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5 Uncle Sam Wants You—Sometimes: Military Enlistments and the Youth Labor Market

David T. Ellwood and David A. Wise

The military is a major employer of young men. Yet there has been very little work done on the impact of military enlistment and service on youth labor markets. The research that has been done has usually been from the perspective of the military focusing on the influence that labor market conditions have on military enlistment, particularly enlistment by so-called high-quality recruits. In this chapter and in a companion chapter (chap. 4) in this volume, we investigate the inverse question of what influence the military has on youth labor markets.

The military is often viewed as a vague employer of last resort. For those meeting the military's standards, the military offers at least one source of employment. The military creates a net addition to the demand for youth. What is rarely considered is the fact that the military cannot possibly serve as the employer of last resort for all youths. Most authors assume that the military chooses a fixed quota of enlistment needs each year and adjusts the quality of its recruits to fill the quota. This assumption implies that when the economy weakens, the military can afford to be more choosy. Thus while the military may serve as an employer of last resort for highly desirable recruits, for those deemed less desirable, the military is less likely to be an option in bad economic times. Far from being an employer of last resort, for the "weaker" groups, military employment opportunities will tend to dry up just when civilian opportunities do.

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We estimate a model that explores military hiring of various groups over the business cycle. We find that while the military mitigates the impact of the business cycle slightly for some groups, for others it magnifies the cycle.

5.1 Previous Work

Most previous studies have at least noted the "demand constraint" problem. If the total demand is fixed, then enlistment behavior of some groups will reflect both their supply decisions and the hiring constraints of the military. To isolate pure supply behavior, nearly all focus on "high-quality" recruits—variously described as high school graduates, youths who score well on the Armed Forces Qualification Test (AFQT), or a similar sort of classification. The assumption made, explicitly or implicitly, is that within the relevant range of economic conditions, all "high-quality" youth interested in serving in the military will be accepted.

Most studies have used national time series models, exploring the influence of various economic variables—such as military pay, civilian pay, and unemployment—on the military supply behavior of the high-ability recruits.[1] The problem with purely time series models is that the all-volunteer force has been in existence only since 1973. Authors must therefore estimate models over a relatively short time span or estimate the model over both draft and nondraft periods.

A few authors have instead used cross-section data. This method offers a much larger data set in the postdraft period. But it suffers from an inability to examine the influence of variation in variables that vary nationally or over time. More important, there are large and well-known variations in the fraction of youths who enlist from various states, and there is a danger that unmeasured tastes and preferences will be correlated with unemployment or civilian pay. For example, enlistment rates are relatively high in the South and wages tend to be low. It is difficult to distinguish whether the high enlistment rate is directly caused by low wages, or whether the same factor that allows wages to be low leads to a greater willingness to serve in the armed forces.

The most appealing study to date is one by Brown (1985) where he uses pooled time series cross-section data. With these data he is able to allow for state fixed effects while maintaining a very large number of degrees of freedom. Brown explores the sensitivity of various classifications of recruits to variations in military pay, area unemployment rates, and civilian wages. While Brown's pay measures performed somewhat unevenly, he found relatively large responses of enlistment among high-quality recruits to local unemployment rates.

These methods cannot be used to isolate supply behavior for all youth, though. If total enlistments are constrained, the behavior of at

least a subset of potential enlistees must be also. In order to understand the influence of the military on youth labor markets, we cannot simply focus on the high-quality recruits that have drawn earlier attention. Instead we must try to resolve both the supply and demand side issues that have thus far been largely avoided.

5.2 Models and Methods

A fairly clear consensus has emerged in the literature about the conceptual model of the military as a recruiter of young men. Each year the military fills a largely predetermined number of positions. Wages are set by a variety of institutional mechanisms that cannot adjust quickly to changes in civilian labor market conditions. As a result, the military is forced to vary the quality of recruits in order to meet its manpower needs. In poor economic times, the quality of new recruits is relatively high. By contrast, when civilian jobs are relatively plentiful, quality standards must decline if all slots are to be filled.

For youths who are prized by the military under almost any conditions, the military may serve as an employer of last resort. As such, the military may serve a variety of beneficial functions in the civilian labor market besides mitigating the negative effects of the business cycle. The military will also serve to reduce geographic variation in employment opportunities at a point in time. In areas where opportunities are more limited, more young men will enter the military, reducing the number of unemployed or underemployed persons. And if the military is more nearly an equal opportunity employer than private sector employers are, the military may help offset any vagaries of the private sector labor market created by inappropriate screening. Those hurt inappropriately by any such private sector practices have the option of joining the military so long as they are deemed high ability by the military.

By contrast, the situation for low-quality recruits is more ominous. For the least qualified, the military may always look like a desirable option. But the least qualified are a residual group: they are taken only in sufficient numbers to fill the gap between total manpower needs and the number of positions filled by better-qualified recruits. Thus their numbers are determined jointly by decisions about the number of recruits needed, and by the decisions of the more highly qualified young men. For the residual group, the number of positions open will be lowest in the worst economic times because during those times, high-qualified recruits will be enlisting more frequently.

Thus at the two extremes, enlistment for the recruits most desired by the military will be determined entirely by their supply decisions concerning military service. Enlistment among those deemed less desirable will be almost entirely determined by the total military demand

and the supply decisions made by those deemed more desirable. To fully understand the impact of the military on the labor market, we must consider not only the likelihood that different groups will desire military service, but also the odds that they will be accepted for it.

We will take as our starting point the basic supply side model offered by Brown. In principal, potential recruits ought to compare the expected future stream of benefits from civilian and military life, including the option of remaining in the military or returning to civilian life. Brown opts for the easiest model—essentially that future expectations are based entirely on current conditions. We adopt the same assumption, though we recognize the limitations inherent in it. His econometric specification is essentially:

$$(1) \qquad LENLIST_{it} = \underset{(+)}{a_1 U_{it}} + \underset{(+)}{a_2 PAY_{Nt}} + \underset{(-)}{a_3 W_{it}} + u_i + e,$$

where

$LENLIST_{it}$ = log of enlistments to population for some group in state i at time t,

U_{it} = unemployment rate in the civilian market in state i at time t,

PAY_{Nt} = log of expected military pay and benefits (uniform nationally),

W_{it} = log of expected civilian pay and benefits in state i at time t,

u_i = time invariant state fixed effect.

So long as the group of potential enlistees chosen for study are not constrained—all who want to serve can do so, this equation can be interpreted as the aggregation of a straightforward choice model where potential enlistees compare the rewards offered by military service with those available in the civilian sector. Expected signs are shown in parentheses.

In principal, one should use pay and unemployment rates appropriate for the specific group being studied. In practice, reliable values for such variables are not available by state. Since there is a high correlation between overall economic conditions and those facing any subgroup, this simplification should not cause important problems. It also makes comparisons across groups much easier.

Problems arise, however, when the group is not entirely free to enlist. In the extreme, explore this model for a group of "low-quality" youths. They are a residual group that is always in excess supply. The same high unemployment that pushed more high-quality youths to enlist will reduce opportunities now. Thus if equation (1) were estimated for them, one might expect to find the reverse signs on each variable. If one picked a group of mixed recruits, the signs become uncertain, and one certainly cannot isolate pure supply behavior.

Nearly all previous authors have been aware of the problems that demand constraints might have on their estimates, but little has been done to explore their significance for various groups. We propose a relatively simple variation on Brown's specification, which helps disentangle the demand constraints and supply behavior.

The basic insight we offer is that so long as there is relatively little mobility across states for young men, supply behavior will be largely determined by local economic conditions, but demand constraints will reflect national conditions. When local unemployment is high or wages are low, the military is a more attractive alternative as supply increases. But demand constraints reflect the balance between the military manpower needs in any given year and accumulated effect of economic conditions on enlistment in *all* areas in that year. When economic conditions are bad in many areas and manpower needs are low, then it ought be harder for a young man of moderate or low "quality" to enter the military, regardless of the economic conditions in his local area. We argue, then, that supply decisions reflect state conditions, whereas demand constraints reflect aggregate supply and military needs and thus are influenced by national conditions.

Assuming demand constraints do in fact arise from national conditions while supply behavior is determined only by local conditions, we can construct a simple model that captures the effect of both supply and demand in a simple specification. If we think of equation (1) as reflecting desired, rather than actual, enlistment, then we need to multiply the result by an acceptance rate to get actual enlistments. The fraction of any group that actually is accepted will depend on the "tightness" of the nationwide military manpower market and on the group's quality. The tightness will depend on the aggregate number of recruits the army decides it needs and on the aggregation of supply decisions of all groups in all areas. The aggregate supply effects could be captured by national unemployment rates and national average pay scales. For any group then we might write:

$$(2)\quad FRACT_t = b_0 + \underset{(+)}{b_1 M_{Nt}} + \underset{(-)}{c_1 U_{Nt}} + \underset{(-)}{c_2 PAY_{Nt}} + \underset{(+)}{c_3 W_{Nt}} + e,$$

where

$FRACT_t$ = log of fraction of those desiring enlistment who will be accepted for service,

M_{Nt} = log of national enlistment levels for all groups relative to population (assumed exogenous),

U_{Nt} = national average civilian unemployment rate,

PAY_{Nt} = log of expected military pay and benefits (uniform nationally),

W_{Nt} = national average of log of expected civilian pay and benefits.

The coefficients will, of course, vary depending on the group, reflecting their quality. For groups facing no demand constraints, all coefficients would be zero and b_0, and the intercept will be 0 (since the fraction is in logs). For other groups, the level of military manpower needed and national average economic conditions will play a role. Putting together equation (1), which is reinterpreted as a potential enlistee equation, and equation (2) yields:

$$(3) \quad LENLIST_{it} = \underset{(+)}{a_1 U_{it}} + \underset{(+)}{a_2 PAY_{Nt}} + \underset{(-)}{a_3 W_{it}} + \underset{(+)}{b_1 M_{Nt}}$$
$$+ \underset{(-)}{c_1 U_{Nt}} + \underset{(-)}{c_2 PAY_{Nt}} + \underset{(+)}{c_3 W_{Nt}} + u_i + e.$$

This equation thus contains information on both local and national economic conditions. This model offers several appealing features. It captures both supply behavior and demand constraints. For groups that really are not constrained, the b and c coefficients should be zero. Logically, enlistment among groups that can join in unlimited numbers should only be influenced by the economic conditions they face. The level of military manpower or economic conditions in other areas should not make any difference. For those who are completely demand constrained, local economic conditions should not influence the numbers accepted for service and the a coefficients will be zero. In their case, only those factors influencing overall "tightness" in the military manpower market should enter.

Thus this specification allows an easy test of the extent to which enlistment behavior reflects supply behavior or military demand constraints. Note that this equation simplifies to equation (1) for groups that are truly unconstrained. It thus offers an easy way to test the assumption made by Brown and others that various "high-quality" groups are not effectively limited by demand.

The model also offers a relatively easy way to explore the influence of the military on the labor market for various groups. Equation (3) implies that the military will mitigate adverse economic conditions for groups whose supply effects dominate any demand constraints. For those where demand forces dominate, if economic conditions were to worsen everywhere, the military would exacerbate the economic problems by reducing the number of people it accepts. However, so long as there is any supply response for the group, conditional on a particular level of national economic conditions, the military will tend to be an equalizing influence on geographic variations in unemployment.

This model also reveals the dangers of estimating equation (1) for a group that does indeed face constraints. Certainly we would expect the national unemployment rate to be correlated with the local one. Since equation (1) includes only the local rate, its coefficient will pick up both the supply effect, which is positive, and part of the demand constraint effect, which is negative. The coefficient will understate the impact of unemployment on military supply. The problem is particularly evident for estimating the impact of military pay. The coefficients a_2 and c_2, which capture the national and local effects of military pay levels, cannot be estimated separately since there are no local variations in military pay.[2] As a result, the coefficient on military pay does not capture the true supply effect of higher pay for any group facing demand constraints. Thus past research may have understated supply responses if they were measured for groups that were demand constrained. This understatement may explain why Brown found smaller effects of local unemployment and pay for enlistments of all persons than for enlistments of high-quality enlistments only.

This model is not without limitations. Separate identification of supply and demand effects depends critically on the assumption that supply is only influenced by local conditions. For groups that operate in a market larger than the state market, enlistment supply may be influenced both by local and national economic conditions. Then the coefficient on national unemployment would reflect both the negative effect of high average unemployment due to demand constraints and the positive supply effect because of the effect of national conditions on enlistment decisions. This problem probably will be least serious for groups most likely to be demand constrained. In general one would expect that less skilled and more poorly educated young men are less mobile and compete in a smaller labor market.

An exactly analogous situation could arise if there is measurement error in state unemployment rates. Once again national unemployment rates would capture some of the supply response, in this case because national rates are partially controlling for local economic conditions. The measurement error problem would probably be exacerbated by allowing for state fixed effects.

Another possible problem arises if national enlistment levels are not completely exogenous. If levels are at least in part influenced by the supply decisions, then the coefficient on the national aggregate level of manpower will be biased upward, giving the appearance of a demand constraint.

We estimate this enlistment model for various racial and educational groups over the postdraft period. For those whose enlistment behavior is influenced by supply constraints, the military can be said to be an

employer of last resort. For those who are relegated to a residual group, the military is a desirable but cyclically sensitive employer.

5.3 Data

Enlistment to Population

The Defense Manpower Data Center provided us with data on accessions by state, by individual years of age, by race, and by either education level or achievement level on the AFQT qualification test between 1973 and 1982. We grouped these into the age groups most commonly used in labor market research—16 to 19 and 20 to 24. As a denominator for our dependent variable, we used unpublished Department of Labor (DOL) information providing population figures by age group and race.

For each age and race group, we look at four different groups of enlistees—all young men, high school graduates and high school dropouts, and those with high scores (mental categories I, II, or IIIA) on the AFQT. We would like to form enlistment-to-population ratios for each group, but population figures are only available for these by age group, race, and state, on an annual basis. Thus we simply divide the number of enlistees in each group by total population in the age and race group to form employment-to-population ratios. Since we are using logs and allowing for state fixed effects, so long as each group is a roughly constant fraction of the population group in the the state, there will be little impact on the results.

Brown used information on contracts signed by state rather than accessions. Since the time between contract signing and enlistment can be a period of many months, if accessions are used, economic conditions probably ought to be lagged. In our work we found that economic conditions lagged one year performed much better than current conditions.[3]

Unemployment

In principal, the model calls for group-specific state unemployment and pay rates. State-level data on annual employment and unemployment are available by age and race from the BLS. We experimented with using group-specific rates, but there is a potentially serious simultaneity problem. If the military serves as an employer of last resort, it will mute the unemployment rate. If it serves as a procyclical employer (as predicted for the lower-ability groups), variation in enlistments will tend to increase unemployment volatility. Youth rates are

also subject to measurement error, particularly rates for nonwhite youths.

The natural way to solve the problem is to instrument the appropriate unemployment rate with something like the prime-age adult rate. While we performed these regressions, we found that interpretation was simpler if we entered the adult rate (for persons aged twenty-five to sixty-four) directly as our measure of unemployment. These data were provided by DOL for most states after 1976 and for about half of them prior to that time. When this variable was missing, we simply excluded the observation.

Military Pay

Information is available on basic military compensation of first-year enlistees, including the value of allowances and tax advantages. But the military offers a rich array of other benefits. The best known are various educational benefits. These have changed over time with the replacement of the GI bill in 1977 for new recruits. Initially benefits were smaller than previously, but the package has been sweetened for recruits serving in various military occupations deemed relatively undesirable. In addition there are very sizable pension benefits available to persons who stay at least twenty years (see Phillips and Wise, and Frant and Leonard, this volume.) Brown (n.d.) and Dale and Gilroy (1983) included various measures of military compensation with varying degrees of success. Brown found that educational benefits were roughly ten times more valuable than basic pay—an extremely anomalous result. We experimented with Brown's education variable and found the results difficult to interpret. Thus we chose to include only basic military compensation in our models. This area clearly merits closer attention.

Civilian Pay

State-level pay for different demographic groups by year and state is not readily available. But if it were, it would likely suffer from the same simultaneity and measurement error problems as unemployment. Thus we followed Brown's lead and used average monthly earnings of private workers based on unemployment insurance records. Nearly all workers are included in this measure, and they include both covered and uncovered earnings. These were deflated by an index that is again similar to Brown's. It is based on the BLS Urban Family Budget series for various metropolitan areas and for nonmetropolitan areas by region. Each state's index was derived by using a weighted average of budget indexes for cities in that state (if any) and the regional nonmetropolitan indexes.

Total Enlistments

For the level of total enlistments, we used the aggregate of all state-level enlistments for all persons between ages sixteen and twenty-four. The variable did not vary depending on the subgroup being studied. There is a chance that using this aggregated figure will introduce some bias, but we found that our results were largely unaffected by the particular choice of total enlistment variable.

5.4 Results

Roughly 2.5 percent of all 16-to-19-year-olds enlisted per year, and roughly 0.8 percent of those aged 20 to 24 enlist in a given year. While such small figures might suggest that the likely impact of the military enlistments on youth labor markets is small, several features of the military suggests its impact may be reasonably large. In a steady state these enlistment figures imply that 15 percent of youths in each cohort enlist at some time between their sixteenth and twenty-fifth birthdays.[4] Most enlistment occurs after high school when young men are eighteen and nineteen. Thus for those age groups, its impact is magnified.

Moreover, for certain groups, particularly nonwhites, enlistment rates are much higher. Some 3.5 percent to 4 percent of all nonwhite youths aged 16 to 19 enlist; 1.6 percent of those aged 20 to 24 do. Since only about one nonwhite teenager in three has a civilian job, military enlistment could be seen as adding to the job total by 10 percent each year. The figures imply that between 20 percent and 25 percent of all nonwhite youth will enlist in the military at some time. Clearly a sizable change in the number of enlistments in the military could imply an important reduction in total employment—civilian plus military.

Figure 5.1 shows the pattern of enlistments of young men aged 16 to 24 as a fraction of the youth population between 1973 and 1982. The base year of 1982 where the enlistment-to-population ratio was .012 is taken to be 100. The unemployment rate, lagged one year to account for the lag between signing and accession, is shown also. There is a strongly discernible downward trend in enlistments over the period, with a particularly large fall between 1977 and 1978. There does not seem to be any discernible link between national unemployment rates and enlistments. Indeed unemployment was often rising while enlistments were falling. A simple regression of enlistment-to-population ratios on national unemployment rates and a time trend yields a small and insignificant relationship. The result is typical of those in the literature which show little impact of national unemployment rates on overall enlistments. The result also suggests that it may be appropriate to take national enlistments as largely exogenous in our models.

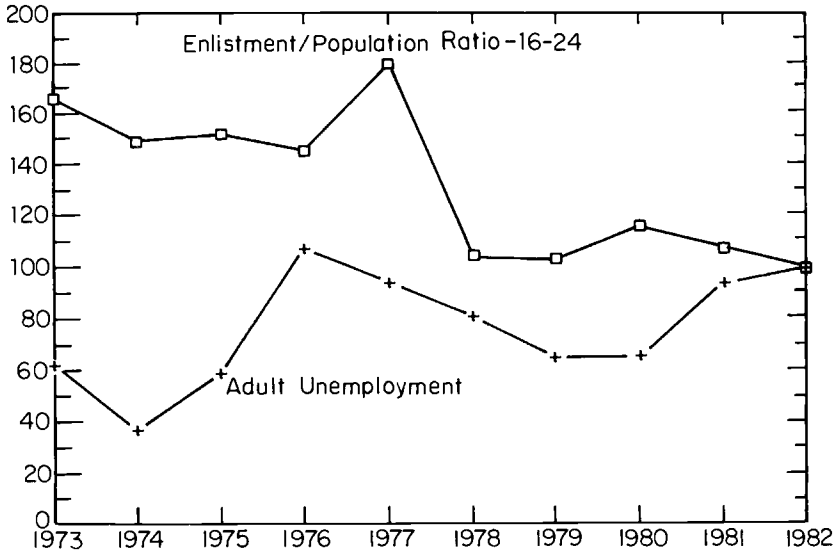

Fig. 5.1 Enlistment versus lagged unemployment relative scales. *Note:* 1982 = 100.

5.4.1 Results for 16-to-19 and 20-to-24-Year-Olds

Our estimation strategy calls for regressing enlistments in a state on both national- and state-level unemployment and civilian pay variables, along with national data on military pay scales and total military enlistments. Table 5.1 shows our results for all youths aged 16 to 19 and those aged 20 to 24. All models allow for state fixed effects by using deviations from state means for all variables. Because deviations are used, the R^2 accurately captures the extent to which our independent variables explain the variation in enlistments.

The results for the younger age groups are extremely good. All signs are as expected, and most are significant. We clearly capture some supply side responses even for the overall age group because both local unemployment rates and local pay scales influence enlistment. According to these results, a one percentage point increase in the adult state unemployment rates will increase enlistment among the age group by 1 percent. This is not a particularly large response considering that the mean adult unemployment rate is just over 4%. Similarly the supply elasticity of enlistment with respect to the state pay variable is 0.4. When wages rise by 1 percent in the state, enlistment falls by 0.4 percent.

These responses are smaller than those found by Brown in his recent work. Although he concentrates on supply responses of so-called high-quality recruits, he estimates one model for all youth. He finds that a

Table 5.1 **Regression Results for State Enlistment/Population Ratio by Age Group**

Variable	Mean (standard deviation)	Regression Coefficient (standard error) (1) Ages 16–19	(2) Ages 20–24
Log of 16–19 state enlist/pop (dep. var. for [1])	3.36 (0.29)	—	—
Log of 20–24 state enlist/pop (dep. var. for [2])	2.12 (0.31)	—	—
State adult unemployment	4.14 (1.82)	0.010 (0.005)	0.049 (0.006)
Log of state pay level	5.78 (0.10)	−0.43 (0.16)	−0.23 (0.20)
Log of national enlist/pop for all young men 16–24	2.74 (0.21)	1.07 (0.05)	0.88 (0.07)
National adult unemployment	3.95 (1.09)	−0.026 (0.008)	−0.018 (0.010)
Log of national pay level	5.81 (1.20)	0.41 (0.31)	−2.01 (0.38)
Log of basic military compensation	8.31 (0.70)	0.62 (0.48)	0.36 (0.60)
Time trend (year)	78.1	0.01 (0.01)	0.02 (0.01)
Intercept	1.0 (.0)	−1.03 (0.77)	−1.39 (0.95)
Number of observations	—	423	423
R^2	—	0.78	0.61

Notes: All regressions allow for state fixed effects by using deviations from state means. All regressions were weighted by the square root of the state population aged 16 to 24. Means shown above are weighted means for the sample before state means are subtracted out.

percentage point rise in unemployment increases youth enlistment by closer to 5 percent. The greater responsiveness may be explained by Brown's use of quarterly data rather than annual data and his use of new contracts rather than accessions. Brown's results are rather puzzling, though, since his equation clearly implies that a uniform increase in unemployment everywhere would lead to a sizable increase in the size of the military—even though other evidence suggests that total enlistments are not very sensitive to economic conditions.

Unlike Brown, we include national measures of unemployment, average civilian pay, and total military enlistments in our model to capture the influence of demand constraints. The variables show strong evidence of such constraints for youths 16 to 19. A one point increase in the national adult unemployment rate reduces enlistments among this

group by 2.6 percent. Presumably the military is able to turn to older recruits (or use reenlistment) to meet its manpower needs when civilian economic conditions are weak. Furthermore, a 1 percent increase in the size of enlistments nationally will lead to a 1.1 percent increase in the number of 16-to-19-year-olds enlisting, again suggesting that their numbers are constrained. High national civilian pay makes the military less attractive to others and ought to increase opportunities for a constrained group. Such a response is observed, but the coefficient is insignificant.

We noted in our previous discussion that the military pay variable is difficult to interpret for any group facing demand constraints. On the one hand it encourages increased supply, but since it encourages increased supply of all groups, it also increases the demand constraints. Overall for this group, the supply effect appears to outweigh the demand effect, but the impact is insignificant.

Thus both supply and demand forces seem to influence military enlistment among 16-to-19-year-olds. Enlistments will be drawn slightly disproportionately from areas suffering unusually high levels of unemployment or pay. But when times are bad and the military can get older recruits, it cuts back the number of younger recruits it will accept. The demand forces seem to predominate. If unemployment were to rise everywhere (so that both state-level and national-level rates rise by the same amount), the total number of recruits from the younger age group would fall.

For 20-to-24-year-olds, the data suggest that enlistment is influenced more by supply and less by demand forces. For this group a percentage point increase in unemployment yields a 5 percent increase in enlistment rates—a result closer to Brown's. By contrast a one point rise in the national rate pushes down enlistments by only 2 percent. Thus a rise in unemployment everywhere would increase the fraction of this group that enlists, just as it would diminish the the fraction of the younger age group. And similarly, whereas a 1 percent rise increased enlistment by younger recruits by more than 1 percent, a similar increase pushes up older recruits by less than 0.9 percent. The evidence suggests that the military has a slight preference for older recruits, that they turn to the younger groups more when manpower needs are greater or when civilian economic conditions inhibit the enlistment of the older groups.

One anomoly appears for this age group. Higher state civilian pay levels reduce enlistments as expected, but the impact is insignificant. National pay levels, which should enter positively, instead enter with a large negative coefficient. It is hard to see how such a result could be correct. One might argue that older workers are more likely to operate in a national market, and thus when national pay is high, it

inhibits supply even if local pay is low. While possibly plausible, it seems strange that national unemployment rates would enter with the correct sign, while national pay would enter strongly and significantly negative.

We generally found that the pay variables were unstable for many groups in many specifications. Often the state variable would be strongly negative and the national variable weakly positive—as it was for the younger group. For other groups or specifications, the state variable had little impact and the national variable was strongly negative.

We suspect the explanation lies in the fact that both national and state pay levels are deflated to account for price changes. A large part of the variation in real wages over time is caused by variation in the deflators. (Recall that "permanent" state differences in pay levels and prices are captured by the state fixed effects.) Each state has a different deflator, but much of the variation in state indexes over time is almost certainly caused by variation in national policies and prices. Thus the two pay variables are highly collinear and may primarily reflect variations in prices over time. We tried entering the price indexes as separate variables, but this tended to create instability in all the various pay and price variables, suggesting that the price index explanation may be correct.

Generally the estimated effect of the military pay variable was also weak. This is less unexpected since its coefficient captures both supply and demand effects. But its sign, which ought to be positive when supply forces dominate and negative when demand constraints are most powerful, was often wrong, and occasionally significantly wrong. We conclude that in this data it simply is impossible to ferret out the separate effects of national and state civilian pay or the role of military compensation. Brown's findings on the effect of pay variables were similar. Occasionally the sign on civilian pay was incorrect, and two forms of military pay gave wildly different elasticities and occasionally opposite signs.

Although the pay variables are unstable, the unemployment coefficients seem quite insensitive to the pay specification used. Our results are almost identical if no pay variables are used. However, it is clearly inappropriate to exclude pay variables. Rather, it is just difficult to interpret the separate coefficients. Thus all equations were estimated using the previous pay variables. But we choose to look only to the unemployment and national military enlistment variables to explore the relative importance of supply and demand forces in influencing enlistment. And since our interest here is primarily in the relationship between the youth labor market and the military, we are not particularly troubled by our inability to generate reliable results on pay effects.

We have already noted that our inclusion of the national level of enlistment in the equation raises another source of possible concern.

Since the national enlistment level is merely the aggregation of all state-level enlistments, its exogeneity is questionable. It arguably should be excluded. Fortunately our unemployment results are almost entirely unaffected by its inclusion or omission. How the level of enlistments of particular groups responds to variations in national manpower needs is extremely important, and the variable casts considerable light on the extent to which supply or demand forces seem to dominate. Still, its coefficient must be interpreted cautiously.

5.4.2 Results for Various Subgroups

Table 5.2 shows the coefficients on state and national adult unemployment rates and on national aggregate enlistment levels for various

Table 5.2 **Percentage Change in State Enlistments as a Result of Changes in State Unemployment, National Unemployment, and the Level of Enlistments Nationally of Young Men Aged 16–19**

Subgroup	Impact of a One Point Rise In Adult Unemployment		Impact of a 1% rise in Total Military Enlistments
	State Unemployment	National Unemployment	
All men 16–19	1.0	−2.6	1.07
	(0.5)	(0.8)	(0.05)
Whites	1.6	−0.8	1.04
	(0.5)	(0.8)	(0.05)
Nonwhites	−0.7	−11.1	1.21
	(1.0)	(0.2)	(0.12)
High school grads 16–19	3.3	1.3	0.96
	(0.1)	(0.1)	(0.06)
Whites	3.9	3.3	0.95
	(0.1)	(0.1)	(0.06)
Nonwhites	1.4	−7.4	1.04
	(1.2)	(2.0)	(0.12)
High school dropouts 16–19	−5.3	−10.5	1.34
	(0.7)	(1.2)	(0.08)
Whites	−4.6	−8.0	1.23
	(0.7)	(1.2)	(0.08)
Nonwhites	−9.7	−22.7	1.82
	(1.9)	(3.1)	(0.19)
High-scoring recruits 16–19	2.3	5.8	0.58
	(0.5)	(0.8)	(0.05)
Whites	2.6	5.7	0.61
	(0.5)	(0.8)	(0.05)
Nonwhites	1.1	6.3	0.30
	(0.1)	(2.5)	(0.15)

Notes: Figures shown are regression coefficients. Coefficients for unemployment are multiplied by 100 percent. Models also include civilian pay, national civilian pay, military pay, time trend, and state fixed effects. All models were weighted by the square root of white or nonwhite population aged 16 to 24. Standard errors shown in parentheses.

subgroups of the 16-to-19 population. The results show that supply and demand forces play very different roles in enlistment behavior of the several groups.

Whites versus Nonwhites

The racial differences are quite pronounced. A one percentage point increase in state unemployment rates has a small but significant effect on white enlistment rates, but virtually no effect on nonwhite enlistment. A similar increase in national unemployment has a very small negative effect on white enlistment, but it causes a remarkable 11 percent decrease in nonwhite accessions. Similarly a 1 percent increase in the overall size of the military leads to only a 1.04 percent increase in enlistments by whites, but it creates a 1.21 percent increase in enlistment of nonwhites.

There is considerable evidence here that nonwhites are in excess supply for the military. Weak local conditions do not lead to increase in local enlistments. But a weak national economy sharply reduces the number of nonwhites enlisting. It appears that the number of nonwhites in the military over the business cycle is determined entirely by demand constraints.

Our results should not be interpreted as indicating that the military has not at least partially offset the effect of disproportionately high unemployment rates for nonwhite youths. The influence of permanent differences in unemployment rates among groups will not be captured by our method since the state fixed effects eliminate all but temporal variation. That is, our method is only able to detect supply and demand responses over the cycle.[5] Still, the results raise the possibility that increases in nonwhite enlistments do not reflect increased supply of nonwhites, rather the results may reflect decreased supply of whites, thereby freeing up positions for nonwhites.

High School Graduates

We would expect that supply responses would be more important and demand constraints less significant for groups of relatively high-quality recruits. For high school graduates overall, the results certainly bear out this expectation. Whereas the impact of a one point increase in state unemployment is to increase enlistment for all youth just 1 percent, for high school graduates it pushes up enlistment by over 3 percent. And national unemployment rates have an insignificant impact on total enlistments. Enlistments rise slightly less than in proportion to total national enlistments.

Here too there are sharp racial differences. For whites, state unemployment pushes up enlistment 4 percent for each percentage point rise; for nonwhites the rise is less than one-third that amount. And

national unemployment rates are actually *positively* correlated with enlistment of whites and *negatively* correlated for nonwhites. The result for whites is somewhat unexpected, but it is plausible. If the market for white high school graduates is at least partially national in scope, and if there are few demand constraints for that group, national unemployment may capture supply effects rather than demand constraints. According to this hypothesis, the enlistment behavior of groups that operate in a national rather than state market ought to be positively correlated with both state and national unemployment. For nonwhites, even high school graduates seems to be largely constrained by demand.

High School Dropouts

Things are very different for high school dropouts. Over our sample period they represented about one-third of all new recruits, but their numbers are severely influenced by economic conditions. Here demand constraints are dominant. A rise in national unemployment causes an 8 percent fall in enlistment among whites and a 23 percent fall for nonwhites. In this case even increases in state unemployment reduce enlistment among dropouts. The implication appears to be that even local areas have some demand constraints.[6] When the military's manpower needs increase, dropouts benefit disproportionately. Nonwhite dropouts, for example, increase almost twice as quickly as the military as a whole. Dropouts clearly are a group that is almost wholly demand constrained. Forces that reduce the desirability of military service or increase the need for military manpower help dropouts a great deal. For whites the figures imply that a one point increase in unemployment in all states would reduce dropout enlistment by 13 percent. For nonwhites, they imply an astonishing 33 percent.

High-Scoring Recruits

The white versus nonwhite differentials are troubling, but difficult to interpret since there is little way to judge whether marginal enlistees among the two groups are similar in "quality." Thus we also explored enlistments of those who score highly on the AFQT qualification test. In this case, the patterns are similar for whites and nonwhites.

For both groups, both state and national unemployment rates have a positive effect on enlistment, and quite interestingly, the national affect is larger than the local one. Apparently these "high-quality" youth operate more in a national than a local market. It is also possible that the availability of the kinds of white-collar jobs that they presumably seek is more sensitive to national economic conditions than to local ones. There is little evidence of significant demand constraints for this group. The size of the military affects the number of such persons hired—indicating some constraints, but the elasticities are small.

For nonwhite youths, a 1 percent increase in the military alone leads to just a 0.3 percent jump in high-quality enlistments. For both groups, a single point rise in unemployment rates everywhere leads to roughly an 8 percent increase in high-quality enlistments. These results are similar to those found by Brown for high-scoring high school graduates.

Results for similar subgroups aged 20 to 24 are shown on table 5.3. The results for the older age group are very similar to those for the younger group. In general the results seem slightly more sensitive to supply side and slightly less constrained by demand, but for both groups they are similar.

The findings shown in tables 5.1, 5.2, and 5.3 are almost completely consistent with the basic theory set forth previously. Certain groups

Table 5.3 **Percentage Change in State Enlistments as a Result of Changes in State Unemployment, National Unemployment, and the Level of Enlistments Nationally of Young Men Aged 20 to 24**

Subgroup	Impact of a One Point Rise In Adult Unemployment		Impact of a 1% Rise in Total Military Enlistments
	State Unemployment	National Unemployment	
All men 20–24	4.9	−1.8	0.88
	(0.6)	(1.0)	(0.06)
Whites	6.1	−0.9	0.82
	(0.6)	(0.1)	(0.06)
Nonwhites	1.5	−9.8	1.11
	(1.0)	(2.1)	(0.13)
High school grads 20–24	6.5	1.5	0.76
	(0.6)	(1.0)	(0.06)
Whites	7.6	3.9	0.72
	(0.6)	(1.0)	(0.07)
Nonwhites	2.2	−6.0	0.96
	(1.3)	(2.1)	(0.13)
High school dropouts 20–24	−3.0	−11.7	1.30
	(1.0)	(1.6)	(0.11)
Whites	−1.4	−7.8	1.17
	(0.8)	(1.6)	(0.10)
Nonwhites	−11.0	−23.0	1.76
	(2.0)	(3.3)	(0.21)
High-scoring recruits 20–24	6.4	5.9	0.47
	(0.6)	(1.0)	(0.07)
Whites	7.0	6.2	0.51
	(0.6)	(1.1)	(0.07)
Nonwhites	2.8	5.8	0.27
	(1.5)	(2.4)	(0.15)

Notes: Figures shown are regression coefficients. Models also include state civilian pay, national civilian pay, military pay, time trend, and state fixed effects. All models were weighted by the square root of the white or nonwhite population aged 16 to 24. Standard errors shown in parentheses.

seem to face severe demand constraints while the behavior of others is largely supply determined. Enlistments of groups expected to be in excess supply for the military seem to be determined largely by demand constraints; enlistments for those in excess demand seem to primarily reflect supply conditions.

5.5 Implications for Youth Labor Markets

For those groups deemed highly desirable, the military serves as the employer of last resort, at least to some degree. When civilian economic conditions worsen, these youths always have the option of enlisting. If flows into the military are large relative to employment or unemployment, the military can serve as a mitigating force for these groups. In geographic areas where jobs are limited, in times when national economic conditions are bad, or if members of this group are suffering disproportionate economic hardship for some reason, military enlistment can help.

High-scoring youths, white high school graduates, and older whites all fall in the largely excess demand group. For all of these, enlistment is sensitive to local conditions, and even if economic conditions worsen everywhere, their numbers will increase in the enlistment pool.

By contrast, for groups in excess supply, the military offers a far less desirable picture. When conditions worsen everywhere, the number of such youths enlisting clearly falls—thereby worsening the already bleak employment outlook. The military may serve to mitigate some of the geographic or demographic differences between groups, but since the group is in excess supply already, these effects are likely to be small.

All dropouts and nonwhite youths who do not score well on the AFQT clearly are in excess supply. For these groups the observed supply responses are minimal. They fare best when national economic conditions are good and when the military has unusually large manpower needs. Over the national business cycle at least, for these groups the military exacerbates rather than mitigates economic conditions.

The overall significance of these effects for youth labor markets can be seen on table 5.4. The table shows the impact that a one percentage point increase adult unemployment rates everywhere would have on civilian employment rates and military enlistment by age and racial group. For whites, the military mitigates adverse economic conditions slightly. While civilian employment falls by 4.1 percent for 16-to-19-year-olds and 2.7 percent for 20-to-24-year-olds, military enlistment rises by 1 percent in the younger group and 5 percent in the older one.[7] If we see each military job as equivalent to a civilian one, total employment fell by slightly less than civilian employment. Military enlistment in any one year is less than 2 percent of total employment for

Table 5.4 **Impact of a One Percentage Point Change in Adult Unemployment for a Single Year on Civilian Employment and Military Enlistment, by Race and Age Group**

	Whites 16–19	Nonwhites 16–19	Whites 20–24	Nonwhites 20–24
Percentage change in civilian employment[a]	−4.1	−4.5	−2.7	−6.6
Percentage change in military enlistment	0.8	−11.8	5.2	−8.3
Enlistment as a percentage of civilian employment	3.9	11.6	0.9	3.2
Total percentage change in civilian employment plus military enlistment	−3.9	−5.3	−2.6	−6.6

Note: All figures are derived assuming that adult unemployment in all states rises by one percentage point.

[a]Derived from an equation using the same dependent variables as in enlistment models, including state and national unemployment and state fixed effects.

both age groups, so total employment is changed only slightly by the increase in military service. Thus while the change in enlistment is sometimes dramatic in percentage terms, as a fraction of total employment for whites, the changes are not particularly large. The military is a slight mitigating factor in the labor market.

For nonwhites, results are more dramatic. A one point rise in adult unemployment rates pushes civilian employment down by 4.5 percent, and it reduces enlistment by 12 percent for the younger men. Since the ratio of enlistment to civilian employment is roughly .12, civilian employment plus enlistments fall by 5.3 percent—nearly a one-quarter greater fall than the civilian impact alone. The impact of a single year of high unemployment magnifies the job loss. And if high unemployment were to persist for several years, the job loss will be magnified because military employment lasts for several years at least. Moreover, enlistment is concentrated in persons aged eighteen and nineteen, so the impact for that group is certainly even larger. For older nonwhites, the reductions in military enlistment also add to civilian job losses, though the effects are less dramatic.

5.6 Conclusion

We estimated a straightforward model of military enlistment by state. The pay variables were unstable, but the unemployment results were extremely reasonable and informative. The military does serve as a kind of employer of last resort for certain groups deemed "high quality"

by the military. The sensitivity of enlistments to economic conditions is large in percentage terms for such groups, but small as a fraction of the total employment. Small proportions of these groups enlist even in poor economic times.

By contrast, military enlistment seems to exagerate the civilian economic conditions for those at the bottom of the military hiring queue. Among nonwhites, the results are particularly dramatic because so few nonwhites have jobs and enlistment is disproportionately high. For them, fluctuations in military enlistments imply relatively large fluctuations in total employment. The fact that their enlistment behavior is almost unaffected by cyclic conditions shows clearly that they are in large excess supply to the military. While such excess supply could be caused by strong tastes for military service, a far more plausible explanation seems to be that they are in excess supply for comparable jobs in the civilian sector. Thus the results can be interpreted as offering at least limited support to the hypothesis that demand shortages in the civilian market are an important cause of nonwhite unemployment.

The results also imply that an expanding military will disproportionately benefit groups that generally fare less well in the labor market—nonwhites and high school dropouts. Clearly these groups benefited from the move to an all-volunteer army, at least in the sense that they now enlist in larger numbers.

There is one other intriguing finding here. We found that national economic conditions are actually a better predictor of enlistment supply behavior than are local ones for certain very-high-scoring recruits. For "lower-quality" groups the reverse seemed true. It is tempting to conclude that the size of the labor market varies directly with "quality."

Notes

1. See for example, Ash, Udis, and McNown 1983; Cooper 1977; Fisher 1969; Grissmer 1979.

2. Arguably, real military pay varies due to differing local price levels. Brown convincingly argues that military pay will not necessarily be spent in the local area, so this variation is probably not a legitimate way to separately identify a_2 and c_2.

3. See Brown (1985) for a discussion of various issues surrounding the lagging of economic conditions and for a discussion of the advantages of using contract signings rather than enlistments.

4. The military actually requires that all new recruits be at least seventeen years old.

5. In principal, the method could be used to detect the effect of variations in group-specific unemployment rates over time, and thus to detect whether long-run declines in black employment seem to have stimulated military en-

listment by nonwhites. We tried using the state employment-to-population ratio for nonwhite youths as our measure of local economic conditions, but still found no effect on local conditions.

6. The military operates on a local quota system that could have the effect of imposing state or local demand constraints to some degree.

7. It may appear that we are comparing stocks and flows on table 5.4. However, the change in employment is a flow as is the change in enlistment. We have not explored whether flows out of the military into civilian life are reduced in poor economic times.

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