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6 Military Service and Civilian Earnings of Youths

Jon R. Crane and David A. Wise

The largest single employer of American youths is the United States military. While the proportion of youths serving in the military has declined continuously since the 1950s, still in 1972 approximately 9 percent of white youths and 9 percent of black youths served in the military. We have shown elsewhere that military hiring adds substantially to the total number of black youths employed, with an additional young black youth hired by the military increasing the total employment of black youths by essentially one. Military hiring also seems to increase the total number of white youths who are employed, although the evidence is less sharp. Military hiring adds substantially to the total number of black youths employed, however, with an additional young black man hired by the military increasing the total employment of black youths by essentially one. Most youths who join the military leave after two or three years and join the civilian labor force. The relationship between military service and subsequent earnings of youths on civilian jobs is the subject of this chapter.

There are at least two reasons why military service could enhance earnings on civilian jobs. Typically, work experience leads to higher wage rates, and military work experience may substitute for civilian work experience in this respect. In addition, military enlistees could receive special training that is transferable to the private sector and leads to higher wages there. Indeed, recruitment advertisements often emphasize the training that military enlistees receive and that this train-

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ing will benefit the enlistee in subsequent civilian employment. Advertisements make clear reference to both the human capital investment and the certification that the military provides. Enlistees are trained in areas of their choice and often work with the latest in high-technology equipment. Moreover, commercials point out, civilian employers are sure to be impressed with the kind of person who can make it in the military.

Our analysis is based on the National Longitudinal Study of the High School Class of 1972 and subsequent follow-up surveys conducted in 1973, 1974, 1976, and 1979. The survey collected a wide range of school, family background, family status, attitude, and aspiration information from approximately 23,000 high school seniors in 1972. The 1972 base survey drew a nationwide sample of high schools stratified in such a way that of the approximately 1,300 schools selected, those in lower socioeconomic areas were somewhat oversampled. The follow-up surveys were used to obtain detailed information on later post-secondary-school choices and labor market experiences, among other things.

The primary advantage of this data set is that it allows us to follow the same youths from high school graduation through possible military enlistment and ultimately to jobs in the civilian labor market. The data also provide information on measures of academic achievement and aptitude and on high school class rank. These measures of academic achievement or aptitude are typically unavailable in other data sources. A disadvantage of the data is the relatively small sample of persons who enter the military. In addition, the survey allows us to follow only high school graduates; approximately 30 percent of military enlistees do not have a high school degree (Cooper 1978).

In section 6.1 we discuss descriptive data on the attributes of military enlistees versus other high school graduates. Contrary to common perceptions, we find that military enlistees are in academic achievement similar to non-enlistees who do not go from high school to a four-year college. The difference between enlistees and other high school graduates reflects the difference between high school graduates who attend four-year colleges and those who do not. Given that most enlistees are not college graduates, it seems fair to conclude that those who join the military are by common ability measures, very much like their peers who are potential enlistees but decide not to join. Consistent with the summary statistics, we also find that we are unable to provide a strong explanation of which youths among high school graduates who do not go on to further education will join the military.

Least squares estimates of the relationship between military service and earnings in the civilian labor market in 1979 are presented in section 6.2. We conclude that the effect of military service on earnings in civilian jobs is similar to the effect of experience with one employer

on earnings with a second. Experience on a given job is much more related to earnings on that job than is experience in a previous job. Similarly, the return on a civilian job for experience in the military is considerably less than the return on experience in the civilian labor market.

Whether military service is a good choice for those who actually choose it is another question. Those who join the military, for example, may be those who would otherwise have had unusually poor employment experiences in the civilian labor force. That is, there may be a self-selection effect that we are unable to capture by this simple analysis. While we began with the intent of addressing through statistical techniques this potential self-selection problem, we have been largely unsuccessful. The results that we obtain are not robust to changes in specification and are often implausible. The difficulty is explained in some detail in a companion paper on the labor market effects of junior college and postsecondary vocational school training. We shall not duplicate that explanation here. We shall argue, however, that our least squares results are unlikely to exaggerate the effects of military service on earnings in the civilian labor market, although they may undervalue the importance of military service for those who choose to enlist. This would be the case if those who enlist would otherwise have had unusually poor employment experiences in the civilian labor market and thus would for that reason have relatively low wage rates in civilian jobs later on.

In short, we conclude that if a high school graduate were primarily motivated by earnings in the civilian job market a few years hence, he would, other things being equal, be best advised to find a job in the civilian sector. But other things may not be equal. Many important reasons for choosing jobs and career paths are of course ignored in this analysis. The evidence in Phillips and Wise (chap. 2), for example, demonstrates that the average high school graduate who does not obtain a four-year college degree would over his lifetime earn considerably more following a career in the military than he would were he to pursue a career path in the civilian sector.

6.1   Descriptive Data

The academic achievements of high school graduates who enlist in the military are very similar to those of their peers who enter the civilian labor force after graduation from high school. As demonstrated in table 6.1, a combination of mathematics and verbal test scores of these two groups are virtually the same. The test score variable and others whose means are shown in table 6.1 are described in more detail in table 6.A.1. We also see that the high school class ranks of these two groups

Table 6.1   **Average Attributes of Young Men by Selected Post-Secondary-School Choice**

Variable	Military[a]	Civilian Labor Force[b]	Junior College/ Vocational[c]	Four-Year College[d]
Weekly earnings 1979	261.68	293.97	302.31	285.22
	(125.37)	(146.17)	(127.68)	(145.94)
Hourly wage 1979	6.28	6.73	7.71	6.96
	(5.13)	(3.10)	(3.41)	(10.15)
Weeks worked 1979	48.43	48.30	48.65	46.37
	(9.76)	(8.74)	(9.53)	(11.26)
Parent's income	9532.31	10,788.92	10,788.92	13,564.68
	(3278.05)	(3278.05)	(3831.59)	(3670.19)
Test score	94.14	94.45	99.12	113.02
	(15.57)	(15.63)	(15.44)	(14.80)
High school rank	30.98	34.04	37.80	59.98
	(23.84)	(25.56)	(24.52)	(28.34)
High school job	0.84	0.85	0.84	0.78
	(0.37)	(0.36)	(0.37)	(0.41)
Urban 1979	0.23	0.22	0.43	0.47
	(0.42)	(0.42)	(0.50)	(0.50)
Black	0.16	0.10	0.09	0.07
	(0.37)	(0.30)	(0.28)	(0.25)
Dependents	1.31	1.24	1.04	0.60
	(1.33)	(1.29)	(1.13)	(0.96)
Father's education high	0.04	0.07	0.09	0.29
	(0.19)	(0.25)	(0.29)	(0.46)
Father's education low	0.52	0.46	0.39	0.21
	(0.50)	(0.50)	(0.49)	(0.40)
Mother's education high	0.04	0.05	0.07	0.18
	(0.19)	(0.21)	(0.26)	(0.39)
Mother's education low	0.45	0.38	0.31	0.17
	(0.50)	(0.48)	(0.46)	(0.38)
N	164	1433	170	1447

[a]Served in the military sometime between 1972 and 1979 and had no postsecondary schooling.

[b]Worked sometime between 1972 and 1979 and neither served in the military nor had any postsecondary schooling.

[c]Attended a junior college or a vocational school between 1972 and 1979 and neither went to a four-year college nor served in the military.

[d]Went to a four-year college sometime between 1972 and 1979 and neither served in the military nor attended a junior college or a vocational school.

are very similar, 31 for military enlistees versus 34 for those who entered the civilian labor force. For comparison, we have also shown in table 6.1 the mean of attributes of high school graduates who go to junior colleges and vocational schools and of those who enter four-year colleges. As the table makes clear, it is the four-year college group that differs from the others; the differences in academic achievement

among the three groups that do not attend four-year colleges are relatively small. This observation has led us for the most part to exclude from our subsequent comparisons high school graduates who have elected to go to four-year colleges. Since those who go from high school to attend a four-year college seldom enlist in the military, it seems appropriate when analyzing the effect of military service on later success in the civilian labor market to compare military enlistees with their high peers who in practice were potential military enlistees, but chose not to enlist.

While the academic achievement of military enlistees and those who enter the civilian labor force are similar, there are differences between the two groups in some family background attributes. Although approximately 10 percent of the civilian labor force group are black, 16 percent of military enlistees are black. The average family income of military enlistees is approximately $1,000 less than the average for entrants into the civilian labor force. The parents' education of military enlistees is somewhat lower than that of those who enter the civilian labor force or go to junior colleges or vocational schools. But again, the major distinction is between the four-year college group and the other three. College entrants, for example, were unlikely to have parents with less than a high school education, while approximately 50 percent of military enlistees and junior college entrants had parents who had not graduated from high school.

Finally, we observe that military enlistees earned about 11 percent less per week in 1979 than their peers who entered the civilian labor market, and they earned approximately 7 percent less per hour. The two groups worked virtually the same number of weeks per year in 1979.

The data in table 6.1 pertain to groups of high school graduates who essentially followed non-overlapping work and educational paths after graduation from high school. Of course many young men who enlist in the military subsequently attend junior colleges or vocational schools or go on to attend four-year colleges. Thus there is no unambiguous way to distinguish military enlistees from other high school graduates.

We have experimented with different definitions, finding that our basic conclusions do not depend significantly on the particular definition chosen. For example, descriptive data based on the status of young men in October of 1973 shortly after graduation from high school, which includes men who went on to college later, presents essentially the same picture as described by the data in table 6.2. The military enlistees earned approximately 11 percent less per week in 1979 than those who were in the civilian labor force in 1973, and again they earned approximately 7 percent less per hour. Enlistees were somewhat more likely to continue their education than those who entered the civilian labor

Table 6.2   **Average Attributes of Young Men by 1973 Military versus Civilian Labor Force Status**

Variable	Military[a]	Civilian Labor Force[b]
Weekly earnings 1979	254.61	286.78
Hourly wage 1979	6.14	6.63
Weeks worked 1979	47.41	47.99
Parent's income	10,395.62	11,332.97
Test score	98.98	101.38
High school rank	38.26	42.77
High school job	0.82	0.86
Urban 1979	0.31	0.34
Black	0.15	0.08
Dependents	1.20	1.02
Father's education high	0.09	0.15
Father's education low	0.45	0.35
Mother's education high	0.06	0.09
Mother's education low	0.40	0.29
State wage 1972	153.57	155.49
Four-year college	0.58	0.50
Junior college/vocational	0.35	0.27
N	285	2991

[a]In the military in October 1973.
[b]In the civilian labor force in October 1973.

force after high school. For example, 58 percent of enlistees went on to a four-year college compared to 50 percent of non-enlistees. In short, our results are not sensitive to the precise sample used. In our analysis below, we rely primarily on comparisons between the first two groups as defined in table 6.1.

The average characteristics of high school graduates who followed other selected paths of work and post-secondary-school attendance are shown in table 6.A.2. The data in this table confirm that among high school graduates, the primary distinction is between those who ultimately go to four-year colleges and those who do not. In particular, those who enlisted in the military and then went to a four-year college have academic achievement attributes similar to other high school graduates who went to four-year colleges.

We note above that the high school graduates who enlisted in the military are in most respects similar to those who enter the civilian labor force. Thus we might suspect that it would be difficult to predict which of these two alternatives is chosen, given that one of them is. Probit estimates of the probability of enlistment in the military confirm this possibility. The estimates are shown in table 6.A.3. Parents' income and race are the only consistently important predictors of enlistment. The percentage of black youths who enlist in the military, holding other

attributes constant, is approximately 2.5 percentage points higher than the percentage among whites. Approximately 10 percent of youths in our sample enlist in the military, as can be seen from the data in tables 6.1 and 6.2. Family income also bears a statistically significant relationship to enlistment among high school graduates who obtain no further education. A $1,000 reduction in family income is associated with an increase of 2.4 points in the probability of enlistment.

6.2 Estimates of the Effect of Military Service on Civilian Earnings

Estimates of the effect of military service on civilian earnings are based on simple least squares regression. The primary results of our analysis are presented in table 6.3, with more detailed results shown in table 6.A.4. These results distinguish youth who served in the military between 1972 and 1979 from those who did not, excluding from the analysis high school graduates who went to four-year colleges. Some of those in the analysis sample attended vocational schools or junior colleges. The regression specification thus includes indicator variables to identify those who obtained further education. We emphasize at the outset that our results are not very sensitive to the particular way in which the sample is selected.

After controlling for other attributes of high school graduates, the weekly earnings on civilian jobs of those who served in the military were in 1979 approximately 12 percent less than the earnings of those who worked only in the civilian sector. Recall that the summary data in table 6.1 show that the weekly earnings of the military group were approximately 11 percent lower than the earnings of the civilian labor force group. Thus, control for other individual attributes that appar-

Table 6.3   **Effects of Military and Civilian Work Experience on 1979 Weekly Earnings, for Men**

	Specification	
Variable	(1)	(2)
Military (0,1)	−0.120	0.136
	(0.028)	(0.138)
Military experience	—	0.030
		(0.022)
Civilian experience	—	0.059
of enlistees		(0.026)
Civilian work	—	.070
experience of nonenlistees		(0.008)

Notes: Complete results are in table 6.A.4. The dependent variable is the logarithm of 1979 weekly earnings. The sample size is 2,987.

ently affect civilian earnings seems to increase very slightly the difference between the two groups.

The explanation for this difference seems simply to be that the value of military experience in the civilian labor market is less than the value of experience on civilian jobs. This is demonstrated by the estimates presented in column (2) of table 6.3. A year (fifty-two weeks) of civilian work experience is associated with an increase of about 7 percent in 1979 earnings. In contrast, a year of military experience is associated with only a 3 percent increase in earnings in the civilian sector. In addition, the estimates suggest that the return on civilian experience for persons who served in the military was slightly lower than the return on civilian experience for those who had no military experience. The relevant estimate is 5.9 percent versus 7 percent for those whose experience was entirely in the civilian sector, although the two estimates are not significantly different by standard statistical criteria. When experience in the civilian and military sectors is controlled for, the estimated coefficient on the simple indicator variable of military service is not significantly different from zero.

Thus, we conclude that the relationship between the return on military experience in the civilian sector is similar to the relationship between the return on experience in the job that one holds in the civilian sector versus the return on that job to experience in a prior job in the civilian sector. Typically, the return on more experience in the job that one holds is substantially greater than the return on experience in a prior job. Or, more experience with one's current employer is typically worth more than experience with another previous employer. This is not to say that military experience is worth less than civilian labor market experience. It simply says that staying with the same employer is typically better than switching from one job to the other. Evidence collected by Phillips and Wise (chap. 2, this volume) indicates that the typical high school graduate choosing the military as a career would earn substantially more over his lifetime than the typical high school graduate following a career in the civilian sector.

Still the data suggest that if one wanted to follow a career in the civilian labor market and if one's goal were to maximize civilian earnings, then other things being equal it would be better to obtain a civilian job after graduation from high school. Of course, other things may not be equal. Youths who enlist in the military may not have the same civilian job opportunities after graduation from high school as those who take these jobs. That is, there may be self-selection effects. We observe, for example, that black youths are more likely to enter the military than nonblack youths. It is common knowledge by now that the civilian unemployment rate of black youths is very much higher than the unemployment rate for nonblack youths. And, it is important

to remember that school and work choices after graduation from high school surely depend on many goals other than earnings.

Finally, the more detailed results in table 6.A.4 show that even seven years after graduation from high school, parents' income bears a significant relationship to earnings of these youths, with a $1,000 increase in parents' income associated with approximately a 1 percent increase in weekly earnings. Consistent with the evidence from Meyer and Wise (1982), youths who held jobs in high school earn more than those who did not. Those with dependents earn more than those without these family responsibilities. Black youths earn approximately 5 percent less than nonblack youths.

Some young women, of course, also served in the military, but the numbers were not large enough to obtain separate estimates for women. We did, however, obtain estimates for men and women combined. The primary results are shown in table 6.4, with more detailed estimates reported in table 6.A.5. The results are similar to those obtained for men alone.

Finally, we obtained separate estimates for black men and nonblack men. The major results are shown in table 6.5, with more detail presented in table 6.A.6. Because of the small sample size, the standard errors of the estimates for blacks are considerably larger than those for nonblacks. But the basic message is the same. The estimates show that the 1979 earnings of nonblack youths who served in the military were 11 percent lower than the earnings of those whose experience was only in the civilian sector, while black youths who served in the military earned 16 percent less than their peers who stayed in the civilian sector. Parameter estimates on military versus civilian experience again demonstrate that the return on civilian experience in ci-

Table 6.4   **Effects of Military and Civilian Work Experience on 1979 Weekly Earnings, for Men and Women**

Variable	Specification	
	(1)	(2)
Military (0,1)	− .099	0.150
	(0.030)	(0.130)
Military experience	—	0.069
		(0.026)
Civilian experience	—	0.039
of enlistees		(0.022)
Civilian work	—	0.096
experience of nonenlistees		(0.004)

Notes: Complete results are in table 6.A.5. The dependent variable is the logarithm of 1979 weekly earnings. The sample size is 6,006.

Table 6.5   **Effects of Military and Civilian Work Experience on 1979 Weekly
Earnings, for Men, by Race**

	Nonblack		Black	
Variable	(1)	(2)	(1)	(2)
Military (0,1)	−.111	.038	−.158	.107
	(.030)	(.163)	(.088)	(.318)
Military experience	—	.060	—	.059
		(.030)		(.064)
Civilian experience	—	.031	—	.010
of enlistees		(0.26)		(.056)
Civilian work	—	.070	—	.084
experience of nonenlistees		(.008)		(.026)

Notes: Complete results are in table 6.A.6. The dependent variable is the logarithm of
1979 weekly earnings. The sample sizes are 2,635 for nonblacks and 352 for blacks.

vilian jobs is greater than the return on military experience in civilian
jobs. Again, we find that the return on civilian experience of those who
served in the military is somewhat less than the return on civilian
experience for those who remained in the civilian sector. For nonblacks,
however, the two coefficients are close, 7.0 versus 6.0, and not statis-
tically different from one another. The coefficient on the civilian ex-
perience of black enlistees is considerably lower than the coefficient
on civilian experience of black youths who remained in the civilian
sector, but the military coefficient for the enlistees is measured impre-
cisely, so again the two are not significantly different. Indeed, it is clear
from the coefficients and their standard errors that the coefficients for
the two groups are not as a group statistically different from one another.

While we have been unable to make rigorous corrections for possible
self-selection impacts on our estimates, contrasts between two partic-
ular groups of youths suggest the direction that the selection effect
might take. Suppose, for example, that youths who enlisted in the
military would have been unemployed otherwise. Having in mind this
possibility, we selected youths who in October 1973 and October 1974
were either in the military or were not employed and not in school.
Then we estimated the relationship between military experience and
civilian experience on the one hand and the 1979 weekly earnings of
this group. It is clear, of course, that this selection procedure arbitrarily
picks out youths who would be expected to have relatively unsuccessful
labor market experiences in the civilian sector. This must be true be-
cause we would expect that youths who were not employed in 1973
and 1974 were disproportionately those with poor employment pros-
pects. Nonetheless, this artificial experiment may be informative.

The results are shown in table 6.6, with more detailed evidence
presented in table 6.A.7. We see that when these two groups are com-

Table 6.6   **Effects of Military and Civilian Work Experience on 1979 Weekly Earnings of Men Who Were Either in the Military or Not Employed and Not in School in 1973–74**

Variable	Specification	
	(1)	(2)
Military (0,1)	−0.174	0.409
	(0.149)	(0.448)
Military experience	—	0.104
		(0.093)
Civilian experience	—	0.001
of enlistees		(0.121)
Civilian work	—	0.143
experience of nonenlistees		(0.042)

Notes: In the military in October 1973 or October 1974, or not employed and not in school in 1973 and 1974. Complete results are in table 6.A.7. The dependent variable is the logarithm of 1979 weekly earnings. The sample size is 142.

pared, those who served in the military had a substantial advantage in civilian earnings over those who were not employed. For example, suppose that the group that was not employed during the first two years after graduation from high school then worked continuously for five years in the civilian labor market. According to the estimates in table 6.6, this work experience would have led to a 72 percent increase in their earnings. In contrast, if the military group served for three years in that capacity and then worked continuously for four years in the civilian sector, their earnings would have increased 83 percent relative to individuals with no work experience over this period. This example is of course artificial and surely tends to exaggerate the point, but it does at the same time emphasize that military service is likely to be a good choice for high school graduates who otherwise would be without work and not in school.

6.3   Conclusions

Among potential military enlistees, those who in fact join the military service are by standard test measures of quality very similar to those who elect not to join the service. The two groups have similar academic test scores, and they performed at approximately the same level in their high school classes. Both groups, however, are different from those high school graduates who elect to go on to four-year colleges. But those who obtained four-year college degrees typically do not then enlist in the military. Thus it seems appropriate when comparing military enlistees with those who do not enlist to make the comparison with other high school graduates who might potentially be in the enlistment group. This comparison suggests a picture that is at variance

with comparisons that are sometimes made in the popular press. Our findings suggest that among individuals with high school degrees and no further education, those who enter the military are very similar to those who elect civilian occupations after graduation from high school. They are not a substandard group.

We also find that to obtain wage increases in the civilian sector, job experience in the civilian labor market is worth more than job experience in the military. Apparently the occupational training and job experience received in the military is not as valuable in the private sector as job training and experience in the civilian sector. It is important to emphasize that this does not mean that earnings in the military sector are lower than those in the private sector. Indeed, as shown in Phillips and Wise (chap. 2), high school graduates who choose a military career should expect to earn over their lifetimes substantially more than high school graduates who follow a civilian career. The results also do not mean that military enlistment is a poor choice for those who make it, even if they intend ultimately to follow a career in the civilian sector. Those who in fact chose to enlist may have been disproportionately those who faced poor employment experiences in the private sector upon graduation from high school. In more formal terms, there may have been self-selection. Unobserved factors, that is, factors we have not been able to control for in the analysis, may have made enlistment a particularly good choice for those who made it. We have not been able in practice to correct satisfactorily for this potential effect in a formal statistical manner.

Appendix

Table 6.A.1   Variable Definitions

Variable	Definition
Weekly earnings 1979	Earnings per week in 1979.
Hourly wage 1979	Earnings per week divided by hours worked per week in 1979.
Weeks worked 1979	Number of weeks worked in 1979.
Civilian experience, nonenlistees	Weeks worked between 1972 and 1979 by nonenlistees divided by 52.
Military experience	Weeks spent in the military between 1972 and 1979 divided by 52.
Civilian experience	Weeks worked (divided by 52) between 1972 and 1979 in the civilian labor force by youth who also were in the military.
Parent's income	The midpoint of the interval reported in the survey. Those in the $18,000 + interval were assigned the value 20,000.

Table 6.A.1   (continued)

Variable	Definition
Test score	The sum of a score on a mathematics test, plus one-half the sum of scores on a reading test and a vocabulary test.
High school rank	Percentile class rank in high school.
High school job	Coded 1 if the individual worked during high school and 0 otherwise.
Urban 1979	Coded 1 if the individual lived in the metropolitan area of a city of more than 100,000 in 1979 and 0 otherwise.
Urban 1972	Coded 1 if the individual lived in the metropolitan area of a city of more than 100,000 in 1972, and 0 otherwise.
Black	Coded 1 if the individual was black and 0 otherwise.
Male	Coded 1 if the individual was male and 0 if female.
Father's education high	Coded 1 if the individual's father graduated from college and 0 otherwise.
Father's education low	Coded 1 if the individual's father did not graduate from high school and 0 otherwise.
Mother's education high	Coded 1 is the individual's mother graduated from college and 0 otherwise
Mother's education low	Coded 1 if the individual's mother did not graduate from high school and 0 otherwise.
Dependents	The number of people an individual listed as being financially dependent on him in 1979.
Military	Coded 1 if the individual served in the military and 0 otherwise.
Four-year college	Coded 1 if the individual went to college and 0 otherwise.
Two-year college and vocational	Coded 1 if the individual went to a junior college or a postsecondary vocational school and 0 otherwise.
State wage 1972	The average weekly wage of manufacturing workers in the individual's state in 1972. If the figure was missing it was coded as the national average.
Missing state wage 1972	Coded 1 if the average manufacturing wage in 1972 in the individual's state was missing and 0 otherwise.
Parent's income missing	Coded 1 if the value for the parents' income variable was missing and 0 otherwise.
Test score missing	Coded 1 if the value for the test score variable was missing and 0 otherwise.
High school job missing	Coded 1 if the value for the high school job variable was missing and 0 otherwise.

Table 6.A.2   Average Attributes of Young Men by Selected Post-Secondary-School Choices

Variable	Choices			
	Military & Jr. Col. or Voc. School	Military, Jr. Col. or Voc. School & 4-Year College	Military & 4-Year College	Jr. Col. or Voc. School and 4-Year College
Weekly earnings	272.40	207.25	253.19	258.54
	(132.33)	(116.88)	(120.32)	(144.77)
Hourly wage	6.51	5.23	5.63	6.26
	(3.23)	(2.15)	(2.59)	(5.91)
Weeks worked 1979	45.15	41.94	42.63	46.71
	(11.53)	(15.12)	(10.15)	(11.94)
Parents' income	10,217.44	11,506.73	11,918.62	13,281.79
	(3927.81)	(3351.95)	(3674.49)	(3549.33)
Test score	93.25	109.30	111.70	110.34
	(17.06)	(16.10)	(14.17)	(13.27)
High school rank	26.65	49.49	51.40	53.77
	(28.05)	(26.52)	(31.43)	(28.22)
High school job	0.70	0.85	0.75	0.80
	(0.47)	(0.36)	(0.44)	(0.40)
Urban 1979	0.45	0.35	0.35	0.46
	(0.51)	(0.48)	(0.48)	(0.50)
Race	0.25	0.15	0.11	0.06
	(0.44)	(0.36)	(0.31)	(0.23)
Dependents	2.00	0.69	0.84	0.54
	(1.49)	(0.98)	(0.98)	(0.90)
Father's education high	0.10	0.23	0.25	0.25
	(0.31)	(0.42)	(0.43)	(0.44)
Father's education low	0.50	0.18	0.28	0.18
	(0.51)	(0.39)	(0.45)	(0.39)
Mother's education high	0.05	0.25	0.10	0.14
	(0.22)	(0.43)	(0.30)	(0.35)
Mother's education low	0.30	0.28	0.20	0.14
	(0.47)	(0.45)	(0.41)	(0.35)
State wage 1972	153.20	154.97	152.06	156.71
	(19.54)	(20.39)	(23.67)	(20.12)
N	20	65	122	512

Table 6.A.3   Military Service in 1973, Probit Model Parameter Estimates

Variable	Parameter Estimate	Standard Error	Simulated Derivative
Constant	− .878	.207	—
Parents' income	− .019	.0044	− .024 ($1,000)

Table 6.A.3   (continued)

Variable	Parameter Estimate	Standard Error	Simulated Derivative
Test score	.0022	.0015	.003
			(10 pts)
High school rank	− .0036	.0008	− .004
			(10 percentile pts.)
High school job	.031	.047	.003
Urban 1972	− .062	.044	− .007
Black	.229	.062	.025
Father's education high	− .197	.619	− .002
Father's education low	.150	.460	.002
Mother's education high	− .897	.718	− .010
Mother's education low	.441	.474	.005
State wage 1972	.0013	.0089	− .001
			($10/wk.)
Parents' income missing	− .316	.731	− .035
Test score missing	.106	.153	.012
High school job missing	.679	.150	.007
State wage 1972 missing	.500	.469	.006

Notes: The results pertain to men who did not go on for postsecondary education between 1972 and 1979. The simulated derivative is given with respect to the change in parenthesis. If no change is specified, the variable is a categorical dummy and the change is from 0 to 1. Each derivative is evaluated at the mean of the other variables.

Table 6.A.4   **Parameter Estimates for 1979 Weekly Earnings, Young Men**

Variable	Specification	
	(1)	(2)
Military	− .120	.036
	(0.28)	(.138)
Work experience	—	.070
		(.008)
Military experience	—	.030
		(.022)
Civilian work experience	—	.059
		(.026)
Parents' income ÷ 1,000	.014	.014
	(.002)	(.002)
Test score	.0006	.0004
	(.0007)	(.0007)
High school rank	.0006	.0006
	(.0004)	(.0004)
High school job	.066	.039
	(.023)	(.023)
Urban 1979	.068	.068
	(.021)	(.020)

Table 6.A.4   (continued)

	Specification	
Variable	(1)	(2)
Black	− .191	− .160
	(.029)	(.029)
Dependents	.049	.040
	(.007)	(.007)
Father's education high	− .075	− .042
	(.039)	(.038)
Father's education low	− .014	− .016
	(0.20)	(.020)
Mother's education high	− .054	− .042
	(.042)	(.042)
Mother's education low	− .026	− .023
	(.020)	(.020)
Two-year college and vocational	− .020	− .014
	(.028)	(.027)
Parents' income missing	.015	− .154
	(.032)	(.031)
Test score missing	.057	.041
	(.069)	(.068)
High school job missing	.115	.103
	(.065)	(.064)
R^2	.07	.10
N	2987	2987

Table 6.A.5   Parameter Estimates for 1979 Weekly Earnings, Men and Women

	Specification	
Variable	(1)	(2)
Military	− .099	.150
	(.030)	(.130)
Work experience	—	.096
		(.004)
Military experience	—	.039
		(.022)
Civilian work experience	—	.069
		(.026)
Parents' income ÷ 1000	.011	.010
	(.002)	(.002)
Test score	.0011	.0010
	(.0006)	(.0006)
High school rank	.0010	.0007
	(.0002)	(.0003)
High school job	.037	.001
	(.016)	(.015)

Table 6.A.5   (continued)

Variable	Specification	
	(1)	(2)
Urban 1979	.131	.123
	(.015)	(.015)
Black	−.029	.011
	(.021)	(.020)
Male	.537	.450
	(.015)	(.015)
Dependents	.047	.043
	(.006)	(.006)
Father's education high	−.036	.004
	(.028)	(.027)
Father's education low	−.011	−.011
	(.015)	(.015)
Mother's education high	−.045	−.024
	(.034)	(.033)
Mother's education low	−.058	−.049
	(.015)	(.015)
Two-year college and vocational	−.007	.005
	(.021)	(.020)
Parents' income missing	.085	.081
	(.023)	(.023)
Test score missing	.127	.108
	(.054)	(.052)
High school job missing	.077	.071
	(.052)	(.050)
R^2	.25	.31
N	6006	6006

Table 6.A.6   Parameter Estimates, 1979 Weekly Earnings of Men, by Race

Variable	Nonblack		Black	
	(1)	(2)	(1)	(2)
Military	−.111	−.038	−.158	−.107
	(.030)	(.163)	(.088)	(.318)
Work experience	—	.070	—	.084
		(.008)		(.026)
Military experience	—	.031	—	.010
		(.026)		(.056)
Civilian work experience	—	.060	—	.059
		(.030)		(.064)
Parents' income ÷ 1,000	.015	.015	.00007	.002
	(.002)	(.002)	(.008)	(.008)
Test score	.0005	.0004	.002	.001
	(.0008)	(.0007)	(.003)	(.003)

Table 6.A.6   (continued)

Variable	Nonblack		Black	
	(1)	(2)	(1)	(2)
High school rank	.0006	.0006	.0004	.0009
	(.0004)	(.0004)	(.0014)	(.0014)
High school job	.086	.060	− .031	− .076
	(.024)	(.024)	(.069)	(.070)
Urban 1979	.062	.062	.012	.109
	(.021)	(.021)	(.070)	(.069)
Dependents	.046	.037	.065	.057
	(.007)	(.007)	(.023)	(.023)
Father's education high	− .083	− .054	.100	.265
	(.038)	(.038)	(.312)	(.313)
Father's education low	− .016	− .018	− .008	− .011
	(.020)	(.020)	(.074)	(.073)
Mother's education high	− .068	− .052	.097	.074
	(.043)	(.042)	(.206)	(.205)
Mother's education low	− .028	− .024	− .015	− .019
	(.021)	(.021)	(.073)	(.072)
Two-year college and vocational	− .013	− .009	− .074	− .047
	(.028)	(.028)	(.100)	(.100)
Parents' income missing	.168	.178	.040	.007
	(.033)	(.033)	(.101)	(.101)
Test score missing	.060	.043	.136	.072
	(.072)	(.071)	(.277)	(.275)
High school job missing	.053	.032	.336	.352
	(.072)	(.071)	(.170)	(.168)
R^2	.06	.08	.06	.09
N	2635	2635	352	352

Table 6.A.7   **Parameter Estimates, 1979 Weekly Earnings of Men, Sample of Military and Not Employed in 1973 and 1974**

Variable	Parameter Estimate	Standard Error
Military in 1973 or 1974	.174	.409
	(.149)	(.448)
Work experience	—	.143
		(.042)
Military experience	—	.001
		(.121)
Civilian work experience	—	.104
		(.093)
Parents' income ÷ 1,000	.006	.009
	(.013)	(.012)
Test score	.005	.006
	(.004)	(.004)

Table 6.A.7   (continued)

Variable	Parameter Estimate	Standard Error
High school rank	−.00008	.0008
	(.00211)	(.0021)
High school job	.109	.015
	(.014)	(.113)
Urban 1979	.237	.195
	(.115)	(.111)
Black	−.048	.029
	(.168)	(.169)
Dependents	.087	.087
	(.055)	(.053)
Father's education high	−.117	−.068
	(.168)	(.163)
Father's education low	−.167	−.097
	(.130)	(.130)
Mother's education high	−.161	−.124
	(.183)	(.177)
Mother's education low	−.013	−.034
	(.133)	(.128)
Two-year college and vocational	−.190	−.199
	(.187)	(.182)
Parents' income missing	.105	.109
	(.196)	(.195)
Test score missing	.310	.416
	(.410)	(.406)
High school job missing	.006	.006
	(.439)	(.422)
R^2	.14	.23
N	142	142

Notes: The sample contains persons who were in the military in October 1973 or October 1974, or not employed and not in school in 1973 and 1974. The dependent variable is the logarithm of weekly earnings.

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Comment   D. Alton Smith

The comparability of military and civilian compensation has long been
a major issue in the economics of national defense. It became even
more important when the armed services turned toward market forces,
and away from the draft, as the mechanism for filling the enlisted ranks.
While most attention has focused on relative pay and fringe benefits,
there has been an increasing interest in analyzing how military service
affects the postservice civilian earnings of veterans. For example,
knowledge about these effects is an important ingredient in designing
an efficient military retirement program. But the vast majority of en-
listed personnel do not stay in the military until retirement; they leave
after their first enlistment term. How, then, do the job training, work
experience, and credentials supplied by the services affect the civilian
earnings of these individuals? Or, in the words of an enlistment ad-
vertising campaign, are the armed forces really "a great place to start"
as far as future earnings are concerned?

Chapter 6 by Crane and Wise provides some of the first reliable
answers to this question. Using the National Longitudinal Study of the
Class of 1972, they estimate an earnings function, for earnings in 1979,
that includes a dichotomous variable indicating past military service.
The model is estimated with a sample that includes high school grad-
uates who did not pursue postsecondary education, so their results are
applicable to between 70 percent and 90 percent of the first-term en-
listed force in the 1980s.

Crane and Wise find that male veterans, on average, have weekly
earnings that are 12 percent less than otherwise comparable civilians.
They then relate this differential to different kinds of work experience
by adding years of military service and years of civilian work experi-
ence, separately for veterans and nonveterans, into the model. These
estimates provide the two most interesting findings in the chapter. First,
the authors find that, for veterans, a year of military experience has
about half the impact on civilian earnings as a year of civilian work
experience. And second, that the civilian experience of veterans has
a smaller impact on civilian earnings than the civilian experience of
those who never served in the armed forces. The difference here,
however, is small and not significantly different from zero.

The first result has also been reported in studies of the effects of
military service on the earnings of retirees (see Goldberg and Warner
1984, for example). As Crane and Wise note, this result is consistent
with the finding that, in the civilian sector, current earnings are affected
more by experience on the current job than experience in previous
jobs. In addition, the difference between the returns to civilian and

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military work experience reflects the fact that some military occupa-
tions, such as combat-related jobs, have no counterpart in the civilian
sector. Even the benefits from transferable skills are attenuated by the
occupation switching that often occurs when an enlisted person leaves
the service. For example, one survey found that less than 20 percent
of Navy enlisted personnel who were trained in an electronics-related
job stayed in the same field after leaving the Navy.

The second finding, that civilian experience is less valuable for vet-
erans, is more subject to measurement error because of the comparison
made between those who did and did not enlist. There is self-selection
in the decision to enlist, and that can introduce unmeasurable differ-
ences between veterans and civilians, biasing the estimated effect on
earnings. Crane and Wise recognize this problem and attempt to correct
for it by estimating an enlistment function along with the earnings
equation. They find almost no difference between the observed char-
acteristics of those who did and did not enlist and, therefore, have
difficulty independently "explaining" the enlistment decision in the
joint model. This result is surprising given the usually strong relation-
ship in cross-section time series models of enlistment behavior between
enlistments of above-average high school graduates and unemployment
and relative military pay, among other variables.

The authors note that ignoring self-selection will bias the effect of
military experience downward because those individuals with less at-
tractive opportunities in the civilian sector will be more likely to enlist.
But a second self-selection occurs at the reenlistment decision (see
Baldwin and Daula 1985), and only individuals who left the armed
forces by 1979 were included in the analysis. This selection process
will have the opposite bias because it is the individuals with superior
prospects in the civilian labor market who, other things being equal,
leave the service. With conflicting sources of bias, we cannot predict
how ignoring self-selection will affect the estimated coefficients.

The question of who decides to enlist also points to a possible mis-
specification of the earnings equation. The enlistment literature (Brown
1985; Daula and Smith 1985; among others) tells us that individuals
from areas with high unemployment and lower civilian wages are more
likely to enlist. If a substantial proportion of the individuals separating
from the military return to their preservice homes, as seems likely after
only two to four years of military service, the military variables in the
earnings equation will pick up this geographic effect on civilian earn-
ings, biasing the estimated coefficients downward. This result could be
avoided by including area unemployment and earnings variables in the
earnings equation.

In terms of future civilian earnings, then, are the armed forces "a
great place to start"? The answer, as noted by the authors, depends
on an individual's alternatives. On average, military work experience

has less of an impact on civilian earnings than civilian work experience, but military experience is better than no experience at all in boosting future earnings. Therefore, military service is particularly attractive to those high school graduates who, because of weak local labor markets or other factors, face lower employment and earnings opportunities in the civilian sector. The military can offer an increase in current earnings and work experience that is valuable in postservice employment.

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Comment   Charles Brown

Previous research on military enlistments has been based, more or less explicity, on the supply behavior of enlistees. Of course, it usually was recognized that the number of enlistments by those lacking the preferred credentials might be demand constrained; the usual response by researchers was to ignore the flow into military service of those with low test scores or those who had not graduated from high school. Understanding the flow of "marginal" enlistees is essential for understanding the impact of the military on youth labor markets. Chapter 4, by Ellwood and Wise, presents a simple extension of earlier work which gives a much clearer picture of the way in which economic conditions affect enlistment of different youth groups.

One important implication of the fact that the ability of less-preferred groups to enlist depends on the supply of more-preferred groups is that the "representativeness" of the all-volunteer force depends on the size of that force and the level of compensation offered to enlistees. Given the total number of recruits, for example, as military pay rises, the fraction of enlistees from preferred groups (whose "underrepresentation" has led to criticism of the all-volunteer force) will increase.

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The two key assumptions of Ellwood and Wise's chapter 4 are that FRACT, the fraction of those who desire to enlist, depends on aggregate but not local conditions, and that total enlistments are exogenously determined. The first assumption is probably a defensible first approximation, though it is unlikely to be exactly correct. If local recruitment targets are not quickly adjusted to local conditions, local conditions may affect FRACT; the likely impact, as Ellwood and Wise recognize, is that effects of local conditions on supply will be understated for groups facing some demand constraints. A description of how recruiting standards are determined would be helpful. If the process is sufficiently mechanical, one might even be able to use this information to constrain some of the coefficients in the FRACT equation.

Total enlistments are not likely to be strictly exogenous since the armed services sometimes fail to obtain the desired number of enlistees. (For example, in FY 1979 they were 7 percent short of their target [Hale and Slackman 1980, 3]). Using the targets instead of the actual number of enlistments would be preferable. A simple way of checking the supply coefficients is to let year dummies stand for all of the relevant national demand-side variables (including some, such as educational benefits or national advertising activity, that are now omitted).

The results presented by Ellwood and Wise are generally sensible, and the exceptions are fairly noted. I was less comfortable than the authors with two of the results. First, while total enlistments matter less for high-scoring youth than for others, I still am surprised that they are so large (an elasticity of about 0.5). Second, I am not comfortable with the idea that the positive effect of *national* unemployment on local enlistments by high school graduates and high-scoring youths reflects these youths responding to national employment alternatives in deciding whether to enlist. Such behavior is plausible for college graduates, but the enlistment decision here is being made by non-college-bound portions of those two groups.

Because the equations are estimated with state-specific fixed effects, determinants of military enlistments which do not change within a state over time are already accounted for. Two enlistment determinants that might have been included are a minimum wage variable and the youth population share. The real minimum wage fluctuated during the period, as the nominal minimum was increased in 1974–75 and 1978–81, but prices and other wages increased more smoothly. Even assuming a 10 percent increase in the minimum wage reduces teenage employment by 1 percent (Brown, Gilroy, and Kohen 1982) would lead to nontrivial fluctuations in civilian youth employment prospects. The youth population share could also be justified on the grounds that, at given levels of adult unemployment and wage, *youth* employment prospects and/or wages are lower where their share of population is highest. In chap-

ter 5, however, Ellwood and Wise find little effect of youth population share on youth employment.

One other possible extension of the reported equations would be to impose the cross-equation constraints implied by the assumption that total recruitment is exogenous. Thus, an increase everywhere in civilian wages or unemployment or military pay must leave overall enlistments unaffected. For example,

$$\frac{\partial \text{Enlistments } 16\text{--}19}{\partial PAY} + \frac{\partial \text{Enlistments } 20\text{--}24}{\partial PAY} = 0.$$

The difficulty is that the dependent variables are logarithmic, so the constraint becomes

$$s \frac{\delta LENLIST \ 16\text{--}19}{\partial PAY} + (1 - s) \frac{\partial LENLIST \ 20\text{--}24}{\partial PAY} = 0,$$

where s is the share of 16-to-24-year-old enlistees who are aged 16 to 19; since s varies over time, no restrictions of the coefficients (i.e., of the derivatives) can make the constraint hold exactly in all years. Still, given the difficulty of getting sensible estimates for military pay, a slightly incorrect constraint may be better than free estimation.

Ellwood and Wise make a strong case in the introduction to chapter 5 for the importance of the military as an employer of youths—particularly black youths. Moreover, the relative importance of the military appears destined to increase as relatively small cohorts enter the enlistment-prone age range.

The main theme of Ellwood and Wise's results is that military hiring seems to have a small negative effect on white civilian youth employment and almost no effect for blacks.[1] My initial reaction was skepticism—youth labor supply is not likely to be perfectly elastic, and institutional rigidities such as the minimum wage (which create an excess supply from which the military could draw without affecting civilian employment) seem more likely to characterize the market for the youths the military does not accept than for the youths it does hire. On reflection, Ellwood and Wise's scenario may be reasonable after all. While the "typical" recruit is a high school graduate with decent achievement-test scores, the marginal recruit may be far more likely to be a low-scoring, disadvantaged graduate or moderate-scoring dropout.

In any case, it is not clear exactly how Ellwood and Wise would explain their results—elastic supply, nonclearing markets, or some more complicated alternative. Neither elastic supply of black youths nor failure of markets to clear lead one to expect the negligible effect of higher white military enlistments (which, like a low adult unemploy-

ment rate, presumably mean more demand for black youths by civilian employees) on black civilian employment. Some complementary evidence might be gotten by estimating similarly structured reduced form wage equations (using, for example, NLS72 data).

Perhaps one should place less emphasis on the point estimates than Ellwood and Wise do. The reported two-stage least squares (TSLS) coefficient for whites in table 6.A.1 ($-.290$, s.e. $= .279$) means that a 95 percent confidence interval runs from $-.85$ to $+.28$—or virtually the entire 0 to -1 range one might accept as reasonable on a priori grounds. (The white and nonwhite TSLS coefficients *may* not even be statistically different at usual significance levels.)

As Ellwood and Wise recognize, TSLS estimation is needed because military enlistments not only depend on youth civilian employment prospects but (possibly) change them. I am a bit puzzled by the two-stage procedure they use. Using lagged (local) military employment in constructing the instrument for the current military-to-population ratio leaves the instrument still correlated with the error term in equation (3), if that error term is serially correlated. It was not clear (in the conference version) under what conditions adding a lagged dependent variable will solve this problem, and whether (as is usually the case) adding the lagged dependent variable changes the interpretation of the remaining coefficients.

Crane and Wise's study (chap. 6) of the effect of military service on civilian earnings is based on the experience of the high school class of 1972. Unlike civilian training programs such as MDTA and CETA, where the training program is abolished before its impact on earnings can be ascertained, the all-volunteer military has been maintained for long enough that the experience of its earliest cohorts can be studied while that experience is still relevant. The NLS72 data provide such an opportunity and also include control variables unavailable in competing files, such as the Current Population Survey or the census. Since recruitment ads characterize the military as "a great place to start," it is of more than academic interest to know how good a start it provides.

Crane and Wise's answer is: about as good a start as a civilian employer one did not remain with would offer. Military experience raises earnings, but less than civilian experience does, a difference Crane and Wise attribute to the fact that military experience is experience with a former employer, while civilian experience includes a mixture of civilian experience and current tenure. Measuring current tenure directly allows a more direct test of their explanation.

Any conclusion about the effect of military service on civilian earnings, as the authors freely acknowledge, must be tempered by the

possibility that military service is related to unmeasured attributes that directly affect civilian earnings. Crane and Wise are unable to correct for this selectivity, largely because the observable characteristics of those who served in the military are very similar to those who entered the civilian labor force after high school.

The Ellwood-Wise chapter 4 provides a reason why this might be the case. The pool of potential enlistees is doubly censored—by the members of that pool who choose not to enlist, and by the armed forces' screening and selection procedure. One might expect that those with the best civilian prospects would be reluctant to enlist, while those with low test scores, serious physical handicaps, or police records would be unable to enlist. If "ability" were unidimensional, I would expect the most and least able to be underrepresented among those who serve in the military. The direction of the bias in Crane and Wise's estimates of military experience effects would be uncertain, and its magnitude might not be large.

Since the military and civilian sectors do not reward exactly the same things, and because other factors enter the decision, it might be feasible to correct for this double-edged selection. The probability of wanting to enlist would depend on civilian alternatives (including local unemployment rates and test score determinants), attitudes toward military service, and the intensity of military recruiting. The probability of being acceptable to the armed forces would depend on test scores (and predicters of test scores, such as parental education), health conditions that would preclude enlistment, and local recruiting standards (if they do, in fact, vary geographically). With neither civilian alternatives nor military test scores observable, one does not get a perfect partition of the independent variables in these two selection equations, but one might have enough variables appearing in only one equation to make progress. Several of the factors I have mentioned (early 1970s economic conditions, recruitment efforts, recruiting standards, and, arguably, attitudes toward the military) would *not* belong in the equation for the 1979 wage rate, so one might have some real leverage for a sample-selection correction. Even if one decides that a twice-censored model is unfeasible, a single probit selection could be bolstered by including some of these variables.

Notes

1. Like Ellwood and Wise, I am inclined to focus on employment-to-population ratios rather than unemployment rates. But it would still be of interest to know to what extent military employment changes the number of youths who are unemployed.

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