NBER WORKING PAPERS SERIES

THE EFFECT OF VETERANS BENEFITS ON VETERANS' EDUCATION AND EARNINGS

Joshua D. Angrist

Working Paper No. 3492

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 1990

This research was supported by the US Department of Education. Thanks also go to the Harvard Institute for Economic Research and the National Science Foundation for financial support, and to the Department of Veterans Affairs for providing the data. Veterans Affairs employees Steve Dienstfrey, Tom Fields, Rob Kline and Susan Krumhaus provided helpful background material, and seminar participants at Harvard and MIT provided helpful comments. Data and computer programs used in this study are available on request. This paper is part of NBER's research program in Labor Studies. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

NBER Working Paper #3492
October 1990

THE EFFECT OF VETERANS BENEFITS ON VETERANS' EDUCATION AND EARNINGS

ABSTRACT

The majority of armed forces veterans make use of the subsidized training and educational benefits provided by the Department of Veterans Affairs. The effect of veterans benefits on educational attainment and civilian earnings is estimated here using the Census Bureau's 1987 Survey of Veterans. Two identification strategies are employed to control for unobserved characteristics that are correlated with educational attainment and benefit usage. First, a fixed effects strategy is implemented by exploiting information on educational attainment at the time of entry to service. Second, instrumental variables estimates are computed, where the excluded instruments are interactions between period of service and educational attainment at entry to service. The effect of veterans benefits on earnings is estimated by decomposing the return to education into a return to the grade completed at entry to service and a return to the post-entry grade increment. Veterans benefits are estimated to increase schooling by roughly 1.4 years and the grade increment is worth roughly 4.3 percent, so that veterans benefits raise annual earnings by approximately 6 percent. This premium appears to accrue primarily to the 77 percent of benefit users who attended college or graduate school.

Joshua D. Angrist
Department of Economics
Harvard University
Cambridge, MA 02138

Since the 1944 GI Bill, the federal government has subsidized education and training for veterans of the armed forces. The rationale for the original GI Bill was to speed the transition to peacetime production and to compensate veterans whose educational plans were interrupted by military service (Levitan and Zickler 1973). Increasingly, however, veterans benefits have come to be seen as an essential recruiting tool in the All-Volunteer Forces (Fernandez 1980). The transition from the Post-Korean GI Bill to the less generous Veterans Educational Assistance Program (VEAP) in 1976 was blamed for a reduction in high quality enlistments, and experimental evidence on the value of education benefits as an enlistment incentive was provided by the Educational Assistance Test Program (EATP) in the early 1980's (Fernandez 1982). In light of results from the EATP, more generous veterans benefits were re-introduced through the Army College Fund in 1982 and the Montgomery GI Bill in 1985.

Although the enlistment effects of educational benefits indicate that recruits value these benefits, few studies have directly considered the question of what benefits are actually worth to veterans.[1] One of the few evaluations of the GI Bill is the study by O'Neill and Ross (1976), who use longitudinal data to estimate the effect of the post-korean GI Bill on earnings. They find that GI Bill users eventually enjoy a 10 percent earnings premium. On the other hand, in a study of nonveteran educational subsidies, Manski and Wise (1983) found that only 25 percent of Basic Educational Opportunity Grants (BEOG) go to students who would not otherwise have enrolled in school. This finding suggests that educational subsidies ultimately have little effect on earnings for the vast majority of grant recipients.

---

[1]Magnum and Ball (1989) investigate the effect of training provided while in the military.

Do veterans benefits really improve the civilian labor market outcomes of veterans? The purpose of this paper is to estimate the effect of veterans benefits on the educational attainment and earnings of veterans who served in the Vietnam era and in the first years of the all-volunteer forces (AVF). The empirical analysis uses data on veterans from the Census Bureau's 1987 Survey of Veterans (SOV). The SOV reports information on 1986 earnings, program usage, and the characteristics of veterans before and after their entry into the military.

When evaluating veteran benefits, it is important to keep in mind that veterans who use benefits may be more educated than nonusers for reasons that have nothing to do with the benefits. In fact, the data show that benefit users have more schooling than nonusers before entering the military. To control for individual characteristics that are correlated with both benefits and the level of educational attainment, a fixed effects strategy is employed. This strategy entails a regression of the increment in veterans' educational attainment since entering the military on a program dummy and other control variables. The effect of veterans benefits on earnings is then estimated by decomposing the return to education into a return to grade at entry and a return to the grade increment. Underlying this strategy is the assumption that veterans benefits have no effect on earnings other than through educational attainment. The empirical results support this assumption.

Another important characteristic of veterans benefits is that benefit users must acquire some sort of training to be eligible for benefits. Thus, it is no surprise that users of veteran benefits end up more educated than they were upon entry to the military. But non-users also acquire additional schooling in the intervening years. For example, Manski and

Wise's (1983) findings suggest that students who do not receive BEOG grants increment their schooling by as much as grant recipients. This may be because government subsidies simply replace alternative sources of funding. In the case of veterans educational subsidies, however, benefit users get 1.4 years of schooling over and above the additional schooling acquired by nonusers.

To further substantiate the interpretation of the difference in the education increment between benefit users and nonusers as being attributable to the use of benefits, Instrumental Variables (IV) estimates of the grade increment equations are also reported. In this case, the excluded instruments are interactions between period of service and grade at entry to service. This estimation strategy uses the reduction in benefit usage following the introduction of VEAP as a natural experiment that generated exogenous variation in benefit usage. Because the reduction in benefit generosity was more likely to reduce benefit usage among less educated veterans, the difference in the change in benefit usage by grade at entry identifies the effect of benefits on grade increment while controlling for secular grade-at-entry and period-of-service effects.

The paper is organized as follows. The next section describes the educational benefits available to Vietnam and early AVF veterans. Section 2 outlines a statistical model for the evaluation of veterans benefits and describes the SOV data. Section 3 reports estimates of the basic model. Section 4 describes the instrumental variables estimation strategy and reports the IV estimates. Section 5 offers a summary and some conclusions.

1. Benefits for Vietnam and Early AVF Veterans[2]

Veterans benefits fund a wide range of educational programs and vocational training. Veterans programs included subsidies and loans for attending vocational and technical schools, correspondence courses, two and four-year colleges, flight training, and apprenticeships. Since their inception, veterans benefits have been the largest single federal program for student aid (Fernandez 1980).

This study focuses on cohorts of veterans who were eligible for benefits under two of the three most important pieces of benefit legislation since the Korean War. Included are Vietnam veterans, who served between August 1964 and May 1975, and veterans of the early AVF period, who served from May 1975 to September 1980. Vietnam veterans were eligible for benefits under the post-Korean GI Bill, sometimes known as the "noncontributory GI Bill". AVF veterans who entered the military after December 31, 1976 were eligible for benefits under a contributory program known as the VEAP. Beginning in 1979, a number of smaller programs were introduced, culminating in the Army College Fund in 1982. The third major piece of post-Korean benefits legislation was the Montgomery GI Bill in 1985, which effectively re-instated the noncontributory GI Bill. Attention is focused here on Vietnam and Early AVF veterans because these groups have had time to re-enter the civilian labor market by 1986, the date for which earnings are recorded in the SOV.

Veterans who served on active duty for more than 180 continuous days between January 31, 1955 and January 1, 1977 were eligible for post-Korean

[2] Background material is drawn from Veterans Administration (1978) and Department of Veterans Affairs (1990).

GI Bill benefits for up to 10 years after discharge.[3] Benefits under the post-Korean GI Bill consisted of monthly payments determined by the type of instruction undertaken and the number of dependents. In 1978, for example, a veteran attending college full time with no dependents would have been eligible for up to 45 monthly payments of 311 dollars. Individuals attending other types of institutions or for less than full time were eligible for less. Benefit recipients under the GI Bill could expect benefit levels to be periodically increased.

Veterans who entered service after December 31, 1976 and before July 1, 1985 were eligible to participate in the VEAP any time during active duty. VEAP participants made monthly contributions to a VEAP fund for at least 12 consecutive months, and VEAP benefits are payable any time up to 10 years after discharge from active duty. The maximum VEAP contribution was 2,700 dollars, which the government matches 2 for 1 when benefits are paid out. Thus, the maximum government contribution under VEAP is 5,400 dollars, payable in 36 monthly payments of 150 dollars each. In contrast, the 36-month total payment under the post-Korean GI Bill was 11,196 dollars in 1978.

Replacement of the GI Bill with the less generous VEAP appears to have contributed to a decline in both the quantity and quality of recruits. To offset this decline, the individual services (beginning with the army) offered enhancements to basic VEAP benefits. These enhancements, known as "kickers", added lump sum amounts of up to 6,000 dollars to the VEAP fund of recruits enlisting after January 1, 1979.[4] In 1980, kicker amounts were

---

[3] GI Bill eligibility for all Vietnam veterans terminated in 1989.

[4] The 1979 kickers were originally introduced as part of the RAND Multiple Option Recruiting Experiment (MORE), in which alternative benefit packages were randomly assigned to Armed Forces Entrance and Examining

further increased for recruits in EATP treatment groups. Lump sum contributions to VEAP funds continued to be a part of the benefit package following the EATP, and an 8,000 to 12,000 dollar contribution for Army recruits was designated the Army College Fund in 1982 (Hogan, Smith, and Sylwester 1990).

For the purposes of this study, an important feature of the VEAP kickers is that eligibility was limited to recruits with a high school diploma who fell into armed forces mental categories I-IIIa (Fernandez 1980).[5] Thus, the VEAP Kicker went a long way towards closing the gap between VEAP and GI Bill benefits in the early AVF, but only for veterans who were relatively educated upon entry to the service. The differences in VEAP benefits for men with different schooling levels are used to identify instrumental variables estimates in Section 4, below.

2. Data and Statistical Models for Veterans Benefits

A simple two-equation model is used to estimate the effect of veterans benefits on education and earnings. The effect of benefits on education is characterized by

$$E_{1i} = X_i\beta_1 + d_i\gamma + \alpha_i + \varepsilon_{1i}, \qquad (1)$$

where E_{1i} is the highest grade completed on the survey date, X_i is a vector of covariates, d_i indicates whether i has ever used veterans educational benefits, α_i is an error component that may be correlated with d_i, and ε_{1i} is an error component orthogonal to X_{1i} and d_i. The effect of education on

---

Stations (AFEES). Shortly after the MORE began, however, kickers were made available to eligible recruits at most of the AFEES (Fernandez 1982).

[5]Eligibility was further restricted to those entering certain occupations while in the service.

earnings is characterized by

$$y_i = X_i\delta + E_{1i}\rho + \nu_i, \tag{2}$$

where y_i is log earnings, and ρ is the return to education. The error term, ν_i, is assumed to be uncorrelated with X_i and E_{1i}.[6] The effect of veterans benefits on earnings is $\pi = \gamma\rho$.

Without additional information, the effect of veterans benefits is not identified in equations (1) and (2) because d_i is correlated with α_i. However, the SOV also reports information on schooling at entry to the service. Denote entry level schooling by E_{0i}, and write

$$E_{0i} = X_i\beta_0 + \alpha_i + \epsilon_{0i}, \tag{3}$$

so that, subtracting (3) from (1), we have

$$\nabla E_i = X_i\beta + d_i\gamma + \epsilon_i, \tag{4}$$

where $\nabla E_i = E_{1i}-E_{0i}$, $\beta = \beta_1-\beta_0$, and $\epsilon_i = \epsilon_{1i}-\epsilon_{0i}$. Note, also, that (2) can be written

$$y_i = X_i\delta + E_{0i}\rho_0 + \nabla E_i\rho + \nu_i, \tag{5}$$

where the return to entry-level schooling (ρ_0) may differ from the return to the schooling increment (ρ).

The effect of veterans benefits on education is identified by Ordinary

---

[6] Angrist and Krueger (1990) present evidence that schooling is not correlated with the error term in human capital earnings functions.

Least squares (OLS) estimates of (4), and the effect of the grade increment on earnings is identified by OLS estimates of (5). The effect of veterans benefits on earnings can then be computed as the product of the two estimates. Alternately, a "reduced form" earnings effect can be computed by OLS estimation of

$$(6) \qquad y_i = X_i\pi_0 + E_{0i}\rho_0 + d_i\pi_1 + [\epsilon_i\rho + \nu_i].$$

where $\pi_0 = [\delta + \beta\rho]$, and $\pi_1 = \gamma\rho$.

Specification Testing

A simple specification test for the assumptions underlying equations (4), (5), and (6) is to add the program dummy, d_i, to equation (5). A non-zero coefficient on d_i in (5) would indicate that veterans benefits are correlated with earnings for reasons other than through the schooling increment. One interpretation of such correlation would be that veterans benefits affect earnings through variables other than schooling. More importantly, correlation between earnings and benefit usage conditional on grade increment might indicate that benefit users are special in a way that invalidates the use of differences between benefit users and nonusers to estimate program effects.

Because equations (4) and (5) do not contain the same covariates (E_{0i} is excluded from equation 4), a comparison of different consistent estimates of the treatment effect provides another specification test. If equations (4), (5) and (6) are correctly specified, the estimate of π formed by multiplying estimates of γ and ρ from equations (4) and (5), and the estimate of π_1 in the reduced form equation, (6), will have the same probability limit. It should be noted, however, that if E_{0i} were included in equation (4), so that equations (4-6) included the same covariates other than d_i and ∇E_i, this test would be algebraically equivalent to the previous test.[7]

The 1987 Survey of Veterans

The 1987 SOV targeted individuals who were identified as veterans in the outgoing rotation groups of the Current Population Survey (CPS) between April 1986 and January 1987.[8] Of the 11,439 veterans identified in outgoing CPS rotation groups, 9,442 were successfully interviewed for the 1987 SOV. Of those not interviewed, many were deceased or not eligible for the survey because of insufficient time in the service. Among veterans who served after 1980, the SOV generally interviewed only those who served for at least 24 months.[9]

Because some of the information collected in the SOV could be used to identify individual veterans, the Census Bureau maintains confidentiality

---

[7] This is easy to see in a model without covariates. Let $\nabla E_i = \tilde{e}_i$. Then in versions of equations (4)-(6) that excluded X_i and E_{0i},

$$\hat{\pi} = (d'd)^{-1}d'y \quad \text{and} \quad \hat{\gamma}\hat{\rho} = (d'd)^{-1}d'\tilde{e}(\tilde{e}'\tilde{e})^{-1}\tilde{e}'y,$$

so that

$$(\hat{\pi} - \hat{\gamma}\hat{\rho}) = (d'd)^{-1}d'\hat{\nu},$$

where $\hat{\nu}$ is the residual from (5). Therefore, a test of $(\hat{\pi} - \hat{\gamma}\hat{\rho}) = 0$ in this case is just test of whether d_i belongs in equation (5).

[8] The 1987 survey was the third survey of veterans. An earlier survey was conducted in 1979, and a telephone survey was conducted in 1977. Other sources of information on veterans include the Current Population Survey veteran supplements in September 1989, November 1987, and April 1985. The 1979-87 National Longitudinal Survey of Youth (NLSY) and the 1966-1981 National Longitudinal Survey of Young Men panel data sets also interviewed veterans, although the NLSY military subsample was dropped in 1984.

[9] See Department of Veterans Affairs (1989a) for details and exceptions to this rule.

by restricting the content of the SOV Public Use file. In particular, information on age is grouped into 5-year intervals, information on length of service is grouped into intervals of varying widths, and information on period of service is restricted to gross measures such as whether or not the veteran served in the Vietnam Era.[10] The period of service variables indicate whether volunteers served in the early AVF (before September 1980), or later. Information on schooling is also restricted for less educated veterans.

The extract used here includes men who served in the Vietnam or early AVF periods, as defined by the Department of Veterans Affairs' period of service recodes.[11] The extract is restricted to men because relatively few women served in this period and the experiences of those who did may be unusual; the extract is restricted to Vietnam and early AVF veterans for the reasons discussed above. Included are men aged 30-54 in 1987 with 1-15 years of active duty service. Younger and older veterans may not be typical for this period, and veterans who served 20 or more years (coded in years-of-service interval 16-20) are retirees eligible for a military pension. Veterans with less than 1 year of service are unlikely to be eligible for veterans benefits. Also excluded are men with less than 9 years of schooling at entry to the service. Finally, the sample is restricted to men with a non-negative schooling increment between entry to

[10] The SOV questionnaire collects information on single years of age, and on the exact years of entry to and exit from the military.

[11] The period of service recodes differ somewhat from individuals self-reported period of service in that individuals who claim only reserve duty in a period are listed with service in the period. In cases where individuals have service in more than two periods, one of which includes a war, the recodes indicate only the wartime service. This should have no impact on a sample restricted to Vietnam and Early AVF veterans (personal communication with Steve Dynstra, Department of Veterans Affairs).

service and the survey date.

For those with 9-18 years of schooling, the SOV gives information on both the highest grade completed at entry to service and the highest grade completed on the survey date. Information on the highest degree obtained is combined with the grade completion variables to construct the schooling variables used here. A detailed description of the constructed schooling variables is given in the appendix.

Table 1 reports descriptive statistics for the selected sample.[12] Of the 3,337 veterans in the SOV with service in the Vietnam era or later periods, 2,388 met the criteria for inclusion in the selected sample. The frequency distributions at the top of the table show that most men in this group were between 35 and 44 years old in 1987, and the majority had served between 3 and 5 years. The sample means show that the average years of schooling completed at entry to service was 12.5, increasing to 14.0 by the survey date. 61 percent of the sample increased their educational attainment since entry to the service. 95 percent of the sample served in the Vietnam era and 16 percent served in the early AVF period. Most were enlisted volunteers.

78 percent of the sample acquired some sort of education or training since discharge. The majority of these, 52 percent, went to college or graduate school. A large fraction also received vocational, technical, or on-the-job training. 63 percent of the sample received some sort of financial aid. 55 percent report receiving aid through the GI Bill, 2

[12]Statistics are unweighted. The SOV includes a sampling weight derived from the CPS. Results proved insensitive to weighting, and so only unweighted estimates are reported.

percent used the VEAP, and 3.3 percent used some other VA program.[13] Overall, 57 percent received financial assistance from the VA.

Additional statistics (not shown in the table) indicate that 77 percent of VA program users went to college or graduate school. Also, program usage rates were higher among Vietnam than early AVF veterans; 58 percent of sample members with Vietnam-era service used VA education and training programs, while only 46 percent of veterans with no Vietnam-era service used these programs.

3. The Effect of Veterans Benefits on Education and Earnings

Equations (4), (5), and (6) constitute the basic framework for inference used to estimate the effect of veterans benefits. Before presenting estimates of these equations, however, results from a simpler difference-in-differences procedure are briefly discussed. Differences-in-differences estimates are based on the following version of equations (1) and (3):

$$E_{ti} = t_i\beta + \alpha_i + d_i\gamma + \epsilon_{ti}, \tag{7}$$

where $t_i = 0$ or 1 to indicate information on i at entry to service or on the survey date, so that $t_i\beta$ is a period specific intercept. The OLS estimate of γ in (7) is

[13] The breakdown of VA program usage should be treated with caution. Census Bureau experience with the CPS Veterans Supplement suggests that veterans do not distinguish accurately between the different VA programs (personal correspondence with Sharon Cohany, Bureau of Labor Statistics). There is a tendency to refer to all veterans educational benefits as "the GI Bill."

(8) $$\bar{\gamma} = (\bar{e}_{1u} - \bar{e}_{0u}) - (\bar{e}_{1n} - \bar{e}_{0n}),$$

where $\bar{e}_{tj}$ denotes average schooling in period t by group j, and j = u or n to indicate program use or non-use.

Equation (8) is simply the difference in the change in schooling between program users and non-users. It is apparent from (7) that such an estimate controls for secular individual and period effects. The statistics underlying estimates of $\bar{\gamma}$ are laid out in Table 2. The top half of the table shows mean levels of schooling by period and by program use for the selected sample discussed in Table 1. Column (1) shows that men who did not use any VA education program increased their schooling by 0.65 years, while Column (2) indicates that men who used VA programs increased their schooling by 2.03 years. The difference in these two increments, 1.39 years, is the estimated effect of the VA programs. Note that Table 2 illustrates the importance of controlling for individual characteristics. The difference in the first row of the table indicates that VA program users were more educated than nonusers even before entering the military.

The lower part of Table 2 repeats the differences-in-differences analysis for a more homogenous sample. This sample includes only Vietnam-era enlisted men who were not drafted. Here the difference in pre-service schooling levels by program use is more pronounced, but the estimate of the effect of program use is nearly identical to that in the larger sample.

Table 3 reports estimates of equations (4), (5), and (6), along with estimates of the undifferenced education equation, (1), and the human capital earnings function, (2). Each equation includes a full set of interaction terms to control for age and years of service using all available information on the SOV tape (there are 18 such interactions).[14] The education equations also include dummy variables to indicate nonwhite race, Vietnam-era service,[15] service as an officer or draftee, marital status or the change in marital status, and whether VA education benefits were used by the respondent.

Column (1) of Table 3 reports estimates of the current years of schooling equation, (1), and column (2) reports estimates of the differenced equation, (4). As in Table 2, estimates of the undifferenced equation indicate that program users are roughly 1.6 years more educated than nonusers, and estimates of the differenced equation indicate that program users increased their level of schooling by roughly 1.4 years more than nonusers.

Column (3) reports estimates of the human capital earnings function, which shows a return to education of 6.5 percent. Column (4) reports estimates of equation (5), which decomposes the return to education into a return to grade completed at entry to service and a return to the post-entry grade increment. Grade at entry is worth 9.6 percent per year, and the grade increment is worth 4.3 percent. The lesser return to the grade increment may be a consequence of the fact that many who attended school after discharge have not been out of school for long on the survey date. Card and Krueger's (1990) finding that the return to education for middle-aged men is virtually constant across levels of schooling suggests that the difference between the return to grade at entry and grade increment may

[14] All interactions of these timing variables are included because a potentially important covariate that is not on the tape is the time since discharge from the military.

[15] In this and subsequent tables, Vietnam-era service is coded directly from the SOV questionnaire and not from the VA recode.

eventually disappear.

The effect of veterans benefits on earnings is given by the product of the grade increment attributable to benefits and the monetary return to the grade increment. This amount is 4.3 * 1.35, or approximately 5.8 percent. Column (5) shows direct estimates of the effect of veterans benefits on earnings, estimated from the reduced form equation, (6). The reduced form estimate, also 5.8 percent, is calculated by replacing the grade increment regressor in equation (5) with a program-use dummy. Column (6) reports the results of adding the program-use dummy to equation (5). The coefficient of -0.002 on the program-use dummy in column (6) shows that, conditional on personal characteristics, entry level schooling and grade increment, use of veterans benefits is not correlated with earnings. This is important evidence in favor of the model outlined in the previous section.

Table 4a presents estimates of equations (4) and (5) where the effect of veterans benefits on grade increment and the effect of grade increment on earnings are allowed to vary with race, period of service, and type of VA program used. Columns (1) and (2) report grade increment and earnings equations by race.[16] The effect of veterans benefits on grade increment differs little by race, although the grade increment is worth somewhat more to nonwhites. The sample of nonwhites is too small, however, to allow for a statistically significant distinction by race.

Column (3) of Table 4a indicates that the effect of benefit usage on grade increment is virtually identical for men with Vietnam-era and early AVF service. Column (4) shows that the effect of grade increment on earnings also differs little by period of service. Column (5) shows the

---

[16] Regressors other than the program-use dummy in equation (4), and grade at entry and grade increment in equation (5), are not allowed to vary by race.

result of separating individual programs in the grade increment equation. Here, the results suggest that the VEAP and other VA programs, less generous than the GI Bill, also lead to a schooling increment lower than that enjoyed by GI Bill users. The distinction between the effects of the GI Bill and other programs is statistically significant.

Table 4b allows the effect of benefit usage to differ by type of training. Column (1) indicates that using veterans benefits to attend college or graduate school is associated with a grade increment of 1.73 years, but using benefits for other types of training leads to no increase in education.[17] The figures in column (3) suggest that men who did not use any VA benefits are rewarded for a post-service grade increment in roughly the same manner as men who used VA benefits to attend college or graduate school (3.4 versus 4.4 percent). The return to grade increment is negative and imprecisely estimated for benefit users who did not attend college or graduate school. Column (4) reports the reduced form effect of benefit usage. The results here show a 9 percent premium for college and graduate student users, and no premium for other users. Column (5) shows that conditional on grade increment there is no effect of benefit usage, so that the hypothesis that users who do not attend college or graduate school are rewarded in some other way can be rejected.

4. Instrumental Variables Estimates

The estimates of the effect of veterans benefits on grade increment in Tables 3 and 4 control for components of variance in schooling levels that are correlated with benefit usage. However, if the error term in the

[17] Note that the schooling variable is constructed so as to include a measure of vocational training. See the data appendix for details.

differenced equation is also correlated with benefit usage, additional information is needed to identify the effect of veterans benefits. One source of additional information is the reduced benefit generosity and usage under the VEAP. Because the VEAP offered different benefit levels to different entry-level schooling groups, an IV strategy can be developed that uses the transition to VEAP as an instrument while controlling for secular entry-level schooling and period-of-service effects.

The IV strategy is easy to motivate in a differences in differences framework similar to that used to estimate the grade increment equation in Table 2. Consider the following version of the grade increment equation:

$$\nabla E_i = p_i\phi + s_i\psi + d_i\gamma + \xi_i, \tag{9}$$

where p_i is a 0-1 dummy variable that indicates Vietnam or early AVF service, and s_i is a 0-1 dummy variable that indicates having a high school diploma at entry. The differences-in-differences estimate of γ in this case is

(10)

$$\hat{\gamma} = [(\nabla\bar{e}_{11} - \nabla\bar{e}_{10}) - (\nabla\bar{e}_{01} - \nabla\bar{e}_{00})]/[(\bar{d}_{11} - \bar{d}_{10}) - (\bar{d}_{01} - \bar{d}_{00})],$$

where $\nabla\bar{e}_{kj}$ is the grade increment of men who served in period k with entry-level schooling j, and $\bar{d}_{kj}$ is the corresponding program-use rate.

The rationale for difference-in-differences estimation of equation (9) is the following. Men who served in the Vietnam era were eligible for the GI Bill, while men who served in the early AVF period were more likely to be eligible for VEAP. Because the VEAP was substantially less generous than the GI Bill, and VEAP eligibility was restricted to those who choose to contribute while on active duty, men who served in the early AVF period were less likely to use any sort of veterans educational benefits. But the difference in program use by period of service is much larger for men without a high school diploma because high school graduates were eligible for VEAP kickers that partially eliminated the difference between VEAP and GI Bill benefit levels. The differences in differences estimator attributes the change in grade increment by period of service and entry-level schooling solely to entry-level schooling differences in the effect of the VEAP on program use.

As a more formal motivation for formula (10), note that the difference in the change in program use rates by entry level schooling is the coefficient on $p_i s_i$, in the following equation:

$$d_i = p_i \phi_d + s_i \psi_d + (p_i s_i)\kappa + \xi_i, \tag{11}$$

The difference in the change in schooling by entry level schooling and period of service is the coefficient on $p_i s_i$ in

$$\nabla E_i = p_i \phi_e + s_i \psi_e + (p_i s_i)\omega + \xi_i, \tag{12}$$

The estimate of ω in equation (12) is the numerator of the difference in differences estimator, (10). The estimate of κ in equation (11) is the denominator of the differences in differences estimator.

Equations (11) and (12) can be used to show that (10) is an IV estimator of the treatment effect, γ, where the instruments consist of dummy variables for period-of-service and entry-level schooling effects, plus an interaction term for service in the Vietnam era and less than high school at entry. The equivalence to IV is easy to see in this case because (11) and (12) are just Two-Stage Least Squares (TSLS) reduced form equations. Solving for the structural coefficients from the reduced form produces the differences-in-differences estimate.[18] The interaction term, $p_i s_i$, is the instrument that identifies γ because it is excluded from (9).

The statistics underlying equation (10) are laid out in Table 5.[19] The top panel shows the statistics on post-service grade increment by period of service and entry-level schooling. The grade increment is lower for early AVF veterans regardless of entry-level schooling, but the difference in grade increment by period of service is larger for veterans without a high school diploma at entry. The lower panel shows corresponding statistics for program use. Early AVF veterans were less likely to use VA programs regardless of entry-level schooling, but the difference in program use is larger for those without a high school diploma at entry. The ratio of the grade increment difference in differences (-0.285) to the program use difference in differences (-0.104) is an estimate of γ, equal to 2.73 (with a standard error of 2.4).

The estimate of γ in Table 5 is not precise and a more efficient estimation strategy is required to make meaningful comparisons with the estimates in Table 3. Efficiency gains are had by interacting the instruments with personal characteristics so as to improve the explanatory power of the first-stage equation. Table 6 reports TSLS estimates for versions of equation (9) that include age and years-of-service main effects and the other covariates included in the equations reported in Table 3.

---

[18] The formal equivalence of (10) to TSLS is also an immediate consequence of results in Angrist (1991).

[19] To include additional early AVF veterans, the sample underlying this table adds 25-29 year old and female veterans to the sample used in Table 1.

Also included are a period-of-service dummy variable, and dummy variables to indicate having a high school diploma or some college at entry to the service. The excluded instruments in this case are interaction terms for period of service with both of the entry-level schooling dummies.

To produce the estimates in columns (1) and (2) of Table 6, the sample was expanded to include women and veterans aged 25-29 with any length of service. The selected sample used to produce the estimates in columns (3) and (4) is the same as in Table 1 with the addition of men aged 25-29. The instrument list for the expanded sample, which includes female veterans, also includes interactions of the period-of-service/entry-level schooling interactions with a sex dummy. To produce the estimates in columns (1) and (3), the instrument list was further expanded by interacting the period-of-service/entry-level schooling interaction terms with age dummies, so that the reduced form effect of the excluded instruments is free to vary with age. Columns (2) and (4) show the results of expanding the instrument list to include interactions of the excluded instruments with length-of-service dummies as well as with age dummies.

The TSLS estimates of the effect of veterans benefits in Table 6 are remarkably similar to those in Table 3. The estimates range from 0.720 in column (4), to 1.75 in column (1). Column (2) shows an estimate of 1.54 with a standard error of 0.614, the most precisely estimated treatment effect in the table. Finally, note that Table 6 shows the chi-square test statistic for instrument-error orthogonality. In no case does the test statistic exceed its degrees of freedom. Overall, these results suggest that the estimates of the effects of benefit usage on grade increment are not an artifact of program eligibility rules or self-selection.[20]

Caveats

Model (4) may be a poor description of the effect of veterans benefits on grade increment because veterans who served in different periods used different programs. For example, the results in column (5) of Table 4 suggest that the more recent VEAP program had less of an impact on grade increment than the GI Bill. The implication of this for OLS estimates of the grade increment equation is that the single estimated treatment effect is actually a weighted average of estimates of the underlying population treatment effects (Heckman and Robb 1985).

The implications of treatment effect heterogeneity for the IV estimates in Tables 5 and 6 depend on how the effects differ, and on whether the treatment effects are correlated with the instruments. Let γ_i denote the treatment effect experienced by i. One model for γ_i is

$$\gamma_i = \gamma_0 + p_i\gamma_p + s_i\gamma_s + g_i,$$

where g_i is uncorrelated with the instruments. If γ_0, γ_p and γ_s are all positive (so that Vietnam veterans and high school graduates benefit more from VA programs), then it is easy to show that the difference-in-differences estimator, (10), underestimates the average treatment effect in the population of program users. In fact, there may also be an interaction term in the treatment effect because of the greater decline in program

[20] Earnings equation results from the expanded sample are similar to those in the selected sample used in Table 3. The return to grade at entry is .090 (.011) in the expanded sample, and the return to grade increment is .036 (.009). The reduced form benefits effect is 0.043 (0.029).

generosity under the VEAP for less educated veterans. In this case, the estimated effect of overall program usage includes a component attributable solely to the use of a less generous program.

It should also be noted that the parameter estimates in Table 6 are estimated after conditioning on a potentially endogenous variable -- veteran status. If veteran status is correlated with the grade increment equation error term, then IV estimates are unlikely to be consistent. To see this, consider a regression equation for the effect of veterans benefits in a population that includes veterans and nonveterans:

$$\nabla E_i = X_i\beta + v_i\gamma_0 + d_i\gamma_1 + \zeta_i, \tag{13}$$

where v_i is a dummy variable that indicates veteran status, and X_i is a vector of covariates that includes period-of-service and entry-level schooling effects. Such an equation would ideally be estimated in a sample of veterans and nonveterans by collecting information on the schooling of both groups at the time the veterans entered the military.

Even if v_i and d_i are both endogenous, γ_0 and γ_1 are identified as long as the projections of v_i and d_i on Z_i are not linearly dependent and $E(\zeta | X_i, Z_i) = 0$. But consistent estimation of γ_1 in a population of veterans requires the stronger assumption that $E(\zeta | X_i, Z_i, v_i=1) = 0$. The meaning of this restriction can be explored in the context of a simple model where v_i equals 1 if an index function, $f(X_i, Z_i)$, crosses a normalized threshold:

$$v_i = 1 \text{ if } f(X_i, Z_i) - \eta_i > 0$$
$$= 0 \text{ otherwise,}$$

where η_i is an error term. Then,

$$E(\zeta \mid X_i, Z_i, v_i = 1) = E(\zeta \mid \eta_i < f[X_i, Z_i]), \quad (14)$$

and

$$E(\zeta \mid \eta_i < f[X_i, Z_i]) = 0$$

if η_i and ζ_i are independent or, under joint normality, uncorrelated. In other words, estimation of the effects of veterans benefits in a population of veterans pre-supposes that veteran status is exogenous in the population grade increment equation, (13).

Angrist (1989) presents evidence that Vietnam veteran status is an endogenous regressor in earnings equations, and Angrist and Krueger (1989) present evidence of earnings-equation endogeneity for World War II veteran status. Of course, the endogeneity of veterans status in earnings equations does not imply that veterans status is endogenous in a grade increment equation. But in the absence of further evidence on this question, the IV estimates should be interpreted cautiously.

5. Summary and Conclusions

Educational subsidies for veterans constitute the largest single federal program of student aid. The effect of veterans benefits on education is estimated here by focusing on the post-service grade increment. This strategy controls for individual effects in the level of education. The use of veterans benefits is associated with a post-service grade increment of roughly 1.4 years. The effect of veterans benefits on earnings is estimated by decomposing the return to education into a return to grade completed at entry, and a return to post-service grade increment.

The grade increment is worth roughly 4.3 percent so that use of veterans benefits raises earnings by around 6 percent. This premium appears to accrue primarily to the 77 percent of benefit users who attended college or graduate school.

Instrumental variables estimates of the effect of veterans benefits on grade increment are also computed. The excluded instruments in this case are interactions between period of service and entry-level schooling. Use of interaction terms as instruments exploits the variance in program use by period of service while controlling for secular period-of-service and entry-level schooling effects. The instrumental variables estimates of the grade increment equations are remarkably similar to the OLS estimates.

The 6 percent premium for benefit users is an important part of the compensation package for veterans, but it does not appear to be enough to overcome the average 15 percent earnings loss to veterans of the Vietnam era (Angrist 1990). Another important question is whether veterans benefits are a cost-effective form of compensation. Discounted at 10 percent per year, the 36-month total GI Bill payment was worth 10,209 dollars in 1978 and 17,151 dollars in 1986. Evaluating the 6 percent premium for benefit users at the average 1986 earnings of veterans gives an annual value of 1708 dollars. Over a 30-year working life this premium has a discounted 1986 dollar value of 17,717 dollars. Of course, the final accounting should allow for the fact that veterans programs cost something to run, and also for the possibility that education is worth more to veterans than just an earnings premium. But these simple calculations suggest that veterans benefits may not be socially wasteful.

Appendix: SOV III Variables

Grade at entry and grade completed

Grade at entry is coded from SOV public use variables Q15a and Q15b. Q15a equals 2 through 6 to identify 8 or less and 9 to 12 years of school completed. Q15a equals 7 to identify some post high school vocational training and 8 through 13 to identify 13 to 18 years of school. Q15a = 7 was coded as 13 years of school. Q15b indicates the level of certification at entry. When Q13b indicated a PhD, years of schooling at entry was coded as 20. Grade completed on the survey date was coded similarly from Q15c and Q15d. It should be noted that the results were insensitive to the exclusion of veterans with vocational training.

Miscellaneous variables

Most variables in the extract were coded directly from SOV-III questionnaire responses. As noted in the text, the sample was selected on the basis of VA period of service recodes (PSER_02, PSER_07 and PSER_08). Vietnam and early AVF veterans were identified in the extract on the basis of questionnaire responses (Q4c8 and Q4c9). Program use variables were coded from Q39e. A respondent was coded as having used VA education programs if he or she used the GI Bill (Q39e5 = 1), the VEAP (Q39e6 = 1), or some other VA education program (Q39e7 = 1 or Q39e8 = 1).

Table 1. Descriptive Statistics

Frequency Distributions (% in parentheses)					
Age	30-34	35-39	40-44	45-49	50-54
	368 (15)	787 (33)	937 (39)	275 (12)	21 (1)
Years of Service	1-2	3-5	6-10	11-15	
	919 (39)	1183 (50)	258 (11)	28 (1)	

Means (standard deviation in parentheses)			
Demographics			
Grade Completed at Entry	12.5 (1.8)	Receive Any Financial Aid	0.63
Highest Grade Completed	14.0 (2.1)	Receive Any Federal Aid	0.063
Schooling Increased	0.61	Use the GI Bill	0.55
Non-White	0.12	Use the VEAP	0.020
Married at Entry	0.11	Use Other VA Assistance	0.033
Married	0.75	Use Any VA Assistance	0.57
Military and VA		**Labor Market**	
Vietnam Era Service	0.95	Full-Time Worker	0.91
Early AVF Service	0.16	Health Affects Work	0.085
Drafted	0.25	1986 Earnings	28,468 (19,520)
Officer (Commissioned or Warrant)	0.09		
Program Usage and Training Since Discharge			
Used Any Education or Training Since Discharge (Other than Vocational Rehabilitation)	0.78	Attended college/grad school	0.52
		Received voc/tech training	0.22
		Received OJT/apprentice	0.18
		Partic. in corresp. course	0.06
attended/completed high school	0.03	Farm, flight, tutor, other	0.07

NOTES: Sample from 1987 survey of veterans (SOV-III), men who served in the Vietnam era (8/5/64-5/7/75) or the early AVF (5/8/75-9/7/80) with at least 9 years of schooling at entry to service and a non-negative increment since entering the service. Sample restricted to men aged 30-54 in 1987, with 1-15 years of active duty service. Of the 3337 SOV-III veterans with any Vietnam-era or later service, 2388 met these sample criteria.

Table 2. Educational Attainment Before and After Military Service
(standard errors in parentheses)

Selected Sample (n = 2,388)	No VA (1)	Used VA (2)	Difference (standard error) (3)
Before	12.48	12.61	0.13 (0.072)
After	13.13	14.64	1.51 (0.082)
Difference (standard error)	0.65 (0.045)	2.03 (0.039)	
		Difference-in-Differences:	1.39 (0.060)
Vietnam-Era Enlisted Non-Draftees (n = 1,506)			
Before	11.97	12.23	0.26 (0.072)
After	12.77	14.39	1.62 (0.094)
Difference (standard error)	0.80 (0.062)	2.16 (0.050)	
		Difference-in-Differences:	1.36 (0.080)

NOTES: Selected sample described in the notes to Table 1. Educational attainment is years of completed schooling. Variable coding is described in the appendix.

Table 3. The Effect of Veterans Benefits on Education and Earnings
(standard errors in parentheses)

Regressor	Dependent Variable					
	Highest Grade Completed (1)	Grade[1] Increment (2)	Log 1986 Earnings (3)	(4)	(5)	(6)
AGE * YRSRV F-Test (df = 18)	4.30	2.36	4.44	4.05	4.09	4.04
Non-White	-0.057 (0.111)	0.055 (0.091)	-0.211 (0.042)	-0.208 (0.042)	-0.207 (0.042)	-0.208 (0.042)
Vietnam	-0.537 (0.193)	0.202 (0.159)	0.055 (0.074)	0.084 (0.074)	0.084 (0.075)	0.084 (0.075)
Officer	3.022 (0.130)	-0.224 (0.107)	0.284 (0.060)	0.180 (0.064)	0.207 (0.065)	0.180 (0.065)
Drafted	-0.111 (0.102)	-0.265 (0.084)	0.051 (0.040)	0.038 (0.040)	0.029 (0.040)	0.038 (0.040)
Married/Δ Married	0.049 (0.084)	0.108 (0.057)	0.318 (0.033)	0.322 (0.033)	0.324 (0.033)	0.322 (0.033)
Use VA Benefits	1.59 (0.074)	1.35 (0.060)			0.058 (0.029)	-0.002 (0.033)
Highest Grade Completed			0.065 (0.008)			
Grade at Entry				0.096 (0.010)	0.085 (0.010)	0.096 (0.010)
Grade Increment				0.043 (0.010)		0.043 (0.010)
R^2	0.34	0.22	0.19	0.20	0.19	0.20

NOTES: Sample described in notes to Table 1. AGE*YRSRV F-Test is an F statistic for the joint significance of a full set of age and years-of-service dummies. [1]Change in marital Status replaces marital status.

Table 4a. The Effect of Veterans Benefits by Age, Period of Service, and Program
(standard errors in parentheses)

Regressor	Race	Grade Increment (1)	Log 1986 Earnings (2)	Period	Grade Increment (3)	Log 1986 Earnings (4)	Program	Grade Increment (5)
		Dependent Variable						
Used VA Benefits	White	1.39 (0.064)		Early AVF	1.36 (0.292)		GI Bill	1.35 (0.060)
	Non-White	1.05 (0.173)		Vietnam	1.34 (0.062)		VEAP	0.690 (0.212)
Grade at Entry	White		0.095 (0.011)	Early AVF		0.083 (0.044)	Other VA	0.443 (0.166)
	Non-White		0.108 (0.029)	Vietnam		0.096 (0.011)		
Grade Increment	White		0.038 (0.010)	Early AVF		0.061 (0.044)		
	Non-White		0.075 (0.026)	Vietnam		0.042 (0.010)		

NOTES: Sample described in Table 1. All equations include the same regressors as in the equations reported in Table 3.

Table 4b. The Effect of Veterans Benefits by Type of Training
(standard errors in parentheses)

Regressor	Type of Training	Dependent Variable				
		Grade Increment	Log 1986 Earnings			
		(1)	(2)	(3)	(4)	(5)
Used VA Benefits	college or grad school	1.73 (0.06)			0.091 (0.031)	0.016 (0.047)
	other training	0.082 (0.087)			-0.046 (0.044)	-0.011 (0.056)
Highest Grade Completed			0.065 (0.008)			
Grade at Entry				0.092 (0.011)	0.081 (0.010)	0.091 (0.011)
Grade Increment	college or grad school			0.044 (0.009)		0.040 (0.014)
	other training			-0.022 (0.036)		-0.015 (0.044)
	no VA usage			0.034 (0.019)		0.035 (0.020)
R^2		0.32	0.19	0.20	0.19	0.20

NOTES: Sample described in notes to Table 1. Each equation also includes the same covariates as the equations reported in Table 3. 77 percent of VA benefit users attended college or graduate school since their entry to service.

Table 5. Difference-in-Differences Estimates of the Effect of Veterans Benefits on Grade Increment (standard errors in parentheses)

Grade Increment	Early AVF (1)	Vietnam (2)	Difference (standard error) (3)
Less than HS at entry	1.48	2.07	0.585 (0.232)
HS or better	1.09	1.39	0.300 (0.111)
Difference (standard error)	-0.393 (0.241)	-0.680 (0.089)	
	Difference-in-Differences		-0.285 ((0.257))
Use of VA Benefits			
Less than HS at entry	0.135	0.468	0.333 (0.072)
HS or better at entry	0.381	0.610	0.229 (0.033)
Difference (standard error)	0.246 (0.075)	0.142 (0.025)	
	Difference-in-Differences		-0.104 (0.079)

Implied two-stage least squares estimate of the effect of veterans benefits on grade increment: -0.285/-0.104 = 2.73
(2.40)

NOTES: Sample same as in Table 1 with the addition of women and 25-29 year olds (n = 2,559).

Table 6. Two-Stage Least Squares Estimates of the Effect of Veterans Benefits on Grade Increment (standard errors in parentheses)

Regressor	Expanded Sample (1)	(2)	Selected Sample (3)	(4)
Female (SEX)	0.026 (0.157)	0.031 (0.155)		
Non-White	0.021 (0.083)	0.026 (0.081)	0.040 (0.087)	0.044 (0.088)
Δ Marital Status	0.043 (0.075)	0.055 (0.062)	0.102 (0.084)	0.125 (0.068)
Officer	0.385 (0.117)	0.375 (0.111)	0.175 (0.123)	0.168 (0.124)
Drafted	-0.218 (0.090)	-0.228 (0.083)	-0.226 (0.111)	-0.253 (0.095)
Vietnam (VIET)	-0.158 (0.279)	-0.104 (0.210)	0.113 (0.308)	0.211 (0.224)
High School Grad at Entry (HS)	-0.824 (0.137)	-0.798 (0.105)	-0.749 (0.165)	-0.696 (0.119)
Some College at Entry (COLL)	-1.06 (0.191)	-1.02 (0.141)	-0.906 (0.227)	-0.831 (0.156)
Used VA Benefits	1.75 (0.942)	1.54 (0.614)	1.10 (1.04)	0.720 (0.624)
R^2	0.075	0.076	0.069	0.066
χ^2 (dof)	10.8 (13)	15.2 (19)	7.22 (11)	11.0 (17)
Excluded Instruments	VIET*HS*AGE VIET*COLL*AGE VIET*HS*SEX VIET*COLL*SEX	VIET*HS*AGE VIET*COLL*AGE VIET*HS*YRSRV VIET*COLL*YRSRV VIET*HS*SEX VIET*COLL*SEX	VIET*HS*AGE VIET*COLL*AGE	VIET*HS*AGE VIET*COLL*AGE VIET*HS*YRSRV VIET*COLL*YRSRV

NOTES: All equations include AGE and years-of-service (YRSRV) main effects. Expanded sample is the same as in Table 5 with the addition of veterans with any number of years of service (n = 2,815). The selected sample adds men aged 25-29 to the sample in Table 1 (n = 2,477). Excluded instruments for columns (1) and (3) include the interactions of high school at entry and college at entry dummies with a Vietnam-era service dummy; each education-service interaction is also interacted with age and sex. Excluded instruments for columns (2) and (4) also include interactions with years of service.

References

Angrist, J.D. (1989), "Using the Draft Lottery to Measure the Effects of Military Service on Civilian Labor Market Outcomes," Research in Labor Economics Volume 10, edited by Ronald Ehrenberg, New York: JAI Press.

_________ (1990), "Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records," American Economic Review 80(3): 313-336.

_________ (1991), "Grouped Data Estimation and Testing in Simple Labor Supply Models," Journal of Econometrics, forthcoming.

Angrist, J.D. and Alan B. Krueger (1989), "Why Do World War II Veterans Earn More than Nonveterans?," National Bureau of Economic Research Working Paper 2991, May 1989.

_________ (1990), "Does Compulsory Schooling Affect Schooling and Earnings?," National Bureau of Economic Research, mimeo, June 1990.

Card, David E. and Alan Krueger (1990), "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States," Princeton Industrial Relations Section, mimeo, April 1990.

Department of Veterans Affairs (1989a), 1987 Survey of Veterans, Washington DC: US GPO, July 1989.

_________ (1989b), Trend Data: 1964-88, Washington DC: US GPO, March 1989.

_________ (1989c), Annual Report 1988, Washington DC: US GPO, July 1989.

_________ (1990), Federal Benefits for Veterans and Dependents, Washington DC: US GPO, January 1990.

Fernandez, Richard L. (1980), "Issues in the Use of Post-Service Educational Benefits as Enlistment Incentives," Santa Monica: RAND Note N-1510-MRAL, July 1980.

_________ (1982), "Enlistment Effects and Policy Implications of the Educational Assistance Test Program," Santa Monica: RAND Report R-2935-MRAL, September 1982.

Heckman, James J., and Richard Robb (1985), "Alternative Methods of Evaluating the Impact of Interventions," in Longitudinal Analysis of Labor Market Data, New York: Cambridge University press.

Hogan, Paul F., D. Alton Smith and Stephen Sylwester (1990), "The Army College Fund: Effects on Attrition, Reenlistment and Cost," in forthcoming Military Manpower Volume, Curtis Gilroy, ed., Alexandria: Army Research Institute.

Levitan, Sar A. and Joyce K. Zickler (1973), Swords Into Plowshares: Our GI Bill, Salt Lake City: Olympus Publishing Company.

Magnum, Stephen L. and David E. Ball (1989), "The Transferability of Military-Provided Occupational Training in the Post-Draft Era," Industrial and Labor Relations Review 42(2) (January 1989): 230-245.

Manski, Charles F. and David Wise (1983), College Choice in America, Cambridge: Harvard University Press.

O'Neill, David and Sue Goetz Ross, (1976) Voucher Funding of Training: A Study of the GI Bill, Arlington: Public Research Institute, October 1976.

Veterans Administration (1978), Department of Veterans Benefits, Handbook for Veterans Benefits Counselors, Washington: US GPO, February 1978.

________ (1988), Office of Information Management and Statistics (713), Veterans Benefits Under Current Educational Programs Fiscal Year 1987, Washington DC.