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The Post-Military Earnings of Female Veterans

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Abstract

Women's role in the military has grown rapidly. Using standard data sets and a special survey of reservists, female veterans are found to have better earnings endowments than nonveterans. Although female veterans have higher unadjusted earnings than nonveterans, a wage disadvantage is found for white but not nonwhite veterans following control for measured and unmeasured skills. Low returns to military service may result from historically limited military opportunities for women and difficulty in transferring skills to civilian jobs.

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Introduction

In the past two decades the representation of women in the U.S. military, as in other areas of the labor force, has grown dramatically, rising from only 1.9 percent of the enlisted force in 1973 to nearly 11 percent in 1990 (Binkin, 1993). Women's role in the military is likely to expand even further as legal and non-legal obstacles that have prevented their serving in certain military occupations, especially combat specialties, are gradually removed (Presidential Commission, 1992; Schmitt, 1994). Changes in the utilization and occupational assignment of women will also likely be accompanied by an increased number of female recruits (Eitelberg, 1993). Consequently, the stock of female veterans in the civilian population, which by 1991 had reached 1.1 million (Department of Labor, 1992), also will grow. Despite the numerous and far-reaching changes in the opportunities for women in the military, the civilian labor market experiences of female veterans has not received attention in previous research.

The purpose of this paper is to investigate the civilian labor market performance of women veterans. Our primary analysis uses a unique data set that deals with the special circumstances surrounding the enlistment and occupational assignment of women. The Reserve Components Survey (RCS) (Defense Manpower Data Center, 1987a; 1987b) provide data on veteran and nonveteran reservists, a population whose members are more alike in numerous respects than a randomly selected sample of the civilian labor force. The survey's sample design controls for numerous background factors that affect individual enlistment behavior and that previously have not been measured. In addition to the RCS, we use standard labor market data from the Current Population Survey (CPS) and the National Longitudinal Survey of Youth (NLSY) to examine veteran earnings.

The attractiveness of the RCS, as compared to the CPS and NLSY, stems from the expectation that selection into the military based on unmeasured characteristics is a particularly important factor bearing on female military participation. From the standpoint of the armed forces, the number of women allowed to enter the military has always been constrained by demand limitations. From the standpoint of potential recruits, the military constitutes a nontraditional occupation for women. Hence, controlling for the selection process may be more important for analyses of female veterans' earnings than it is for males.

Although prior research on the civilian earnings of veterans has been extensive, covering both the volunteer era and periods when conscription was used, the literature has concentrated almost exclusively on men.[1] To analyze veterans who served during conscription periods, researchers have used various labor market surveys, including the CPS, the Census, and the National Longitudinal Survey of Young Men. For the volunteer era, which began in 1973, most prior studies have relied on the National Longitudinal Survey of Youth (NLSY) (see Bryant and Wilhite, 1990; Phillips, et al., 1992; Bryant et al., 1993). Because of differences between women and men in self-selection, military demand restrictions, and occupational assignment, the experiences of males may not provide a reliable guide to the effects of military service on females.

A study by Mangum and Ball (1989; see also, 1987) is one of the few even to have included female veterans. The authors use the NLSY to examine the determinants of the transfer of military and other types of training, and the effect of skill transfer, veteran status, and post-school training on the annual earnings and hourly wages of men and women volunteer-era veterans. For women, the authors find that military training is less likely than various types of civilian training to be transferred to civilian jobs. Measures of military service – a veteran status dummy and time spent in the military – are statistically insignificant in explaining women's hourly wages.

Although Mangum and Ball offer preliminary evidence on the earnings of female veterans, further research is clearly warranted. Although two-thirds of all female veterans served during the pre-volunteer era (Cohany, 1990), Mangum and Ball must focus only on the volunteer period because of the young sample in the NLSY. A further drawback of the NLSY is that only a small number of female veterans from this period is available for analysis. Small sample sizes are likely to account for their estimated veteran status coefficient of 0.427 for women, implying a 53 percent wage premium for veteran women as compared to similar nonveteran women. Despite the magnitude of this coefficient, it is not statistically significant.[2] Finally, their estimates do not account for potential bias from selection effects, a potentially important issue

[1] Mangum and Ball (1989) provide a brief survey of this literature. More recently, Angrist (1990) has addressed in some detail selectivity issues using information on date of birth for veteran and nonveteran birth cohorts affected by the draft lottery in the late Vietnam period (1970-1972).

when examining occupational assignment, skill transfer, and earnings.[3] In the present study, the Current Population Survey and the Reserve Components Survey are used because they offer relatively large samples of female veterans and because they provide data on veterans from both draft and volunteer periods. The design of the RCS, moreover, provides a natural control for important types of selectivity.

The next section of this paper analyzes the reserve survey, as well as providing supplementary evidence from the NLSY. This is followed by a similar analysis of female veteran and nonveteran earnings utilizing data from the CPS.

The Reserve Components Survey: Background and Results

The 1986 Reserve Components Survey (RCS) sampled 60,120 officer and enlisted reservists.[4] Most reservists hold full-time civilian jobs and attend reserve drills for one weekend per month and for two weeks during the summer to train in their specialty.[5] What makes the reserves a fertile ground for investigating veterans' earnings is that members are divided between those who have prior active-duty service and those who do not; that is, some reservists are veterans and some are not.[6] Furthermore, the RCS data provide implicit controls for both program selection by the military and self-selection by individuals.

Self-selection arises in veteran-nonveteran earnings studies because recruits have chosen the military over other alternatives; in addition, veterans represent members of the regular military who have chosen to separate at the expiration of their term of service. Both of these choices may hinge on unmeasured characteristics. Censoring also occurs because veterans must meet fairly stringent physical,

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[2] Their wage equation does not control for part-time status, a particularly important wage determinant among women (nonveteran women are more likely to work part-time than are veterans).

[3] Bryant et al. (1993) apply the Heckman correction to male, all-volunteer era veterans, but find no evidence of selection bias after controlling for AFQT and attitudes toward military service in their wage equation. Angrist (1990) provides a particularly careful treatment of selectivity issues.

[4] The 1986 Reserve Components Survey: Selected Reserve Officer and Enlisted Personnel (RCS) was conducted by the Department of Defense to assess a wide range of manpower issues and personnel policies. The population of the basic samples consisted of trained selected reservists. Surveys were administered to approximately 109,000 reservists. The population of reservists in 1986 was 1.1 million (U.S. Department of Defense, 1987). The member population was stratified by reserve component, reserve category, enlisted status, and sex; within most strata, the design provided for a 10 percent sample. The questionnaires were administered at reserve units during March and April 1986. The response rate for enlisted personnel was 59.7 percent, yielding usable responses for 60,120 persons.

[5] The average reservist spent 15.5 days in 1985 on reserve duty (mostly for training purposes) and received $2,420 in reserve earnings. Civilian income averaged $17,197 in 1985. A more extensive description of the compensation and labor force status of reservists in the RCS can be found in Grissmer et al. (1989).

[6] The legal definition of a veteran is one who has served at least 24 consecutive months on active duty in the regular military (U.S. Department of Veteran Affairs, 1989). Reservists who meet this criterion are defined as veterans; reservists

mental, and moral standards to qualify for enlistment, and a different set of standards (e.g., job performance) to be eligible for reenlistment. Because of the limited number of military jobs available to female recruits, censoring at the enlistment point is particularly important for women. If the factors that explain why some women enlist, and why some subsequently separate, are also correlated with earnings, selectivity may bias estimates of veteran status on civilian earnings.

The RCS data provide important controls for the unmeasured heterogeneity that can bias earnings studies. Since entrance standards for both reserve and active duty are the same, all RCS respondents are qualified to serve on active duty. These entrance standards are based largely on mental ability tests (AFQT), education, moral background (criminal record, drug use, etc.), and physical or medical tests.[7] Hence, differences in these important personal characteristics for the reserve population – veterans and nonveterans alike – are minimized. This contrasts to a random sample of the civilian population in which assignment to the treatment and control groups (i.e., veterans and nonveterans) is based partly on these characteristics, but they typically are not observed by the researcher.

A related source of selection bias is controlled in the RCS because of the similar preferences or positive military propensity shared by all reservists. In a random sample, preferences and alternative opportunities are major unobservables that explain why most otherwise qualified youth do not attempt to join the military. In sum, the comparison group design adopted here matches veterans with nonveterans who are similar in crucial respects, except for active-duty service. By controlling for many of the unobserved pre-treatment taste and ability factors that account for the non-random assignment of the eligible population to the treatment and control groups, the data may yield more precise estimates of the economic return to military service.[8]

Several considerations bear on the civilian earnings potential of female veterans. Women have not only increased their representation in the military, they also have made dramatic inroads into nontraditional military occupations. The proportion of military women in "non- traditional" broad occupation categories

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who do not are classified as nonveterans.

[7] Although the AFQT is required of reservists, test scores are not reported in the RCS.

[8] In this regard, the RCS shares some features with samples of siblings and twins that have been used in estimating the returns to education.

increased from only 9.4 percent in 1972 to 45.0 percent in 1984, a six-fold increase (Eitelberg, 1988). Compared to their civilian counterparts, military women are now much more heavily represented in the nontraditional broad occupational categories of "electrical/repair," "communications/intelligence," and "electrical/mechanical." Conversely, military women are far less likely than civilian women to be working in traditional "functional support" jobs (Firestone, 1992). As a result of these differences, military women may acquire advanced skill training, some of which is general in nature and transferable to civilian employers. If skill acquisition differs significantly between nonveterans and veterans, female veterans may reap positive benefits from military service.

These gains are limited by the extent to which veterans' skills are nontransferable to civilian jobs, either because they are military-specific, or because nontraditional civilian jobs for which veterans are trained either remain closed to women or are not sought out by female veterans. Differences in civilian earnings may also result if female veterans have different attachment to the labor force than their nonveteran civilian peers. Finally, it has been shown that military experience for men is often not a good substitute for civilian job experience (Trost and Warner, 1979). Because of the importance of continuous job tenure to earnings, both male and female veterans may suffer an earnings penalty associated with job change, especially if occupational change is involved. This penalty may be less evident for veteran women than for men, however, since short or discontinuous tenure is somewhat more likely among civilian women (the comparison group for female veterans) than among men.[9]

To estimate veteran-nonveteran wage differentials among women, earnings functions are specified using the log of hourly earnings as the dependent variable. The RCS data are restricted to enlisted reservists who worked in paid civilian jobs. Observations with missing (and in a few cases implausible) values for any of the variables used in the analysis also were deleted. These restrictions resulted in a usable sample of 1,946 women, of whom 25.4 percent were veterans. Variables that most directly capture general human capital include years of education, potential work force experience, and potential experience squared.

[9] There has been much debate on the relationship between tenure and earnings. For a summary of this debate, see Hutchens (1989); a recent contribution to this literature is Brown and Light (1992). The RCS provides no information on tenure in the civilian job, or type and length of active-duty military training among veteran reservists.

Current labor force status was reflected in dummy variables for part-time status, government employment, and broad occupation and industry (one-digit census codes) categories. Demographic variables representing marital status (married, spouse present=1) and number of children are also included in the specification.

Separate log wage equations are estimated for veteran and nonveteran female civilian workers. This approach does not constrain the labor market rewards to other worker characteristics to be equal for veterans and nonveterans. We subsequently estimate veteran- nonveteran wage differentials by race and for the draft and volunteer eras. For the 1986 population of reservist-veterans, enlistment dates coincide with the volunteer period (post- 1973) for respondents who are 30 and under. The draft-era sample is restricted to those over age 30 and the volunteer era sample to those 30 and under. It is unknown whether the earnings potential of female veterans will differ according to era of service. On the one hand, women have always been volunteers, even during conscription, and differences in enlistment behavior during the two eras may be slight. On the other hand, differences may arise because the most recent draft period included the Vietnam War and enlistment motives may differ between a draft/wartime period versus the volunteer/peacetime period.

The issue of minority representation in the armed forces continues to be heatedly debated. In 1989, racial and ethnic minorities accounted for 29 percent of the enlisted force, roughly twice their percentage in the civilian population (Office of the Assistant Secretary of Defense, 1990). A number of reasons have been advanced to explain why military service may augment the productivity of nonwhites more than whites. These include the argument that the military may be a more effective mechanism for nonwhites to make the transition from school to the civilian workforce – the "bridging hypothesis" (Fredland and Little, 1985); that the general training and skills received in the military are more valuable to nonwhites; and that military service provides a more effective "screen" to employers. To account for these possible differences, earnings differences are estimated for nonwhites and whites.

Table 1 presents RCS variable means and regression estimates based on separate wage equations for female veterans and nonveterans of all eras and races. Consistent with the belief that selectivity is important, there are notable differences between the population of female reservists and the overall female

labor force (compare the means in Table 1 with nonveteran means from the CPS presented in Table 4). In the RCS sample, the proportions of women who are nonwhite and work for the public sector are more than twice as high for reservists as for civilian women in general. Conversely, female reservists are only half as likely to work part time as are other female civilians and are far less likely to be married. Nonveteran reservists have less education and potential experience than veteran reservists and are more likely to be nonwhite.

Among the notable results evident in Table 1 are relatively small schooling coefficients and steep wage-experience profiles both among veteran and nonveteran reservists. Schooling coefficients are low in part because occupational controls are included (hence schooling coefficients represent intra-occupational returns and exclude the broad occupational mobility or access provided by schooling), and in part because of the relatively high degree of homogeneity among the reservist population (i.e., included are disproportionate numbers of high-ability low-schooling and low-ability high-schooling workers) that lessens wage differentials associated with years of schooling.

The estimated effect of experience for female reservists is much closer to that of males than of females in the largely nonreservist civilian labor force. For example, the experience- earnings profile for veterans in Table 1 is almost identical to that estimated for males by Mangum and Ball (1989, Table 2, p. 239). In contrast, the experience-earnings profile for females in the Mangum-Ball study is essentially flat, while subsequent results reported here from the CPS indicate an experience profile with an initial slope (at $EXP = 0$) just half of that among reservists. This difference between reservists and nonreservists may be due to the differences in characteristics noted above, especially the higher labor force participation of female reservists. While the labor force participation rate in 1986 for females in the CPS is almost identical for veterans and nonveterans at 54.7 percent (Roca, 1986), the rate for female reservists in the RCS is 82.5 percent. A majority of reservists, however, are single and ages 25-34. The participation rate for this demographic group in the civilian sector in 1986 was 81.1 percent, virtually identical to that of reservists (U.S. Department of Labor, 1988).

The RCS results presented in Table 1 are used in turn to decompose the total veteran- nonveteran

log wage gap into an "endowment" effect and "coefficient" effect. Let the superscripts *v* and *n* index veteran and nonveteran, $\hat{a}$ represent regression coefficients, and lnW and independent variables *X* represent means. The total or unadjusted wage gap, ($\ln W^v - \ln W^n$), is decomposed into the log wage difference owing to differences in measured characteristics, referred to as the endowment effect, and differences in coefficients, referred to as the coefficient effect. The endowment effect $Ó\hat{a}^n(X^v - X^n)$ is computed by assuming the nonveteran wage structure applies to both groups of workers; the coefficient effect $ÓX^v(\hat{a}^v - \hat{a}^n)$ represents the unexplained or adjusted veteran-nonveteran wage differential. Although this decomposition is not unique, the choice of nonveteran coefficient weights is appropriate here since female veterans comprise a tiny part of the labor force and the nonveteran coefficients represent the prevailing market wage structure (for a discussion of appropriate weights, see Neumark, 1988). In Table 2, the total log wage gap is shown in column 1, the endowment effect in column 2, and the adjusted gap or coefficient effect in column 3. As discussed below, results are presented not only from the RCS, but also from the NLSY and CPS.

The unadjusted veteran log wage differential among reservists is small, about a 2½ percent disadvantage. As shown in column 2, however, female veterans possess larger stocks of human capital and other characteristics than do nonveterans and might be expected to display a roughly 6½ percent wage *advantage* were they paid according to the nonveteran wage structure. The coefficient effect (column 3 of Table 2), representing the wage differential after accounting for measured characteristics, indicates a sizeable wage *penalty* of about 8½ percent.[10] In work not shown, we find a particularly large endowment advantage and large adjusted wage disadvantage among white veteran reservists, whereas nonwhite veterans have a relatively small endowment advantage and almost no adjusted wage disadvantage in comparison to their nonveteran counterparts. We will subsequently return to other results in Table 2 using the NLSY and CPS.

In Table 3, we provide estimates of adjusted wage differentials from pooled veteran- nonveteran samples, with coefficients on veteran dummy variables or appropriate dummy interaction variables serving as differential measures. Distinct veteran-nonveteran differentials are estimated by race, schooling group, era

[10] Logarithmic wage differentials are converted to percentage differentials by the approximation, [exp(á)-1]100, where á is

(the draft versus volunteer eras), and race by era. Estimates are highly similar to comparable estimates of the coefficient effect obtained from separate wage equations. The pooled estimates in Table 3 have the advantage of greater efficiency, since sample sizes of sub-groups are relatively small.

The coefficient of the veteran status dummy variable in line 1 of Table 3 indicates a female veteran wage disadvantage of approximately 9 percent. In line 2, however, where estimates of the differential are allowed to vary by race, we find a veteran penalty of about 12 percent for white women, as compared to about 2 percent for nonwhites. It seems clear that the relative performance of nonwhite female veterans in the civilian labor market is far less negative than among white veterans.

When veteran wage differentials are examined by schooling group, as shown in line 3, women with high school diplomas (or less) and those with some college (but not degree) experience an almost identical wage penalty of 10 percent. The differential for college graduates, however, is considerably less negative, and statistically insignificant. The veteran wage penalty by era, shown in line 4, suggests more negative wage outcomes for veterans during the draft than the AVF era (recall that women were not drafted during either period). Further disaggregation by race (line 5) indicates that white females suffered similarly large veteran wage penalties during both eras, whereas coefficients among nonwhites are considerably smaller during both periods.[11]

This paper argues that the RCS data are superior to random surveys in terms of controlling for unobserved factors that affect both enlistment and separation (i.e., veteran status) and earnings.[12] To provide a basis for examining this claim, veteran-nonveteran wage differentials are also computed using data from the NLSY and, in the next section, the CPS. In the NLSY, samples are not randomly assigned to

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the log differential. For a comparison of alternative approximations, see Giles (1982).

[11] In results not shown, we added to the wage equation dummies measuring the reserve component. Although there are differences in earnings by reserve component (reservists in Navy and Air Force units had higher earnings than those in Army and Marine Corps units), estimated veteran-nonveteran differentials are affected little. The VET coefficient changed from -.093 without component dummies to -.096 following their inclusion.

[12] There may be systematic differences between veterans who choose or are eligible to join the reserves and those who do not join or are not eligible to join. This implies that our results for reservists cannot automatically be generalized to the non-reserve population. We believe the RCS provides the preferred measure of the true veteran status effect, however, since the RCS controls for what in the CPS are substantial unmeasured differences between the non-reservist veteran and nonveteran populations. Although the RCS controls for many background factors, some differences between veterans and nonveterans may remain unobserved. For instance, reservist veterans have previously chosen a full-time military lifestyle that involved leaving the home area, whereas reservist nonveterans chose a less disruptive, part-time military affiliation. Indeed, reserve participation is often viewed as equivalent to moonlighting (Grissmer et al.,

treatment and control (i.e., veteran and nonveteran) groups but, rather, are determined based on taste and ability differences. The direction of the potential bias is unknown, although if AFQT scores and previously measured endowments are positively correlated, the adjusted differential (the coefficient effect) should decrease following control for AFQT. The NLSY for 1984 is used for this comparison as this was the last year that the large sample of armed forces members (originally interviewed in 1979) were in the survey. Even though the 1984 panel provided the largest sample of veterans in the NLSY, observations on only 191 female veterans are available. The specification is similar to that used for the RCS and, subsequently, the CPS.[13]

Table 2 presents estimated wage differentials computed from the NLSY. Due to the young age of the NLSY respondents in 1984, these results should be compared to the RCS (and CPS) results for the volunteer era (in Table 3, line 4). Note that AFQT scores are available in the NLSY to provide a partial control for military selection standards. The wage models are estimated with and without AFQT to determine how the presence of the control influences the measured wage effect of veteran status. Differences in the NLSY results with and without controlling for AFQT indicate positive selection into the military. That is, the adjusted veteran-nonveteran wage differential changes from slightly positive to slightly negative following control for AFQT. This is consistent with the relatively stringent enlistment standards for women throughout the volunteer period. The NLSY result without AFQT is close to zero, similar to that obtained with the CPS (.011 versus .007). Comparison of the NLSY results with those from the RCS, however, suggest that AFQT scores provide only a partial control for selectivity, based most likely on military entrance standards, whereas the RCS data provide controls for self-selection as well as administrator selection.

1989).

[13] The NLSY provides information on reserve status, but in 1984 there were only 36 female reservists, 23 of whom were veterans. We explored the possibility of estimating Heckman-Lee selection models with the NLSY, as done previously by Bryant et al. (1993) for males. Among the 191 women veterans in our NLSY sample, however, 164 had an enlistment year prior to 1979 (this results from the NLSY design of an initial oversample of active-duty military). Hence, information on such things as attitude toward serving in the military and local area unemployment *at the time of enlistment* are not available. In work not shown, we included a measure of attitude toward military service (in 1984) in the wage equation. The variable was not significant and did not affect other coefficients.

Evidence from the Current Population Survey

Further evidence is presented on the civilian earnings of female veterans and nonveterans, based on Current Population Surveys (CPS) for 1989-93. The CPS provides information on large representative samples of U.S. households. The CPS has not been used previously to examine the relative earnings of female veterans, owing in part to the fact that the CPS did not begin the regular recording of women's veteran status until the 1989 surveys, and in part because of the very small sample sizes of female veterans in each monthly public use survey. Our sample is constructed from the 60 monthly Current Population Survey (CPS) Outgoing Rotation Group (ORG) files between January 1989 and December 1993. Each ORG file comprises the quarter sample of the CPS that is asked the earnings supplement questions (e.g., weekly earnings, hours worked, and union status). The CPS ORG "earnings microdata files" are not public use files, but are made available by the Data Services Group at the Bureau of Labor Statistics (BLS).

The CPS ORG files are well suited for providing evidence on civilian earnings differences among relatively large and representative samples of the U.S. female (and male) veteran and nonveteran populations. Wage differentials can be measured unadjusted for wage correlates other than veteran status, or estimated conditional on measured individual and labor market characteristics. The major disadvantage of the CPS is that it is not well suited to control for selectivity, or unmeasured quality and taste differences between veterans and nonveterans. This contrasts with the RCS, which controls for both military selection and self- selection by comparing veteran and nonveteran reservists, and the NLSY, which partially controls for both types of selectivity through the inclusion of AFQT scores. If there exists positive selection among female veterans, as suggested in the previous section, we would expect the CPS evidence on earnings to appear more favorable toward veterans than does evidence from the RCS and NLSY (with control for AFQT).

The CPS sample includes all employed female wage and salary workers ages 20 and over with positive weekly earnings and hours, whose principal activity during the survey week was not school. Of the total sample of 402,883 women, 4,229 (1 percent) are veterans.[14] We measure the wage rate by usual

[14] In the CPS, reservists cannot be identified (they are a relatively small proportion of the total sample) and are included

weekly earnings divided by usual hours worked per week, in December 1993 dollars. The unadjusted veteran-nonveteran logarithmic wage differential is 0.0628 indicating a 6.5 percentage wage advantage for female veterans relative to nonveterans.

The Appendix provides descriptive evidence for five-year birth cohorts on the percentage veteran, average wages by veteran status, mean years of schooling by veteran status, and percentage nonwhite by veteran status. The top panel of the table provides information for women. For purposes of comparison, the bottom panel contains the same information for men (the sample for men has been constructed identically to that for women). The percentage veteran is below 1 percent for all older female cohorts, except for the cohort born prior to 1930, which includes WWII-era veterans. The 1955-59 and 1960-64 cohorts have a somewhat higher percentage veteran, reflecting the increased participation of women in the military. As expected, the 1965-73 cohort has a relatively small number of female veterans who were out of the military, out of school, and in the civilian labor force by 1989-93. Average wage differences largely mirror differences in mean years of schooling. There is a wage advantage to most earlier cohorts of female veterans, corresponding to a schooling advantage of about one year. Recent cohorts of female veterans, however, have schooling and wage rates similar to their nonveteran counterparts. Just as is the case for males, nonwhites are underrepresented in the military among older cohorts, while being overrepresented among younger cohorts.

Table 4 provides CPS sample means and regression coefficients from separate log wage equations for female veterans and nonveterans. Control variables are listed at the bottom of Table 4. Veterans have an approximate half year advantage in mean schooling, and small advantages in the proportion union members and proportion *full*-time. Veterans, however, have less experience and are less likely to reside in large metropolitan areas. A notable difference in mean characteristics is the greater proportion of veterans in relatively highly rewarded federal government and postal service jobs. Note that hiring preferences for veterans in these sectors account in part for these employment differences. One might argue, therefore, that inclusion of the public sector dummies biases downward estimates of the total effect of veteran status on

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in both the veteran and nonveteran samples. Individuals in the CPS are classified as veterans if they previously served

earnings (estimates of the veteran-nonveteran differential are about .01 higher when these are excluded). A notable difference in parameter estimates is that veteran coefficients on the marriage variables are close to zero, as opposed to positive marriage coefficients of about .05 for nonveterans (a similar difference in coefficients is seen in the RCS sample). Overall, most regression coefficients from the CPS sample are broadly similar to those obtained from the RCS.

The difference in veteran and nonveteran log wages in the CPS is decomposed into that portion explained by different endowments or characteristics (weighted by the nonveteran earnings structure), and that portion owing to differences in coefficients (evaluated using veteran means). These results are presented in Table 2, where they can be compared to results obtained previously using the RCS and NLSY. The veteran log wage advantage of .0628 can be accounted for almost entirely by differences in measured characteristics, the endowment effect being .0556. The unexplained veteran-nonveteran difference is only .0072. Although not the focus of this paper, we note that an identical analysis for men reveals a larger unadjusted veteran log wage advantage (.1317), but one which is also accounted for by measured characteristics, in particular the higher average age (experience) among male veterans than nonveterans (the endowment effect is .1501 and unexplained difference -.0184).

As evident in Table 2, the CPS results for women are similar to the NLSY results excluding the AFQT measure. They differ substantially but in a predictable way with results from the RCS. Whereas the RCS (and the NLSY with AFQT included) show a wage disadvantage for female veterans relative to nonveterans, the CPS results indicate, on average, little wage difference between veterans and nonveterans. We believe an important reason for these differences is that selectivity bias is more serious in the CPS, given the absence of an explicit quality measure such as AFQT, or natural controls for unobservables such as that present in the sample of reservists. In the RCS, CPS, and NLSY data sets, female veterans have superior measured earnings endowments as compared to their nonveteran counterparts. Estimates of endowment effects are .06 log points in each of the three data sets (or .09 in the NLSY with AFQT included).

Table 3 provides alternative estimates of veteran-nonveteran differences from the RCS and CPS,

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in the active-duty military.

based on pooled equations with appropriate interaction terms. To compare the CPS results for females to those for men, the right-hand side of the table provides equivalent estimates for males. The data source, time period, and sample selection criteria are identical for women and men.

CPS regression results using a veteran dummy variable (Table 3, line 1) indicate a difference of, essentially, zero (.0071), nearly identical to the previous result of .0072 (Table 2) based on separate veteran and nonveteran equations. Qualitative differences in female veteran premiums based on race and education are reasonably similar between the CPS and RCS surveys. In line 2 of Table 3, separate estimates are provided by race. Whereas we find no significant difference in earnings between white veterans and nonveterans (.001) in the CPS, there is a small (.038) premium realized by nonwhite veterans relative to their nonveteran counterparts. The qualitative evidence on racial differences, therefore, is similar in the RCS and CPS samples. The suggestion from the data is that in contrast to whites, nonwhite veterans possess an unobserved productivity advantage relative to nonwhite nonveterans. We cannot discern from the data the source of the differential. This productivity advantage may be the result of selectivity by the armed forces, such that nonwhite recruits place higher in the ability distribution among the nonwhite population than do white recruits among the overall white population, or it may result directly from a relatively greater enhancement of skills acquired in military service by nonwhites than by whites. We suspect both are important sources of racial differences in veteran-nonveteran wage differences. Because we obtain a similar racial pattern of results in the RCS and CPS, even though the reservists sample already controls to some extent for military selection, we lean toward the latter explanation.

The pattern of veteran wage differentials with respect to schooling are found to be similar in both the CPS and RCS. In the CPS, veteran-nonveteran differences are estimated to be .000, .001, and .026 for civilian workers with no more than a high school diploma, with some college, and with a college degree, respectively. While women with some college and those with a high school education or less realize similar differentials, wage differentials are higher among college graduates (.05 less negative in the RCS and .03 more positive in the CPS). A similar pattern with respect to schooling is found among CPS males. Our schooling breakdown, which does not separate out workers with less than a high school diploma (among

recent cohorts, very few women or men who have not completed high school are admitted into the military) masks the traditionally high returns to military service found for older, less- educated males (see Berger and Hirsch, 1983, for evidence). A compelling explanation for a more favorable veteran-nonveteran performance by college graduates is not readily evident. One possibility is that educational benefits provided to veterans permit them to make economically desirable but otherwise liquidity-constrained investments in schooling. Recent evidence by Angrist (1993) from the 1987 Survey of Veterans indicates that veteran benefits increase schooling levels by an average 1.4 years, with benefits accruing primarily to those attending college and graduate school. Returns to years of schooling following service are not found by Angrist to be particularly high (about 4.3 percent a year), however, resulting in an earnings increase of about 6 percent.

We next examine differences in veteran-nonveteran differences among women likely to have served during the draft and AVF eras. Differences in the veteran differential by time period of service are small and insignificant, reflecting, perhaps not surprisingly, little effect of the draft on women. It is important to note that with data covering a short time span (5 years for the CPS), we cannot distinguish between the effects of draft versus volunteer-era service, birth cohort, and age. In work not shown, we find little difference in female veteran- nonveteran wage differentials when these are estimated separately either by 10-year birth cohorts or age groups. In fact, we had expected to find a veteran wage disadvantage for young women (below age 30) who are making the transition from military to civilian work, coupled with a steeper wage profile as catch-up takes place. Note that such a pattern of initially depressed earnings but faster wage growth is typical of the previous evidence (Berger and Hirsch, 1983) reported for male veterans (and confirmed by us in results not shown). The literature on male veterans suggests that this pattern reflects some combination of age, cohort, draft-era, and year effects.

Conclusions

Despite considerable attention and the increasing importance of women in the military, there exists little scholarly evidence on the relative civilian earnings of female veterans. This paper provides what we hope is a valuable step in that direction. Data from the 1986 Reserve Components Survey (RCS), the 1989-93 Current Population Survey (CPS), and the 1984 National Longitudinal Survey of Youth (NLSY) have

been used to estimate veteran-nonveteran civilian wage differentials. Our principal analysis has focused on the RCS, which provides a natural control for unobserved preferences and abilities since selection criteria and tastes are similar among individuals serving in the active-duty military and the reserves.

The evidence from all three data sets indicates that female veterans possess a higher level of measured earnings endowments than do nonveterans. Moreover, evidence from the RCS and NLS is consistent with the hypothesis that ability and other wage determinants unobservable in the CPS are positively correlated with measured endowments. In the RCS, sizable veteran wage disadvantages are evident among white women following controls for measurable wage determinants. In both the RCS and CPS, veteran-nonveteran wage differentials are more favorable among nonwhites than among whites, and among college graduates than among those without a college degree. Our main results offer little support for the contention that military service provides work experience for women that is of superior value to that available in the civilian labor market. Under the most favorable estimates from the CPS, time spent in military service by white women has a value equivalent to time spent in the civilian labor market.

The postmilitary earnings experience of female veterans is important for at least two reasons. First, the recruitment of highly qualified personnel depends partly on the expectation and promise that military training provides a valuable bridge to subsequent civilian jobs. Second, the current military drawdown has been accompanied by a number of programs from the Departments of Defense and Labor to assist the transition of veterans to the civilian labor force. Our evidence indicates that the military historically has not provided to women training that is equally valued to that received in the civilian sector. The current military drawdown is likely to have exacerbated this problem, since personnel are being discharged who in the past would have chosen to make the military their career.

The low returns to military service may reflect the restricted range of military occupations (prior to the mid-1980s) in which women were able to serve, the narrow opportunities for skill enhancement within the military, training that is nontransferable to civilian jobs, and an inability to transfer these skills to the civilian sector owing to occupational barriers to women in jobs utilizing these skills.[15] Because of improved military

[15] The military and civilian occupations and industries in which women are employed differ from those of nonveterans.

opportunities for women within the last 5-10 years, however, it is important to keep our results in perspective. Moreover, substantial changes are currently underway. In the future, enhanced military opportunities for women, coupled with declining sex segregation in the civilian labor market, should produce more favorable civilian performance outcomes for female veterans.

To some extent, the military may provide a mechanism by which women can gain training and subsequent entry to nontraditional civilian jobs to which they might otherwise be excluded. We find some evidence along these lines. When we estimate a log earnings equation from the CPS *excluding* occupation and industry dummies, the veteran differential increases from .007 to .024. Although both coefficients are small, the direction of change suggests that veteran status may provide access to women to occupations and industries that are somewhat higher paying than those obtained by otherwise similar nonveterans.

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Table 1
Regressions for Separate Veteran and Nonveteran Log Wage Equations from the RCS Data

Variables	Veteran Means	Nonvet. Means	$\|t\|$ Diff.	Veterans Coeff.	Veterans (s.e.)	Nonveterans Coeff.	Nonveterans (s.e.)
Education	13.636	13.312	(3.54)	.039	(.012)	.036	(.009)
Experience	11.953	10.619	(3.74)	.029	(.012)	.032	(.007)
Exper^2/100	1.903	1.601	(2.86)	-.058	(.034)	-.044	(.023)
Married	.357	.317	(1.65)	.017	(.045)	.022	(.032)
Nonwhite	.288	.401	(-4.43)	.134	(.046)	-.001	(.030)
Part-time	.096	.124	(-1.54)	-.230	(.071)	-.139	(.044)
Children	.743	.669	(1.41)	-.036	(.023)	.005	(.016)
Public	.525	.443	(3.21)	.051	(.066)	.069	(.046)
Industry (8)				yes		yes	
Occupation (7)				yes		yes	
R^2				.235		.180	
N	495	1,451		495		1,451	

Data source is the 1986 Reserve Component Survey (RCS). The dependent variable is the log of the wage, calculated by weekly earnings divided by weekly hours worked, with a mean of 2.005 for veterans and 2.030 for nonveterans. Included in each equation are variables measuring years of schooling completed; potential experience and its square; and dummies equal to one if currently married, nonwhite, part-time, number of children, public sector worker, and dummies for broad industry and occupation (the number of included dummies is in parentheses). $|t|$ Diff are t-ratios testing for equality of means; (s.e.) are the standard errors attaching to regression coefficients.

Table 2
Decomposition of Veteran-Nonveteran Wage Differentials by Race and Era

Sample	Log Wage Gap	Endowment Effect	Coeff. Effect	F	N
RCS: 1986					
All Women	-.0248	.0642	-.0891	(1.501)	1,946
NLSY (Volunteer Era, All Women): 1984					
Without AFQT	.0755	.0645	.0109	(1.564)	1,159
With AFQT	.0755	.0874	-.0118	(1.605)	1,106
CPS: 1989-93					
All Women	.0628	.0556	.0072	(2.595)	402,883
All Men	.1317	.1501	-.0184	(23.115)	426,936

All calculations are based on separate log wage equations for veterans and nonveterans. The RCS results are based on coefficient estimates shown in Table 1, those for the CPS women on estimates shown in Table 4, and those for CPS men on estimates from a specification identical to that for CPS women. The NLSY wage equations include variables identical to those in the RCS equation, with the exception that actual work experience is substituted for potential experience, and AFQT is included in one of the specifications. The log wage gap is the unadjusted difference in the means of the log wage. The endowment effect is the wage differential that would be observed were veterans and nonveterans rewarded similarly for measured characteristics; it is measured by the sum of the differences in explanatory variables times the nonveteran coefficients. The coefficient effect or adjusted differential reflects wage differences following control for measured characteristics, and is measured by the sum of the differences in coefficients times the veteran means. F is the F-statistic testing the null that the coefficient effect is zero. N is the sample size. See the text for further discussion.

Table 3
Regression Estimates of Veteran-Nonveteran Wage Differentials by Race, School Group, and Era, Partial Regression Results from the RCS and CPS

Specification	RCS Females		CPS Females		CPS Males	
1. VET	-.0926	(.0271)	0.0071	(.0062)	-.0160	(.0016)
2. WH*VET	-.1262	(.0327)	0.0009	(.0068)	-.0164	(.0017)
NW*VET	-.0198	(.0580)	0.0382	(.0153)	-.0131	(.0046)
3. VET*SCH<=12	-.1058	(.0399)	0.0001	(.0101)	-.0173	(.0021)
VET*SCH13-15	-.1012	(.0406)	0.0011	(.0121)	-.0269	(.0032)
VET*SCH16+	-.0472	(.0575)	0.0263	(.0130)	-.0072	(.0030)
4. VET*DRAFT	-.1221	(.0390)	0.0143	(.0096)	-.0102	(.0019)
VET*AVF	-.0690	(.0351)	0.0020	(.0082)	-.0296	(.0028)
5. WH*VET*DRAFT	-.1378	(.0450)	0.0092	(.0102)	-.0103	(.0020)
NW*VET*DRAFT	-.0883	(.0716)	0.0534	(.0283)	-.0095	(.0054)
WH*VET*AVF	-.1171	(.0427)	-0.0056	(.0091)	-.0317	(.0031)
NW*VET*AVF	.0269	(.0603)	0.0320	(.0181)	-.0171	(.0074)
N	1,946		402,883		426,936	

Shown are regression coefficients (standard errors) attaching to dummy variables reflecting veteran status and interactions of veteran status with race, schooling group, era, and race by era.

RCS sample: Dependent variable is log of hourly earnings, based on usual weekly earnings (excluding reserve pay) divided by hours worked per week. Also included in all equations are years of schooling completed, potential experience and its square, currently married, nonwhite, part-time, number of children, public sector worker, and dummies for broad industry and occupation.

CPS sample: Dependent variable is log of real hourly earnings, in December 1993 dollars, based on usual weekly earnings (excluding reserve pay) divided by hours worked per week. Also included in all equations are years of schooling completed, potential experience and its square, married spouse present, ever married but spouse not present, union membership, nonwhite, part-time, number of children in primary family, federal (exc. postal), state, local, postal, and large metropolitan area. Also included are dummies for Census region, broad industry, broad occupation, and year.

Table 4
Variable Means and Regression Results for Separate Female Veteran and Nonveteran Log Wage Equations from the CPS

				Veteran		Nonveteran	
Variable	Veteran Means	Nonvet. Means	$\|t\|$ Diff.	Coeff.	(s.e.)	Coeff.	(s.e.)
Education	13.603	13.201	(10.25)	.051	(.0038)	.055	(.0003)
Experience	20.166	20.819	(-3.36)	.016	(.0022)	.016	(.0189)
Exper^2/100	5.392	5.922	(-5.27)	-.026	(.0041)	-.026	(.0004)
Married, w/ spouse	0.529	0.586	(-7.36)	-.021	(.0194)	.056	(.0020)
Ever Married w/o Spouse	0.291	0.212	(12.47)	-.001	(.0202)	.045	(.0023)
Union	0.149	0.135	(2.64)	.210	(.0201)	.150	(.0021)
Nonwhite	0.166	0.149	(3.04)	-.009	(.0181)	-.041	(.0019)
Part-time	0.210	0.236	(-3.99)	-.099	(.0173)	-.130	(.0016)
Children	0.786	0.736	(3.12)	-.014	(.0071)	-.008	(.0007)
Federal	0.101	0.024	(31.95)	.040	(.0289)	.048	(.0048)
State	0.074	0.053	(5.96)	-.039	(.0296)	-.030	(.0033)
Local	0.097	0.125	(-5.42)	-.082	(.0254)	-.088	(.0024)
Postal	0.022	0.006	(12.43)	.152	(.0545)	.131	(.0087)
Large CMSA/MSA	0.395	0.453	(-7.57)	.091	(.0140)	.122	(.0014)
Region (8)				yes		yes	
Industry (5)				yes		yes	
Occupation (13)				yes		yes	
Year (4)				yes		yes	
R^2				yes		yes	
N	4,229	398,654		4,229		398,654	

Data source is the Current Population Survey for 1989-93. Dependent variable is log of real wage rate. The mean of the dependent variable is 2.2869 for veterans and 2.2241 for nonveterans. Included variables are years of schooling completed, potential experience and its square, married spouse present, ever married but spouse not present, union membership, nonwhite, part-time, number of children in primary family, federal (exc. postal), state, local, postal, and large metropolitan area. Also included are dummies for Census region, broad industry, broad occupation, and year (the number of included dummies is listed in parentheses). $|t|$ Diff. are t-ratios testing for equality of means; (s.e.) are the standard errors attaching to regression coefficients.

Appendix
Female and Male Veteran Status, Wages, Schooling, and Race, by Birth Cohort, 1989-93 CPS

Birth Cohort	N	VET	W^v	W^n	W^v/W^n	S^v	S^n	S^v-S^n	NW^v	NW^n
Females:										
< 1930	19,230	1.17	13.66	9.19	1.49	13.69	12.05	1.64	3.11	12.05
1930-34	20,110	0.87	13.21	10.48	1.26	13.48	12.45	1.03	5.71	13.19
1935-39	27,541	0.89	12.31	10.78	1.14	13.49	12.73	0.75	11.02	14.38
1940-44	38,158	0.80	14.31	11.37	1.26	13.93	13.09	0.84	9.87	14.26
1945-49	50,972	0.91	12.59	11.78	1.07	14.15	13.42	0.73	12.96	14.62
1950-54	58,242	1.07	12.27	11.70	1.05	14.27	13.50	0.77	17.57	15.87
1955-59	62,025	1.42	11.27	11.34	0.99	13.68	13.42	0.26	19.13	16.35
1960-64	60,611	1.35	10.14	10.55	0.96	13.07	13.45	-0.38	23.11	15.54
1965-73	65,994	0.75	8.25	8.40	0.98	12.85	13.17	-0.31	20.61	14.56
All	402,883	1.05	11.48	10.66	1.08	13.60	13.20	0.40	16.62	14.95
Males:										
< 1930	19,171	67.22	14.45	12.81	1.13	12.89	11.31	1.59	7.30	17.53
1930-34	22,688	64.01	16.52	14.65	1.13	13.12	11.66	1.46	7.80	17.59
1935-39	29,837	48.39	17.02	16.09	1.06	13.26	12.50	0.75	7.75	15.14
1940-44	39,423	40.29	17.36	16.74	1.04	13.49	13.09	0.40	8.46	14.83
1945-49	51,400	43.76	16.70	16.86	0.99	13.67	13.66	0.01	8.95	14.39
1950-54	60,113	22.26	14.82	15.85	0.93	13.31	13.69	-0.38	11.76	13.25
1955-59	67,193	12.98	13.21	14.46	0.91	12.98	13.37	-0.39	15.29	12.33
1960-64	67,214	10.51	11.42	12.52	0.91	12.69	13.19	-0.50	14.60	12.13
1965-73	69,897	6.27	9.14	9.22	0.99	12.47	12.65	-0.18	13.79	12.87
All	426,936	26.65	15.45	13.64	1.13	13.23	13.11	0.12	9.75	13.30

N is the CPS sample size, VET is the percentage veteran, W^v and W^n are the mean wages in December 1993 dollars for veterans and nonveterans, S^v and W^n are mean years of schooling for veterans and nonveterans, and NW^v and NW^n are the percentages nonwhite among veterans and nonveterans. Wage ratios and schooling differences are calculated prior to rounding. Birth cohort (year born) is estimated based on reported age in the CPS.