Army accessions plus DEP of male NPS high school graduates.

P = male population of 16-19 year olds.

Independent Variables:

UM = unemployment rate of all males 16-19 years old.

UM-2 = UM lagged 2 months.

UM-4 = UM lagged 4 months.

W4 = ratio of first-year military BMC to average weekly earnings in the private economy, with a 4-month lead.

GI = dummy variable = 1 in December 1976, when GI Bill expired, and = 0 everywhere else.

BILL = maximum monthly benefit for a GI Bill beneficiary without dependents, deflated by the consumer price index. Variable is set = 0 after December 1976.

VEAP = maximum monthly benefit for a VEAP beneficiary without dependents, deflated by the consumer price index. Variable is set = 0 before January 1977.

KICK = maximum value of kicker payments, deflated by the consumer price index.

TARGET = binary variable = 1 from November 1979 to August 1981, when LTG Thurman headed USAREC, and = 0 everywhere else.

Q3 = seasonal dummy = 1 in July, August and September, and = 0 everywhere else.

RECRTR = number of production recruiters.

Adjusting for the relationship between the total unemployment rate and the unemployment rate for 16-19 year olds (described in Section V) implies that a drop in the national jobless rate of one percentage point -- from 10 percent to 9 percent, for example -- would cause Army enlistments of male NPS high school graduates to fall by about 7,000 per year, or about 8.8 percent of the fiscal year 1981 total. If, for example, the aggregate unemployment rate falls to 8 percent in 1984, Army enlistments of male NPS high school graduates would fall by over 14,000 per year. For comparison purposes, total Army enlistments of male NPS high school graduates were 66,500 in fiscal year 1980 and 77,500 in fiscal year 1981. A drop in unemployment, then, would reduce sharply the total supply of high school graduate enlistees.

Further, enlistment among white men was found to be more responsive to unemployment rates than that for their black counterparts (see Table 1). This result is not surprising, despite the fact that the jobless rate for blacks is considerably higher than that for whites. According to Binkin (1982), in periods of high unemployment a greater proportion of blacks than whites become discouraged with job prospects, give up looking for work, and withdraw from the labor market. As a result, they are not counted among the Nation's unemployed. When the economy enters a downturn and enlistments rise, relatively more blacks than whites enter the Army from outside the labor force rather than from the ranks of the unemployed. This effect would not be picked up, then, from the unemployment variable in the regression equation. Grissmer (1978), too, derived positive and significant unemployment elasticities for nonblack volunteers, and negative and less significant unemployment elasticities for black volunteers.

The wage term (W4) in Table 1 is Basic Military Compensation (BMC -- a weighted average of first-year enlistees' total basic pay, housing and subsistence allowances, and tax advantages) divided by average weekly earnings in the private economy, with a 4-

month lead.[4] We also estimated equations with 3-month and 5-month leads, although a 4-month lead produced the best statistical fit. Incorporating a lead on this term is one of the unique aspects of the present work. New enlistees are assumed to adopt anticipated future pay raises in their enlistment decision. The elasticity of this wage term was 2.3, implying that a drop in military relative to civilian wage rates of 10 percent would cause Army enlistments of male NPS high school graduates to fall by 23 percent.[5] Coefficients of the 3- and 5-month leads were also significant and produced pay elasticities of 1.9 and 1.2, respectively -- still larger than most of those found in the earlier literature.

These results show that a combination of falling unemployment rates and military pay freezes could have a significant adverse impact on enlistments of male NPS high school graduates. Although unemployment effects for black high school graduates were not found in the present work, blacks were, however, highly responsive to relative wage rates and most educational benefits.[6]

The variables BILL, VEAP, and KICK in Table 1 refer to different educational benefits offered enlistees.[7] BILL is the maximum monthly benefit for a GI Bill beneficiary without dependents, VEAP is the maximum monthly benefit for a beneficiary without dependents under the Veterans' Educational Assistance Program (VEAP) that replaced the GI Bill in 1977, and KICK is the maximum value of kicker payments (offered only to Army

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[4]Teenage and youth earnings obtained from the Bureau of Labor Statistics' Current Population Survey were tried as an alternative civilian pay component of the wage variable, since historically there has not been a strong relationship between the earnings of youth and the earnings of all workers. Because the data for most of the sample period were available only on an annual basis, the series behaved too erratically to produce reliable results.

[5]Questions of how to maintain military and civilian pay comparability involve some difficult problems of measurement (see Joint Service Study Group, 1982).

[6]Equations were also estimated for nonblack-nonwhite enlistees, but the numbers in this category were too small to render meaningful results.

[7]See Huck (1982) for a discussion of proposed educational benefit changes.

enlistees who enter designated military specialties). Such payments may total as much as $12,000. All three variables were deflated by the consumer price index to adjust for inflation, and all were statistically significant in explaining enlistment rates for all males. Another variable, enlistment bonuses, was also tried. Although it was not statistically significant for all Army enlistees, it was significant in the estimates for those in the highest mental categories (see Section III).

The next three variables in Table 1 are qualitative. Q3 is a seasonal dummy which is equal to 1 only in July, August, and September to account for seasonal variation. GI is used to capture the large influx of new enlistments which occurred when the GI Bill expired (see Chart 1), and is equal to 1 only in December 1976.

TARGET is the third binary variable and is another novel aspect of the present work. This variable equals 1 from November 1979 to August 1981, when Lt. General Maxwell Thurman headed the U.S. Army Recruiting Command (USAREC), and was included to account for the special targeting of high school graduates. Some of the policy changes included relocating recruiting stations from the inner city to the suburbs, and expanding the use of the DEP. The TARGET variable captures, in part, recruiter effort and is our proxy for the important role recruiters play in the enlistment process. In an alternative equation, a binary variable that was set equal to 1 from 1978 to the present was not statistically significant, indicating the effect was not present after August 1981. Although the present work was intended to focus on the Army, regressions of enlistments for other service (Table 2) were estimated to test, among other effects, the explanatory power of the TARGET variable. It did not produce a statistically significant result in these equations, implying that its effect was Army-specific. This is important because it means that the Army did not increase its enlistments of high school graduates at the expense of the other services (see Lockman, 1982).

Finally, the actual number of production recruiters (PRCRTR) was included in the

TABLE 2

GLS REGRESSION RESULTS FOR NAVY, AIR FORCE,
AND MARINE CORPS ENLISTMENTS OF HIGH SCHOOL GRADUATES
Monthly Data, October 1975 to March 1982

Variable	Navy	Air Force	Marine Corps
INTERCEPT	-1065.84 (-2.96)***	-750.32 (-1.93)*	-945.08 (-4.42)***
UM	8.78 (1.98)**	8.70 (1.61)**	3.15 (1.30)
UM-2	3.39 (0.94)**	9.18 (2.03)**	-1.31 (-.67)
UM-4	5.28 (1.25)**	-.89 (-.17)	2.08 (.91)
W4	24.77 (2.80)***	22.23 (2.09)***	24.99 (5.58)***
BILL	180.14 (3.80)***	-120.94 (-1.25)	108.15 (3.15)***
VEAP	185.04 (2.08)*	-235.16 (-1.41)	140.54 (2.19)*
Q3	107.27 (4.23)***	73.21 (2.61)***	13.06 (1.11)
GI	678.61 (10.53)***	781.92 (11.46)***	167.94 (4.90)***
$\bar{R}^2$	.80	.69	.54

t-ratios in parentheses.

*Significant at .05 level.
**Jointly significant at .01 level.
***Significant at .01 level.

Dependent Variable: A/P where A = Navy/Air Force/Marine Corps accessions plus DEP of male NPS high school graduates.

P = male population of 16-19 year olds.

Independent Variables: See Table 1.

regression equation to test for the effect of the changing numbers of recruiters over time. Its effect, however, was not significant in a statistical sense. Fernandez (1979) and Daula et al. (1982) tried recruiter variables and also failed to find a significant impact. Daula et al. hypothesized that their negative result for recruiters may be the result of a 1978 policy change that assigned proportionately more recruiters to areas where recruitment rates were lower. Other studies that consider the relative effectiveness of recruiters and advertising achieved mixed results (see Goldberg, 1980, N.W. Ayer, Inc., 1981, Coleman, 1981, Elig, et al.,1983, and Hertzbach, et al., 1983). This does not, of course, mean that recruiters are unimportant. It simply means that the variation has not been large enough to show any correlation with enlistment rates. In fact, over the estimation period, the number of Army production recruiters rarely varied more than 10 percent from the average value of about 4,500. Thus, what is needed is not the **number** of recruiters **per se**, but some proxy for their effort. We attempted to measure recruiter effort with our TARGET variable.[8]

Table 2 reports results for the Navy, Air Force and Marine Corps. As expected, neither the TARGET variable nor the KICK variable was significant since both are unique to the Army.[9] The Marine Corps equation had a relatively poor fit and none of the

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[8]Table 1 also illustrates a technical point that has been emphasized by Fernandez (1979, pp. 16, 37-38). He asserts that high multicollinearity between pay and the number of recruiters makes it impossible to separate their effects. Thus, regression equations that omit the recruiter variable, which frequently has the wrong sign, will have pay elasticities that are biased upward.

We have avoided the multicollinearity problem by our use of 3-, 4- and 5-month leads on the wage variable. The regression results in Table 1 show that not only was the number of recruiters not statistically significant, the remaining coefficients were stable when the recruiter variable was dropped. Its omission, then, does not adversely affect the specification of the model.

[9]The recent numbers of production recruiters for the other services were not available. We used Fernandez's (1979) data, which were themselves approximations, and did not obtain statistically significant results. The discussion above shows that dropping insignificant variables does not necessarily result in model misspecification. Nevertheless our

unemployment variables were significant, indicating that alternative civilian employment opportunities have a relatively unimportant impact on Marine Corps enlistment rates.

A separate equation was estimated for all female high school graduates (Table 3). Female Army enlistment rates, however, could not be explained very well in macroeconomic terms. The few variables that were significant could explain only about 42 percent of the variation in female enlistment rates. This finding is consistent with research which has shown that women do indeed frequently join the military for reasons that cannot easily be quantified, such as the belief they will learn a particular trade (see Nogami, 1982, and M. Segal, 1982).

III. ENLISTMENTS BY MENTAL CATEGORY

If different mental category groups have different supply functions, then the aggregate equations in the last section will have incorrect coefficients. In this section, we provide estimates for enlistees in mental categories (CAT) I-IIIA, which are applicants who score in the top half on the Armed Forces Qualification Test. These results not only provide a useful check for aggregation bias, but also enable us to focus on high quality enlistees.[10]

Estimates for Army enlistees in mental categories I-IIIA are shown in Table 4. The raw data is listed in the Data Appendix. Pay and unemployment remain significant variables for all male NPS high school graduates, although the sizes of the coefficients are considerably smaller.[11] Results are shown with and without the RECRTR variable.

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non-Army estimates are for illustrative purposes only. We leave to subsequent research the issue of measuring over time non-Army recruiter effort.

[10] For a dramatic illustration of how much more effective higher mental category personnel perform in a wartime scenario, see Toomepuu (1981).

[11] We also estimated enlistments of mental category IIIB male high school graduates, but did not obtain meaningful results. The most likely explanation is that the quantity of

TABLE 3

GLS REGRESSION RESULTS FOR ARMY ENLISTMENTS OF FEMALES
Monthly Data, October 1975 to March 1982

Variable	Coefficient
INTERCEPT	313.98 (1.10)
UF	5.04 (2.28)*
UF-2	-.69 (-.38)
UF-4	.44 (.23)
W4	-2.34 (-.49)
BILL	-64.95 (-.90)
VEAP	-135.42 (-1.13)
KICK	.06 (.06)
Q3	27.15 (2.42)***
GI	115.59 (3.90)***
TARGET	-4.30 (-.19)
RECRTR	-.01 (-.18)
$\bar{R}^2$	.42

t-ratios in parentheses.

*Significant at .05 level.
***Significant at .01 level.

TABLE 3 (continued)

Dependent Variable:	A/P where	A =	Army accessions plus DEP of female NPS high school graduates.
		P =	female population of 16-19 year olds.
Independent Variables:		UF =	unemployment rate of female 16-19 year olds.
		UF-2 =	UF lagged 2 months.
		UF-4 =	UF lagged 4 months.
Other Variables:			See Table 1.

As before, omitting the number of production recruiters does not appear to result in a misspecified model, as shown by the stability of the coefficients.

One modification in these estimates, compared to those in Table 1, was our use of **nondeflated** values for educational benefits. This was done in response to conjectures that enlistees suffer from money illusion as they pay more attention to aggregate or "nominal" amounts today than they do deflated or "discounted" amounts in the future. This adjustment, however, adversely affected the VEAP variable; because of its close relationship with BILL and KICKER, it was dropped from this version of the estimating equation.

Not surprisingly, educational benefits are very important to both black and white enlistees in the higher mental categories. In addition, enlistment bonuses are significant in the estimates for CAT I-IIIA white males.[12] The results of Table 4 clearly illustrate the value of economic incentives for attracting high quality recruits.

The estimates for the Navy, Air Force, and Marine Corps appear in Table 5. While pay and unemployment rates are important to CAT I-IIIA enlistees in all the services, educational benefits are most important to the Navy.

A summary of the pay and unemployment effects is shown in Table 6. We emphasize that results for the other services are for comparison purposes only. If, for example, it could be shown that the recruiter variable in the other services is highly correlated with the wage term, than the problems discussed in the last section would apply and the elasticities for the other services would be biased (see Fernandez, 1979).

Since CAT I-IIIA enlistees are of special interest, we reestimated those equations

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available CAT IIIB applicants makes this a demand - rather than a supply-constrained market. Thus, our model would not apply.

[12] For a discussion of enlistment bonuses, see General Accounting Office (1982). Although no conclusions were reached, the GAO urged the Army to study the effectiveness of the bonus program.

TABLE 4

GLS REGRESSION RESULTS FOR ARMY ENLISTMENTS OF HIGH SCHOOL GRADUATES
MENTAL CATEGORY I-IIIA
Monthly Data, October 1975 to March 1982

Variable	All Males		White Males		Black Males	
	With RECRTR	Without RECRTR	With RECRTR	Without RECRTR	With RECRTR	Without RECRTR
INTERCEPT	-641.75 (-2.98)***	-651.21 (-3.64)***	-549.37 (3.02)***	-543.29 (-3.59)***	-64.22 (-1.67)*	-83.71 (-2.63)***
UM	10.50 (3.73)**	10.46 (3.78)**	9.45 (3.95)**	9.48 (4.03)**	1.03 (2.09)**	.97 (1.99)**
UM-2	7.76 (3.24)**	7.73 (3.32)**	6.37 (3.13)**	6.39 (3.24)**	1.16 (2.78)**	1.08 (2.65)**
UM-4	2.66 (1.02)**	2.61 (1.04)**	2.10 (.95)**	2.13 (1.00)**	.59 (1.30)**	.50 (1.13)**
W'	11.39 (2.11)*	11.33 (2.14)*	9.07 (1.98)*	9.11 (2.03)*	1.77 (1.87)*	1.65 (1.76)*
BILL	.30 (5.00)***	.30 (5.36)***	.24 (4.87)***	.24 (5.19)***	.05 (4.48)***	.05 (5.03)***
KICK	.01 (2.45)***	.01 (2.48)***	.01 (2.76)***	.01 (2.80)***	-.00 (-.11)	-.00 (-.22)
Q3	24.72 (1.56)	24.74 (1.58)	20.36 (1.51)	20.34 (1.52)	4.52 (1.65)*	4.61 (1.69)*
GI	360.90 (8.74)***	360.25 (8.94)***	327.77 (9.31)***	328.15 (9.55)***	27.52 (3.88)***	26.36 (3.79)***
TARGET	35.09 (2.35)***	34.72 (2.46)***	37.61 (3.00)***	37.84 (3.19)***	-4.29 (-1.58)	-5.01 (-1.93)*
BONUS	.02 (2.43)***	.02 (2.48)***	.02 (2.51)***	.02 (2.60)***	.00 (1.24)	.00 (1.07)
RECRTR	-.00 (-.08)		.00 (.06)		-.01 (0.91)	
$\bar{R}^2$	.88	.88	.89	.89	.74	.74

t-ratios in parentheses.

*Significant at .05 level.
**Jointly significant at .01 level.
***Significant at .01 level.

TABLE 4 (continued)

Dependent Variable: A/P where	A	=	accessions plus DEP of male mental category I-IIIA NPS high school graduates.
	P	=	male population of 16-19 year olds.
	BONUS	=	Maximum value of enlistment bonuses.
Other Variables:			See Table 1.

TABLE 5

GLS REGRESSION RESULTS FOR NAVY, AIR FORCE, AND MARINE CORPS ENLISTMENTS OF MALE HIGH SCHOOL GRADUATES, MENTAL CATEGORY I-IIIA
Monthly Data, October 1975 to March 1982

Variable	Navy	Air Force	Marine Corps
INTERCEPT	-696.65 (-3.36)***	-626.92 (-2.44)***	-450.89 (-4.13)***
UM	9.22 (3.07)**	7.76 (2.10)**	4.83 (3.04)**
UM-2	9.58 (3.94)**	10.99 (3.67)**	0.76 (.58)**
UM-4	2.63 (.90)**	.64 (.17)**	2.17 (1.40)**
W4	15.79 (2.63)***	15.42 (2.09)*	11.05 (3.49)***
BILL	.20 (2.50)***	.04 (.40)	-.02 (-.62)
Q3	40.35 (2.40)***	30.04 (1.46)	11.83 (1.33)
GI	418.09 (10.06)***	461.40 (9.04)***	115.68 (5.24)***
$\bar{R}^2$	.77	.68	.57

t-ratios in parentheses.

*Significant at .05 level.
**Jointly significant at .01 level.
***Significant at .01 level.

Dependent Variables: A/P where A = Navy/Air Force/Marine Corps accessions plus DEP of male mental category I-IIIA NPS high school graduates.

P = male population of 16-19 year olds.

Independent Variables: See Table 1.

TABLE 6

SUMMARY OF UNEMPLOYMENT AND PAY ELASTICITIES

Service	All High School Graduates				HSG's -- CAT I-IIIA			
	Unemployment		Pay		Unemployment		Pay	
	Average	End	Average	End	Average	End	Average	End
Army	.69	.94	2.12	2.31	1.1 to 1.3	.8 to 1.0	.6 to 1.5	.9 to 1.7
Navy	.86	.82	1.97	2.18	1.2 to 1.3	1.1 to 1.2	.5 to 1.8	.4 to 1.4
Air Force	.86	1.07	1.79	2.25	1.0 to 1.1	1.2 to 1.3	.9 to 1.6	.9 to 1.6
Marine Corps	0	0	4.75	5.47	1.0 to 1.3	.9 to 1.2	1.5 to 3.1	1.1 to 2.4

HSG's = nonprior service male high school graduates.

CAT I-IIIA = mental categories I through IIIA.

Ranges for CAT I-IIIA are from equations with 3 to 5 month leads on the pay variable.

with 3- to 5-month leads and present elasticities as a range. The unemployment elasticities appear very stable, and relatively high. The pay elasticities are less stable, but are still higher than most previous studies have shown. Thus, an upturn in the economy, coupled with pay increases that fall behind those in the private sector, could lead to a rapid fall-off of CAT I-IIIA enlistments. We present some projections in Section V.

IV. COMPARISONS WITH PREVIOUS WORK

A distinguishing characteristic of the present effort is the finding of **both** sizable and significant pay and unemployment effects on military enlistments. The relatively attractive statistical properties of our estimating equations point to a variety of conceptual and statistical drawbacks of some of the earlier literature.

Almost all previous studies have estimated regression equations using accessions rather than total contracts as the numerator of the dependent variable. Since Army recruiters frequently have quotes set three months at a time, the time of accession is more demand-determined by recruiters than supply-determined by enlistees; in many months the number of DEP contracts has been very large. Using accessions without a DEP component as the dependent variable introduces a bias in the regression results.

Another issue involves the measured elasticities of the wage ratios in the time-series literature. Estimates vary considerably -- from .28 to 1.68 -- and indicate that pay rates are much less important in these studies than the present work demonstrates (Table 7). However, current or lagged values were used in the literature rather than leading values. Using lead values was originally suggested by Gilman (1970) but not attempted until the present work. Since enlistment rates are highest and inflation-adjusted wage rates are lowest at the same time of year (summer), it is not surprising that their elasticities are biased downwards.

The validity of pay elasticities in two of the latest studies by Grissmer (1978) and

TABLE 7

COMPARISON OF ARMY UNEMPLOYMENT AND PAY ELASTICITIES

Study	Period	Elasticity Unemployment	Pay
Time-Series:			
Fisher (1969)[a]	Quarterly: 1957(III)-1965(IV)	.18	-.46[b]
Fechter (1970)	Quarterly: 1958(I)-1968(IV)	c	1.24 to 1.67
Cooper (1977)[a]	Semiannual: FY71-FY76	.11 to .27	.95 to 1.23
Fechter (1978)[d]	Quarterly: 1958(I)-1974(II)	-2.08	1.12
Grissmer (1978)	Monthly: 6/70-7/75	.37 to .42	1.22 to 1.68
Withers (1978)[b]	Quarterly: 1966(II)-1973(IV)	-.29	-.28[b]
Fernandez (1979)	Monthly: 7/70-9/78	.05 to .51	.54 to .88
McNown et al. (1980)	Semiannual: 1968(I)-1976(II)	.05	.54 to .82
Dale and Gilroy (1983)	Monthly: 10/75-3/82	.94[e]	2.3[e]
Ash et al. (1983)	Semiannual: 1968(I)-1976(II)	.13	.88
Cross-Section:			
Gray (1970)	1964	c	1.5
Huck et al. (1977)	1977	.24	.80
Daula et al. (1982)	1978	2.30	3.36
Baldwin et al. (1982)	1978	.93	3.54
Kim (1982)	1979	f	f

[a]Estimated DoD equations only.

[b]Uses ratio of civilian to military pay rather than military to civilian.

[c]No effect, and elasticity not reported.

[d]Uses employment rather than unemployment rate.

[e]Nonprior service male high school graduates, all mental categories.

[f]Elasticities not reported. Estimates for logit equations mixed and very low.

Fernandez (1979) is suspect. Grissmer obtained Durbin-Watson statistics as low as .8, but still reported his pay variable significant at the .01 level. In the Fernandez study, the pay variable was not significant.

Although one would intuitively predict a close positive relationship between military enlistments and unemployment (see Chart 1), this effect has not been found consistently in the literature (see Table 7). Fisher (1969), Fechter (1970), Fernandez (1979), McNown et al. (1980), and Ash et al. (1983) found statistically insignificant effects. Withers' (1978) unemployment coefficients were statistically significant, but wrong-signed. The unemployment elasticities in Fechter (1978) were very unstable, with a wide range in coefficient sizes and many wrong signs. Cooper (1977) and Grissmer (1978) reported marginally significant although very low unemployment effects. The results among cross-section studies are even more divergent. Gray (1970) was unable to find an unemployment impact. Kim (1983) found significant but small effects for blacks, and insignificant impacts for whites and Hispanics.[13] Daula et al. (1982) reported a positive unemployment elasticity over 10 times as large as previous studies. Pay and unemployment rates have also been found to be important determining factors of enlistments in Britain. Bellany (1980) obtained relative pay elasticities greater than 1 and unemployment elasticities greater than 3 for enlistments into the British Army.

V. ARMY ENLISTMENT PROJECTIONS

The alternative economic scenarios that were used for making projections of Army male NPS high school graduate enlistees are shown in Table 8. The necessary conversion[14] from aggregate unemployment rate projections to teenage rate forecasts

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[13]Fisher (1969), Cooper (1977), and Kim (1983) do not estimate Army-specific enlistment equations.

[14]Projections of more aggregated unemployment rates are easier to obtain than fore-

was accomplished by regressing the 16-19 year old male jobless rate on the aggregate rate and three seasonal dummy variables using ordinary least squares (OLS) as shown in Table 9. The resulting projections of Army enlistees appear in Tables 10 and 11.[15] There are clearly sharp differences depending on both the economic outlook and the amount of the military pay raise. The pay raise results are especially striking. We assumed that a FY 84 pay freeze would not be followed by catch-up raises in subsequent years. Thus, even a one-time transient shock to the system caused by a pay freeze would have a lasting effect on enlistment levels.

The measured elasticities and empirical results appear to be within the range of **a priori** expectations. We tested our unemployment elasticity of .94 for all male high school graduates using historical values for FY 81 and for six months of FY 82. The results were impressive, as we were only 600 contracts too high in FY 81, from a total of 77,500 contracts (an error of less than 1 percent), and about 1,100 contracts too high in the first half of FY 82 (an error of 2.4 percent). Since we assumed all high school seniors who signed contracts will eventually graduate from high school, we would expect our estimates to be slightly on the high side.

Preliminary fiscal year 1982 accession data have become available which permit the further testing of our model. There were 88,153 male NPS high school graduate enlistees in 1982, 43,131 of them in mental categories I-IIIA. These were lower than our predicted values of 92, 400, and 46,000, respectively, with OMB assumptions and a 4 percent FY 83 pay raise. The fact that enlistments have been lower than projected, even

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casts of teenage jobless rates. In addition, policymakers are more likely to ask about changes in Army enlistments due to changes in a well-known measure such as the national unemployment rate, rather than in male teenage unemployment.

[15]Note that Table 8 contains calendar year forecasts, which is the customary way to make economic projections, while Tables 10 and 11 present fiscal year forecasts, which are more compatible with Army planning. A large-scale Army strength management model, which is currently being modified to incorporate alternative macroeconomic scenarios, may be found in Holz and Wroth (1980).

TABLE 8

ECONOMIC ASSUMPTIONS FOR ARMY ENLISTMENT PROJECTIONS

Office of Management and Budget (OMB) Assumptions:

	1982	1983	1984	1985	1986
Unemployment	9.2	8.4	7.6	7.2	7.0
CPI	5.9	6.7	6.9	6.4	6.0

Moderate Growth (MID) Assumptions:

Unemployment	9.6	9.4	8.6	8.2	8.0
CPI	6.4	7.7	7.9	7.4	6.9

Sluggish Growth (SLO) Assumptions:

Unemployment	10.0	9.9	9.1	8.7	8.5
CPI	6.9	8.2	8.4	7.9	7.4

Fiscal Year 1984 Pay Freeze Assumptions:

Military pay will be increased 4 percent in FY83, but there will be no pay increase in FY84. Military pay will increase at the same percentage rate as civilian wages (comparability) from FY85 onward.

Fiscal Year 1983 4 Percent Raise Assumptions:

Military pay will be increased 4 percent in FY83. Military pay will increase at the same percentage rate as civilian wages (comparability) from FY84 onward.

Unemployment and CPI assumptions are for calendar years.

OMB assumptions are from the July 30, 1982, Mid-Session Review of the 1983 Budget.

TABLE 9

OLS REGRESSION RESULTS FOR 16-19 YEAR OLD MALE UNEMPLOYMENT RATE
Monthly Data, October 1975 to March 1982

Variable	Coefficient
INTERCEPT	1.48 (1.13)
UNEMP	2.36 (13.11)***
Q1	2.29 (5.33)***
Q2	-0.30 (-0.69)
Q3	-1.64 (-3.72)***
$\bar{R}^2$	.80
Durbin-Watson Statistic	1.99

t-ratios in parentheses.

***Significant at .01 level.

Dependent Variable: UM = unemployment rate of male 16-19 year olds, not seasonally adjusted.

Independent Variables: UNEMP = national aggregate unemployment rate, seasonally adjusted.

Q1,Q2,Q3 = quarterly seasonal dummies.

TABLE 10

ARMY ENLISTMENT PROJECTIONS FOR ALL MALE HIGH SCHOOL GRADUATES
Thousands of Contracts

	FY82	FY83	FY84	FY85	FY86	FY87
OMB Assumptions						
Military Raise = Civilian Raise	95.5	89.9	78.8	68.9	62.3	56.2
FY83 4 Percent Pay Raise	92.4	86.9	75.9	66.2	59.7	53.6
FY84 Pay Freeze	92.4	85.2	68.8	59.3	53.0	47.0
MID Assumptions						
Military Raise = Civilian Raise	98.7	93.0	81.8	71.8	65.2	59.1
FY83 4 Percent Pay Raise	95.7	90.1	79.0	69.1	62.5	56.4
FY84 Pay Freeze	95.7	88.3	71.9	62.2	55.9	49.8
SLO Assumptions						
Military Raise = Civilian Raise	105.1	99.3	87.9	77.7	70.9	64.7
FY83 4 Percent Pay Raise	102.1	96.4	85.0	74.9	68.2	62.0
FY84 Pay Freeze	102.1	94.5	77.9	68.1	61.5	55.4

OMB, MID, and SLO assumptions are listed on Table 8. FY87 projections are 3-month figures at annual rates.

TABLE 11

ARMY ENLISTMENT PROJECTIONS FOR MENTAL CATEGORY I-IIIA
HIGH SCHOOL GRADUATES
Thousands of Contracts

	FY82	FY83	FY84	FY85	FY86	FY87
OMB Assumptions						
Military Raise = Civilian Raise	47.1	45.2	40.6	36.5	34.1	31.8
FY83 4 Percent Pay Raise	46.0	44.3	39.8	35.7	33.3	31.0
FY84 Pay Free .e	46.0	43.3	37.3	33.3	31.0	28.7
MID Assumptions						
Military Raise = Civilian Raise	48.3	47.9	44.6	40.4	37.9	35.5
FY83 4 Percent Pay Raise	47.2	47.1	43.8	39.6	37.1	34.8
FY84 Pay Freeze	47.2	45.9	41.3	37.1	34.7	32.4
SLO Assumptions						
Military Raise = Civilian Raise	49.8	49.3	46.6	42.3	39.8	37.4
FY83 4 Percent Pay Raise	48.7	46.4	45.8	41.5	39.0	36.6
FY84 Pay Freeze	48.7	45.3	43.3	39.1	36.6	34.3

OMB, MID and SLO assumptions are listed on Table 8. FY87 projections are 3-month figures at annual rates.

using our strong unemployment effects, is additional evidence that the Army has not been taking enlistees away from the other services (see Gade et al., 1982, and Lockman, 1982).

VI. CONCLUSIONS

We have measured the effects of various macroeconomic variables on military enlistment rates and have reached the following conclusions.

First, the rise in the unemployment rate has led to a substantial increase in Army enlistments of male nonprior high school graduates. Similarly, a drop in the national unemployment rate from 10 percent to 9 percent could cause Army enlistments of male nonprior service high school graduates to fall sharply by about 8.8 percent -- over 7,000 per year.

Second, the elasticity of total Army enlistment rates with respect to relative pay rates is in a range of 1.2 to 2.3, while that for CATI-IIIAs is between .9 and 1.7. A military wage freeze resulting in a decline in military pay relative to civilian pay would cause enlistment rates to fall substantially (see Tables 10 and 11). We therefore agree with Daula et al. (1982) and Ash et al. (1983) that without considerable relative pay increases, the Army will again experience recruiting difficulties following any significant economic recovery.

Third, noneconomic factors also play a significant role in determining the size of Army enlistments. There was a statistically significant increase in the rate of enlistments in the period November 1979 to August 1981, a time when the Army Recruiting Command was committed to increasing the percentage of high school graduate enlistees.

Fourth, educational benefits are very important to many high school graduate enlistees, including those in the highest mental categories. These results support the recent work of Moskos (1982) and the Atlantic Council of the United States (see Good-

paster and Elliott, 1982); both studies recommend establishing special types of educational benefit programs to encourage the enlistment of high school graduates.

The explanatory power and forecasting capability of the model are good. The signs and significance of important variables are in accord with economic theory, and the forecasting and back-forecasting results help confirm our basic conclusions.

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DATA APPENDIX

TABLE A-1

NEW DOD CONTRACTS

WHITE MALE HIGH SCHOOL GRADUATES AND HIGH SCHOOL SENIORS

MENTAL CATEGORY I-IIIA

CALENDAR YEAR/MONTH	ARMY	NAVY	AIR FORCE	MARINE CORPS
7510	5279	5799	5449	2089
7511	3429	4624	5033	1618
7512	3250	4336	4397	1452
7601	3921	4366	4860	1517
7602	3318	3649	3760	1184
7603	3168	3755	3701	1088
7604	2060	2640	2507	0691
7605	2034	2248	1945	0664
7606	2651	3104	2538	1146
7607	2354	3271	2564	0887
7608	2362	3333	2915	0897
7609	2267	3001	2118	0868
7610	2217	2782	1730	0850
7611	3038	3445	2686	0955
7612	5175	6189	5797	1615
[illegible]	2006	2296	2071	0823
[illegible]	1921	2203	2319	0771
7703	2022	2362	2714	0825
7704	1585	1959	2135	0601
7705	1439	1780	1985	0518
7706	1831	2294	2414	0761
7707	1811	2365	2304	0767
7708	2033	2671	2449	0798
7709	1577	2059	1867	0513
7710	1296	1825	1601	0474
7711	1481	1991	1957	0645
7712	[illegible]	1829	1946	0587
7801	[illegible]506	2021	2042	0620
7802	1383	1860	2040	0568
7803	1291	1940	2126	0616
7804	0918	1371	1530	0474
7805	080	1340	1435	0491
7806	138	1817	1846	0800
7807	12[illegible]	1782	1690	0718
7808	1327	1900	1849	0657
7809	1006	1534	1496	0510
7810	1139	1407	1460	0511
7811	1205	1455	1503	0624
7812	1308	1630	1676	0634

TABLE A-1 (continued)

NEW DOD CONTRACTS

WHITE MALE HIGH SCHOOL GRADUATES AND HIGH SCHOOL SENIORS

MENTAL CATEGORY I-IIIA

CALENDAR YEAR/MONTH	ARMY	NAVY	AIR FORCE	MARINE CORPS
7901	1972	2278	2066	0756
7902	1617	2029	1969	0670
7903	1063	1498	1253	0488
7904	1260	1642	1701	0553
7905	1787	2024	2299	0720
7906	1750	2064	1915	0830
7907	1669	2157	1902	0962
7908	1697	1812	1834	0819
7909	1280	1812	1834	0819
7910	1413	1939	1926	0889
7911	1528	2141	2008	0912
7912	1455	2043	1962	0820
8001	2209	2948	2793	1103
8002	2249	3221	3536	1136
8003	2100	2794	2991	0913
8004	1949	2454	2709	0841
8005	1946	2318	2585	0850
8006	2115	3074	2924	1188
8007	2546	3787	3581	1447
8008	2324	3607	3497	1277
8009	2043	3145	3011	1200
8010	2209	2682	2586	1141
8011	2033	2477	2416	1074
8012	2173	2704	2666	1012
8101	2739	3100	3060	1239
8102	2695	3455	3420	1356
8103	2637	3255	3475	1277
8104	2312	2652	3028	1048
8105	1976	2275	2610	0859
8106	2615	2804	3247	1534
8107	3035	3134	3501	1672
8108	2706	3070	3487	1443
8109	2668	3015	3317	1374
8110	2660	2592	2847	1324
8111	2801	2619	2801	1216
8112	3199	3012	3395	1329
8201	3849	3489	3654	1398
8202	3873	3553	3186	1336
8203	4332	3659	2883	1378

TABLE A-2

NEW DOD CONTRACTS

BLACK MALE HIGH SCHOOL GRADUATES AND HIGH SCHOOL SENIORS

MENTAL CATEGORY I-IIIA

CALENDAR YEAR/MONTH	ARMY	NAVY	AIR FORCE	MARINE CORPS
7510	0866	0257	0460	0252
7511	0549	0202	0425	0227
7512	0425	0223	0357	0216
7601	0592	0239	0420	0166
7602	0697	0228	0307	0109
7603	0648	0274	0345	0145
7604	0337	0174	0221	0108
7605	0351	0157	0213	0092
7606	0481	0190	0308	0149
7607	0425	0203	0303	0100
7608	0428	0231	0326	0108
7609	0388	0193	0255	0108
7610	0378	0161	0176	0104
7611	0388	0188	0194	0121
7612	0625	0192	0434	0196
7701	0323	0131	0202	0106
7702	0266	0124	0194	0109
7703	0280	0149	0260	0081
7704	0244	0116	0203	0075
7705	0252	0146	0189	0074
7706	0287	0203	0291	0107
7707	0313	0189	0275	0103
7708	0362	0173	0299	0092
7709	0274	0146	0243	0070
7710	0192	0141	0176	0086
7711	0229	0150	0222	0071
7712	0210	0137	0198	0065
7801	0272	0159	0225	0109
7802	0197	0130	0238	0106
7803	0225	0156	0238	0093
7804	0167	0119	0224	0091
7805	0141	0118	0174	0091
7806	0269	0189	0260	0143
7807	0234	0157	0227	0121
7808	0254	0180	0260	0138
7809	0259	0160	0238	0122
7810	0208	0147	0200	0105
7811	0229	0111	0224	0119
7812	0197	0140	0169	0104

TABLE A-2 (continued)

NEW DOD CONTRACTS

BLACK MALE HIGH SCHOOL GRADUATES AND HIGH SCHOOL SENIORS

MENTAL CATEGORY I-IIIA

CALENDAR YEAR/MONTH	ARMY	NAVY	AIR FORCE	MARINE CORPS
7901	0287	0177	0224	0122
7902	0207	0150	0209	0113
7903	0157	0097	0157	0068
7904	0182	0152	0201	0094
7905	0338	0188	0255	0115
7906	0284	0185	0249	0120
7907	0268	0203	0252	0130
7908	0240	0209	0317	0145
7909	0189	0151	0263	0111
7910	0153	0135	0288	0107
7911	0180	0164	0256	0102
7912	0141	0148	0201	0090
8001	0208	0170	0279	0105
8002	0185	0147	0286	0097
8003	0178	0186	0275	0070
8004	0190	0149	0234	0083
8005	0167	0169	0237	0085
8006	0223	0210	0313	0117
8007	0286	0259	0399	0141
8008	0253	0211	0336	0141
8009	0263	0216	0337	0135
8010	0223	0165	0299	0126
8011	0222	0155	0240	0103
8012	0238	0174	0263	0109
8101	0280	0210	0338	0120
8102	0252	0204	0334	0128
8103	0260	0207	0340	0128
8104	0257	0210	0341	0127
8105	0262	0194	0345	0093
8106	0330	0261	0451	0191
8107	0400	0233	0450	0200
8108	0317	0253	0466	0155
8109	0346	0219	0427	0186
8110	0337	0203	0350	0139
8111	0334	0188	0295	0135
8112	0341	0235	0420	0153
8201	0474	0240	0395	0167
8202	0454	0284	0316	0158
8203	0482	0283	0298	0170

TABLE A-3

MACROECONOMIC VARIABLES FOR REGRESSION EQUATIONS

CALENDAR YEAR/MONTH	PM	CPI	UM	BMC	CIVWAGE
7510	8.16	164.6	18.5	6907.56	166.88
7511	8.17	165.8	19.4	6907.56	168.69
7512	8.18	166.8	19.9	6907.56	169.52
7601	8.19	167.4	23.0	6907.56	171.92
7602	8.19	167.4	21.8	6907.56	172.17
7603	8.20	167.7	20.6	6907.56	171.95
7604	8.21	168.1	19.7	6907.56	172.56
7605	8.21	168.8	17.4	6907.56	174.48
7606	8.22	169.6	20.4	6907.56	174.72
7607	8.23	170.6	17.6	6907.56	175.81
7608	8.23	171.5	15.4	6907.56	176.76
7609	8.24	171.6	18.5	6907.56	177.35
7610	8.23	173.4	18.3	7315.62	178.56
7611	8.24	174.1	20.1	7315.62	180.36
7612	8.24	175.0	19.4	7315.62	181.08
7701	8.24	176.0	20.4	7315.62	181.51
7702	8.25	177.5	21.0	7315.62	184.11
7703	8.25	178.4	19.9	7315.62	185.55
7704	8.25	179.6	16.4	7315.62	187.00
7705	8.26	180.4	15.2	7315.62	187.72
7706	8.26	181.3	20.3	7315.62	188.28
7707	8.26	182.1	16.4	7315.62	189.72
7708	8.26	182.9	14.5	7315.62	189.19
7709	8.26	183.7	16.9	7315.62	190.63
7710	8.26	184.4	15.4	7823.89	193.50
7711	8.26	185.7	16.8	7823.89	194.04
7712	8.26	186.6	15.1	7823.89	194.22
7801	8.26	187.8	17.6	7823.89	193.28
7802	8.26	188.8	19.4	7823.89	195.44
7803	8.26	190.1	18.3	7823.89	198.53
7804	8.26	191.6	15.5	7823.89	201.96
7805	8.26	193.2	13.1	7823.89	202.12
7806	8.27	194.8	16.2	7823.89	204.12
7807	8.26	196.1	15.2	7823.89	205.56
7808	8.26	197.4	12.3	7823.89	206.07
7809	8.26	199.1	14.9	7823.89	207.28
7810	8.26	200.9	15.2	8288.42	210.02
7811	8.25	202.4	16.3	8288.42	209.79
7812	8.26	203.6	16.9	8288.42	211.58

TABLE A-3 (continued)

MACROECONOMIC VARIABLES FOR REGRESSION EQUATIONS

CALENDAR YEAR/MONTH	PM	CPI	UM	BMC	CIVWAGE
7901	8.25	205.4	18.1	8288.42	211.23
7902	8.25	207.6	19.1	8288.42	213.24
7903	8.25	209.4	17.5	8288.42	215.87
7904	8.25	211.5	15.4	8288.42	212.86
7905	8.24	213.8	13.9	8288.42	217.41
7906	8.24	216.0	16.6	8288.42	219.81
7907	8.24	218.4	14.9	8288.42	221.24
7908	8.24	220.7	13.3	8288.42	222.05
7909	8.23	223.1	15.6	8288.42	223.84
7910	8.24	225.5	14.8	8906.12	223.57
7911	8.23	228.1	16.2	8906.12	224.99
7912	8.22	230.8	16.0	8906.12	227.13
8001	8.22	234.0	18.1	8906.12	226.21
8002	8.22	236.9	18.5	8906.12	227.98
8003	8.22	240.1	16.5	8906.12	229.80
8004	8.21	242.3	15.5	8906.12	230.86
8005	8.20	244.6	17.5	8906.12	231.26
8006	8.20	247.0	20.8	8906.12	233.73
8007	8.20	247.2	18.4	8906.12	233.77
8008	8.18	248.9	16.5	8906.12	236.54
8009	8.16	251.4	18.3	8906.12	238.63
8010	8.15	254.1	19.2	10031.89	241.10
8011	8.13	256.9	20.5	10031.89	243.57
8012	8.12	259.4	19.2	10031.89	244.98
8101	8.11	261.4	22.5	10031.89	246.75
8102	8.09	263.9	23.1	10031.89	247.81
8103	8.08	265.4	21.1	10031.89	250.28
8104	8.07	266.5	18.7	10031.89	252.78
8105	8.05	268.6	18.4	10031.89	253.45
8106	8.05	270.6	21.5	10031.89	254.50
8107	8.02	273.7	17.5	10031.89	256.28
8108	8.00	275.9	16.1	10031.89	258.37
8109	7.98	278.9	19.0	10031.89	257.21
8110	7.96	280.1	19.2	11247.75	258.65
8111	7.93	281.4	22.9	11247.75	260.75
8112	7.91	282.6	23.3	11247.75	260.01
8201	7.90	283.4	25.1	11247.75	257.18
8202	7.87	284.1	26.1	11247.75	263.20
8203	7.87	283.3	25.0	11247.75	263.09

TABLE A-3 (continued)

MACROECONOMIC VARIABLES FOR REGRESSION EQUATIONS

PM = male population of 16-19 year olds.

CPI = consumer price index.

UM = unemployment rate of all males 16-19 years old.

BMC = average of first two years of basic military compensation.

CIVWAGE = average weekly earnings in the private economy.

TABLE A-4

MICROECONOMIC VARIABLES FOR REGRESSION EQUATIONS

CALENDAR YEAR/MONTH	GIBILL	BASVEAP	KICKER	BONUS	RECRTR
7510	342	0	0	3000	4608
7511	342	0	0	3000	4637
7512	342	0	0	3000	4759
7601	342	0	0	3000	4830
7602	342	0	0	3000	4367
7603	342	0	0	3000	4399
7604	342	0	0	3000	4373
7605	342	0	0	3000	4367
7606	342	0	0	3000	4349
7607	342	0	0	3000	4349
7608	342	0	0	3000	4349
7609	342	0	0	3000	4349
7610	342	0	0	3000	4215
7611	342	0	0	3000	4327
7612	342	0	0	3000	4452
7701	0	225	0	3000	4525
7702	0	225	0	3000	4544
7703	0	225	0	3000	4561
7704	0	225	0	3000	4536
7705	0	225	0	3000	4570
7706	0	225	0	3000	4587
7707	0	225	0	3000	4547
7708	0	225	0	3000	4555
7709	0	225	0	3000	4525
7710	0	225	0	3000	4515
7711	0	225	0	3000	4492
7712	0	225	0	3000	4435
7801	0	225	0	3000	4396
7802	0	225	0	3000	4345
7803	0	225	0	3000	4295
7804	0	225	0	3000	4344
7805	0	225	0	3000	4379
7806	0	225	0	3000	4340
7807	0	225	0	3000	4311
7808	0	225	0	3000	4307
7809	0	225	0	3000	4255
7810	0	225	0	3000	4245
7811	0	225	0	3000	4223
7812	0	225	0	3000	4207

TABLE A-4 (continued)

MICROECONOMIC VARIABLES FOR REGRESSION EQUATIONS

CALENDAR YEAR/MONTH	GIBILL	BASVEAP	KICKER	BONUS	RECRTR
7901	0	225	4000	3000	4151
7902	0	225	4000	3000	4136
7903	0	225	4000	3000	4104
7904	0	225	4000	3000	4255
7905	0	225	4000	3000	4286
7906	0	225	4000	3000	4483
7907	0	225	4000	3000	4357
7908	0	225	4000	3000	4672
7909	0	225	4000	3000	4574
7910	0	225	4000	3000	4479
7911	0	225	4000	3000	4406
7912	0	225	4000	3000	4410
8001	0	225	4000	3000	4592
8002	0	225	4000	3000	4592
8003	0	225	4000	3000	4592
8004	0	225	4000	3000	4471
8005	0	225	4000	3000	4471
8006	0	225	4000	3000	4471
8007	0	225	4000	3000	4608
8008	0	225	4000	3000	4608
8009	0	225	4000	3000	4608
8010	0	225	4000	3000	4766
8011	0	225	4000	3000	4766
8012	0	225	4000	3000	4766
8101	0	225	4000	3000	4766
8102	0	225	4000	3000	4766
8103	0	225	4000	3000	4766
8104	0	225	4000	3000	4779
8105	0	225	4000	3000	4779
8106	0	225	4000	3000	4779
8107	0	225	4000	3000	4395
8108	0	225	4000	3000	4395
8109	0	225	12000	3000	4395
8110	0	225	12000	5000	4931
8111	0	225	12000	5000	4931
8112	0	225	12000	5000	4931
8201	0	225	12000	8000	4931
8202	0	225	12000	8000	4931
8203	0	225	12000	8000	4931

TABLE A-4 (continued)

MICROECONOMIC VARIABLES FOR REGRESSION EQUATIONS

GIBILL = maximum monthly benefit for a GI Bill beneficiary without dependents.

BASVEAP = maximum monthly basic benefit for a VEAP beneficiary without dependents.

KICKER = maximum value of kicker payments.

BONUS = maximum value of enlistment bonuses.

RECRTR = number of production Army recruiters.