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4 Military Hiring and Youth Employment

David T. Ellwood and David A. Wise

One of the most dramatic changes in the 1970s was a substantial reduction in the size and composition of the military. While these changes have been widely noted in popular discussion, they have received surprisingly little attention in the youth employment literature. The silence may, in part, reflect uncertainty about how to treat the military. Most authors are interested primarily in assessing the performance of the civilian labor market, and data are almost always collected only for those in the civilian population.

The military is a major employer of men between the ages of eighteen and twenty-four. Obviously the need for military personnel serves as an additional labor demand for young men. At the same time, military employment is often regarded as very different from civilian employment. The working conditions, the skills, the commitment, and the risks may indeed differ enormously between the sectors, and the working conditions within the military obviously vary depending on whether the country is fighting a war. Moreover, the nature of the selection process changes from year to year. In draft years, the proportion of the eligible population inducted and the rules for deferral or avoidance are quite variable. With the volunteer army, rigid pay rules and working conditions may deter many of the most able or educated young men, while the military may reject those with comparatively low skills. The vast complexity of the issue, coupled with poor data, probably has led most authors to ignore it entirely.

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Yet changes in the military over the past several decades have been dramatic and may have had a substantial impact on the youth labor market. There has been a sizable long-term decline in the relative number of young men in the military over the last three decades, interrupted only by the Vietnam War. The decline in military manpower in the 1970s effectively increased the civilian 18-to-24-year-old labor force at least as much as the baby boom did during this decade. Figure 4.1 shows that in 1952 nearly one-third of all 18-to-24-year-old young men were serving in the military. By 1964 the proportion had fallen to 15 percent. But by 1979, only 7 percent of the age groups are military personnel. The possible impact of these declines can be gleaned by contrasting them to the baby boom rises of the 1970s. Between 1969 and 1979, the total male population aged eighteen to twenty-four rose 25 percent. However, the total male *civilian* population jumped by over 50 percent. Thus, at least one-half of the rise could be traced directly to the decline in the role of the military. By contrast, in the previous decade the total population had risen 50 percent but the civilian pop-

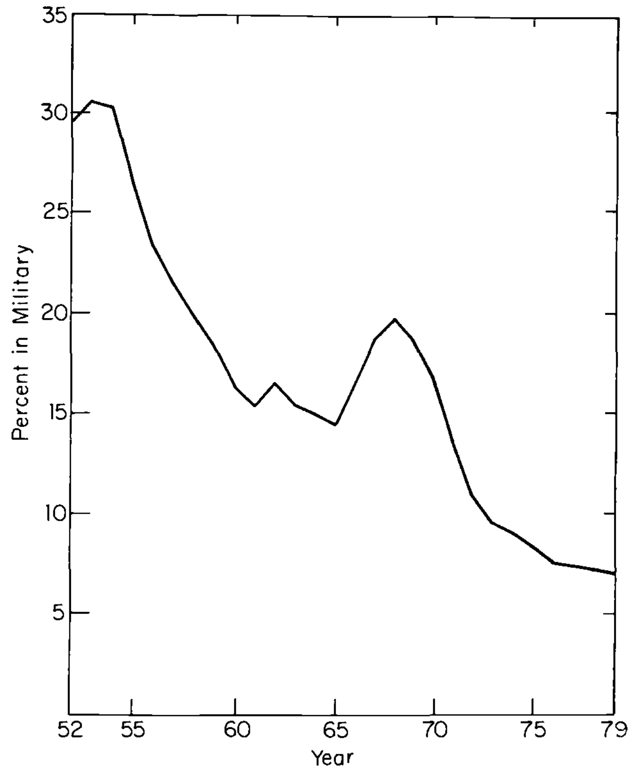

Fig. 4.1 Percentage of all men aged 18 to 24 in the military.

ulation had grown by slightly over 40 percent. In fact, although the baby boom occurred primarily during the 1960s, the growth in the civilian labor force of persons aged eighteen to twenty-four was actually greater in the 1970s.

Between 1969 and 1978, the proportion of young whites in the military fell precipitously while the proportion of young blacks remained relatively constant. Figure 4.2 shows that after the Vietnam War, the proportion of young whites between eighteen and twenty-four doing military service fell sharply. After peaking at roughly 20 percent, the proportion fell to under 7 percent in 1978. At the military peak in the late 1960s, whites were actually proportionately more common than blacks, with only 16 percent of blacks and 20 percent of whites serving. But the falloff in service for blacks was much smaller in the 1970s. Beginning in 1973, young blacks have been found in the military in disproportionate numbers. By 1978, blacks were twice as likely as whites to have enlisted.

During the 1970s the racial gap in employment rates of men aged sixteen to twenty-four grew by 14 percentage points. Yet it is unclear how to treat the military. One logical treatment would be to include military personnel as employed and calculate employment-to-population ratios for the entire population (civilian and military). Such a calculation leads to a 10 point growth in the black/white employment gap over the 1970s rather than the 14 point growth based only on the civilian pop-

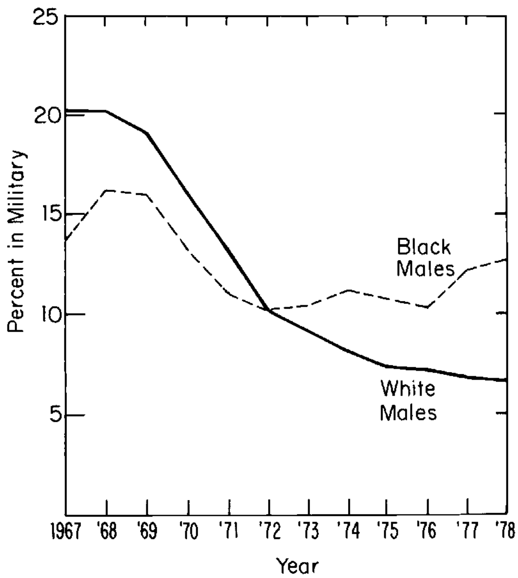

Fig. 4.2 Percentage of men aged 18 to 24 in the military, by race.

ulation. Since whites were disproportionately serving in the military in 1969, their employment rates are boosted more than those for blacks. Conversely, blacks were overrepresented in the later years so their employment rates are pushed up more in 1979. The net effect is that the racial employment gap grows by 3 to 4 points, less if serving in the military is treated as employment.

Because our subsequent analysis must rely on youths aged 16 to 24, rather than 18 to 24, the trend in military-personnel-to-population ratio for men 16 to 24 over the years 1972 to 1982 is shown in Figure 4.3. This figure is based on the data used subsequently in this chapter. For comparison, civilian-employment-to-total-population ratios are shown in figure 4.4. The gap between whites and nonwhites in this ratio grew by 10 percentage points between 1972 and 1982. If those in the military are included, the gap in the total employment-to-population ratio grew by about 7 points. Thus it is clear that military employment can have a substantial impact on the employment statistics that guide our evaluation of youth employment. But if military employment can be treated

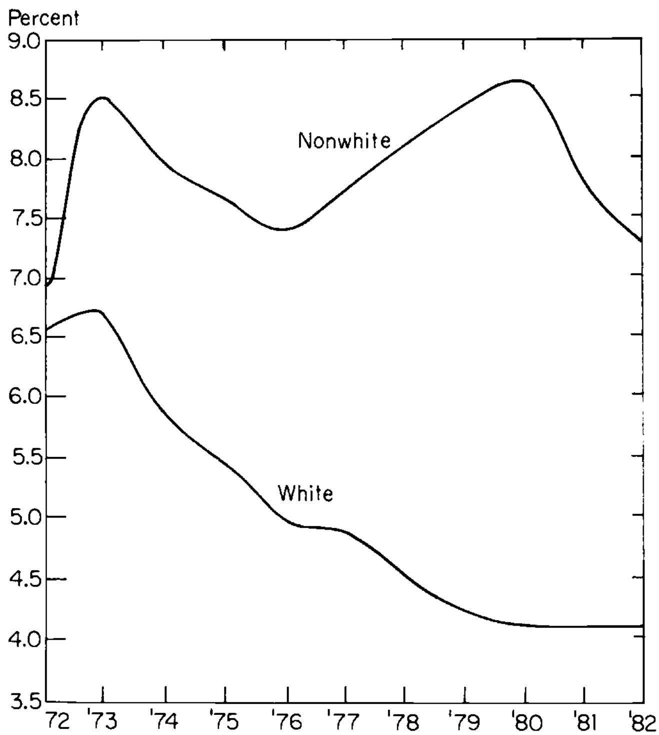

Fig. 4.3 Percentage of men aged 16 to 24 in the military, by race, 1972–82.

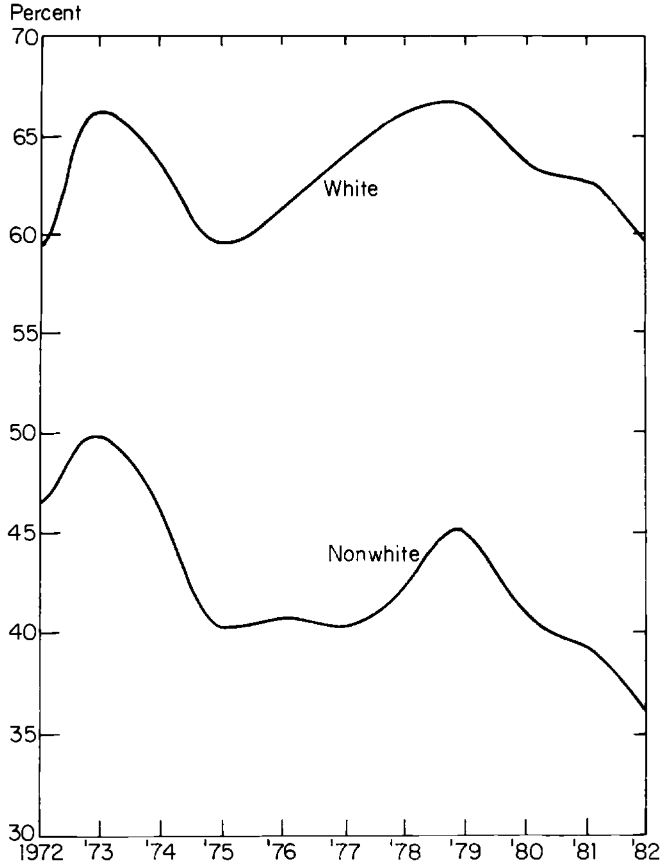

Fig. 4.4 Percentage of men aged 16 to 24 in civilian employment, by race, 1972–82.

as equivalent to civilian employment, this is largely an accounting problem. Yet there is little empirical research on this point. The reduction in the size of the military, however, could well have a much more fundamental impact on the youth labor market. The military has in the past served as a mechanism by which many youths make the transition from school to work. Possibly it was important in accustoming youths to the world of work; possibly it provided major vocational training that enhanced civilian labor force opportunities.

This chapter discusses the relationship between military hiring and youth employment in the civilian sector. If military employment is increased, does youth employment in the civilian sector decline? Or if a youth is employed by the military, is there no decline in civilian employment, thus indicating that an additional youth employed by the military means a net increase of one in the total number of youths employed? Thus while we know that counting youths in the military as employed has a substantial effect on perceived trends in youth employment, the question addressed here is a more behavioral one and requires statistical estimation.

To answer this question, we use cross-section time series data by state, covering the period 1972–82. The statistical model is a straightforward variance components one. Before describing this model, we first present in section 4.1 a description of the data. Then we return in section 4.2 to some details of the statistical approach. Finally, in section 4.3, we present parameter estimates. Concluding remarks are in section 4.4.

4.1 The Data

To analyze the relationship between military hiring and civilian employment, we have assembled what we believe is a unique set of data. It comes in two parts: first we have obtained from unpublished microfiche files, maintained by the Bureau of Labor Statistics, information on youth employment by state, race, age group (and sex). The data cover the years 1972–82. For the earlier years, information is not complete for all states, but after 1973 we have complete information for each state. Even for earlier years, complete information is available for the largest fifteen states. These data provide information on youth labor force participation, youth-employment-to-population ratios, and youth unemployment rates. It is important, of course, that we have the data by race. Joined with these data are comparable data for the adult labor force. The youth data are broken down by two age groups: 16 to 19 and 20 to 24.

From the Defense Manpower Data Center we have obtained data for the same years covering military personnel. The military data pertain to the stock of military manpower, that is, they tell us for each state in each year how many youths from that state are in the military at that time. The information is available for each age beginning with 17 through 35. For example, we know how many eighteen-year-olds in the military came from California. Of course, we can aggregate these data to obtain, for example, the number of California youths 16 to 24 who are in the military in any particular year.[1]

4.2 A Simple Statistical Model

To develop a relationship between military employment and civilian employment, we begin with the following identity:

(1)
$$P \equiv E + N + M;$$
$$E \equiv P - N - M;$$
$$\frac{E}{P} \equiv 1 - \frac{N}{P} - \frac{M}{X};$$

where

$P \equiv$ population,

$E \equiv$ number employed in civilian jobs,

$N \equiv$ number not employed,

$M \equiv$ number in the military.

We can think of the relationships in equation (1) as pertaining to any age group, in particular the age group 16 to 24, and applying in any state and in any year. In practice, we would like to think of each variable as indexed by state and year, but for convenience of exposition we will repress the indexes in the exposition. For the moment, assume that M is determined exogenously, that is, that military hiring is determined by military need and is unrelated to other economic phenomena.

To develop a behavioral relationship from the last identity in equation (1), we assume for the moment that while M/P may be determined exogenously, military hiring may affect the number of civilians who are without work, that is, military hiring may affect N/P. Suppose that the relationship is as follows:

(2)
$$\frac{N}{P} = a\frac{M}{P} + Xb + S + T + e\ ,$$

where X is a vector of variables and b is a vector of parameters, S is a state effect and T is a year effect, and a is a parameter that represents the effect of military employment on the number nonemployed in the civilian sector. Then the proportion of youth employed in the civilian sector can be described as

(3)
$$\frac{E}{P} = 1 - S - T\,Xb - (1 + a)\frac{M}{P} - e\ .$$

The state effect S should in principle be indexed by i and the year effect T by t; all other variables should be indexed by it, including the disturbance term e.

The parameter of most interest is $(1 + a)$. Notice that if $-(1 + a) = 0$, then $a = -1$. This means that an additional person hired by the military leads to one less youth not employed. If $-(1 + a) = -1$, then $a = 0$. This means that an additional person hired by the military has no effect on nonemployment or on employment in the civilian sector. These two values, or any values between -1 and 0, are plausible.

To some extent a simultaneous relationship exists between M/P and E/P. It is reasonable to suppose that when employment in the civilian sector is low, youths are more likely to enlist in the military. Of course the variable that we use on the right-hand side of equation (3) is a stock and represents the cumulative effect of enlistments over several years, not just employment in the year in question. Nonetheless, if enlistments are correlated over time, there is likely to be a negative relationship between the disturbance term e and military employment M, that is, civilian employment in year T is likely to be negatively related to military employment in that year. This would mean that our estimate of a is biased downward so that we underestimate the effect of military employment on nonemployment in the civilian sector.

To correct for this possible simultaneity, we present two-stage least squares parameter estimates, as well as ordinary least squares estimates. The instrument used in the two-stage least squares procedure is total military hiring in the previous year times the proportion of the total that came from a given state in the previous year. While in principle this lagged instrument may be uncorrelated with the current period disturbance term—as in equation (3)—if the disturbance terms are serially correlated then the instrument may also be correlated with the current period disturbance. Therefore, we have included in the two-stage least squares specification the lagged value of civilian employment to population. The remaining disturbance term would be uncorrelated with the lagged instrument.

The variables X in our specification are the adult unemployment rate and the ratio of the youth population to the adult population aged twenty-five to sixty-four. In most instances we have estimated equation (3) using state and year dichotomous indicator variables. This however, leads to a very inflated indication of the explanatory power of the specification. (Typical R^2 values are close to 1.) A more reasonable indication of the explanatory power of the model can be explained by asking what the effect of the continuous variables is when state and year variables are controlled for. To do this we can estimate the model in a more standard analysis-of-variance framework.

Consider first the variable E/P in the difference form,

$$\left(\frac{E}{P}\right)_{it} - \left(\frac{E}{P}\right)_{\cdot t} - \left(\frac{E}{P}\right)_{i\cdot} + \left(\frac{E}{P}\right)_{\cdot\cdot}$$

In this formulation $\left(\frac{E}{P}\right)_{\cdot t}$ indicates the average of E/P over all states in year t and $\left(\frac{E}{P}\right)_{i\cdot}$ indicates the average of all values of E/P in state i, and the term $\left(\frac{E}{P}\right)_{\cdot\cdot}$ represents the average of E/P over all years and states. If each of the variables x and M/P are defined in this way, then the state variables S and the time variables T are differenced out. This is the standard variance components way of obtaining estimates of the other parameters in the model corrected for unobserved state and year effects. There is, however, information in the estimated state and time effects, and we shall present them in some instances.

Finally, the variance of the disturbance term in equation (3) is of the form K/P_{it}. Thus we have in most instances estimated the relationship in equation (3) weighted by the square root of P_{it}.

4.3 Parameter Estimates

Estimates for youths aged 16 to 24 by race are presented first, followed by results for 16-to-19 and 20-to-24-year-olds separately and results based only on data for the years 1976–82. Finally, estimates are presented of the relationship between white youths in the military and civilian employment of nonwhites.

4.3.1 Estimates for Whites and Nonwhites 16 to 24

Parameter estimates for youths 16 to 24 are presented in table 4.1. Separate estimates have been obtained for whites and nonwhites,

Table 4.1 Parameter Estimates for Youths 16–24, by Race and Estimation Method

	Whites		Nonwhites	
Variable	OLS	2SLS	OLS	2SLS
M_{16-24}/P_{16-24}*	−.914	−.290	−.072	.195
	(.186)	(.279)	(.244)	(.325)
P_{16-24}/P_{25-64}	.038	.031	−.036	(.022)
	(.061)	(.071)	(.051)	(.061)
U_{25-64}	−.012	−.010	−.009	—
	(.001)	(.001)	(.003)	
$(E_{16-24}/P_{16-24})_{-1}$	—	.233	—	.128
		(.052)		(.061)

Note: Estimates are weighted by $\sqrt{P}$, where P is the population aged 16 to 24.
*Predicted value for 2SLS estimates.

and two-stage least squares as well as ordinary least squares estimates are shown. The estimate of primary interest is the coefficient on M_{16-24}/P_{16-24}. We rely primarily on the two-stage least squares estimates. For whites this parameter is estimated to be −.290. It indicates that when military employment is increased by 1, employment in the civilian sector declines by .29. The estimate is not significantly different from zero, however, and thus we cannot reject the hypothesis that an increase in military employment involves no loss in civilian employment. The estimate for nonwhites is .195 with a standard error of .325. Thus both estimates suggest that an additional youth employed by the military has essentially no effect on employment in the civilian sector. This means that one more youth employed by the military is essentially a net increase of 1 in the total number of youths employed. The estimates themselves, however, suggest some loss in civilian employment among white youths. The positive estimate for black youths would suggest that hiring by the military leads to more civilian employment as well.

We argued earlier that ordinary least squares estimates should exaggerate the decline in civilian employment associated with military hiring and that two-stage least squares estimates should if anything show less decline in civilian employment. A comparison of the ordinary least squares estimates in table 4.1 with the two-stage least squares estimates demonstrates findings consistent with our a priori reasoning. For both whites and nonwhites the two-stage least squares estimates are greater than the ordinary least squares counterpart. The difference is particularly pronounced for white youths. In summary, we conclude that military hiring of a black youth represents a net addition of one to the total number of black youths employed, while military hiring of a white youth may be partially offset by fewer white youths employed in the civilian sector.

The results also indicate essentially no relationship between the ratio of youth-to-adult populations and the proportion of youths employed. This result seems inconsistent with a substantial effect of the baby boom on youth employment in the 1970s. It is more consistent with the hypothesis that over time, larger numbers of youths are assimilated into the work force without a substantial effect on the employment ratio. The result is also consistent with the observation that during the summer months the proportion of youths employed increases dramatically, suggesting that aggregate production technology can adjust to very substantial shifts in the proportion of youths employed, even in the very short run.

We find a noticeable relationship between the adult unemployment rate and youth employment in the civilian sector, although the relationship seems weaker for nonwhite than for white youths. The estimate of −.010 for white youths implies that a one percentage point increase in the adult unemployment rate is associated with a one percentage point decrease in the proportion of white youths employed, after controlling for aggregate year effects that are included in the specification. The effect among nonwhite youths is somewhat less. Thus, aggregate economic activity, as indexed by the adult unemployment rate, has a substantial effect on youth employment, but demographic relationships seem unimportant.

To demonstrate the variation across states in the employment experiences of youths, we have shown in table 4.2 the estimated coefficients on the state indicator variables, as well as the coefficients on the continuous variables. For this purpose we have presented the ordinary least squares estimates, since the lagged endogenous variable in the two-stage least squares specification changes the meaning of the state-specific estimates. The estimated state effects range from a low of 0.597 in New York to a high of 0.760 in South Dakota for whites, suggesting substantial differences among states in youth employment rates. For nonwhites, the variation in state effects is more dramatic, ranging from a low of 0.429 in Illinois to a high of 0.835 in Nevada. These effects are estimated with considerable precision.

The year effects for whites are all positive, relative to 1972, reaching a high in 1979, with no apparent trend. For nonwhites, however, the year effects show a general downward trend reaching a high of −0.091 in 1982, relative to 1972. This result means that after controlling for state effects and the continuous variables, the proportion of black youths employed declined by almost 0.1 over the decade 1972 to 1982. Thus these numbers reinforce the by now well-known observation that there has been a general decline over time in the employment ratio of black youths in the civilian labor market. This of course has not been true in the military sector, as indicated in figures 4.2 and 4.3.

The effect of military hiring on youth employment in the civilian sector indicates that if military hiring were to decline, the employment position of black youths would be even worse. Or, in reverse, if military hiring were increased, the total number of black youths employed would also increase. If we refer back to figure 4.2 we can ask what the effect of military hiring was on these trends. The increase in the proportion of black youths in the military, however, reduced the number of black youths who otherwise would have been without employment. In 1972, approximately 7 percent of both black and white youths aged sixteen to twenty-four were in the military. After that, the proportion of white males in the military fell to about 4 percent by 1982, while the proportion of black males increased to close to 9 percent in 1980 and was somewhat over 7 percent in 1982. If the proportion of black youths in the military had also declined to 4 percent, then the proportion of black youths

Table 4.2 OLS Parameter Estimates for Youths 16 to 24, by Race

	Whites		Nonwhites	
Variable	Estimates	(Standard Error)	Estimates	(Standard Error)
M_{16-24}/P_{16-24}	−0.914	(0.186)	−0.072	(0.244)
P_{16-24}/P_{25-64}	.038	(.061)	−.036	(.051)
U_{25-64}	−.012	(.001)	−.009	(.003)
State Effects				
Alabama	.687	(.030)	.457	(.051)
Alaska	.698	(.030)	.599	(.057)
Arizona	.694	(.032)	.518	(.055)
Arkansas	.720	(.031)	.552	(.057)
California	.696	(.029)	.548	(.037)
Colorado	.704	(.032)	.580	(.053)
Connecticut	.689	(.028)	.515	(.046)
Delaware	.687	(.032)	.564	(.056)
D. C.	.625	(.028)	.550	(.041)
Florida	.709	(.030)	.572	(.043)
Georgia	.712	(.029)	.566	(.049)
Hawaii	.639	(.039)	.670	(.040)
Idaho	.747	(.033)	1.099	(.150)
Illinois	.710	(.029)	.430	(.040)
Indiana	.711	(.031)	.502	(.045)
Iowa	.739	(.032)	.567	(.062)
Kansas	.742	(.031)	.604	(.052)
Kentucky	.687	(.030)	.464	(.050)
Louisiana	.682	(.029)	.520	(.047)
Maine	.672	(.035)	—	—
Maryland	.675	(.028)	.535	(.042)
Massachusetts	.685	(.030)	.549	(.046)
Michigan	.689	(.031)	.495	(.039)
Minnesota	.739	(.032)	.646	(.047)
Mississippi	.684	(.028)	.523	(.048)
Missouri	.708	(.031)	.484	(.045)
Montana	.690	(.034)	.663	(.073)
Nebraska	.752	(.031)	.477	(.072)
Nevada	.749	(.030)	.865	(.061)
New Hampshire	.710	(.033)	—	—
New Jersey	.637	(.027)	.481	(.043)
New Mexico	.659	(.034)	.570	(.056)
New York	.597	(.028)	.437	(.040)
North Carolina	.709	(.028)	.589	(.048)
North Dakota	.710	(.033)	—	—
Ohio	.689	(.031)	.519	(.043)
Oklahoma	.724	(.030)	.559	(.046)
Oregon	.694	(.032)	.623	(.054)
Pennsylvania	.649	(.029)	.443	(.044)
Rhode Island	.737	(.031)	.746	(.074)
South Carolina	.717	(.028)	.680	(.050)
South Dakota	.760	(.035)	.669	(.082)
Tennessee	.682	(.029)	.527	(.047)
Texas	.710	(.030)	.582	(.041)

Table 4.2 (continued)

	Whites		Nonwhites	
Variable	Estimates	(Standard Error)	Estimates	(Standard Error)
Utah	.733	(.032)	.710	(.068)
Vermont	.733	(.034)	—	—
Virginia	.679	(.028)	.576	(.045)
Washington	.687	(.031)	.534	(.044)
West Virginia	.624	(.031)	.588	(.067)
Wisconsin	.720	(.031)	.544	(.046)
Wyoming	.718	(.032)	—	—
Year Effects				
1973	.023	(.007)	−.0018	(.023)
1974	.023	(.006)	−.013	(.019)
1975	.006	(.006)	−.044	(.020)
1976	.017	(.007)	−.047	(.019)
1977	.030	(.007)	−.059	(.019)
1978	.037	(.007)	−.054	(.018)
1979	.038	(.007)	−.031	(.019)
1980	.026	(.009)	−.054	(.019)
1981	.021	(.010)	−.074	(.019)
1982	.015	(.010)	−.091	(.022)

Note: Estimates are weighted by $\sqrt{P}$ where P is the population aged 16 to 24.

without work would have been about 3 percent higher in 1982 than it was, according to our estimates.

The estimates in table 4.1 were obtained using state and year indicator variables, and the explanatory power of the equations comes largely from them. Indeed, the R^2 value associated with the regression equations is close to 1. It is informative, however, to consider the explanatory power of the continuous variables in the models. This can be done by entering the variables in deviation form as explained earlier. Then the state and year effects are differenced out. We have performed this for white youths. The resulting specification explains differences over time within states after controlling for aggregate year effects. The estimates of the parameters on the continuous variables are of course identical to those obtained using the dichotomous indicators. While the explanatory power of the resulting model is considerably lower than when the dichotomous variables are used, there still remains considerable explanatory power. The R^2 value is 0.27, largely due to the strong relationship between the adult unemployment rate and youth employment.[2]

4.3.2 Estimated Effects by Age Group and Sample

We also obtained ordinary least squares estimates of a model like the one described previously, but for two age groups separately, 16 to 19 and 20 to 24. The right-hand variables were the same as described in table 4.1, but the left-hand variable pertained to youths 16 to 19 in one case and 20 to 24 in another. These results are shown in the first column of table 4.3, along with the estimates for all youths 16 to 24 together. We have only shown here the results pertaining to the coefficients on military hiring. The bottom two numbers in the first column are the estimated military effects reproduced from table 4.1.

The estimates in the last column of table 4.3 are analagous to those in the first, but are based only on data for the years 1976–82. We obtained estimates separately for these years because the Bureau of Labor Statistics youth employment data for these years was in general considered more accurate than data for prior years. The results from the two sets of estimates are very close. In part at least, the potential shortcomings of the data for the earlier years were mitigated by weighting the observations by the youth population. Most of the uncertainty about data from the earlier years is the result of relatively small sample sizes in some states. Estimates based only on the largest fifteen states but using all years led to results very close to those reported in table 4.3, but we have not shown them here.

For whites, the estimates for the 16-to-19 and the 20-to-24 age groups are both very close to the estimates based on the age groups treated together. For nonwhites, however, the estimates differ somewhat between the age groups, although in neither case is the parameter estimate significantly different from zero by standard criteria. Although we have not obtained two-stage least squares estimates by age group, the consistency of ordinary least squares estimates by age group leads us to believe that the relative difference between ordinary least squares and two-stage least squares estimates would be similar to that shown in table 4.1.

Table 4.3 **OLS Estimated Effects of Military Hiring on Civilian Employment by Age Group, Race, and Sample**

Age Group and Race	All Years and All States	Years 1976–82 and All States
16–19		
White	−0.92 (0.27)	−1.06 (0.34)
Nonwhite	0.32 (0.33)	0.29 (0.37)
20–24		
White	−0.94 (0.20)	−.091 (0.26)
Nonwhite	−0.52 (0.28)	−0.38 (0.37)
16–24		
White	−0.91 (0.19)	−0.94 (0.24)
Nonwhite	−0.10 (0.24)	0.02 (0.29)

Note: Using $\sqrt{P}$ as weight.

4.3.3 The Effect of Military Hiring of White Youths on the Civilian Employment of Black Youths

It seems plausible that the civilian employment of black youths in particular could be affected by the military hiring of white youths. That is, one can imagine that if a large enough proportion of white youths were taken out of the civilian labor market, it could be easier for black youths remaining in this market to find jobs. Thus it is possible that military hiring of white youths could lead to increased employment of black youths in the civilian sector. To estimate any such effect, we have incorporated into the estimates for black youths the number of white youths in the military. To motivate a specification, we use a specification analagous to the one presented above for each race separately. That is, we begin with an identity, but in this case we need to distinguish white and black youths. Equation (4) represents the distribution of the population of youths among those employed in the civilian sector, those in the military, and those not employed, with the subscript w indicating white youth and subscript b indicating black youth.

$$(4) \qquad P \equiv P_w + P_b \equiv E_w + E_b + N_w + N_b + M_w + M_b;$$

$$E_b \equiv P_b - E_w - N_w - N_b + P_w - M_w - M_b;$$

$$\frac{E_b}{P_b} \equiv 1 - \left(\frac{E_w + N_w + N_b}{P}\right) + \frac{P_w}{P_b} - \frac{M_w}{P_b} - \frac{M_b}{P_b}\,.$$

Notice that the last relationship in equation (4) shows the proportion of black youths employed as identically equal to terms involving the proportion of white to nonwhite youth populations, military employment of white youths, military employment of black youths, and a term in brackets that represents the civilian employment of white youths plus the number of white and nonwhite youths who are not working. To develop a probablistic model, we assume that this term in brackets would be affected by each of the last three terms, without attempting to determine the separate effect on each of the terms individually. For convenience we let the term in brackets be represented by

$$\frac{E_w + \mathrm{N}_w + \mathrm{N}_b}{\mathrm{P}} \equiv \frac{\mathrm{D}}{\mathrm{P}}\,.$$

Now specify D over E as

$$(5) \qquad \frac{D}{P} = a_1 \frac{M_b}{P_b} + a_2 \frac{M_w}{P_b} + a_3 \frac{P_w}{P_b} + Xb + S + T + e\,,$$

where e is a random disturbance term and the other parameters are defined analogous to those in equations (2) and (3) above. If we substitute equation (5) into the last identity in equation (4), we obtain

$$(6)\quad \frac{E_b}{P_b} = 1 - S - T - Xb - (1 + a_1)\frac{M_b}{P_b} - (1 + a_2)\frac{M_w}{P_b} - (1 - a_3)\frac{P_w}{P_b} + e$$

$$= 1 - S - T - Xb - b_1\frac{M_b}{P_b} - b_2\frac{M_w}{P_b} - b_3\frac{P_w}{P_b} + e .$$

This equation is analagous to equation (3) above except that it includes the ratio of white youths in the military to the nonwhite youth population and the ratio of white to black youth populations.

We have estimated several variants of this specification, allowing different interactions of P_w/P_b with M_w/P_b. That is, we have allowed the effect of white military employment to depend on the ratio of white to black youths in the population. The results of three specifications are summarized in table 4.4. Only the parameters estimates on the last three variables in equation (6) and an interaction term are reported. It should be clear from these estimates that the effect of military employment of white youths on black youth employment in the civilian sector is essentially zero. And analagous to the results above, we find essentially no reduction in black youth employment with military hiring of black youths. If we note that the ratio of white youths to black youths in our sample is 8.94, we can calculate using the estimates in columns (2) and (3) of table 4.4 the effect of military hiring of white youths on black employment. This calculation based on the estimates in column (2) is -0.079 and based on the estimates in column (3) is

Table 4.4 **OLS Parameter Estimates: Military Hiring of White Youths versus Civilian Employment of Black Youths**

	Specification		
	(1)	(2)	(3)
$M_{b,16-24}/P_{b,16-24}$	−0.319	−0.020	0.025
	(0.281)	(0.313)	(0.297)
$M_{w,16-24}/P_{b,16-24}$	−0.017	−0.101	−0.099
	(0.042)	(0.058)	(0.058)
$P_{w,16-24}/P_{b,16-24}$	0.005	0.001	—
	(0.003)	(0.003)	
$(M_{w,16-24}/P_{b,16-24})$		0.002	0.003
$x(P_{w,16-24}/P_{b,16-24})$	—	(0.001)	(0.001)

−0.066. Thus we find essentially no effect of white youths in the military on black civilian employment.

4.4 Conclusions

We have estimated the effect of military hiring of youths on the civilian employment of youths. The estimates are based on a cross-section time series variance components analysis. According to our estimates, if a black youth is hired by the military, the total number of black youths employed is essentially increased by one. There is essentially no offset in the number of black youths employed in the civilian sector. Thus we conclude that for black youths, military employment contributes very substantially to the total number of black youths employed; if fewer black youths were hired by the military, the employment picture for black youths would be even worse than it is. In particular, the increasing proportion of black youths in the military, relative to the proportion of white youths since 1972, has resulted in many more black youths being employed than would have been employed had the proportion of black youths in the military paralleled the declining proportion of white youths since 1972. The results for white youths are somewhat more ambiguous. The weight of the evidence suggests that military hiring of white youths is partially offset by reduced employment of white youths in the civilian sector, but that the offset is considerably less than one and may be closer to zero. In summary, there may be some reduction in the civilian employment of white youths when more white youths are hired into the military, but we can identify no reduction in the civilian employment of black youths when military hiring of black youths is increased.

Notes

1. The data is also broken down by sex, education, education level, and several other demographic characteristics.

2. For black youths, the explanatory power of the resulting model is less. This is in part because the adult unemployment rate bears a weaker relationship to black youth employment. In addition, because of smaller sample sizes, individual state and year employment-to-population ratios are estimated with considerably more error for nonwhite than for white youths. Thus the residual variance is greater in part for this reason. The standard error of the estimate (the estimated variance of e in equation 3) for nonwhites is almost four times as large as for whites.

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