# *Did Vietnam veterans get sicker in the 1990s? The complicated effects of military service on self-reported health*

# Did Vietnam Veterans Get Sicker in the 1990s? The Complicated Effects of Military Service on Self-Reported Health*

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**Abstract**

The veterans disability compensation (VDC) program, which provides a monthly stipend to disabled veterans, is the third largest American disability insurance program. Since the late 1990s, VDC growth has been driven primarily by an increase in claims from Vietnam veterans, raising concerns about costs as well as health. We use the draft lottery to study the long-term effects of Vietnam-era military service on health and work in the 2000 Census. We find no evidence that military service affected overall employment rates or overall work-limiting disability (that is, health conditions that make work difficult), although it slightly increased non-work-limiting disability rates for whites. At the same time, military service drastically increased federal transfer income, especially for lower skilled white men, among whom there was a large negative impact on employment and a marked increase in disability rates. The differential impact of Vietnam-era service on low-skilled men cannot be explained by more combat or war-theatre exposure for the least educated, because high school graduates were at least as likely to be exposed to combat or war theatre as the less-educated. This leaves the relative attractiveness of VDC for less skilled men and the work disincentives embedded in the VDC system as a likely explanation.

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# 1 Introduction

The difficulties faced by many Afghanistan and Iraq war veterans have once again drawn attention to the fact that military service can have long-term health consequences. Care for injured and disabled veterans imposes a burden on soldiers, their families, and, in a less personal but still important way, on the government agencies that provide health care and disability insurance to veterans. These social insurance systems support almost three million sick and disabled veterans. Veterans Administration (VA) support programs increasingly serve a relatively young population made up of veterans of post-Korea conflicts. Vietnam veterans constitute the largest group receiving veterans disability compensation (VDC), with almost one million beneficiaries, about one third of the total. At the end of fiscal year 2006, the population receiving VDC amounted to roughly 12 percent of Vietnam-era veterans and 15 percent of Gulf War veterans, exceeding VDC take-up rates of 5 percent among Korean-era veterans and 10 percent among veterans of WWII. Moreover, payments to Vietnam veterans have expanded to almost half of VDC costs, partly because Vietnam veterans are disproportionately likely to receive the maximum payment allowed (Veterans Benefits Administration, 2007).

The most visible health concerns for veterans are the long-term consequences of combat injury. Battlefield injuries can be individually devastating and socially costly for years after a conflict ends. Fortunately, acute injuries are less common among veterans of recent conflicts than they were in WWII (U.S. Bureau of the Census, 2006). At the same time, an increasing fraction of veteran disability claims in the past two decades has been for chronic conditions that were not necessarily apparent on the battlefield. These conditions include post-traumatic stress disorder (PTSD), hearing loss, and diabetes. Evidence for the importance of PTSD among Vietnam veterans comes in part from the pioneering draft-lottery study by Hearst, Newman, and Hulley (1986), which showed elevated civilian suicide rates for draft-eligible men. Among Gulf War veterans, a large and growing health concern stems from a collection of symptoms with no specific identifiable cause known as Gulf War syndrome. The question of whether military service is indeed the root cause of these symptoms continues to be debated, but they are usually presumed to be service-connected and therefore covered by VDC.[1]

The civilian re-entry experiences of each veteran cohort are in many ways unique, but there are some striking similarities. The debate over Gulf War syndrome echoes a similar controversy surrounding the rise in disability claims by Vietnam veterans—a rise that accelerated in the late 1990s and continues today. Until very recently, claims by Vietnam veterans were the source of most VDC claims growth. After 2002, this growth is partly attributable to the Veterans Benefits Administration's designation of diabetes as a service-

[1] Key studies of this question include Research Advisory Committe on Gulf War Veterans' Illnesses (2008) and Medical Research Council (2003). See Iversen, Chalder, and Wessely (2007) for a review.

related disability linked to the herbicide Agent Orange (Autor and Duggan, 2008).[2] Perhaps surprisingly, however, much recent claims growth is due to new PTSD claims by Vietnam veterans (Rosenheck and Fontana, 2007). The recent growth in Vietnam veterans' disability claims makes the long-term health consequences of Vietnam-era service an important contemporary policy concern.

An assessment of the link between Vietnam-era military service and long-term disability also contributes to a broader understanding of the likely health and social insurance costs of other wars. The Vietnam War lasted longer and was much more costly in terms of fatality and injury rates than more recent conflicts. Consistent with this, Vietnam veterans are much more likely to receive the maximum VDC benefit than any other cohort. We might therefore expect the health and social insurance consequences of Vietnam-era service to provide a rough upper bound on the long-term health consequences of military service for veterans of recent wars. The experience of veterans from earlier wars provides the best available evidence on the likely consequences of military service for more recent veterans, a point made in a recent assessment of the long-run costs of the Iraq conflict by Stiglitz and Bilmes (2008).

The purpose of this paper is to provide new evidence on the long-term health impact of Vietnam-era military service as the affected cohorts reached their late 40s and early 50s. Because employment is closely associated with health, we also look at veterans' labor force status. To solve the problem of selection bias inherent in comparisons of outcomes between veterans and non-veterans, we use the draft lottery to construct instrumental variables for Vietnam-era service.[3] Our empirical strategy relies on the 1-in-6 sample of the 2000 U.S. Decennial Census. The 2000 Census provides an exceptionally large sample and, uniquely among large representative samples, contains the birthday information required to determine draft lottery numbers. Moreover, in addition to the usual labor force status variables, the 2000 Census long form asks respondents about disabilities along a variety of dimensions, with a distinct category for disabilities that affect work. Our results show no overall causal effect of Vietnam-era veteran status on employment, labor force participation, or work-limiting disabilities (that is, long-lasting physical or mental health conditions causing difficulty working). On the other hand, we find a large increase in federal transfer income and modest effects on disabilities that census respondents describe as not limiting work.

An important feature of our analysis is an exploration of veteran effects that vary with veterans' predicted wages and schooling. High replacement rates (i.e., the ratio of disability income to prior earnings) have made Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) an increasingly attractive alternative to employment for low-skilled men not yet old enough to retire, as Black, Daniel, and Sanders (2002), Autor and Duggan (2003), and Duggan, Singleton, and Song (2007) have argued. Motivated

[2] The Veterans Benefits Administration is the part of the VA that administers VDC and other benefit programs.

[3] Earlier work by Angrist (1990) and Angrist and Chen (2008) uses the draft lottery to evaluate the earnings consequences of military service.

by the possibility of similar interactions with VDC, we look for differences in the impact of veteran status across quantiles of predicted wage levels and schooling. The results of this investigation show a strong interaction: in contrast to the small overall effects, estimates for veterans with low predicted earnings show a large negative effect on employment and a marked increase in disability rates (again, mostly for disabilities not limiting work). Moreover, there is little evidence that this variation can be explained by variation across skill levels in the likelihood of serving in combat or a war zone. As measured in the 1987 Survey of Veterans, the likelihood of a service-connected disability and combat exposure is similar for high school graduates and dropouts. These results therefore suggest that the causal effects of Vietnam-era service on employment and disability for less educated veterans reflect something other than wartime injuries. A leading alternative explanation is the relative attractiveness of VDC for less-skilled men and the work disincentives embedded in the VDC system.

The paper is organized as follows. The next section uses statistics on VDC and data from the CPS to identify the primary health concerns of Vietnam veterans and to describe recent changes in veterans' disability status, beneficiary status, and employment rates. Section 3 discusses the descriptive statistics and first-stage estimates from the 2000 Census that provide a foundation for the draft-lottery-based causal analysis in Section 4. Section 3 also briefly discusses the impact of Vietnam veteran status on mortality, since this is a possible source of selection bias in our analysis. Section 4 reports overall disability and employment effects and effects by predicted wage and schooling group. These results show important differences in effects across skill groups. Section 5 discusses the link between schooling and variables related to combat or war-theatre exposure and interprets the other findings in the paper. Finally, Section 6 concludes.

## 2 VDC and Health in the Vietnam Cohort

Veterans disability compensation (VDC) increases with the recipient's combined disability rating (CDR), which is the aggregate of ratings for all diagnoses for which VDC is awarded. Veterans with a zero percent CDR get no monthly payment but are eligible to use the VA health care system. The largest awards go to veterans deemed to be 100 percent disabled. Veterans with a single disability rated at 60 percent or more, or a combined rating of 70 percent or more plus a single disability rated at 40 percent or more, can receive an Individual Unemployability (IU) benefit if the Veterans Benefits Administration determines that they cannot work by virtue of their disabilities. An IU determination generates payments at the 100 percent CDR level. As noted by Autor and Duggan (2008), the IU contingency generates a substantial implicit tax on the earnings of VDC awardees.[4]

[4]In fiscal 2004, VDC award amounts ranged from about $100 per month for veterans with a 10 percent CDR to almost $2,300 per month for veterans with a 100 percent CDR (VA Office of the Inspector General, 2005). There is a much larger

Our descriptive analysis focuses initially on VDC award and diagnosis data for Vietnam veterans in the period 1999-2005 because this is a time when the Vietnam-era VDC beneficiary population was growing and changing in important ways, as shown in Table 1, which list the nine most common diagnoses among Vietnam-era veterans (as determined in 2005) and the number of disability recipients under these diagnoses for the years 1999, 2001, 2003, and 2005. The top panel shows that in fiscal year 2005, over 900,000 Vietnam veterans were receiving VDC, up sharply from about 736,000 in 1999 (this can be compared to a Vietnam-era population of 8 million veterans, of whom about 3 million served in Vietnam or nearby). The number of disabling conditions per Vietnam-era recipient also increased, from 2.76 to about 3. Panel C shows the same trend is true for veterans of more recent conflicts, such as the Gulf War. In contrast, statistics in Panel B for Korean-era cohorts show lower proportions receiving compensation, less growth in the numbers receiving compensation, and fewer disabilities per veteran.

In fiscal year 2005, the most widely compensated disability among Vietnam veterans was diabetes, with more than 190,000 recipients. This can be seen in the bottom of Panel A in Table 1. Diabetes was recognized as a service-related disability beginning in fiscal year 2002, in response to evidence of a possible link with exposure to the Agent Orange herbicide used by US forces during the Vietnam War. The growth in diabetes claims from zero in 2001 to many thousands in 2003 is not a result of new cases of diabetes, but rather reflects the fact that diabetes was a newly recognized service-related condition.

The most prevalent condition for which Vietnam veterans received compensation from 1999 to 2003 is PTSD, with about 91,000 claimants in 1999 and 143,000 in 2003. PTSD has long been a health concern for Vietnam veterans; the incidence of PTSD among Vietnam-era veterans is much larger than that for veterans of the Korean War, the Gulf War, and WWII (from statistics not shown here). Perhaps surprisingly, the number of Vietnam-era PTSD claimants doubled between 1999 and 2005, long after the Vietnam war ended. Although the recent increase in PTSD claims is sometimes attributed to the psychological impact of post-September 11th conflicts, Table 1 shows a marked increase between 1999 and 2001 (data for 2001 are from July), and a dramatic jump between fiscal 2001 and fiscal 2003, before the wars in Afghanistan and Iraq had begun to generate large numbers of casualties. Moreover, an analysis of veterans' use of PTSD treatment services in the 6 months before and after the September 11 attacks failed to uncover a short-term increase in the number of veterans seeking treatment (Rosenheck and Fontana, 2007). At the same time, psychiatrists and others involved with the treatment of PTSD have noted anomalies that point to financial motives on the part of some treatment-seeking veterans. These include volatile or implausible PTSD symptom descriptions

increase in benefits in the step from 90 to 100 percent CDR than at other steps. VDC benefits are not subject to federal income or payroll taxes and have usually kept pace with inflation. Appendix II of U.S. General Accountability Office (2006) estimates that an IU determinations adds about $348,000 to the lifetime present value of VDC payments for a 45 year old man with a 60 percent schedular CDR.

and combat-experience reports, the apparent ineffectiveness of treatment for combat-related PTSD (therapy for non-military PTSD has been shown to be effective), and a review of military records that turned up evidence of combat exposure for only 41 percent of those seeking PTSD treatment at a VA clinic (see Frueh, et al. 2005 for this last finding and a summary of related results).

The increase in PTSD among Vietnam veterans has led to a number of government studies, motivated by the question of whether this increase reflects a true deterioration in health or a change in VDC eligibility screening standards and diagnostic criteria (see, e.g., VA Office of the Inspector General, 2005 and Institute of Medicine and National Research Council, 2007). A related concern is the growing proportion of PTSD beneficiaries designated IU, which increased from 14 percent in 1999 to almost 30 percent in 2006. Over one-third of IU beneficiaries in 2006 had PTSD as either a primary or a secondary diagnosis (U.S. General Accountability Office, 2006).[5]

Evidence for a regulatory or administrative explanation of the growth in the number of Vietnam veterans receiving VDC comes in part from state variation in average VDC payments. Specifically, a major contributor to cross-state differences in VDC awards appears to be variation in the likelihood that otherwise similar cases are designated 100 percent disabled as a result of IU or PTSD (VA Office of the Inspector General, 2005). Along the same lines, the General Accountability Office found that the number of IU beneficiaries was increased by the fact that, beginning in 1999, the Veterans Benefits Administration no longer required IU recipients to submit any kind of paperwork to maintain their IU status (U.S. General Accountability Office, 2006).[6] Moreover, around this same time, the Veterans Benefits Administration began to *presume* IU eligibility in some cases where veterans would previously have been required to actively file an IU claim (Cooper, 2005).

## 2.1 Disability and Beneficiary Status in the CPS

A longer view of trends in Vietnam veterans' disability status appears in Figure 1, which shows the average amount and incidence of VA-source income. These data come from the Current Population Survey (CPS) and are described in the data appendix**.** The sample includes Vietnam-era and Korean-era cohorts over the period 1988-2005.[7] Changes in VA-source income are mostly due to changes in VDC, since the Vietnam-era GI Bill expired in 1989. Figure 1 shows a marked increase in the average VA income of Vietnam veterans

[5] This statistic is from Tables 5-9 and page 150 in Institute of Medicine and National Research Council (2007)**.** A report by the VA Office of the Inspector General (2005) notes that there is more discretion in IU determinations than in the result of the CDR rating system. An earlier report along these same lines (U.S. General Accounting Office, 1987) recommended that IU determinations be subject to an evaluation by the VA's vocational services division, but this has yet to be implemented.

[6] This order was rescinded in 2005 (Philpott, 2005).

[7] The comparison should be interpreted with caution, since Korean-era veterans are of course older than Vietnam veterans. For this reason we also compare Vietnam veterans to non-veterans of the same age in subsequent figures to get a more complete descriptive picture.

in the late 1990s, and a sharper contrast in VA income between Vietnam-era and Korean-era veterans after 2000. During the same period, VA income levels were fairly flat for Korean-era veterans. As shown in Panel B, the relative likelihood that a Vietnam veteran received any VA income compared to Korean-era veterans also jumped in the late 1990s, though this series is noisier than the average income series.

The growing share of Vietnam-era veterans receiving VA income in the past two decades comes mainly from growth in the probability of receiving VDC, shown in Panel C of Figure 1, which contrasts the probability of VDC receipt for Vietnam-era and Korean-era veterans over the same period. This figure closely parallels the plot in Panel B.[8] Overall, the VA income trend for Korean-era veterans has been flattening or declining since the late 1990s, in marked contrast to the rapid increase in VA income receipt among Vietnam-era veterans over this period. Although Korean-era veterans are older, VA income receipts for Vietnam veterans by 2005 are at much higher levels than for Korean-era veterans at the beginning of the series, when Korean-era veterans were of a similar age.

Direct measures of self-reported disability rates and a measure of poor health, plotted in panels A and B of Figure 2, also increased in the late 1990s, both in absolute terms and relative to the trend among non-veterans. This increase may reflect a deterioration in the health of Vietnam veterans, but the sharpness of the break suggests that policy or regulatory changes may also play a role. Consistent with the regulatory hypothesis, Duggan, Rosenheck, and Singleton (2006) conclude that modest changes in medical eligibility criteria for federal disability programs can substantially affect program enrollment. Regulatory changes may in turn influence self-reports of health if these measures are at least in part endogenous in the sense that they are caused by program use (a point made by Bound and Waidmann (1992) regarding social security disability programs). In the CPS, there is a further mechanical link between disability income and disability assessment since the CPS disability question is a screener for questions about disability income.

As we might expect given the growing importance of IU claims in the overall VDC caseload, Panel A of Figure 3 shows that the employment rate of Vietnam veterans also dipped in the late 1990s, relative to the non-veteran trend. Although employment should fall as the Vietnam cohort ages, the figure shows a dip relative to non-veterans of the same age with the gap by veteran status eventually increasing over time, after a period in which veteran and non-veteran employment rates had moved roughly in parallel. Panel B of Figure 3 shows that this relative decline is associated with a decline in self-reported health: the fraction of Vietnam veterans reporting that they quit a job or retired for health reasons ticked up sharply in 1998, and eventually pulled away from the same measure for non-veterans in the cohort, although the measure is somewhat noisy. Following a brief review of related work, our empirical analysis attempts to determine whether a causal effect of Vietnam-era military service on health can explain the relative deterioration in

[8] Data for the figures in this subsection are described in the appendix.

Vietnam veterans' self-reported disability status and employment rates.

## 2.2 Related Work on Military Service and Health

The question of how military service affects civilian health is of long-standing concern to veterans and policy-makers. As noted in the introduction, one of the most controversial issues in the health arena is the proper clinical response to Gulf War Syndrome (Iversen, Chalder, and Wessely, 2007). The growth in PTSD diagnoses among Vietnam veterans has been similarly controversial (Rosenheck and Fontana, 2007). Perhaps not surprisingly, given the numbers of men involved and the unique features of each era, the subject of military service and health has generated a large literature covering each service era back to WWII. A comprehensive review of these literatures is beyond the scope of our paper, but it's worth emphasizing the importance of selection bias in this context. This selection problem is highlighted by Seltzer and Jablon (1974), which shows that WWII veterans live longer than non-veterans born in the same years, primarily due to lower death rates from conditions that would have made them ineligible for service.

A number of earlier studies have used instrumental variables in an effort to eliminate selection bias in estimates of the health effects of military service, as we do here. Bedard and Deschenes (2006) used cohort-dummy instruments to show that military service during World War II and the Korean conflict led to higher mortality from smoking-related causes, apparently because soldiers had access to free or subsidized cigarettes. In contrast, using draft lottery instruments, Eisenberg and Rowe (2008) found no evidence of a lasting increase in smoking by Vietnam veterans (who did not get as large a cigarette subsidy as WWII veterans). Hearst, Newman, and Hulley (1986) found excess suicide and motor vehicle death rates among draft-eligible men. Excess deaths from these causes might be due to PTSD. But a re-analysis of the HNH data by Angrist, Imbens, and Rubin (1996) was less conclusive. Similarly, also using draft-lottery instruments, Dobkin and Shabani (2006) found no clear link between Vietnam-era service and a range of health outcomes measured in the National Health Interview Survey.[9]

[9] Other draft lottery studies include Goldberg, Richards, Anderson, and Rodin (1991), who found no evidence of increased alcohol consumption among draft-eligible men and Hearst, Buehler, Newman, and Rutherford (1991), who found no increase in AIDS among draft-eligible men, although many Vietnam veterans stationed overseas were thought to have experimented with intravenous drugs.

# 3 Census Data and the Draft-Lottery First-Stage

## 3.1 The 2000 Census 1-in-6 File

The 2000 long-form census sample includes approximately one-sixth of U.S. households.[10] For the purposes of this study, we created an extract from this sample consisting of U.S.-born men residing in the 50 States and the District of Columbia, born between 1948 and 1952. The cohorts of 19-year-olds at risk of conscription in the draft lotteries were born from 1950-52. Men born in 1948 and 1949, who were also affected by the 1970 lottery, are included as well. The estimation sample contains more than 1.14 million whites and about 155,000 nonwhites.

Roughly 31 percent of men born 1948 to 1952 served in the Vietnam era and about 44 percent were draft-eligible. The average age in the cohort is 49. These and other descriptive statistics appear in Table 2, which reports means by veteran status and race (means for whites appear in Panel A and means for nonwhites appear in Panel B). Many men report having some kind of disability—about 20 percent of whites and a third of nonwhites. Based on a question asking respondents whether they have a disability that causes difficulty working, we categorized disabilities as *work-limiting* or *non-work-limiting*.[11] While this distinction may be imprecise and subjective, it provides a simple measure of severity and may also be informative about the presence of disabilities that might support SSDI or VDC-IU claims. Among white veterans, the regression-adjusted labor force non-participation rate is 3.3 percentage points larger for those with a work-limiting disability than for those with a non-work-limiting disability. Likewise, the regression-adjusted probability of SSDI receipt is 3.4 percentage points larger for those with a work-limiting disability. Both of these differences are significant at conventional levels.[12]

White veterans have somewhat higher disability rates than white non-veterans, while disability rates differ little by veteran status for nonwhites. Table 2 also shows that both white and nonwhite veterans are much more likely than non-veterans to report having income in a category that includes VDC. This is coded from an *other income* question that asks about sources of income received regularly such as veterans' (VA) payments, unemployment compensation, child support, or alimony. Since our all-male sample probably has

[10] The 1-in-6 long form sample is the basis for the publicly available PUMS files. These files, documented in US Census Bureau (2005), are simple random samples drawn from the 1-in-6 file, though the 1-in-6 file is not a simple random sample from the census sampling frame. Rather, the Census Bureau reduces the sampling rate in more densely populated areas. Adjustment for variation in sampling rates is made here by using the weighting variables that are included in the long-form file. These weights adjust for non-response and for non-random sampling, and are designed to match external population totals by age, race, sex and Hispanic origin. In practice, weighting matters little for our results.

[11] The work-related disability question asks: *Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty working at a job or business?* The complete set of 2000 Census disability questions appears in the data appendix.

[12] These estimates come from regressions that include dummies for state of birth, year of birth, and month of birth. Among white veterans, the estimated effect of a non-work-limiting disability (relative to no disability) on labor force non-participation is about 0.27 (s.e.=0.003), and the estimated effect on SSDI receipt is about 0.10 (s.e.=0.002).

no income from child support or alimony, and employment rates differ little by veteran status for whites and are higher for nonwhite veterans, the other income differential by veteran status is most likely due to VDC.[13] In our sample, about 11 percent of white veterans have other income, a sharp contrast to the 3.7 percent of non-veterans who have this sort of income. Among nonwhites, 14 percent of veterans and 5.2 percent of non-veterans have other income.

Social Security income is measured by two variables in the same panel of Table 2: Supplemental Security Income (SSI), and Social Security income excluding SSI. Since Vietnam-era cohorts are too young to have retired, and are unlikely to qualify for benefits under the means-tested SSI program, their Social Security income is mostly from Social Security Disability Insurance (SSDI). About 4 percent of whites and 6 percent of nonwhites receive SSA income other than SSI. Among whites, the proportions receiving SSI are 1.3 percent for veterans and 1.9 percent for non-veterans. Among nonwhites, veterans are also less likely to receive SSI than non-veterans (2.9 percent compared to 5.1 percent). Finally, we constructed an indicator for men who receive any federal transfers–either other income, Social Security income, or SSI. Not surprisingly, given the other income differential, both white and nonwhite veterans are much more likely to have federal transfer income of some sort.[14]

Table 2 also reports statistics for the specific types of disabilities identified in the census. The incidence of each disability is slightly higher for veterans than for non-veterans among whites, while the difference in specific disability rates by veteran status is small for nonwhites. Among veterans, the most commonly reported disability is related to mobility (identified in a question asking about going outside the home alone to shop or visit a doctor's office). The second most common disability is associated with restricted physical activities such as walking, climbing stairs, reaching, lifting, or carrying. Mental disabilities, the third most common type of impairment, are recorded in response to a question about difficulty learning, remembering, or concentrating.

The bottom of the table shows descriptive statistics for two labor force status variables that might be related to self-reported disability status, *not working* (one minus employment) and *not in the labor force*. White veterans and non-veterans are about equally likely to be working or in the labor force. Among nonwhites, veterans work more.

Finally, since differential effects across skill groups play an important role in our analysis, we also provide

[13] Income from military disability pensions received directly from the defense department is most likely captured by another census variable that asks about retirement, survivor, or disability pensions excluding Social Security. The *other income* variable might also include payments received under the GI Bill, but few veterans in our cohort were likely to have still been active in GI Bill supported training. Vietnam-era GI Bill eligibility expired in 1989. The 2000 Census income questions used in our study appear in the data appendix.

[14] Eligible claimants can receive both VDC and SSDI benefits without any reduction from either program; see Autor and Duggan (2008). In 2005, about 61 percent of VDC claimants with an IU rating received SSDI (Christensen, McMahon, Schaefer, Jaditz, and Harris, 2007). Few veterans receive SSI because SSI is means tested and because most veterans have a work history that qualifies them for the more generous SSDI program.

summary statistics for veterans and non-veterans by skill group in appendix Table A2.

### 3.2 The Draft-Lottery First Stage

The first draft lottery, held in December 1969, affected men born in 1944-50 who were at risk of conscription in 1970, while subsequent draft lotteries involved 19-year-olds only. Men born in 1951 were at risk of conscription in 1971, and men born in 1952 were at risk of conscription in 1972. Men born in 1953 were assigned lottery numbers in 1972, but there were no draft calls in 1973.

Each lottery was associated with a draft-eligibility ceiling or cut-off. Men with a random sequence number (RSN) below the ceiling were draft-eligible, while men with an RSN above the ceiling were draft-exempt. The draft-eligibility ceiling was 195 in the 1970 lottery, 125 in the 1971 lottery, and 95 in the 1972 lottery. Draft eligibility is highly correlated with Vietnam-era veteran status, but the link is far from deterministic. Many men with draft lottery numbers below the ceiling were able to avoid conscription through an occupational or educational deferment, or because of poor health or low test scores, while many with lottery numbers above the ceiling volunteered for service. Throughout the Vietnam era (1964-1975), most soldiers were volunteers. Using the draft lottery as an identification strategy yields estimates of the effects of military service specific to the set of "draft lottery compliers": those individuals who were or would have been induced to serve by being draft eligible, but who would not have served otherwise. While our results may not apply to volunteers, compliers make up a substantial fraction of our sample, as the first stage estimates we report below indicate.

In the sample of men born 1948-52, the effect of draft eligibility on Vietnam-era veteran status is .112 for whites and .072 for nonwhites, as shown in panels A and B of Table 3. Draft-eligibility effects for men born 1944-47 (not reported here) are small so we omit these cohorts.

Our primary IV strategy uses a draft-eligibility dummy as an instrument for veteran status. However, in an effort to produce more efficient 2SLS estimates by exploiting within-eligibility changes in the probability of enlistment, we also work with an instrument set constructed from five lottery-number groups and interactions of these groups with year of birth (an instrument set we call $5zx$). The five lottery-number groups are constructed using RSN cutoffs of 95, 125 and 195, and two intermediate points, 160 and 230. The reference group consists of those with RSNs above 230. The intermediate points capture the small but significant increases in the probability of service for RSNs just above the cut-offs.

The first column in each panel of Table 3 reports estimates of the lottery-group first stage in pooled samples.[15] For example, column (1) shows that men born 1948-52 with RSNs up to 95 were .128 more likely to serve than men with RSNs above 230. The next group, with RSNs 96-125, was .082 more likely

[15] The estimates in Table 3 and the second-stage estimates that follow control for year of birth, state of birth, and month of birth.

to serve than the reference group; the next group was .058 more likely to serve; the next group after that was .044 more likely to serve; and the last group with RSNs 196-230 was .006 more likely to serve, although they were above the cut-off at 195. All of these first-stage effects are precisely estimated and significantly different from zero. The draft lottery may have induced some with RSNs above the cutoff to volunteer to obtain better terms of service (e.g., choice of branch of service) in case they were to be drafted eventually. As with the draft-eligibility effects, estimates of lottery group effects are consistently smaller for nonwhites than for whites. $F$-statistics in the pooled 1948-52 sample range from 134 for nonwhites to nearly 2300 for whites. The $5zx$ first stage appears in columns (2) through (6) of Table 3. Partial $F$-statistics for the marginal contribution of $5zx$ in a model that includes lottery-group main effects are on the order of 150 for whites and 10 for nonwhites.[16]

### 3.3 Mortality and Survivor Bias in the Census Sample

As a preliminary step, we looked for under-representation of draft-eligible men in the census sample. This analysis is motivated by the possibility that draft-eligible men were more likely to have been killed in wartime and by the link between Vietnam-era service and civilian mortality established in the Hearst, Newman, and Hulley (1986) draft-lottery study of the long-term consequences of Vietnam-era service. Following the mortality investigation, which shows little evidence of an impact of Vietnam-era service on mortality, we look at the effects on self-reported disability rates and labor force status.

Mortality effects are of interest both as an important health outcome and because excess mortality among draft-eligible men may induce selection bias in samples of survivors. The two most likely channels for excess mortality among draft-eligible men are war-related deaths and elevated post-service mortality. The latter may be due to physical injury, PTSD, or other long-term consequences of military service, such as an increased likelihood of cigarette smoking as found by Bedard and Deschenes (2006) for World War II veterans. The excess deaths in the Hearst, Newman and Hulley (1986) study are due to suicide and motor-vehicle accidents, both of which have been linked to PTSD.

Roughly 47,000 men died as a result of hostile action in the Vietnam Era (1964-75) while 8.7 million personnel served in the military during this period for an overall casualty rate of about half a percent. Overall casualty rates among Vietnam-era veterans were low, in part because less than half of active duty personnel served in Indochina, and because of those who did, many served in positions not exposed to combat. Although casualty rates among draftees were higher than the overall Vietnam era death rate, draftees accounted for a minority of combat deaths. It is also noteworthy that over 80 percent of combat deaths occurred before

[16] A larger instrument set with dummies for RSN 1-30 and RSN 31-60 adds little to the precision obtained with $5zx$. See Angrist and Chen (2008) for more on the draft lottery first stage.

1970.[17] It therefore seems unlikely that war-related deaths have a large effect on the composition of the sample used in our study.

As a simple check on the possibility of mortality-related selection bias—a potential threat to the validity of using draft eligibility as an instrument—we compared the actual and expected numbers of draft-eligible men in the 2000 Census by race and year of birth. The expected ratio was computed using monthly birth totals for males by race (Vital Statistics Division, 1948-1955), assuming birthdays (and hence lottery numbers) are uniformly distributed within a month. On the whole, draft-eligible men are represented in the census sample almost exactly as predicted, assuming a uniform distribution of lottery numbers within a month. Among whites, the predicted proportion eligible is .407, while the empirical proportion eligible is .405. Among nonwhites, the empirical proportion eligible is slightly more than predicted, .408 versus .405.

Comparisons by single year of birth for white men born 1948-53, reported in appendix Table A1, show draft-eligible men slightly over-represented in three cohorts and slightly under-represented in the other three cohorts (one of these is the 1953 cohort, with no draftees). Only two cohort-specific differences for whites are significant, and all are small. Two out of six cohort-specific contrasts are significant for nonwhites, with slightly more eligibles in the sample than predicted for nonwhites born in 1950 and 1952. Given the magnitudes and sign pattern in this set of comparisons, it seems unlikely that differential mortality by draft-eligibility status had a substantial effect on the composition of the 2000 Census sample. These results also weigh against the view that Vietnam-era service led to elevated civilian mortality.[18]

# 4 Results

## 4.1 Effects on Disability, Transfer Income, and Work

Our main focus is on the effects of Vietnam-era service on self-reported disability status, disability-related transfers, and labor force status, all denoted by $Y_i$. The empirical framework for these estimates is the equation:

$$Y_i = X_i'\gamma_0 + \beta_0 VET_i + \varepsilon_i, \tag{1}$$

[17] Service and casualty statistics in this paragraph are from Table 583 in the 2000 Statistical Abstract, available on-line at http://www.census.gov/prod/2001pubs/statab/sec11.pdf. Data on casualties by year are available from the national archives: http://www.archives.gov/research/vietnam-war/casualty-statistics.html#year. Statistics on service in Indochina and exposure to combat are from Hearst, Newman, and Hulley (1986).

[18] The appendix table also breaks out draft-eligibility rates by high school graduation status. The estimates by schooling group also hover around the theoretical proportions, and the rates for HS dropouts are very close to the rates for HS graduates, with significant differences in only two out of six cohorts for whites, and no significant differences in any cohorts for nonwhites. It seems fair to say there is little consistent evidence that draft-eligible men in either schooling group are especially likely to be missing.

where $X_i$ is a vector of controls for state, year and month of birth, and $VET_i$ indicates Vietnam-era veteran status. We construct OLS and 2SLS estimates of (1), the latter using the first stages reported in Table 3. As noted in the introduction, veterans may have suffered long-term combat injuries, either physically or as a result of PTSD. Many Vietnam veterans have also been concerned about exposure to the Agent Orange defoliant used by American forces. The loss of earnings associated with Vietnam-era conscription for white veterans (documented in Angrist, 1990) may have also been debilitating, although Angrist and Chen (2008) showed that by 2000 the effect on earnings had diminished. Any lasting health effects should turn up in positive effects on disability for veterans, as captured by census self-reports. In addition, veterans may be more likely to describe themselves as disabled as a consequence of qualification for VDC and/or SSDI. This sort of endogenous disability reporting is discussed by Bound and Waidmann (1992), and Benitez-Silva, Buchinsky, Chan, Cheidvasser, and Rust (2000), among others. Finally, poor health and transfer income may directly affect employment, though each for different reasons, as we discuss further below.

The 2SLS estimates of effects on disability outcomes in panel A of Table 4 suggest that Vietnam-era conscription induced a small overall increase in self-reported disability rates among whites. The estimated effects, reported in columns (3)-(4), range from .012-.014 and are only marginally significant. These effects come from an increase in non-work-limiting disabilities; the estimated effects on overall work-limiting disability rates are nearly zero. There is little evidence of an increase in disability rates for nonwhites, though the 2SLS estimates for nonwhite men, mostly negative, are imprecise. It's also worth noting that the OLS estimates show increased disability rates for whites, while those for nonwhites show a decrease. While the sign pattern of the OLS estimates is consistent with that of the 2SLS estimates, OLS estimates are especially hard to interpret in this context, since men with disabilities are typically precluded from military service.

In contrast with the modest estimated impacts on overall disability rates, panel B shows a marked increase in the likelihood that (both white and nonwhite) veterans receive other income (mostly VDC). The 2SLS estimates here are around .04, which can be compared with a mean proportion receiving other income of .06-.08. At the same time, we find little evidence that Vietnam-era military service raised the proportion of men receiving income from Social Security (mostly SSDI, as noted before). The estimated effect on Social Security income receipt is close to zero for whites, and negative and not significantly different from zero for nonwhites. The estimated effects on the probability of receiving any federal transfers are generally similar to the effects on the probability of receiving other income, reflecting the absence of an overall effect on Social Security income and SSI (results for the latter are not shown in the table).

The largest and most consistent result coming out of an analysis of overall effects on specific disabilities is an increase in the likelihood of a vision or hearing-related problem. These effects, reported in panel C of Table 4, range from .011 for whites to .039 for nonwhites, and both are statistically significant at conventional

levels. This increase might reflect an increased incidence of hearing loss or tinnitus among veterans. In contrast, Vietnam-era service does not appear to have worsened average mental health as reflected in the rate at which men report difficulties learning, remembering, or concentrating. This is surprising given the large numbers of Vietnam veterans receiving VDC for PTSD and the fact that such difficulties are recognized PTSD symptoms (Institute of Medicine and National Research Council, 2007).

The veteran effect on non-work-limiting disability rates for whites may reflect a negative causal impact of military service on health. However, the pattern of disability effects does not seem consistent with an interpretation of the increase in disability transfers as the downstream consequence of poor veteran health. First, even if we ignore the work/non-work distinction, the effects of military service on disability rates are too small to explain the increase in disability-related transfers. In other words, if military service affected disability-related transfer receipt only through service-induced disabilities, one could consider military service as an implicit instrumental variable for the effect of disability status on transfer receipt. However, since the transfer effect is around 4 percentage points while the disability effect is a little over one percentage point, this would imply impossibly large (i.e., greater than unity) estimates of the effect of disability status on transfer receipt. Military service must therefore affect transfer receipt for reasons other than disability status (such as financial incentives). In fact, the effects on work-limiting disability—which would seem the most likely to have health consequences that qualify veterans for disability transfers—are nearly zero. Finally, the disability effects in Table 4 do not appear to have translated into lower employment rates or reduced labor force participation, as would usually be expected for workers with consequential health limitations.

The next section further explores the link between Vietnam-era military service and disability, focusing on how this link varies with earnings potential.

## 4.2 Interactions with Predicted Wages and Schooling

The empirical literature on the unintended economic consequences of disability insurance has two themes. The first is that such programs increase the likelihood of early retirement. For example, Bound and Waidmann (1992) and Stapleton and Burkhauser (2003) present evidence suggesting that disability insurance contributed significantly to the drop in labor force participation of near-elderly men over the second half of the twentieth century. A second strand of this literature argues that disability insurance has become increasingly attractive for (non-elderly) low-skilled men because declining real wages for the less skilled have meant a rise in disability insurance replacement rates. In particular, Autor and Duggan (2003) find a close link between enrollment in SSDI or SSI and regional variation in wage levels. Black, Daniel, and Sanders (2002) similarly show that disability insurance take-up rates are highly sensitive to regional variation in labor

demand.

As with Social Security disability programs, VDC may provide an attractive alternative to employment for low-wage men even if their disabling conditions are not serious enough to prevent or limit paid employment. In support of this view, Duggan, Rosenheck, and Singleton (2006) show that enrollment in the VDC program seems highly sensitive to small changes in eligibility criteria and in unemployment rates. Moreover, paralleling the incentives created by SSDI and SSI, VDC should reduce work for low-wage men through both income and substitution effects. Substitution effects arise because many veterans are awarded benefits at the 100 percent level on the basis of an IU determination that depends in part on low earnings.

We explore the link between earnings potential and disability outcomes for Vietnam veterans by looking for variation in the causal effects of veteran-status across skill groups. If causal effects on VDC take-up rates and self-reported disability status are driven primarily by deteriorating health, we should not expect these effects to be larger for men in the lowest skill groups, unless low-skilled men were also more likely to have suffered wartime injuries. On the other hand, if VDC is used primarily as an alternative to work for those with low earnings potential, we should see a strong gradient in the effects of veteran status.

Our interacted models use predicted wages and a schooling variable to define skill groups. The predicted wage is the fitted value from a regression of non-veterans' weekly wages on state of birth and education interactions, controlling for year of birth, run separately for whites and nonwhites.[19] Descriptive statistics for subsamples classified by predicted wage appear in columns 4-7 of Table 2. Not surprisingly, these statistics show that men with a lower predicted wage are much more likely to be disabled and have reduced labor force attachment. As a robustness check, we report results from an alternative specification using interactions classified by four schooling groups only. This generates a scheme that can be matched to our analysis of combat exposure by schooling group, described below. As it turns out, the two classification schemes for interacted models produce similar results.

The empirical framework for models with interactions is

$$Y_i = \sum_{j=1}^{4} \left( \alpha_j D_{ij} + \beta_j D_{ij} VET_i \right) + X_i'\gamma + \varepsilon_i, \tag{2}$$

where the variables $D_{i1}$ to $D_{i4}$ are indicators either for the four schooling groups, or for men with a predicted wage below the 10th percentile, between the 10th and 25th percentile, between the 25th and 75th percentile, and above the 75th percentile. The $D_{ij} \times VET_i$ terms are treated as endogenous and a set of four $D_{ij} \times ELIG_i$

[19] The sample for the predicted wage regressions consists of male US-born non-veterans born 1948-52. The dependent variable is the weekly wage and the explanatory variables are a full set of state of birth by education-group effects plus year of birth main effects. The education groups are: high school dropout, high school graduate, some college, and college graduate, as described in the appendix. Wage prediction regressions were run separately for whites and nonwhites.

terms are used as excluded instruments in 2SLS estimation of a just-identified model (Table 4 suggests little precision is gained in over-identified models). As before, the vector of covariates, $X_i$, contains dummies for year, month, and state of birth. The coefficients of interest are $\beta_1$ to $\beta_4$, the estimated causal effect of Vietnam veteran status on men in each predicted wage or schooling group.[20]

The resulting 2SLS estimates of veteran effects by skill level appear in Table 5. Column 1 in Panel A shows that for white men in the lowest wage group, the effect of Vietnam veteran status on the probability of reporting any disability is .109 (the mean disability rate in this group is .4, as shown in Table 2). There are also much smaller, though still marginally significant, effects of .029 and .018 on white men with wages in the next two quantile groups, but no effect on men with high earnings potential. An almost identical pattern arises when predicted wage groups are replaced by schooling groups, as can be seen in Panel B.

The overall disability effects are decomposed into effects on work-limiting and non-work-limiting disabilities in columns 2 and 3 of Table 5. Consistent with a similar breakdown in the full sample, the first row in each panel of Table 5 shows that the large veteran effect on any disability for low-skilled men is due mostly to an effect on non-work-limiting disabilities, with no significant effect on work-limiting disabilities in any group, though the point estimate for the effect on work-limiting disabilities for men with wages in the lowest group is still substantial. For the highest skill group, the estimated veteran impacts on both non-work and work-limiting disabilities are essentially zero.

Effects on transfer income are generally somewhat larger than those on non-work-limiting disabilities, as shown in columns 4-6. Moreover, while veterans at all predicted wage levels are estimated to be more likely to receive other income (mostly VDC), the largest effect is again for men with the lowest earnings potential. The estimated effects on other income in the low skill groups are .069 using predicted wages and .08 using schooling groups. The effect of veteran status on the likelihood of receiving Social Security income (SSDI) is smaller than that on other income but still significant for men in the lowest skill groups. This suggests that many men leaving the labor force to receive VDC also qualify for and receive SSDI, as argued by Autor and Duggan, 2009).

On the other hand, the results for any federal transfers indicate that SSDI (and to a lesser extent, SSI) is a partial substitute for VDC. This is apparent from the fact that effects on the aggregate transfer category are larger than the effects on any single component. For example, veterans in the lowest skill group about 10 percentage points more likely to receive federal transfers, while those in the next lowest group are about

[20] The schooling classification scheme also provides a check on selection bias from the possible endogeneity of schooling. Specifically, 2SLS estimates using the draft lottery (reported in Angrist and Chen, 2008) show that Vietnam-era military service increased the likelihood of college attendance but had little effect on schooling at the high school level or below. Therefore, draft-lottery estimation of veteran effects conditional on high school graduation status is unaffected by any post-treatment selection bias that might contaminate contrasts by college graduation status. This in turn means that the difference in treatment effects between high school dropouts and the other three groups is not subject to bias from conditioning on an outcome variable.

5 percentage points more likely to receive transfers. Given that VDC and SSDI are two separate programs with independent disability determination procedures, disabled veterans may begin receiving SSDI while they are waiting (or trying) to qualify for VDC or vice versa. Although SSDI is not especially designed to be attractive to veterans, all veterans who apply are required to submit their military discharge papers (form DD-214). In practice, military service increases SSDI benefits and the likelihood of SSDI qualification for men with weak labor force attachment because time in the military generates earnings credits in addition to base pay.[21]

The last set of results in Table 5 is for the veteran effect on employment and labor force participation. These estimates, reported in columns 7 and 8, show a marked decrease in employment and labor force participation among men in the lowest skill groups, with more muted effects in the middle of the predicted wage or schooling distribution, and no effect for men at the top of these distributions. The parallel between the variation in employment effects across skill groups and the pattern of effects on disability and transfer income is striking. However, because the veteran effect on unemployment or being out of the labor force exceeds the effect on work-limiting disability reported in column 2, especially for the least skilled men, disability-induced work limitations seem unlikely to be the sole explanation for reduced veteran employment.[22]

Finally, Table 6 looks at effects on specific disability types. The estimated impact of Vietnam-era service is, again, largest at the low end of the predicted wage or schooling distribution, with no significant effects at the high end. The largest impact at the low end is on physical disabilities, a category that probably includes most muscular and skeletal problems (e.g., related to knees or back). There appear to be smaller effects on physical disabilities in the second-lowest skill group. The second largest set of veteran effects relates to mental disabilities, including difficulties in learning, remembering and concentrating. Vision and hearing problems also appear to have been aggravated by military service among men at the low end of the skill distribution, though the estimates are less precise. Thus, within skill groups, the impact of military service on specific limitations seems broadly consistent with the diagnoses most prevalent among VDC claimants, seen in Table 1.[23]

[21] See, e.g., the pamphlet *Social Security and Military Service,* available at http://www.ssa.gov/pubs/10017.pdf.

[22] Much as we argued in Section 4.1 regarding the relation between effects on disabilities and transfers in the full sample, if the only channel whereby military service affects employment and labor force participation were work-limiting disabilities, the effect of military service on work-limiting disabilities would necessarily be larger than the effect on employment outcomes. The fact that the results come out otherwise suggests something other than health contributes to the employment effects.

[23] We also looked at models for log wages as in Angrist and Chen (2008). The estimated effects on log wages, both overall and within skill groups are essentially zero. We also tried a model that allows for interactions between veteran status and state-level VDC generosity as measured by the fraction of veterans designated IU or with a 100 percent disability rating. This generated marginally significant positive interactions in equations for non-work-limiting disability for both whites and nonwhites and significant interactions in equations for any- and work-limiting disability for nonwhites. On the other hand, we cannot really say whether these interactions reflect the differential application of VA policy or the unobserved characteristics of the veterans who reside in different states.

# 5 Interpreting the Impact of Vietnam-era Service Across Skill Groups

A natural question raised by the results in Table 5 is whether the effects of Vietnam-era service on disability, transfer income, and employment for low-skilled men can be accounted for by differences across skill groups in exposure to combat or the risk of service-related injury. For example, to be diagnosed with PTSD, a veteran must establish that he was exposed to traumatic events of an extreme nature (VA Office of the Inspector General, 2005, p. 46). We therefore ask whether less-educated men were more likely to be exposed to combat or war or to have suffered a service-connected disability. We explore this question using the 1987 Survey of Veterans (known as the SOV-III since it was the third in a series of veteran surveys). The SOV-III interviewed veterans (excluding those still on active duty) in CPS outgoing rotation groups from April 1986 through January 1987. The survey covered roughly two thousand Vietnam veterans and collected information on veterans' service experiences and health. Most relevant for us, the SOV-III included questions about service location and exposure to combat, as well as a direct assessment of service-connected disabilities. The SOV-III asks specifically about service-connected injuries and disabilities, while the disability variables in the 2000 Census are more general. As expected, the disability rates observed in the Census are larger. The data appendix describes the definitions of the variables and the criteria used to select our extract, which is a subset of the sample analyzed in Angrist (1993). Because the results in Tables 4 and 5 show significant effects only for whites, we focus on white men in the SOV-III.

Among all white Vietnam veterans in our SOV-III extract, 40 percent report having served in the Vietnam War theatre (Vietnam, Laos, or Cambodia), 36 percent report exposure to combat, 46 percent report exposure to combat or war, and 6.1 percent report a service-connected disability.[24] To increase the sample size, we analyze an extract that includes men born 1943-57 in addition to an extract limited to the draft lottery cohorts (men born 1948-52). The descriptive statistics for both samples are broadly similar, as can be seen by comparing the descriptive statistics in the first rows of Panels A and B in Table 7.

Our empirical analysis of the relationship between education and war exposure is structured by regressions of combat or war exposure and service-connected disabilities on schooling dummies similar to those used to construct the estimates in Panel B of Table 5.[25] Specifically, the schooling dummies are indicators for high school graduates, men with some college, and college graduates, with high school dropouts as the omitted

[24] Respondents are coded as having been exposed to combat if they responded in the affirmative to a question asking whether they were in or exposed to combat. Respondents are coded as having been exposed to combat or war if they indicated that they were either exposed to combat or were stationed in a war zone. Respondents with a service-connected disability are those who indicated they have been notified by the VA that they are eligible for payment for a service-connected medical condition or disability.

[25] Definitions of SOV-III schooling groups appear in the data appendix. Schooling group dummies describe education at the time of the SOV-III survey. The covariates in these regressions consist of 5-year cohort dummies.

reference group. The estimated coefficients on the schooling dummies, reported in columns (1)-(4) of Table 7, show little difference in the likelihood of combat/war exposure or service-related disability across schooling groups. For example, while 33 to 40 percent of veterans with no high school diploma reported ever being exposed to combat, as shown in Panel A, column (2), the combat exposure rates were only 1 percentage point less for men with some college or a college degree.

Because the largest effects of Vietnam veteran status on disability and employment (reported in Table 5) appear among high school dropouts, the relationship between high school dropout status and exposure to war or combat is of special interest. Estimates of this relationship in columns 5-7 of Table 7 show a small and insignificant relationship between having a high school diploma and the likelihood of serving in the war theatre, or being exposed to combat or war.

The muted relationship between education and exposure to war or combat does not support the notion that less educated veterans were more likely to have been exposed to war-related trauma or injury. At the same time, we note the possibility, investigated by Macklin, Metzger, Litz, McNally, Lasko, Orr, and Pitman (1998) (among others), that exposure to the same traumatic experience may be more likely to trigger PTSD in veterans with lower cognitive ability (or less education). Moreover, exposure to combat or service in a war zone may have entailed different experiences for veterans of different education levels (because of, say, differences in rank). We therefore look at a direct measure of service-connected disability and examine how this measure varies with education. Columns 4 and 8 in Table 7 show no significant difference in the likelihood of a service-related disability across schooling groups, either in the full sample of Vietnam veterans (Panel A), or in the draft lottery subsample (Panel B). These findings are inconsistent with the notion that less-educated men were especially vulnerable to PTSD or other service-connected injuries.

Although the results in Table 7 are somewhat imprecise and therefore less than conclusive, they are consistent with the findings in Table 5 in pointing away from health *per se* as the primary explanation for lower employment rates among Vietnam veterans with low levels of education or low earnings potential. As noted earlier, the effects of Vietnam-era service on work-limiting disabilities are too small (on the order of 4-5 percentage points) to account for employment reductions ranging from 8-12 percentage points (depending on the outcome and skill group definition). It therefore seems likely that part of the explanation for service-induced increases in disability rates among the low-skilled is an *ex post* validation of VDC or SSDI eligibility, a status administratively bound up with employment. Specifically, a veteran who qualifies for a federal disability insurance program may be more likely to identify himself as disabled, even if his disability does not limit work. The strong effect of Vietnam-era veteran status on aggregate transfer income, reported in column 6 of Table 5, seems to be the leading proximate cause for the negative effect of veteran status on employment and labor force participation rates among low-skilled men.

# 6 Conclusions

Our estimates of the causal effects of Vietnam-era military service on disability rates, transfer income, and employment paint a complicated picture. We find only a small service-induced increase in overall disability rates among white veterans, and an insignificant decrease among nonwhites. Moreover, the increase among whites comes almost entirely from disabilities judged by census respondents not to be work-limiting. At the same time, an analysis of effects by skill groups, using either predicted wages or schooling, shows a sizeable effect on disability among the least skilled white veterans, with some smaller but still significant effects in the lower-middle of the skill distribution. We also find large negative effects on employment in the lowest skill groups.

Did the least skilled suffer the most serious and lasting health consequences of Vietnam-era service? Our analysis points away from this interpretation. First, less-educated men were not more likely to serve in the Vietnam War theatre, to be exposed to combat or war, or to have reported a service-connected disability in 1987. In addition, the estimated effects of Vietnam-era veteran status on work-limiting disabilities are too small to explain the estimated effects on employment and labor force participation. A case can therefore be made for disability insurance as a primary causal agent driving these results, even allowing for a modest negative overall health effect suggested by our estimates. Veterans who get VDC (or SSDI), especially those who are (or aspire to be) classified as "individually unemployable," are probably more likely to define themselves as disabled and less likely to work. This seems to be a special concern for Vietnam-era PTSD claims; data from 2005 show that roughly one-third of PTSD claimants are designated IU and that IU claimants are concentrated in the Vietnam cohort (Christensen, et al, 2007, Figures 58-59).

Our results have important implications for veterans compensation policy. The number of Vietnam-era VDC beneficiaries grew rapidly in the late 1990s, growth that accelerated in the early part of this century and has not yet leveled off. This imposes a growing burden on a system that must serve new cohorts of veterans from the Gulf War, Afghanistan, and Iraq. The results reported here suggest the growth in Vietnam-era disability claims (and hence costs) are not only a manifestation of the health consequences of the Vietnam war, but also a reflection of the incentives embedded in our disability insurance system for veterans. While our estimates are specific to those individuals whose veteran status was determined by their draft eligibility status, the incentives in the compensation programs likely apply to veterans more broadly.

Our findings also raise questions about widely publicized projections of the disability costs likely to come out of current conflicts. Specifically, Stiglitz and Bilmes (2008, pp. 82-83) note that a large number of VDC claims in this most recent cohort are for PTSD and that PTSD is an especially expensive diagnosis associated with high program costs and large earnings losses. But the costliness of PTSD claims comes

in large part from the link with IU and the consequent increase in VDC benefits. Case reviews in VA Office of the Inspector General (2005) show that mental health visits declined by 82 percent after an IU rating decision, and that many granted IU status stop seeking treatment for mental health entirely, though health care visits for other conditions are unchanged. Likewise, our results indicate that the employment consequences of PTSD may have as much to do with incentives as with a medical inability to work, at least in many cases. The complicated links between military service and variables related to health show that the disability-related costs of conflict are driven by policy and regulatory choices, as well as the battlefield consequences of war.

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# DATA APPENDIX

## Health and Disability Data in the CPS

Figures 1-3 were constructed using data from the 1990-2006 CPS March Demographic Supplements. All data were downloaded from the Minnesota Population Center's Integrated Public Use Microdata Series (IPUMS), accessible at www.ipums.org. Year of birth was imputed assuming men were born after the survey date. We categorized Vietnam veterans as all men born between 1944-54 who served during the Vietnam era, as reported in the variable VETLAST, which reports an individual's most recent period of service. Active duty servicemen were excluded. Korean-era veterans were identified the same way, except we used the 1929-1934 birth cohort. non-veterans were classified based on the variable VETSTAT.

The disability-related income variables used in Figure 1 uses the variable INCVET and a dummy for men who received veterans' disability compensation (GOTVDISA), both in 2005 dollars.. INCVET captures any income from the VA, including service-related disability payments (VDC), non-disability pension payments,

and educational allowances. GOTVDISA information is collected only for respondents who received veterans' payments during the previous calendar year, and it indicates whether respondents received VDC.

Figure 2 was constructed from the variable DISABWRK, which codes the response to a question about disabilities that limit or prevent work. Men with fair or poor health were identified using the variable HEALTH, which gives self-reported health status. This variable is available beginning in 1996.

The employment measure used in Panel A of Figure 3 is based on the CPS variable EMPSTAT, which codes as working men at work, with a job not at work, or in the armed forces. The share quitting or retiring for health reasons in Panel B is based on the CPS variable QUITSICK, which identifies respondents who said that they had ever retired or left a job for health reasons.

All plots show weighted means collapsed by year using sampling weights (PERWT) and including imputed values. Because income amounts refer to the previous year in the March CPS, Figure 1 runs from 1989-2005. Disability and health are measured at the time of the survey, so Panel A of Figure 2 runs from 1990-2006 and Panel B from 1996-2006.

## 2000 Census Disability Questions

We constructed disability variables from responses to the following questions:

**16.** Does this person have any of the following long-lasting conditions:

- **a.** Blindness, deafness, or a severe vision or hearing impairment? (Yes, No)
- **b.** A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying? (Yes, No)

**17.** Because of a physical, mental, or emotional condition lasting 6 months or more, does this person have any difficulty in doing any of the following activities:

- **a.** Learning, remembering, or concentrating? (Yes, No)
- **b.** Dressing, bathing, or getting around inside the home? (Yes, No)
- **c.** (Answer if this person is 16 YEARS OLD OR OVER.) Going outside the home alone to shop or visit a doctor's office? (Yes, No)
- **d.** (Answer if this person is 16 YEARS OLD OR OVER.) Working at a job or business? (Yes, No)

A respondent was coded as having a work-limiting disability if he or she answered "Yes" to 17(d). He was coded as having a non-work-limiting disability if he answered "No" to 17(d), but yes to any of 16(a), 16(b), or

17(a)-17(c). The variable "any disability" was defined as having either a work-limiting or non-work-limiting disability. Specific disabilities were coded as follows: Vision or hearing (yes to 16(a)); Physical (yes to 16(b)); Mental (yes to 17(a)); Self-care (yes to 17(b)); Mobility (yes to 17(c)).

## 2000 Census VA and Social Security Income Questions

The 2000 Census has one multi-part question that collects information on income by source. We use these parts of question 31, Income in 1999:

**d.** Social Security or Railroad Retirement

**e.** Supplemental Security Income (SSI)

**h.** Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony - Do NOT include lump-sum payments such as money from an inheritance or sale of a home.

The response to 31(h) is used to code an indicator for Other Income (mostly VDC); the response to 31(d) is used to code an indicator for Social Security Income (mostly SSDI); our dummy for any federal transfers indicates individuals with an amount in either 31(d), 31(e), or 31(h).

## 1987 Survey of Veterans (SOV-III)

### 6.0.1 Sample selection

The analysis of the SOV-III in Section 5 starts with the extract of 3,337 Vietnam and later-era veterans used by Angrist (1993). These data are available at http://econ-www.mit.edu/faculty/angrist/data/ang1993. For confidentiality reasons, age data in the SOV-III are bracketed in 5-year intervals. The sample used in Table 7, Panel A is arrived at by restricting to white males with bracketed ages between 30 and 44 who served during the Vietnam era as indicated by their response to Question 4(c). Finally, the five observations with missing education (coded N/A) are deleted to arrive at a sample size of 1893. The sample in Panel B is further restricted to recoded ages between 35 and 39 for a sample size of 724.

### 6.0.2 Variable definitions

The measures of combat exposure were taken from questions 16(b), 17, and 18:

**16b.** In which of these places did you serve, sail in, or fly missions over while on active duty in the United States Armed Forces? (*list of regions*)

**17.** During your military service, were you ever in or exposed to combat? (Yes, No)

**18.** Even though you were not in combat, were you ever stationed in a war zone? (Yes, No)

The dependent variables in columns (1) to (3) of Table 7 were respectively defined as an indicator for Vietnam, Laos, or Cambodia on question 16(b); and indicator for "Yes" on 17; an indicator for "Yes" on 17 or "Yes" on 18.

The measure of service-connected disability status is taken from question 35(b):

**35b.** Have you ever been notified by the VA that you have a medical condition or disability related to your military service or that you are eligible for VA medical care because you have a medical condition or disability related to your military experience? (Yes, No)

## Schooling Group Definitions in the 2000 Census and SOV-III

The analysis in Section 4.2 defines four schooling groups using the highest level of school completed (question 9 in the census). The four census schooling groups are:

1. *High school dropout*: the highest level completed is at most 12th grade, no diploma (response code less than or equal to 9)
2. *High school graduate*: the highest level completed is high school graduate or GED (response code equal to 10)
3. *Some college*: the highest level completed is greater than high school graduate but less than a Bachelor's degree (response codes 11-13)
4. *College graduate*: the highest level completed is greater than or equal to a Bachelor's degree (response codes 14 and up)

The four schooling groups in the Survey of Veterans (analyzed in Section 5) are based on respondents' answers to questions 15(b) (highest degree before service), 15(c) (highest grade completed), and 15(d) (highest degree received):

1. *High school dropout*: the highest level completed is at most 11 (response code 5 or less in question 15(c))
2. *High school graduate*: the highest level completed is 12 or a vocational program (response code 6 or 7 in question 15(c))

3. *Some college*: the highest level completed includes at least one year of college but less than a Bachelor's degree (response code 8 or more in question 15(c), but a code of less than 2 in questions 15(b) and 15(d))

4. *College graduate*: the highest level completed is at least a Bachelor's degree (response code 2 or more in question 15(b) or 15(d))

Table 1: Veterans disability compensation claims: Most common diagnoses for Vietnam veterans in 2005

| | | | Veterans receiving compensation for: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Veteran Population (1) | Disabilities per Veteran (2) | Any disabilities (3) | Diabetes* (4) | PTSD (5) | Hearing (loss of acuity) (6) | Scars (7) | Generalized Musculo-skeletal Conditions (8) | Hyper-tension (9) | Arthritis (due to trauma) (10) | Knee impairment (11) |
| | | | | | | A. Vietnam | | | | | |
| 1999 | 8,113,000 | 2.76 | 735,627 | - | 90,695 | 50,184 | 127,023 | 82,446 | 56,231 | 48,263 | 67,836 |
| 2001 | 7,916,774 | 2.77 | 749,554 | - | 106,809 | 60,753 | 125,939 | 80,586 | 55,545 | 53,332 | 66,335 |
| 2003 | 8,210,925 | 2.88 | 848,156 | 135,011 | 142,876 | 95,931 | 125,534 | 78,413 | 66,084 | 62,821 | 65,026 |
| 2005 | 8,054,993 | 3.00 | 916,220 | 190,199 | 179,737 | 129,323 | 121,850 | 78,270 | 72,169 | 69,034 | 62,713 |
| | | | | | | B. Korea | | | | | |
| 1999 | 4,064,000 | 2.01 | 174,807 | - | N/A | N/A | 18,879 | N/A | N/A | 8,903 | 6,862 |
| 2001 | 3,347,310 | 2.04 | 166,362 | - | 6,524 | N/A | 17,703 | 6,452 | N/A | 9,230 | 6,411 |
| 2003 | 3,580,249 | 2.12 | 164,482 | - | 8,994 | 15,659 | 16,761 | N/A | N/A | 9,941 | N/A |
| 2005 | 3,256,925 | 2.2 | 161,512 | - | 10,994 | 25,529 | 15,476 | 5,552 | N/A | 10,030 | N/A |
| | | | | | | C. Gulf War | | | | | |
| 1999 | 2,223,000 | 3.20 | 282,140 | - | N/A | 28,208 | 33,719 | 59,337 | 28,405 | 35,304 | 56,320 |
| 2001 | 3,095,952 | 3.32 | 365,780 | - | N/A | 36,399 | 42,523 | 77,849 | 37,260 | 52,826 | 63,966 |
| 2003 | 3,783,414 | 3.48 | 476,026 | - | N/A | 47,031 | 52,479 | 100,925 | 49,948 | 77,202 | 72,300 |
| 2005 | 4,377,845 | 3.70 | 611,729 | - | N/A | 60,023 | 60,350 | 131,092 | 64,558 | 100,374 | 81,677 |

Notes: This table reports the number of veterans receiving VDC in total and for specific disabilities. The listed diagnoses are the top 10 conditions in 2005, except for tinnitus (which is often diagnosed with loss of hearing acuity) and degenerative arthritis (which is not in the top 10 before 2005). Diabetes recognized as a service-related impairment in 2002. "N/A" denotes that the diagnosis was not among the top ten compensated diagnoses for the given year and service era.

Source: Veterans Benefits Administration Annual Reports for 1999, 2001, 2003, and 2005.
* Diabetes not presumed service-related for Korea- and Gulf War-era service.

Table 2. Descriptive statistics by race and veteran status

| | | | | Wage index percentile | | | |
|---|---|---|---|---|---|---|---|
| | All | Vietnam veteran | Non-veteran | <10 | 10-25 | 25-75 | >75 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| **A. Whites** | | | | | | | |
| Draft eligibility (by RSN) | 0.437 | 0.552 | 0.386 | 0.425 | 0.424 | 0.438 | 0.446 |
| Veteran status (served in Vietnam Era) | 0.305 | 1.000 | 0.000 | 0.261 | 0.354 | 0.338 | 0.228 |
| Age | 49.2 | 49.6 | 49 | 49.1 | 49.1 | 49.2 | 49.3 |
| i. Disability variables | | | | | | | |
| Any disability | 0.198 | 0.217 | 0.190 | 0.386 | 0.265 | 0.183 | 0.113 |
| Work-limiting disability | 0.124 | 0.134 | 0.120 | 0.243 | 0.172 | 0.113 | 0.070 |
| Non-work-limiting disability | 0.074 | 0.083 | 0.070 | 0.143 | 0.093 | 0.070 | 0.043 |
| ii. Transfer income | | | | | | | |
| Other income (mostly VDC) > 0 | 0.059 | 0.109 | 0.037 | 0.069 | 0.068 | 0.062 | 0.044 |
| SSA income excluding SSI (mostly SSDI) > 0 | 0.035 | 0.036 | 0.034 | 0.097 | 0.051 | 0.028 | 0.014 |
| SSI > 0 | 0.017 | 0.013 | 0.019 | 0.060 | 0.024 | 0.012 | 0.005 |
| Any Federal transfer income > 0 | 0.100 | 0.142 | 0.082 | 0.197 | 0.129 | 0.093 | 0.059 |
| iii. Specific disability types | | | | | | | |
| Mental (difficulty learning, remembering, or concentrating) | 0.045 | 0.049 | 0.044 | 0.134 | 0.062 | 0.036 | 0.019 |
| Vision or hearing (blindness, deafness, or a severe vision or hearing impairment) | 0.038 | 0.043 | 0.036 | 0.076 | 0.049 | 0.035 | 0.021 |
| Physical (limitation to physical activities e.g. walking, climbing stairs, reaching, lifting, or carrying) | 0.086 | 0.101 | 0.080 | 0.193 | 0.118 | 0.078 | 0.041 |
| Mobility (difficulty going outside the home alone) | 0.052 | 0.054 | 0.052 | 0.133 | 0.077 | 0.044 | 0.023 |
| Self-care (difficulty dressing, bathing, or getting around inside the home) | 0.022 | 0.022 | 0.022 | 0.062 | 0.030 | 0.018 | 0.010 |
| iv. Labor market variables | | | | | | | |
| Not working | 0.145 | 0.154 | 0.141 | 0.327 | 0.205 | 0.125 | 0.074 |
| Not in labor force | 0.118 | 0.126 | 0.115 | 0.281 | 0.170 | 0.100 | 0.056 |
| N | 1,141,551 | 353,367 | 788,184 | 114,588 | 171,459 | 572,311 | 283,193 |
| **B. Nonwhites** | | | | | | | |
| Draft eligibility (by RSN) | 0.440 | 0.520 | 0.406 | 0.427 | 0.424 | 0.443 | 0.449 |
| Veteran status (served in Vietnam Era) | 0.293 | 1.000 | 0.000 | 0.148 | 0.195 | 0.337 | 0.326 |
| Age | 49.2 | 49.5 | 49 | 49.0 | 49.0 | 49.2 | 49.2 |
| i. Disability variables | | | | | | | |
| Any disability | 0.332 | 0.326 | 0.334 | 0.447 | 0.409 | 0.338 | 0.226 |
| Work-limiting disability | 0.212 | 0.205 | 0.215 | 0.275 | 0.253 | 0.217 | 0.151 |
| Non-work-limiting disability | 0.120 | 0.120 | 0.120 | 0.173 | 0.156 | 0.121 | 0.075 |
| ii. Transfer income | | | | | | | |
| Other income (mostly VDC) > 0 | 0.078 | 0.140 | 0.052 | 0.067 | 0.069 | 0.083 | 0.078 |
| SSA income excluding SSI (mostly SSDI) > 0 | 0.060 | 0.056 | 0.062 | 0.093 | 0.085 | 0.060 | 0.032 |
| SSI > 0 | 0.044 | 0.029 | 0.051 | 0.086 | 0.072 | 0.041 | 0.017 |
| Any Federal transfer income > 0 | 0.163 | 0.198 | 0.148 | 0.218 | 0.201 | 0.163 | 0.116 |
| iii. Specific disability types | | | | | | | |
| Mental (difficulty learning, remembering, or concentrating) | 0.076 | 0.072 | 0.077 | 0.136 | 0.115 | 0.071 | 0.036 |
| Vision or hearing (blindness, deafness, or a severe vision or hearing impairment) | 0.048 | 0.047 | 0.049 | 0.070 | 0.063 | 0.047 | 0.032 |
| Physical (limitation to physical activities e.g. walking, climbing stairs, reaching, lifting, or carrying) | 0.139 | 0.145 | 0.136 | 0.205 | 0.178 | 0.140 | 0.085 |
| Mobility (difficulty going outside the home alone) | 0.122 | 0.112 | 0.126 | 0.173 | 0.162 | 0.124 | 0.072 |
| Self-care (difficulty dressing, bathing, or getting around inside the home) | 0.042 | 0.036 | 0.044 | 0.069 | 0.061 | 0.040 | 0.022 |
| iv. Labor market variables | | | | | | | |
| Not working | 0.338 | 0.295 | 0.356 | 0.508 | 0.468 | 0.341 | 0.183 |
| Not in labor force | 0.284 | 0.247 | 0.300 | 0.440 | 0.400 | 0.286 | 0.148 |
| N | 154,810 | 45,344 | 109,466 | 16,002 | 23,148 | 77,088 | 38,572 |

Notes: This table reports descriptive statistics for men born 1948-52 in the 2000 1:6 census file. Statistics use census sampling weights.

Table 3. First-stage estimates by race and year of birth

| | Pooled cohorts | By single year of birth | | | | |
|---|---|---|---|---|---|---|
| | 1948-52 | 1948 | 1949 | 1950 | 1951 | 1952 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | | A. Whites | | | | |
| Draft-eligibility effect | .112*** | .058*** | .074*** | .133*** | .138*** | .168*** |
| | (.001) | (.001) | (.003) | (.002) | (.002) | (.002) |
| *RSN effects (5zx):* | | | | | | |
| RSN 1-95 | .128*** | .065*** | .088*** | .154*** | .155*** | .173*** |
| | (.001) | (.003) | (.003) | (.003) | (.003) | (.003) |
| RSN 96-125 | .082*** | .060*** | .077*** | .131*** | .128*** | .023*** |
| | (.002) | (.005) | (.005) | (.004) | (.004) | (.003) |
| RSN 126-160 | .058*** | .054*** | .061*** | .126*** | .050*** | .008*** |
| | (.002) | (.004) | (.004) | (.004) | (.004) | (.003) |
| RSN 161-195 | .044*** | .044*** | .054*** | .102*** | .024*** | -.001 |
| | (.002) | (.004) | (.004) | (.004) | (.003) | (.003) |
| RSN 196-230 | .006*** | .004 | .006 | .013*** | -.001 | .008** |
| | (.002) | (.004) | (.004) | (.004) | (.003) | (.003) |
| F-statistics | 2294 | 111 | 202 | 731 | 861 | 1028 |
| N | 1,141,551 | 220,891 | 224,130 | 223,984 | 232,348 | 240,198 |
| | | B. Nonwhites | | | | |
| Draft-eligibility effect | .072*** | .031*** | .049*** | .090*** | .096*** | .096*** |
| | (.003) | (.007) | (.006) | (.006) | (.006) | (.006) |
| *RSN effects (5zx):* | | | | | | |
| RSN 1-95 | .081*** | .039*** | .059*** | .101*** | .101*** | .099*** |
| | (.003) | (.009) | (.008) | (.007) | (.007) | (.007) |
| RSN 96-125 | .058*** | .027** | .072*** | .089*** | .090*** | .016* |
| | (.005) | (.013) | (.012) | (.011) | (.011) | (.009) |
| RSN 126-160 | .041*** | .027** | .042*** | .093*** | .034*** | .005 |
| | (.005) | (.012) | (.012) | (.011) | (.010) | (.009) |
| RSN 161-195 | .021*** | .012 | .027** | .066*** | -.005 | .005 |
| | (.005) | (.012) | (.011) | (.010) | (.009) | (.009) |
| RSN 196-230 | .001 | -.004 | .018 | .008 | -.010 | -.006 |
| | (.005) | (.012) | (.011) | (.010) | (.009) | (.009) |
| F-statistics | 134 | 4.98 | 14.3 | 48.9 | 55.1 | 47.3 |
| N | 154,810 | 28,272 | 30,321 | 31,942 | 31,162 | 33,113 |

Notes: This table reports draft-eligibility and RSN-group effects on the probability of veteran status. Draft-eligibility effects and RSN group effects are from separate regressions. Effects in columns (2)-(6) are from separate regressions by year. Robust standard errors are shown in parentheses. All models include a full set of dummies for state of birth and month of birth, and column (1) also includes year of birth dummies. Statistics use census sample weights. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Table 4. OLS and 2SLS estimates of effects on disability and labor force status for men born 1948-52

| | Whites | | | | Nonwhites | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2SLS | | | | 2SLS | |
| Dependent variable | Mean (1) | OLS (2) | elig (3) | 5zx (4) | Mean (5) | OLS (6) | elig (7) | 5zx (8) |
| A. Disability variables | | | | | | | | |
| Any disability | .198 | .024*** | .012 | .014* | .332 | -.012 | -.061 | -.063 |
| | | (.001) | (.008) | (.007) | | (.003) | (.040) | (.036) |
| Work-limiting disability | .124 | .013*** | .000 | -.001 | .212 | -.010 | -.045 | -.054 |
| | | (.001) | (.007) | (.006) | | (.003) | (.034) | (.031) |
| Non-work-limiting disability | .074 | .011*** | .013** | .014*** | .120 | -.001 | -.016 | -.006 |
| | | (.001) | (.005) | (.005) | | (.002) | (.028) | (.026) |
| B. Transfer income | | | | | | | | |
| Other income (mostly VDC) > 0 | .059 | .072*** | .042*** | .040*** | .078 | .087*** | .034 | .040** |
| | | (.001) | (.005) | (.004) | | (.002) | (.022) | (.020) |
| SSA income excluding SSI (mostly SSDI) >0 | .035 | .000 | .001 | .004 | .060 | -.007 | -.027 | -.030 |
| | | (.000) | (.004) | (.003) | | (.002) | (.020) | (.018) |
| Any Federal transfer income > 0 | .100 | .058*** | .039*** | .040*** | .163 | .047*** | .032 | .027 |
| | | (.001) | (.006) | (.005) | | (.002) | (.031) | (.028) |
| C. Specific disability types | | | | | | | | |
| Mental | .045 | .003*** | .007 | .006 | .076 | -.007 | .015 | .011 |
| | | (.001) | (.004) | (.004) | | (.002) | (.023) | (.021) |
| Vision or hearing | .038 | .005*** | .011*** | .012*** | .048 | -.003 | .039** | .036** |
| | | (.000) | (.004) | (.003) | | (.001) | (.018) | (.016) |
| Physical | .086 | .018*** | .009 | .012** | .139 | .005** | -.028 | -.030 |
| | | (.001) | (.006) | (.005) | | (.002) | (.029) | (.026) |
| Mobility | .052 | .001** | .005 | .005 | .122 | -.014 | -.008 | -.008 |
| | | (.001) | (.005) | (.004) | | (.002) | (.028) | (.025) |
| Self-care | .022 | .000 | .007** | .008*** | .042 | -.009 | .011 | -.001 |
| | | (.000) | (.003) | (.003) | | (.001) | (.017) | (.016) |
| D. Labor force status | | | | | | | | |
| Not working | .145 | .010*** | .005 | .003 | .338 | -.063 | -.001 | -.020 |
| | | (.001) | (.007) | (.007) | | (.003) | (.040) | (.037) |
| Not in labor force | .118 | .007*** | .002 | .002 | .284 | -.057 | .026 | .016 |
| | | (.001) | (.007) | (.006) | | (.003) | (.039) | (.035) |
| N | 1,141,551 | | | | 154,810 | | | |

Note: This table reports OLS and 2SLS estimates of the effects of Vietnam veteran status on the dependent variable listed at left. All regressions include a full set of dummies for state of birth, year of birth and month of birth. The estimates in columns 3 and 7 use a simple draft-eligibility dummy as instruments. The estimates in columns 4 and 8 use 5 RSN dummies interacted with year of birth. Robust standard errors are reported in parentheses. Estimates use census sampling weights. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Table 5. 2SLS estimates of veteran effects by predicted wage and schooling: Whites

| | | Disability variables | | | Transfer income | | | Labor Force Status | |
|---|---|---|---|---|---|---|---|---|---|
| | | Any disability | Work-limiting disability | Non-work-limiting disability | Other income (mostly VDC) >0 | SSA income (mostly SSDI) >0 | Any Federal transfer income >0 | Not working | Not in labor force |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | | | | A. By wage index percentile | | | | |
| Veteran status x wage index percentile | <10 | .109*** | .046 | .062** | .069*** | .055*** | .102*** | .081** | .058* |
| | | (.034) | (.030) | (.025) | (.017) | (.021) | (.028) | (.033) | (.032) |
| | 10-25 | .029* | .021 | .009 | .037*** | .013 | .048*** | .038** | .030** |
| | | (.016) | (.014) | (.010) | (.009) | (.008) | (.012) | (.015) | (.014) |
| | 25-75 | .018** | .000 | .018*** | .045*** | -.001 | .041*** | .009 | .008 |
| | | (.009) | (.007) | (.006) | (.006) | (.004) | (.007) | (.008) | (.007) |
| | >75 | .006 | .000 | .006 | .035*** | -.005 | .032*** | .008 | -.008 |
| | | (.011) | (.010) | (.008) | (.008) | (.604) | (.009) | (.010) | (.009) |
| | | | | | B. By schooling group | | | | |
| Veteran status x schooling group | HS dropout | .105** | .039 | .066* | .080*** | .084*** | .134*** | .116** | .086* |
| | | (.050) | (.044) | (.037) | (.025) | (.032) | (.042) | (.049) | (.047) |
| | HS graduate | .036*** | .018* | .018** | .033*** | .009 | .036*** | .032*** | .027*** |
| | | (.012) | (.010) | (.008) | (.007) | (.006) | (.009) | (.011) | (.010) |
| | Some college | .026** | .009 | .017** | .056*** | .002 | .056*** | .014 | .009 |
| | | (.011) | (.009) | (.008) | (.007) | (.005) | (.009) | (.010) | (.009) |
| | College degree | .006 | -.005 | .011* | .036*** | -.005 | .032*** | -.006 | -.005 |
| | | (.010) | (.008) | (.006) | (.006) | (.004) | (.007) | (.008) | (.007) |

Notes: Panel A reports coefficients from a regression in the sample of white men born 1948-1952 of the variable indicated in the column heading on dummies for the wage index percentile and their interactions with Vietnam veteran status, and Panel B reports coefficients from a regression of the variable indicated in the column heading on dummies for education level and their interactions with Vietnam veteran status. The sample size is 1,141,551. All regressions control for state, year, and month of birth. The wage index was computed from a regression of white non-veterans' weekly wages on state of birth and education interactions, controlling for year of birth. Robust standard errors are shown in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Table 6. 2SLS estimates of veteran effect interactions for specific disability types: Whites

| | | Disability Type: | | | | |
|---|---|---|---|---|---|---|
| | | Mental (1) | Vision or hearing (2) | Physical (3) | Mobility (4) | Self-care (5) |
| | | A. By wage index percentile | | | | |
| Veteran status x wage index percentile | <10 | .064*** | .039** | .088*** | .062*** | .027 |
| | | (.024) | (.019) | (.028) | (.024) | (.017) |
| | 10-25 | .014 | .022*** | .028** | .005 | .013** |
| | | (.009) | (.008) | (.012) | (.010) | (.006) |
| | 25-75 | .006 | .011*** | .010* | .008 | .010*** |
| | | (.004) | (.004) | (.006) | (.005) | (.003) |
| | >75 | .003 | .003 | -.008 | .000 | .002 |
| | | (.005) | (.005) | (.007) | (.006) | (.004) |
| | | B. By schooling group | | | | |
| Veteran status x schooling group | HS dropout | .060 | .047* | .120*** | .056 | .036 |
| | | (.037) | (.028) | (.042) | (.037) | (.027) |
| | HS grad | .013** | .021*** | .026*** | .010 | .011** |
| | | (.006) | (.006) | (.009) | (.007) | (.005) |
| | Some college | .012** | .010* | .015* | .011* | .013*** |
| | | (.006) | (.006) | (.008) | (.006) | (.004) |
| | College degree | .003 | .006 | -.006 | .002 | .002 |
| | | (.004) | (.004) | (.006) | (.005) | (.003) |

Notes: The same as table 5. The sample size is 1,141,551. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Table 7. Combat and war-theater exposure by education for white Vietnam veterans

| | Schooling | | | | HS graduate status only | | | |
|---|---|---|---|---|---|---|---|---|
| | Vietnam/ Laos/ Cambodia (1) | Combat (2) | Combat or war (3) | Service-related disability (4) | Vietnam/ Laos/ Cambodia (5) | Combat (6) | Combat or war (7) | Service-related disability (8) |
| | | | | A. Birth cohorts 1943-1957 (N=1893) | | | | |
| Dependent variable mean | 0.398 | 0.360 | 0.462 | 0.089 | 0.398 | 0.360 | 0.462 | 0.089 |
| Dep. var. mean for HS dropouts | 0.406 | 0.328 | 0.439 | 0.112 | 0.406 | 0.328 | 0.439 | 0.112 |
| *Regression estimates* | | | | | | | | |
| HS graduate | .021 | .050 | .054 | -.046 | | | | |
| | (.063) | (.063) | (.065) | (.041) | | | | |
| Some college | -.059 | -.010 | -.019 | -.004 | | | | |
| | (.062) | (.063) | (.066) | (.042) | | | | |
| College graduate | -.081 | -.010 | -.044 | -.025 | | | | |
| | (.065) | (.066) | (.068) | (.042) | | | | |
| HS graduate or more | | | | | -.033 | .014 | .004 | -.026 |
| | | | | | (.059) | (.060) | (.062) | (.040) |
| F test p-value for education vars. | 0.039 | 0.294 | 0.071 | 0.185 | 0.584 | 0.818 | 0.950 | 0.621 |
| | | | | B. Birth cohorts 1948-1952 (N=724) | | | | |
| Dependent variable mean | 0.417 | 0.371 | 0.439 | 0.093 | 0.417 | 0.371 | 0.439 | 0.093 |
| Dep. var. mean for HS dropouts | 0.404 | 0.404 | 0.419 | 0.095 | 0.404 | 0.404 | 0.419 | 0.095 |
| *Regression estimates* | | | | | | | | |
| HS graduate | .072 | -.018 | .081 | -.003 | | | | |
| | (.108) | (.107) | (.108) | (.064) | | | | |
| Some college | .025 | -.007 | .029 | .001 | | | | |
| | (.108) | (.108) | (.108) | (.063) | | | | |
| College graduate | -.112 | -.113 | -.100 | -.003 | | | | |
| | (.115) | (.116) | (.116) | (.066) | | | | |
| HS graduate or more | | | | | .014 | -.035 | .022 | -.002 |
| | | | | | (.103) | (.103) | (.104) | (.060) |
| F test p-value for education vars. | 0.078 | 0.461 | 0.088 | 0.004 | 0.893 | 0.736 | 0.834 | 0.000 |

Notes: the table reports OLS coefficients of the dependent variables in the column headings on dummies for education levels and 5-year cohort dummies in Panel A. The sample in Panel B contains only one 5-year cohort group. The omitted education level is HS dropout. Data are from the third Survey of Veterans (SOV-III), conducted in 1987.

Table A1. Proportion Draft-Eligible in the 2000 Census

| | Actual | | | | |
|---|---|---|---|---|---|
| | HS dropout | HS grad or more | All | Theoretical | Difference |
| | (1) | (2) | (3) | (4) | (5) |
| | | | (A) White | | |
| 1948 | 0.5241 | 0.5310 | 0.5303 | 0.5348 | -.0044 |
| | (.0039) | (.0013) | (.0012) | | (.0012) |
| 1949 | 0.5394 | 0.5356 | 0.5359 | 0.5358 | .0002 |
| | (.0039) | (.0013) | (.0012) | | (.0012) |
| 1950 | 0.5279 | 0.5394 | 0.5384 | 0.5376 | .0008 |
| | (.0040) | (.0013) | (.0012) | | (.0012) |
| 1951 | 0.3336 | 0.3401 | 0.3395 | 0.3424 | -.0030 |
| | (.0037) | (.0012) | (.0011) | | (.0011) |
| 1952 | 0.2499 | 0.2605 | 0.2596 | 0.2596 | .0000 |
| | (.0034) | (.0011) | (.0010) | | (.0010) |
| 1953 | 0.2575 | 0.2594 | 0.2592 | 0.2604 | -.0012 |
| | (.0033) | (.0011) | (.0010) | | (.0010) |
| F(6,∞) | 4.77 | 2.85 | 3.74 | - | 3.74 |
| p-value | 0.0001 | 0.0090 | 0.0010 | | 0.0010 |
| N | 109,754 | 1,031,797 | 1,141,551 | | |
| | | | (B) Nonwhite | | |
| 1948 | 0.5413 | 0.5304 | 0.5376 | 0.5358 | .0017 |
| | (.0068) | (.0039) | (.0034) | | (.0034) |
| 1949 | 0.5294 | 0.5395 | 0.5371 | 0.5354 | .0016 |
| | (.0067) | (.0037) | (.0032) | | (.0032) |
| 1950 | 0.5365 | 0.5463 | 0.5440 | 0.5371 | .0069** |
| | (.0066) | (.0036) | (.0032) | | (.0032) |
| 1951 | 0.3362 | 0.3446 | 0.3427 | 0.3417 | .0010 |
| | (.0065) | (.0035) | (.0031) | | (.0031) |
| 1952 | 0.2598 | 0.2666 | 0.2650 | 0.2583 | .0068** |
| | (.0058) | (.0032) | (.0028) | | (.0028) |
| 1953 | 0.2604 | 0.2667 | 0.2653 | 0.2600 | .0053* |
| | (.0058) | (.0031) | (.0028) | | (.0028) |
| F(6,∞) | 0.38 | 3.31 | 2.48 | - | 2.48 |
| p-value | 0.8950 | 0.0029 | 0.0210 | | 0.0210 |
| N | 37,313 | 117,497 | 154,810 | | |

Notes: Columns 1-2 report the fraction draft eligible observed in each cohort by high school graduation status. Column 3 reports the overall fraction draft-eligible. Column 4 reports the theoretical fraction assuming births are evenly distributed within a month. Column 5 reports the difference between the overall empirical proportion draft eligible and the theoretical fraction, with robust standard errors in parentheses. The F-statistic is for a joint test of theoretical and empirical equality for all cohorts.

Table A2. Descriptive statistics by race, veteran status, and wage percentile

| | Wage index percentile | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | <10 | | 10-25 | | 25-75 | | >75 | |
| | Vietnam Vets (1) | Non-Vets (2) | Vietnam Vets (3) | Non-Vets (4) | Vietnam Vets (5) | Non-Vets (6) | Vietnam Vets (7) | Non-Vets (8) |
| | A. Whites | | | | | | | |
| Draft eligibility (by RSN) | 0.520 | 0.393 | 0.537 | 0.361 | 0.550 | 0.381 | 0.588 | 0.404 |
| Age | 49.4 | 49.0 | 49.5 | 48.8 | 49.6 | 49.0 | 49.8 | 49.2 |
| | i. Disability variables | | | | | | | |
| Any disability | 0.346 | 0.400 | 0.259 | 0.268 | 0.208 | 0.169 | 0.146 | 0.103 |
| Work-limiting disability | 0.125 | 0.252 | 0.168 | 0.174 | 0.126 | 0.106 | 0.087 | 0.069 |
| Non-work-limiting disability | 0.131 | 0.147 | 0.091 | 0.094 | 0.082 | 0.063 | 0.059 | 0.038 |
| | ii. Transfer income | | | | | | | |
| Other income (mostly VDC) > 0 | 0.118 | 0.152 | 0.107 | 0.046 | 0.111 | 0.036 | 0.103 | 0.027 |
| SSA income excluding SSI (mostly SSDI) > 0 | 0.077 | 0.104 | 0.047 | 0.053 | 0.032 | 0.026 | 0.019 | 0.013 |
| SSI > 0 | 0.033 | 0.069 | 0.017 | 0.029 | 0.011 | 0.012 | 0.006 | 0.005 |
| Any Federal transfer income > 0 | 0.197 | 0.198 | 0.151 | 0.117 | 0.138 | 0.069 | 0.119 | 0.042 |
| | iii. Specific disability types | | | | | | | |
| Mental (difficulty learning, remembering, or concentrating) | 0.099 | 0.146 | 0.060 | 0.064 | 0.044 | 0.031 | 0.028 | 0.016 |
| Vision or hearing (blindness, deafness, or a severe vision or hearing impairment) | 0.069 | 0.079 | 0.047 | 0.050 | 0.042 | 0.032 | 0.030 | 0.019 |
| Physical (limitation to physical activities such as walking, climbing stairs, reaching, lifting, or carrying) | 0.178 | 0.198 | 0.122 | 0.116 | 0.096 | 0.069 | 0.062 | 0.035 |
| Mobility (difficulty going outside the home alone) | 0.103 | 0.144 | 0.071 | 0.080 | 0.049 | 0.041 | 0.030 | 0.021 |
| Self-care (difficulty dressing, bathing, or getting around inside the home) | 0.045 | 0.067 | 0.027 | 0.032 | 0.020 | 0.016 | 0.014 | 0.008 |
| | iv. Labor market variables | | | | | | | |
| Not working | 0.292 | 0.339 | 0.200 | 0.208 | 0.141 | 0.118 | 0.090 | 0.069 |
| Not in labor force | 0.249 | 0.293 | 0.164 | 0.173 | 0.114 | 0.094 | 0.070 | 0.052 |
| N | 29,851 | 84,736 | 60,671 | 110,788 | 193,623 | 378,708 | 64543 | 218,650 |
| | B. Nonwhites | | | | | | | |
| Draft eligibility (by RSN) | 0.492 | 0.415 | 0.493 | 0.407 | 0.520 | 0.404 | 0.537 | 0.406 |
| Age | 49.1 | 49.0 | 49.3 | 49.0 | 49.5 | 49.0 | 49.6 | 49.1 |
| | i. Disability variables | | | | | | | |
| Any disability | 0.427 | 0.451 | 0.386 | 0.415 | 0.339 | 0.337 | 0.258 | 0.210 |
| Work-limiting disability | 0.265 | 0.277 | 0.235 | 0.257 | 0.214 | 0.219 | 0.167 | 0.143 |
| Non-work-limiting disability | 0.162 | 0.174 | 0.151 | 0.157 | 0.125 | 0.118 | 0.091 | 0.067 |
| | ii. Transfer income | | | | | | | |
| Other income (mostly VDC) > 0 | 0.125 | 0.057 | 0.124 | 0.055 | 0.139 | 0.054 | 0.150 | 0.043 |
| SSA income excluding SSI (mostly SSDI) > 0 | 0.082 | 0.095 | 0.084 | 0.085 | 0.058 | 0.060 | 0.037 | 0.030 |
| SSI > 0 | 0.062 | 0.090 | 0.050 | 0.077 | 0.029 | 0.047 | 0.014 | 0.019 |
| Any Federal transfer income > 0 | 0.233 | 0.216 | 0.225 | 0.195 | 0.198 | 0.146 | 0.181 | 0.084 |
| | iii. Specific disability types | | | | | | | |
| Mental (difficulty learning, remembering, or concentrating) | 0.124 | 0.138 | 0.103 | 0.118 | 0.073 | 0.070 | 0.048 | 0.030 |
| Vision or hearing (blindness, deafness, or a severe vision or hearing impairment) | 0.067 | 0.070 | 0.058 | 0.065 | 0.048 | 0.047 | 0.039 | 0.029 |
| Physical (limitation to physical activities such as walking, climbing stairs, reaching, lifting, or carrying) | 0.211 | 0.203 | 0.173 | 0.179 | 0.150 | 0.135 | 0.111 | 0.073 |
| Mobility (difficulty going outside the home alone) | 0.156 | 0.176 | 0.141 | 0.168 | 0.118 | 0.122 | 0.082 | 0.068 |
| Self-care (difficulty dressing, bathing, or getting around inside the home) | 0.072 | 0.068 | 0.049 | 0.064 | 0.036 | 0.042 | 0.026 | 0.021 |
| | iv. Labor market variables | | | | | | | |
| Not working | 0.480 | 0.513 | 0.417 | 0.480 | 0.306 | 0.360 | 0.195 | 0.198 |
| Not in labor force | 0.409 | 0.445 | 0.358 | 0.410 | 0.254 | 0.302 | 0.160 | 0.142 |
| N | 2,365 | 13,637 | 4,518 | 18,630 | 25, 963 | 51,125 | 12579 | 25,993 |

Notes: Same as the previous table.

Table A3. Estimated Median of the VDC Replacement Rates, by States and by Skill Groups

| | | Replacement rate | Average annual earnings |
|---|---|---|---|
| | | (A) White | |
| Wage index percentile | <10 | .983 | 34556 |
| | 10-25 | .848 | 38412 |
| | 25-75 | .707 | 49458 |
| | >75 | .569 | 65411 |
| Schooling groups | HS dropout | 1.001 | 33382 |
| | HS grad | .828 | 39636 |
| | Some college | .730 | 46604 |
| | College degree | .586 | 63266 |
| | | (B) Nonwhite | |
| Wage index percentile | <10 | 1.226 | 28859 |
| | 10-25 | 1.107 | 32699 |
| | 25-75 | .932 | 35777 |
| | >75 | .731 | 47308 |
| Schooling groups | HS dropout | 1.250 | 29483 |
| | HS grad | 1.001 | 32905 |
| | Some college | .854 | 38036 |
| | College degree | .714 | 48266 |

Note: All states are included, except for DC. N=279,999 for whites and 31,352 for nonwhites. The replacement rate is the reciprocal of the OLS estimate of the coefficient of the state average VDC, for 100% disability or IU, in a regression of annual earnings, without covariates or a constant. The state average VDC with 100% disability/IU is derived from the “Review of State Variances in VA Disability Compensation Payment” (Department of VA Office of Inspector General, 2004).

Table A4. 2SLS estimates of veteran effects by predicted wage and schooling: Non-whites

| | | Disability variables | | | Transfer income | | | Labor Force Status | |
|---|---|---|---|---|---|---|---|---|---|
| | | Any disability | Work-limiting disability | Non-work-limiting disability | Other income (mostly VDC) >0 | SSA income (mostly SSDI) >0 | Any Federal transfer income >0 | Not working | Not in labor force |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | A. By wage index percentile | | | | | | | |
| Veteran status x wage index percentile | <10 | -.102 | -.045 | -.057 | .045 | .026 | .359* | .304 | .333 |
| | | (.235) | (.211) | (.177) | (.120) | (.136) | (.205) | (.242) | (.244) |
| | 10-25 | .007 | .004 | .003 | -.101 | -.026 | -.029 | .114 | .254* |
| | | (.144) | (.128) | (.107) | (.075) | (.083) | (.117) | (.145) | (.147) |
| | 25-75 | -.045 | -.035 | -.011 | .046* | -.034 | .028 | -.051 | -.026 |
| | | (.045) | (.039) | (.031) | (.025) | (.023) | (.035) | (.045) | (.044) |
| | >75 | -.094 | -.072 | -.022 | .049* | -.023 | .007 | .011 | .010 |
| | | (.046) | (.039) | (.029) | (.029) | (.019) | (.035) | (.043) | (.040) |
| | | B. By schooling group | | | | | | | |
| Veteran status x schooling group | HS dropout | -.255 | -.175 | -.080 | -.077 | -.053 | .225 | .227 | .332 |
| | | (.236) | (.209) | (.179) | (.121) | (.141) | (.200) | (.234) | (.240) |
| | HS grad | -.022 | -.027 | .005 | .016 | -.031 | .009 | -.043 | .012 |
| | | (.057) | (.050) | (.039) | (.030) | (.029) | (.044) | (.058) | (.056) |
| | Some college | -.009 | .010 | -.019 | .050* | -.017 | .031 | .002 | .015 |
| | | (.047) | (.041) | (.032) | (.029) | (.022) | (.037) | (.047) | (.045) |
| | College degree | -.081 | -.079 | -.003 | .053* | -.017 | .038 | .063 | .055 |
| | | (.048) | (.041) | (.030) | (.030) | (.019) | (.036) | (.044) | (.041) |

Notes: The same as Table 5. The sample size is 154,810.

Table A5. 2SLS estimates of veteran effect interactions for specific disability types: Non-whites

| | | Disability Type: | | | | |
|---|---|---|---|---|---|---|
| | | Mental (1) | Vision or hearing (2) | Physical (3) | Mobility (4) | Self-care (5) |
| | | A. By wage index percentile | | | | |
| Veteran status x wage index percentile | <10 | -.092 | .177 | -.144 | .035 | .060 |
| | | (.162) | (.123) | (.192) | (.179) | (.120) |
| | 10-25 | .085 | .158** | -.053 | .016 | .052 |
| | | (.098) | (.075) | (.113) | (.110) | (.074) |
| | 25-75 | .023 | .032 | -.012 | -.011 | -.002 |
| | | (.025) | (.020) | (.033) | (.031) | (.019) |
| | >75 | -.004 | -.002 | -.028 | -.013 | .015 |
| | | (.021) | (.019) | (.031) | (.029) | (.017) |
| | | B. By schooling group | | | | |
| Veteran status x schooling group | HS dropout | -.013 | .258** | -.158 | -.042 | .095 |
| | | (.166) | (.126) | (.190) | (.182) | (.125) |
| | HS grad | .011 | .053** | .012 | -.042 | -.007 |
| | | (.032) | (.026) | (.042) | (.040) | (.025) |
| | Some college | .049* | .024 | -.037 | .046 | .012 |
| | | (.025) | (.021) | (.035) | (.032) | (.019) |
| | College degree | .006 | .007 | -.012 | -.006 | .023 |
| | | (.021) | (.020) | (.032) | (.029) | (.017) |

Notes: The same as table 6. The sample size is 154,810.

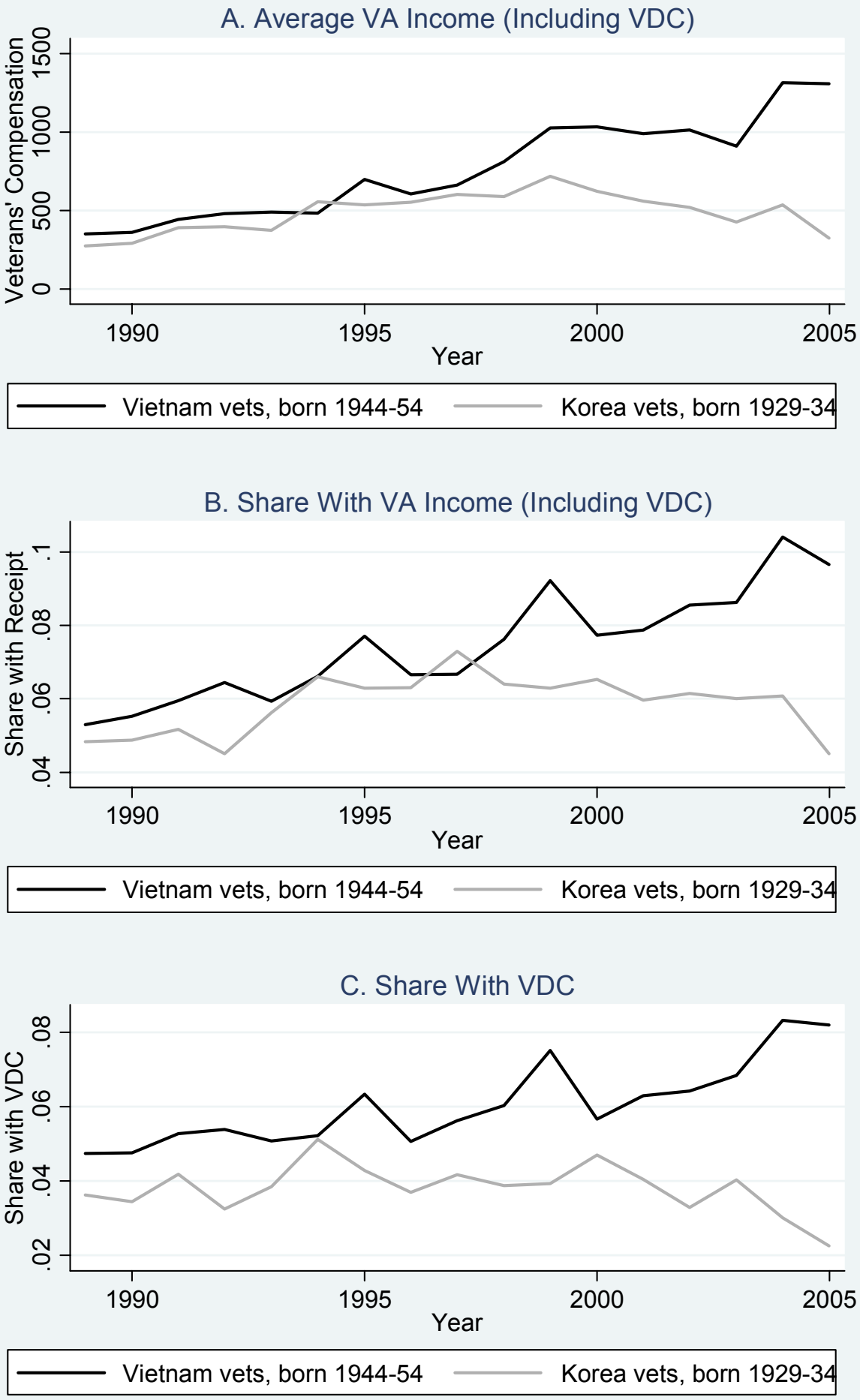



Figure 1. VA Income and Receipt by Year and Service Era

Note: Amounts are in 2005 Dollars. Data are from the March CPS.

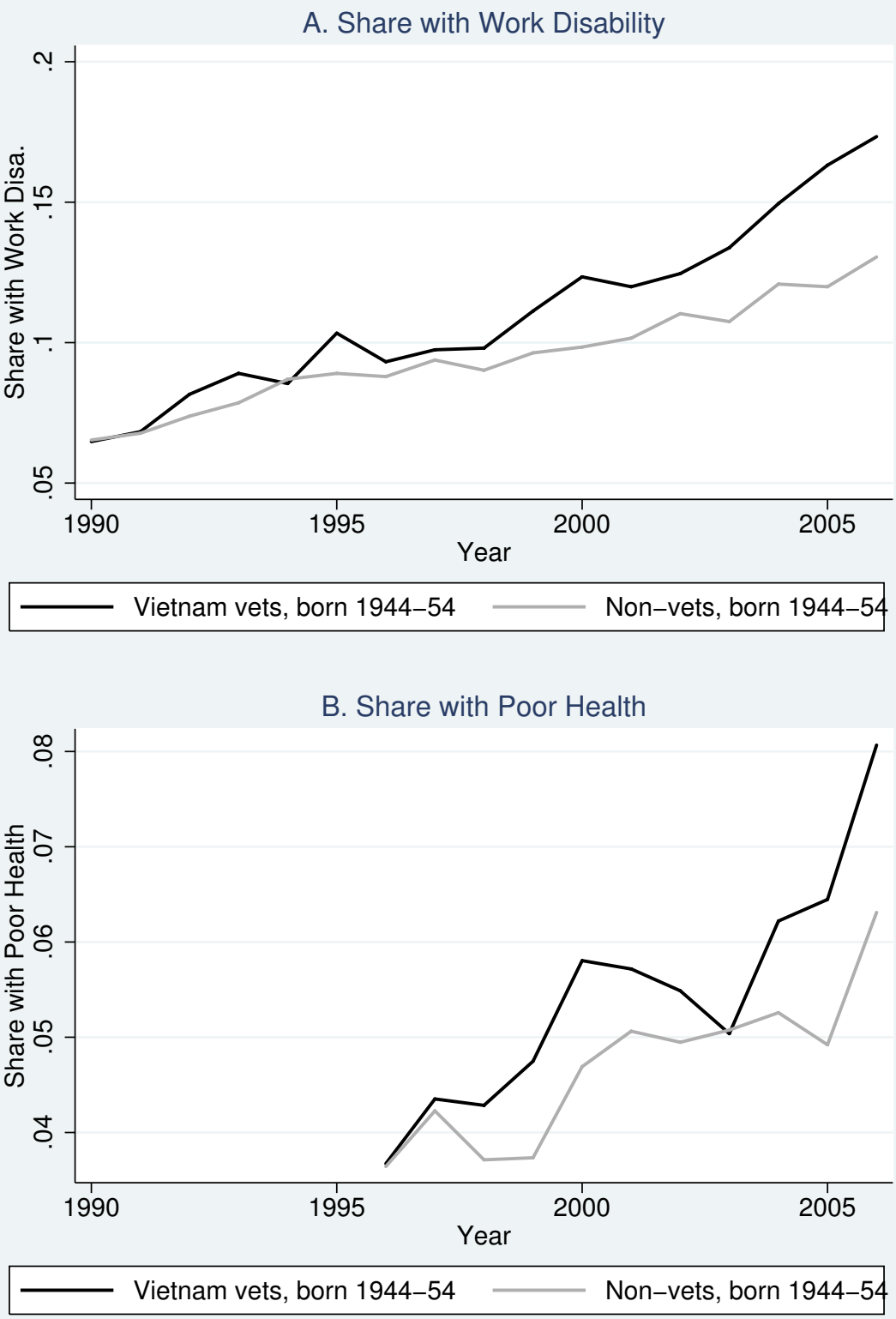
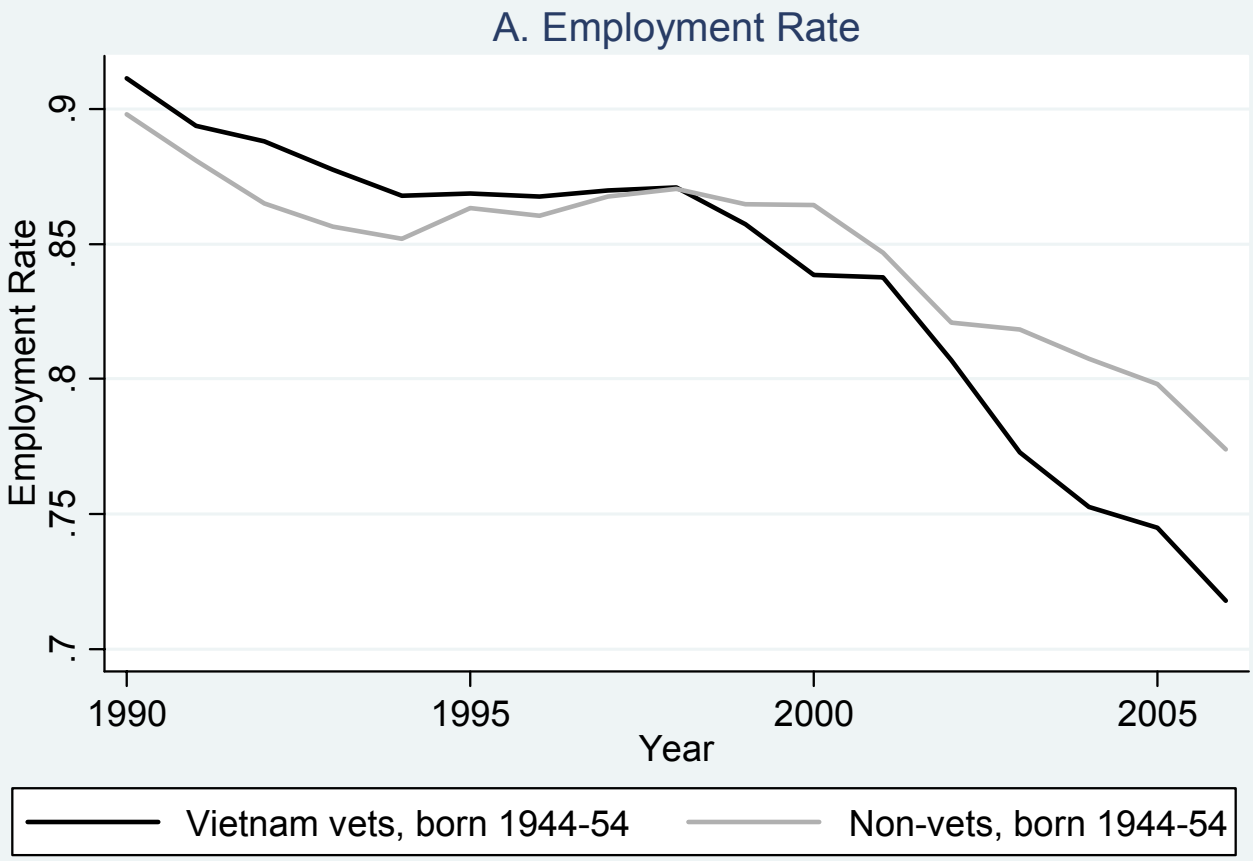



Figure 2. Work Disability and Health by Year and Veteran Status

Note: Data are from the March CPS.



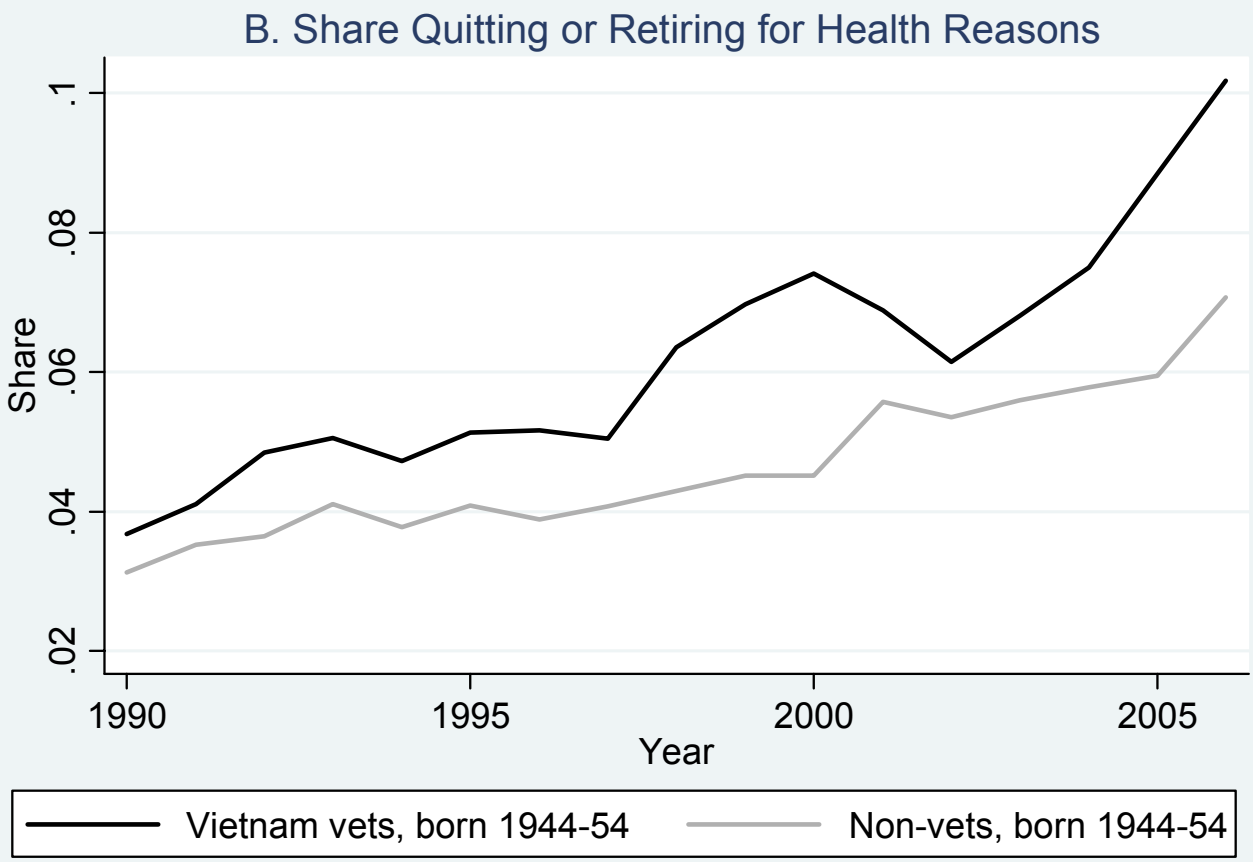




Figure 3. Employment and Health-Related Labor Force Exit by Year and Veteran Status

Note: Data are from the March CPS.