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THE LONG-TERM IMPACT OF MILITARY SERVICE ON HEALTH: EVIDENCE FROM WORLD WAR II VETERANS

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Abstract: In this paper we study the long-term impact of military service on the health of WWII veterans. We address non-random military participation by constructing an instrument for induction using the age-based draft rules in place for men born between 1925-28. Using this instrumental variables approach and data from the 1970-90 censuses, we find that veterans are 5 percentage points more likely to be disabled than non-veterans by their mid 50s. These results are in sharp contrast to cross-sectional comparisons, which suggest a negative association between veteran status and long-term disability. We further document the excess post-service mortality of cohorts with higher WWII participation rates. Similar to our findings for disability, age-specific mortality is higher for cohorts with higher WWII participation, and the differential is increasing with age. Using cause-specific mortality rates, we further show that the excess mortality is largely attributable to lung cancer and circulatory disease, which are generally associated with or exacerbated by smoking. Overall, our results suggest that military service has a substantial impact on long-term health and mortality, and that the progressive worsening of veteran health relative to non-veteran health as the cohort ages may be partly attributable to the early adoption of risky behaviors like smoking.

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1. Introduction

More than 30 million Americans served in the military during World War II, Korea, and Vietnam. Given the sizable fraction of the population involved, there has been substantial interest in the subsequent well-being of wartime veterans. A central component of this interest is the challenging task of finding the appropriate compensation for the returning veterans. For example, multiple studies have attempted to determine the "cost of military service" for the veterans involved.[1] The cost is typically measured by comparing civilian earnings of veterans and non-veterans. In an influential study, Angrist (1990) found that white Vietnam-era veterans earned 15% less than comparable non-veterans, while the results in Angrist and Krueger (1994) provided no evidence of an earnings gap between WWII veterans and non-veterans after accounting for the non-randomness of military participation.

However, military service may also influence the well-being of veterans by affecting their health during and after service. In the years immediately following discharge from the military, veterans are more likely to suffer from health conditions that are detrimental to labor market participation, for example alcohol and drug abuse, depression, and post-traumatic stress syndrome (PTSD).[2] Despite this important progress, there is still considerable uncertainty about causal nature of the relationship between military service and health. With the exception of the influential study of Hearst, Newman and Hulley (1986), most of these health studies are based on research design that do not address the non-random selection of young men into the military and the non-random assignments within the military.[3] Moreover, the long-term health consequences of military service induced by the elevated rates of stress, smoking, and drinking that are typically associated with military experiences remain understudied. This kind of information is extremely important from

[1] See for example Angrist (1990), Angrist and Krueger (1994), Berger and Hirsch (1983), Imbens and van der Klaauw (1995), and Schwartz (1986).

[2] Recent examples include Bullman and Kang (1994), Center for Disease Control (1987), Elder et al. (1997), McFell et al. (1999), Page and Miller (2000), Page and Brass (2001),

[3] Some of these studies are based on comparisons within veteran groups (i.e. combat / non-combat, or POW / non-POW veterans). While this approach may overcome the impact of selection at entry in the military, it does not address the problem of non-random allocation of soldiers within the military. See Elder and Clipp (1989).

a policy viewpoint. If military participation increases the incidence of health conditions that prevent or limit labor market participation, estimates of the cost of military service based on earnings comparisons may considerably understate the true cost of military participation for the veterans involved. Furthermore, analyses of the prevalence of post-service health impairments may also provides unique insight into the impact of early traumatic experiences on the later health, productivity and general well-being of individuals as they age.

The purpose of this paper is to measure the long-term causal effect of military service during WWII on post-service health. Because of the non-randomness of military selection and service, the identification of the causal relationship between wartime service and post-service health is extremely difficult. The military administration selects individuals who satisfy minimum physical and mental aptitude criteria, and at some points in time have also allowed deferments based on college enrollment or marital/dependant status.[4] As a result, differences in health outcomes between veterans and non-veterans may reflect the underlying differences in the characteristics of the two populations instead of the impact of military service on health.[5]

We overcome this selection problem by using an institutional feature of the WWII induction process. Between 1943-47 men born from 1925-28 were drafted in chronological birth order. This fact allows us to construct a set of credible instruments for veteran status for these cohorts of men (see Angrist and Krueger 1994). Using this instrumental variable approach and data from the 1970-90 Censuses of Population, we find that by their early 40s, veterans were 1 percentage point more likely to suffer from work-preventing disability than non-veterans.[6] In contrast, simple regression-adjusted comparisons between veterans and non-veterans indicate lower incidence of work disability among veterans. More interestingly, the causal impact of military service on these disabilities grows from 1 to 6 percentage points as the cohort ages from their early 40s into their early 60s. These results clearly suggest a substantial "age-gradient" in the health production

[4] See Selective Service (1946, 1947). For example Card and Lemieux (2001) find that draft avoidance behavior during the Vietnam War raised college enrollment by 5 percent for men relative to women.

[5] For example Seltzer and Jablon (1974) attributed the lower mortality rates of WWII veterans relative to non-veterans of the same age to the military screening process.

[6] Bound and Burkhauser (1999) document the recent trend in work disability in the United States.

function.[7] This finding is consistent with the notion that wartime service induces unhealthy habits and/or perpetual stress, which leads to a progressive worsening of veteran health relative to non-veteran health as the cohort ages. Not surprisingly, these results for work disability also have a direct analogue in terms of the labor market participation of veterans. Using the same instrumental variables approach we find that at pre-retirement ages veterans have a weaker attachment to the labor force, in particular veterans have lower participation rates, work fewer hours per week and fewer weeks per year.

A similar pattern is also apparent in the mortality rates of men from these cohorts. Using data from the Mortality Detail Files and the Multiple Cause of Death Files, we compute the post-service age-specific mortality rates for men born in the cohorts at risk of serving during WWII and contrast them to the proportion of veterans in each cohort.[8] There is clear evidence of excess post-service mortality among cohorts with higher military service rates. Similar to our findings for disabilities, the excess mortality of cohorts with higher military service rates is also increasing with age. Our cohort-based estimates suggest that a 10 percentage point decrease in the fraction of veterans is associated with 7,000 fewer deaths per 100,000 from the ages of 45 and 70.

Next we turn to the potential explanations for the positive and increasing gap in disability and mortality between veterans and non-veterans. We begin by documenting the higher rates of circulatory and respiratory system conditions among the disabled veterans relative to disabled non-veterans. Moreover, the excess post-service mortality for cohorts with higher rates of military participation is also apparent for specific causes of mortality. Causes that tend to be associated with smoking, like lung cancer and diseases of the circulatory system are more prevalent in cohorts with higher proportions of veterans. In particular, there is a sharp age-increasing difference in mortality due to lung cancer and diseases of the circulatory system between the cohorts with highest and lowest rates of WWII participation. As a specification test, we also compare mortality

[7] Age-gradients have also been documented in the relationship between children's health and household income (see Case, Lubotsky and Paxson 2001 and Currie and Stabile 2002).

[8] The mortality records do not contain veteran status information, so veteran status constrasts cannot be computed.

rates for causes that are likely independent of smoking, such as diabetes and cancers of the digestive system. In these cases, we find little evidence of differential rates of age-adjusted mortality across cohorts have different military participation rates. We argue that the long-run impact of military service on health (as measured by disability and mortality) can be partly attributed to the early adoption of risky behavior like smoking[9]. This contention is consistent with the fact that tobacco was freely distributed to soldiers during WWII.[10] Moreover, our tabulations from the CPS Tobacco usage supplements indicate that WWII veterans are 15 percent more likely to have been smokers than non-veterans from the same cohorts.

Taken as a whole, the findings reported in this paper provide substantial evidence of long-term reduced health, increased disability, lower productivity and premature mortality for World War II veterans. Our estimates indicate that as a consequence of military participation during WWII, an additional 750,000 men had experienced a work-limiting disability by their early 60s. In addition to the reduction in quality of life for the veterans and their families that were directly affected, the implied loss of productivity and increase in medical and disability payments are clearly substantial. Abstracting from work-preventing disabilities, a 5 percentage point increase in the work-limiting disability rate for veterans from ages 40-60 (which is typically associated with a 50 percent reduction in labor force participation),[11] results to $10 billion in lost wages per year for the affected veterans. For a cohort with a military participation rate of 75% (as was prevalent during WWII), this implies a permanent reduction in annual productivity of about 2% between the ages of 40 and 60.

[9] The volume by Gruber (2001) provides an economic analysis of risky behavior among youths.

[10] Until 1975 tobacco was included in the C and K rations provided to soldiers (Department of Health and Human Services 1989). The higher incidence of smoking among vetarans may also be partly attributable by peer-effects on the smoking decisions.

[11] This figure is from our tabulation of the 1980 Census. Acemoglu and Angrist (2001), Burkhauser and Daly (1996) report simular figures.

2. Data Sources and Preliminary Data Analysis

The data for this study are taken from several sources. A data appendix provides more detail on the specifics of each data set. Our main data set is taken from the 1970, 1980 and 1990 Censuses of Population. The initial sample is composed of individuals born in the continental United States between 1920 and 1929.[12] These cohorts had the highest risk of serving during WWII. Table 1 begins the analysis by presenting descriptive statistics for these cohorts at three points in time (1970, 1980, and 1990), corresponding to average to ages 45, 55 and 65.

The Census defines a disability as the presence of a "physical, mental, or other health condition which has lasted 6 or more months, and which limits or prevents a certain type of activity". The work disability question therefore provides important information on the long-term health of individuals.[13] Work disability is reported as either work-limiting or work-preventing, with work-preventing including the less severe work-limiting classification. Table 1 indicates that for men and women born in the 1920s the incidence of work disability increased dramatically from 1970 to 1990. The proportion of men (women) with work-limiting and work-preventing disabilities increased from 0.10 to 0.26 (0.09 to 0.22) and from 0.03 to 0.18 (0.04 to 0.17), respectively. These proportions are similar to those reported elsewhere (see e.g. Bound and Burkhauser (1999) and the references therein) The similar rise in disability across men and women reflects the strong age trend in the disability rates.

In order to determine if these trends are specific to the cohorts born during the 1920s, Table 2 reports the proportion of men and women with working disabilities for a wider range of cohorts (5-year cohorts born between 1915 and 1949). The evidence in Table 2 suggests that the incidence of disability increases with age for all cohorts.[14] Moreover, these figures also document the acceleration of disability rates with age for all cohorts. As such, the rise in disability for the

[12] Observations with allocated values for sex, age, veteran status and work disability are excluded from the sample.

[13] Table 11 presents some evidence confirming this point.

[14] Autor and Duggan (2002) document the rapid increase in the incidence of DI receipt among younger men and women.

cohorts who were at-risk of WWII service does not appear to be a cohort-specific phenomenon.

Figure 1 begins the analysis by illustrating the connection between military participation and post-service health for men born between 1915 and 1939. The horizontal axis identifies the birth year, the right axis is the fraction of veterans in each birth year, and the left axis reports the mean residual by year of birth from linear regressions for the two disability indicators on a smooth age profile and other characteristics.[15] The strong association between the fraction of veterans in a cohort and the average residual disability is apparent from the figure. In particular, the 15 percentage point drop in veteran status between birth years 1926 and 1928 is associated with a 0.006 reduction in residual work-limiting disability for the same cohorts, a 3 standard deviation reduction.[16]

A. Simple comparisons of veterans and non-veterans

Thus far we have documented the general disability age-profile and hinted at a higher disability rate among cohorts with higher rates of military participation. We now turn our attention to exploring the difference between veterans and non-veterans in terms of both health and socioeconomic characteristics. Unless noted otherwise, we classify men who served between 1940 and 1947 as WWII veterans and will use veteran and WWII veteran interchangeably. Table 3 reports the unadjusted difference in means for WWII veterans and non-veterans for the men born in the 1920s. Unfortunately, the veteran / non-veteran disability contrast cannot be computed for 1970 because the disability questions and the veteran status question were asked separately on the two forms used for the 1970 Census of Population. Nevertheless, Table 3 provides interesting evidence regarding health differences between veterans and non-veterans. The entries indicate that veterans are less likely to suffer from work-limiting or work-preventing disabilities by 1-2 percentage points. These unadjusted differences are significant, and remain roughly constant as

[15] These results are based on pooled 1980 and 1990 Census data. All regressions include a quartic in age, years of education, and indicators for state of birth, state of residence, smsa status, race, and current marital status.

[16] The across-cohort standard deviations of the mean residuals for work-limiting and work-preventing disabilities are 0.0021 and 0.0027 respectively.

the cohorts of veterans and non-veterans age from 55 to 65.

While veterans report lower disability rates than non-veterans, it is important to keep in mind that military participation is non-random, and is likely positively selected. The bottom panel of Table 3 provides suggestive evidence. The difference in average socioeconomic indicators between veterans and non-veterans are statistically significant at the 5 percent level for all relevant variables. Veterans are older, more educated, wealthier, and more likely to be white, married and employed. Interestingly, even the labor force participation rate among the work-limited group is higher for veterans, at least in 1980 when the majority of men are still pre-retirement age. The the sign and magnitudes of these differences are consistent with a "positive" selection of veterans from these cohorts. However, some of these socioeconomic characteristics may have been altered after military service (for example educational attainment). As such, one should not push the interpretation of the results in Table 3 as evidence of positive selection too far. Table 4 examines this issue in further detail.

B. Selective service during World War II

The registration and induction process during WWII was regulated by The Selective Service Act, which was enacted in September 1940.[17] The first step of selective service process was the registration of every male U.S. citizen and male alien resident with a local registration office. In total, there were seven draft registrations (only the first six pertained to residents of the continental U.S.) between 1940 and 1947, with different registrations having different age limits defining eligibility. Overall, 48,889,454 men registered during Registrations I-VI.[18]

For each registration, sequence numbers were assigned to determine the order in which men would be called for induction. During the first three registrations, sequence numbers were assigned using "goldfish bowl" lotteries. For the fifth and the sixth registrations the order numbers were determined by chronological birth dates, with the older individuals in the local

[17] Angrist and Krueger (1994) provide a similar account of the selective service process during WWII.

[18] Of those 14,369,325 were not liable for military service because of age restrictions. See Selective Service (1955).

pool of available registrants being called first for induction.[19] Each local office met their specific quotas by running down the list of available registrants based on the sequence numbers. Once an office filled the quota, the remaining men on the registrant list were not at risk of induction until the next call (typically 1 month later). second step of the selective service process was the classification of registrants. There were 18 classes in which registrants could be placed, among 3 global categories: (1) awaiting induction (classes I-A and I-A-O); (ii) deferred; and (iii) physically, mentally, or morally unfit for military service. The classification was done mainly at local draft boards and was based on questionnaires and physical examinations. Approximately one-third of the registrants subjected to the examinations were found to be unfit.[20] The final step of the process was the induction of men in classes I-A and I-A-O. About 10 million men were drafted and 4.5 million men volunteered during the WWII period. Adding these men to the existing military personnel, more than 16 million men participated in WWII in total.

As a consequence of the selective service process, and in particular of the physical and mental selection criteria, only men with sufficient potential were at risk of being drafted, in other words there was "positive" selection.[21] Consequently, veteran status is not randomly assigned for these cohorts. Table 4 provides some evidence on the extent of positive selection into military of men born during 1920-29. The data reported in Table 4 are from the 1973 Occupational Change in a Generation (OCG), which is described in the data appendix. We compute contrasts based on veteran status for the cohort of men at risk of serving during WWII (birth years 1920-29). The main advantage of the OCG is that it provides family background and other pre-military characteristics for these cohorts. The positive selection of men into the military during WWII is apparent from this table. For example, veterans have better-educated parents and fewer siblings. In addition, the *pre-military* educational attainment of veterans is larger than the *ever-completed* educational attainment of non-veterans by 1.5 years. In fact, all veteran/non-veteran

[19] No order numbers were assigned for the fourth registration since it included men aged 45-65 who were not liable for military service (see Selective Service (1945) p70). At each registration, delinquents and volunteers were called first, followed by non-volunteers. The sequence numbers for induction only pertained to non-volunteers.

[20] See Shapiro and Striker (1970) p. 416.

[21] On the other hand, deferments based on occupational status and school enrollment may have reduced the extent of positive selection.

differences are statistically significant (except the fraction born in the south). Taken as a whole, the evidence in Table 4 clearly shows that WWII military induction was non-random. Therefore, the differences in work disability reported in Table 3 are likely confounded by positive selection bias, even after adjusting for differences in observable characteristics.

3. Research Design.

The evidence provided in Tables 3 and 4 clearly show that the causal impact of military service on later health cannot be assessed from simple cross-sectional comparisons. Fortunately, because of the nature of the selective service process for some of the cohorts at risk during WWII, credible instruments for veteran status can be constructed. During the second part of the Sixth Registration, held between January 1943 and October 1947, men in class I-A and I-A-O in the local registrant pools were drafted in chronological birth order. As part of the Sixth Registration, men had to register with their local draft board on the day of their eighteenth birthday. Consequently, men born between January 1925 and March 1929 had to register for the Sixth Registration. Moreover, voluntary enlistments were prohibited during this period ruling out non-random volunteering. Therefore, we follow the empirical strategy of Angrist and Krueger (1994) and use birth dates to derive a set of instrumental variables for veteran status for these cohorts.

Figure 2 displays the fraction of veterans by quarter of birth, for men born over the 1915-1949 period.[22] There is substantial variation in the proportion of veterans across birth years and quarters, following the war efforts in WWII and Korea. This figure also illustrates the relationship between quarter of birth (the census does not provide exact date of birth) and the probability of service for the cohorts at risk during the Sixth Registration (birth years 1925-1928). First, the fraction of WWII veterans falls from 74 percent for men born in 1925 to 30 percent for men born in 1928. Examining induction rates by quarter of birth further reveals substantial differences in

[22] Figure 1 is based on data from the 1980 Census of Population.

veteran rates even from quarter-to-quarter. More specifically, the WWII veteran rate rises from the first quarter of the 1925 birth cohort through to the first quarter of the 1926 birth quarter, remains level for four quarters and then declines through the end of the 1928 birth cohort. This pattern reflects the fact that inductions peaked in 1943 and declined thereafter. Table 1 in the appendix provides the complete set of sample proportions, along with the F-statistics for testing the equality of the proportion of veterans across quarters of birth.

Date of birth is a valid instrument for studying the impact of military service on later health if two requirements are satisfied. First, birth dates must be correlated with the probability of service. Figure 2 and Table 1 in the appendix clearly show this to be the case. Second, date of birth must be uncorrelated with the unobserved determinants of health/disability. This requirement involves unobservables and therefore is not directly testable. However, if birth dates are randomly distributed in the population and independent of unobserved health determinants, pre-military characteristics–the variables observed at the time of selection for military service–should be balanced for different values of the instrument.[23] Table 5 provides comparisons of pre-military characteristics by birth year/cohort. Using OCG data, we calculate the sample means of these variables for birth years 1925-28, and test the hypothesis of equality across year of birth and across year and quarter of birth interactions (i.e. across the 16 interactions). The top panel reports the fraction of WWII veteran by cohort. The middle panel reports average age at induction and length of service for the veterans of these cohorts. Finally, the sample means of the pre-military characteristics for the four cohorts are reported in the bottom panel. The last two column report the F-statistics testing the equality of means across the 4 year of births, or across the 16 year of birth*quarter of birth cells for these 4 cohorts. As it can been seen in the table, the mean of pre-military characteristics are not statistically different across the 4 year of birth (the F-statistics are always below the 5 percent critical level). The same result is obtained when comparing the means of the covariates across the 16 year of birth*quarter of birth cells . This is what should be expected if birth dates were randomly distributed. Consequently, Table

[23]See Angrist and Krueger (1999) page 1302 and Angrist, Imbens and Rubin (1996).

5 provides no evidence against the null hypothesis that year of birth is unrelated to unobserved health determinants.

Based on these results, our baseline instrument for military service for birth years 1925-28 is *year of birth* (approximated by census year–age–1) [24]. This choice is dictated by the absence of quarter of birth information in the 1990 public-use census files. The shortcoming of this measure is that those born in the first quarter of the year are assigned to the birth year that follows their actual birth year. As such, we also use two alternative instrument definitions. The first alternative instrument uses the available quarter of birth information for 1970 and 1980 to properly assign individuals to year of birth and randomly moves 25 percent of each age to the following birth year in 1990 since actual quarter of birth information is unavailable. We refer to this instrument as adjusted year of birth and the baseline instrument as unadjusted year of birth.[25] As a third approach, we use quarter of birth directly for 1970 and 1980. We evaluate the robustness of our results these different definitions in section 5.

4. The Impact of Military Service on Post-Service Health.

Our investigation of the impact of military service on post-service health (as measured by work disability) begins with a simple linear probability model. Let y_{ic} be an indicator for the presence of a disability for person i, born in cohort c. Suppose that disabilities and veteran status are related in the following way:

$$y_{ic} = \beta V_{ic} + x'_{ic}\gamma + \varepsilon_{ic} \qquad c = 1925, 1926, 1927, 1928 \tag{1}$$

where V_{ic} is a veteran status indicator (=1 if WWII veteran), x_{ic} is a vector of observable determinants of health (including an intercept), and β is the causal effect of veteran status on

[24] One is subtracted because census data is as of April 1 of the interview year.

[25] The samples will differ slightly depending on which measure of year of birth is used. Table 2 in the appendix reports the sample means when the adjusted and unadjusted year of birth measures are used to form the samples. The differences between the two samples are trivial.

health. In all cases the model is estimated separately for each census year. As such, we allow the impact of veteran status β to be time-varying: as the cohorts age, the effect of military service on post-service health may change. A time-changing impact of veteran status on post-service well-being might arise because wartime service causes direct health impairments or induces unhealthy habits and/or perpetual stress, which may lead to a progressive worsening of veteran health relative to non-veteran health as the cohort ages.

It is important to note that this simple model for disability excludes cohort effects. This restriction is dictated by our research design: the cohorts we consider were born in a narrow interval (the maximal age difference is four years), there are only 3 cross-sections of data, and we focus on a (potentially) time-changing causal effect.[26] In Tables 8 and 9 we relax this assumption.

A. OLS and Probit estimates of the impact of military service on post-service health

As a starting point, Table 6 presents the OLS estimates of the impact of military service on the incidence of work disabilities for men born between 1925-28, based on the sample for the adjusted year of birth. Since the dependent variable is binary, these correspond to linear probability models. Because of the design of the 1970 Census of Population, OLS estimates cannot be computed using these data (see section 2). Row 2 displays the unadjusted difference between veteran and non-veteran work-limiting and work-preventing disabilities. By their early 50s, the veterans are 1.3 (1.2) percentage points less likely to be work-limited (work-prevented). As the cohort ages into their early 60s (in 1990), the differential between veterans and non-veterans grows to -1.4 (-2.1) percentage points for work-limiting (work-preventing) disabilities. Rows 3 and 4 add a set of controls for race, years of education, current marital status, smsa status, state of birth and state of residence. The estimates are LPM and probit marginal effects evaluated at sample means of the variables. As it is apparent from rows 3 and 4, controlling for differences

[26] Controlling for age or cohort effects and allowing for a time-changing causal impact is difficult here since there are only 3 cross-sections of data. The problem is that each "age" is observed only once in the data. With multiple cross-sections a smooth age profile could be easily included in the model.

in observable characteristics among veterans and non-veterans essentially reduces the estimated impact of military service on post-service disability to 0. Based on these results one would erroneously conclude that there is no difference in the long-term health of veterans and non-veterans.

B. Basic TSLS estimates of the impact of military service on post-service health

Because of the selective service process in place during WWII, veteran status is likely correlated with the unobserved determinants of health (i.e. V is positively correlated with ε). In this case, OLS estimates of β, like those reported in Table 6, will be biased because of omitted-variable bias. A standard solution to this problem is to rely on instrumental variables, i.e. a causal determinant of veteran status that can be rightfully excluded from the equation for health outcomes. Following the discussion of the induction rules during the Sixth Registration, we begin by using indicators of year of birth as such instrumental variables. Consider the following first-stage equation determining veteran status:

$$V_{ic} = 1(\pi_0 + \sum_{c=1925}^{1927} Z_{ic}\pi_1 + x'_{ic}\pi_2 + u_{ic} > 0) \tag{2}$$

where Z_{ic} is a birth cohort indicator, corresponding to each cohort at risk for drafting during the second part of the Sixth Registration (birth years 1925-28). Table 7 presents a first set of IV estimates of the impact of military service on disability for the birth years 1925-28 in 1970, 1980 and 1990, corresponding their early 40s, 50s and 60s, derived from three instrument definitions. In the left panel we use year of birth dummies derived from the "unadjusted" measure of birth year. In the middle panel we use birth cohort dummies derived from the adjusted year of birth, and finally in the right panel, we use a set of 15 dummies corresponding to each possible quarter of birth between 1925, quarter 1 to 1928, quarter 3. We refer to this set of instruments as the "quarter of birth" instruments.

We begin by reporting TSLS estimates[27]. This approach has been showed to provide similar results to bivariate probit estimates in the context binary response variable with binary endogenous regressors and instruments (see Angrist 1991, 2001).[28] Rows 1 and 2 present the "Wald" (unadjusted TSLS) and the TSLS estimates of the impact of military service on work-limiting disabilities using unadjusted year of birth, adjusted year of birth and quarter of birth as the instrumental variables.[29] Rows 3 and 4 report the same results for work-preventing disabilities. Since the disability and veteran status questions are on separate forms in the 1970 Census, we use two-sample instrumental variables (TSIV) estimator of Angrist and Krueger (1992) for that year.

There are several points to note. First, the three set of instruments indicate that year of birth (or quarter of birth) is an important determinant of the probability of military service, as indicated by the large first-stage F-statistics reported at the bottom of Table 7 (all the p-values are smaller than 0.001). Second, for all ages and disability types the TSLS estimates of the health-impact of military service are substantially larger than the corresponding OLS estimates. Using a Hausman test, the null hypothesis that the difference between all TSLS and OLS coefficients is only due to sampling error is easily rejected at conventional levels (all p-values are smaller than 0.001). The large and positive difference between the TSLS and OLS point estimates is consistent with our earlier contention that cross-sectional comparisons of veteran status and disability rates will understate the true the impact of military service on post-service disability, because of the positive selection of young men into the military during WWII.

The entries in Table 7 provide clear evidence that WWII participation is associated with higher long-term disability rates at all ages from 40 onwards. At all ages veterans are more likely to suffer from work disability than non-veterans. Irrespective of the set of instrumental variables used, all the points estimates in Table 7 are statistically significant at the conventional

[27] The full set of reduced-forms and first-stage equations underlying the TSLS estimates are reported in Table 3 in the appendix.

[28] In Appendix Table 3 we also report estimates from bivariate probits.

[29] All models are estimated separately for each census year and include controls for race, years of education, marital status, smsa status, and unrestricted dummies for state of birth and state of residence.

levels. Moreover, the extent of excess disability among veterans is age-increasing. For example, the figures in the middle panel (derived from the adjusted year of birth instrument) indicates that at age 40 veterans are approximately 5 percentage points more likely to have a work-limiting disability and 1 percentage points more likely to suffer from a work-preventing disability. By age 60, these figures are up 7 and 6 percentage points respectively, with most of the increase in disability occurring between the ages of 50 and 60 (i.e. between 1980 and 1990).

In the appendix we also report bivariate probit estimates from the same specifications. Because of the data limitations of the 1970 Census, we only report estimated average treatment effects for 1980 and 1990. The point estimates of the effect military service on disability, as well as the estimated correlation between the unobservables in the military participation and disability outcome equations are reported in Table 4 in the appendix. The estimated excess disability rates among veterans are essentially the same as those reported in Table 7. Again, the disability gap between veterans and non-veterans increases with age. The estimated correlation coefficients are negative and very precisely estimated, ranging from -0.15 to -0.11, with standard errors ranging between 0.01 and 0.02. These results provide quantitative evidence of "positive" selection into the military: the unobservable determinants of military participation are negatively associated with the unobservable determinants of disability.

Finally, we discuss the over-identification tests. For the models reported in Table 7, the excluded instruments consist of 3 birth cohort dummies, or 15 quarter-of-birth dummies. Therefore each model is over-identified by either 2 or 14 degrees of freedom. For both disability outcomes we report the GMM over-identification test statistics for tests of validity of the over-identified instruments. Interestingly, in the work-limiting disability models, the null hypothesis of orthogonality is rejected at the conventional level (with the exception of the right panel). For work-preventing disability models, we fail to reject the null hypothesis of orthogonality in all cases.

C. Impact on labor supply outcomes

A simple extension of the analysis in Table 7 suggest to examine the labor market participation outcomes of veterans and non-veterans born in the late 1920s. If military participation increases the odds of work disability conditions among veterans, then weaker attachment to the labor market should be observed for this group. We view this type analysis as providing confirmatory evidence to the results in Table 7. However, because of the positive selection of men in the military during WWII, cross-sectional comparisons of labor market outcomes between WWII veterans and non-veterans will tend to overstate the impact of military service, as noted by Angrist and Krueger (1994). Therefore we use the same instrumental variables approach as in section 4.B.

Table 8 reports OLS and TSLS estimates of the impact of military service during WWII on labor supply outcomes for the cohorts born 1925-28. We report the results for 1970 and 1980 only (corresponding to the ages of 40 and 50), since at later age of 60 the labor market attachment of these cohorts is much weaker.[30] We focus on 3 labor supply outcomes: labor force participation, hours worked per week, and weeks worked last year. The first row displays OLS estimates of the veteran / non-veteran difference in the labor supply outcomes. With the exception of hours worked per week, the OLS estimates indicate that veterans have "stronger" attachment to the labor force (i.e. higher participation rate, and work more weeks per year). The TSLS estimates reported in row 3 indicate that the OLS estimates may overstate the true impact of military service on future labor market attachment. The IV estimates indicate that once selection is accounted for: (i) veterans have lower labor market participation rate; (ii) work fewer hours per week; and (iii) work fewer weeks per year. The magnitude of the points estimates is significant. For example, at age 50 (in 1980), veterans work 2 fewer per weeks and 2 fewer weeks per year on average. All but one of the IV are significant at the conventional level. Interestingly, the results suggest that the impact of military service on post-service labor force attachment is becomes

[30] Approximately half of these men had left the labor force by age 60. See Table 3.

more pronounced as the overall cohort ages.

D. Alternative estimates of the impact of military service on post-service health

A potentially important limitation of the estimates reported in Table 7 is the absence of cohort effects in the health equations. While the cohorts included in the sample are born in a narrow range (with a maximal age difference of four years), limiting the potential for important age-driven differences across cohorts, an examination of the robustness of the results to this identifying restriction is desirable. In the absence of repeated cross-sectional data set with overlap of age observations across cohorts, the most obvious approach is to examine adjacent birth year pairs. Restricting attention to adjacent birth years reduces the potential for large confounding age effects in our estimates.

The first two blocks of columns in Table 9 report the IV estimates for work-limiting and work-preventing disabilities for the 3 adjacent year pairs. First, we describe the results in column blocks 1 and 2. These are derived from binary year of birth instruments. Given the similarity of results across instruments in Table 7, we only report here the estimates using adjusted year of birth. In general the results of this more disaggregated analysis are consistent with those reported in Table 7. As one would expect, given the near identical WWII participation rates for men born in 1925 and 1926, the point estimates for veteran status are hugely inflated when comparing only these two years. In all three years of our samples, the difference in the proportion of WWII veterans between the 1925 and 1926 cohorts ranges between 1-2 percentage point (Table 5 in the appendix reports the full set of first-stage equations). Therefore, even small differences in disability rates across the 1925 and 1926 cohorts are magnified by the TSLS/Wald estimator since the magnitude of the denominator is in the 50-100 range. This phenomenon is also indicated by the small first-stage F-statistics associated with the excluded instruments (reported under the point estimates in row 2), ranging from 4.6 to 35.6. Based on this we disregard the estimates from row 2 as being uninformative.

By comparison, for the other birth cohort contrasts, the differences in fraction of veterans ranges from 10-30 percentage points, with associated F-statistics ranging from 70.2 to 12,147.7. For both the 1926/27 and 1927/28 comparisons, reported in rows 3 and 4, the IV estimates indicates that WWII participation significantly increase the disability rate, and for work-preventing disabilities there is evidence of an age-increasing, as was previously reported in Table 7. A comparison of the magnitude of the point estimates in rows 3 and 4 is also informative. Typically, the estimates based on the 1927/28 comparison are smaller than the estimates from the 1926/27 comparisons, by magnitudes of 1/5 to 1/6. Examination of the reduced-form and first-stage results (which are reported in Table 5 of the appendix) suggests that this phenomenon is explained by the large differences in military participation between the 1927 and 1928 cohorts. In contrast, the reduced-form estimates of the effect of year of birth on disability are quite stable.

The last block of columns in Table 9 adds indicators for adjusted year of birth to equation (1) and uses interactions of year of birth and quarter of birth as the excluded instruments. As such, the empirical strategy here is to rely only on within year of birth variation in disability rates and in military participation. By using within year of birth variation to identify the effect of military service on disability, we can gauge the importance of the potentially confounding effect of omitted cohort effects in our baseline models of Table 7 and Table 9 (column blocks 1 and 2). However, this specification is also more demanding for the data. Due to data limitations we only estimate this specification using the 1980 data.[31] While the point estimates are quite noisy, the estimated veteran disability premium is positive in all cases, consistent with the previously reported evidence.

As a final attempt to isolate the impact veteran status from age we use the data from the National Health Interview Survey (NHIS). Unfortunately, the definition of disability in the NHIS differs from that in the Census in two important ways. First, it simply asks if activity is limited, and does not specify a duration of at least six months. Second, the activity limitation definition refers to the 'major' and 'other' activities which is not particularly well defined. Given this

[31] Quarter of birth information is not available in the public-use files of the 1990 census, and the public-use files of the 1970 census do not provide a sufficient number of observations to estimate this model precisely.

we define a person as activity limited if they report any activity limitation. The benefit of the NHIS is that it provides annual data from 1982-96 for veterans and non-veterans aged 55-69 who were born between 1925-28. With 15 cross-sections we can control for age. In fact, the NHIS allows us to construct actual age in months as it reports the month of birth and the month of the interview.

Table 10 reports the TSLS estimates for the causal impact of veteran status on activity limitations. All models include indicators for survey year, black, married, SMSA residence, region of residence, and a continuous measure of education. Similar to Table 7, the column one uses year of birth as the instrument and column 2 uses quarter of birth. Neither of these specifications controls for age. In both cases, the estimated veteran disability premium is approximately 9 percentage points. As the average age of the NHIS sample is 62, these results are fairly similar to the work-limiting results for the 1990 Census. The third column, adds the year of birth to the controls in the disability equation and uses the interaction between year and quarter of birth as the instrument vector. While the estimated causal effect is substantially larger, the standard errors are also quite large, the 95 percent confidence interval spans a 5-30 percentage point difference between veterans and non-veterans. Finally, column four adds a quadratic function of age (in months) to the list of variables in the disability equation and uses quarter of birth as the instrument. Adding the quadratic in age reduces the point estimate from 0.095 to 0.050, but it is still significant at the conventional level. Overall, these results add strength to the contention that the causal estimates based on Census data are not entirely confounded by omitted cohort effects.

D. Health conditions associated with work disability

Taken as a whole, the evidence in Tables 7-10 indicates that military service substantially increases the incidence of disabilities among veterans. In this section, we investigate the medical conditions associated with work-limiting and preventing disabilities. In order to evaluate the correlates of disability, we need information on the health conditions of individuals and a measure of work disability that is consistent with the Census definition. This requirement rules out the National Health Interview Survey since it does not have comparable information on work disabilities. Fortunately, the 1976 Survey of Income and Education provides such information.[32] Using these data, we first select the cohorts of men and women at risk of serving during WWII (born 1925-28). Then we calculate the incidence of various health conditions and disorders among individuals <u>with</u> work-limiting and work-preventing disabilities. For both types of disabilities, we break down the figures for male veterans and non-veterans, as well as for the overall population of men.

Table 11 shows the results of our analysis. First we note that the major correlates of work-limiting disabilities are arthritis, back/spine conditions, and heart conditions. The same conditions are also associated with work-preventing disabilities, which in addition are also explained by respiratory disorders, nervous system conditions, and crippled conditions. As the table shows, there are some noticeable difference between veterans and non-veterans for these cohorts. On the one hand disabled veterans are more likely to be affected by heart conditions and respiratory system conditions (at least among men with work-preventing disabilities) than disabled non-veterans. On the other hand, disabled non-veterans have higher rates of blindness, mental retardation, and are more likely to be crippled. One explanation for this is perhaps the positive selection at military entry. While this evidence is at best suggestive, Table 11 indicates that the negative health-impact of military service documented in Tables 7-10 can be attributed to post-service health impairments, in particular heart and respiratory conditions, as opposed to service-related injuries.

5. Cohort Differences In Overall And Cause-Specific Mortality

If military service truly contributes to a higher incidence of detrimental health conditions among veterans, then in the long-run a mortality rate gap between veterans and non-veterans should be

[32] The Survey of Income and Education was administered by the Census Bureau as a supplement to the Current Population Survey. See the data appendix.

observed. Moreover, if the causal effect of veteran status increases with age, then age-increasing excess mortality should also be evident. Figure 3 provides some evidence on this point. We use the published mortality rates (per 1000) from the Human Mortality Database at UC Berkeley (http://www.mortality.org). The data is available for the years 1959-1999. During those 40 years, we can track the cohorts who served during the Sixth Registration of WWII. Since the mortality records do not provide information on the veteran status of individuals, we cannot compute the veteran / non-veteran differences in death rates. The proportion of veterans, however, varies greatly by year of birth for the cohorts who were at risk of serving during WWII. Therefore if military service has a negative impact on post-service health, excess mortality should be apparent for the cohorts with a higher proportion of veterans. For example, there should be excess age-adjusted mortality in the cohort born in 1926 relative to 1928, since men born in 1926 had higher WWII participation rates (0.74 vs. 0.31, a difference of 43 percentage points). However, as Table 6 in the appendix reports, 40% of the men born in 1928 served in Korea, while only 13% of the men born in 1926 served in Korea. As a consequence, the overall difference in the proportion of veterans between the 1926 and 1928 cohorts is only 14 percentage points (0.79 vs. 0.65). Nevertheless, the higher military participation rate for the 1926 cohort should translate into higher age-adjusted mortality rates relative to the 1926 cohort. As a specification test, we also compute the 1924-1926 difference in mortality rates (two cohorts with similar proportion of veterans: 0.77 for the 1924 cohort and 0.79 for the 1926 cohort).[33] Therefore, since the proportion of veterans among men born in 1924 and 1926 is essentially the same, small differences in their respective mortality rates should be expected.[34]

Figure 3 presents the results of this analysis. The black line represents the difference in the age-specific mortality rate (per 1000) of men born in 1924 and in 1926, at each age between 35 and 70.[35] The starred gray line displays the same difference in age-specific mortality rates,

[33] The cohort of men born in 1930 could also provide a valid comparison cohort. We elected not to use this cohort since most of its veterans are from the Korean war.

[34] We also chose the 1924 cohort as a comparison cohort for 1926 in order to keep a two year age difference between the cohorts.

[35] These differences are smoothed using an MA(3) filter in age.

for the cohorts born in 1926 and 1928. The patterns in Figure 3 are consistent with the main conclusions from Tables 7-9: At all ages, men born in 1926 have higher death rate than men born in 1928. Moreover, the excess mortality rate (per 1000) of the 1926 cohort increases with age, from essentially 0 at age 35 to 1.75 at age 70. As expected, there is little evidence of age-increasing difference in the mortality rates of cohorts in 1924 and 1926 (the maximal difference is 0.75 deaths per 1000). This provides clear evidence of age-increasing excess mortality in cohorts with higher military participation rates.

One caveat of the HMD data is that information on cause-specific mortality rates is not available. We calculate the mortality rates per 1000 of white men born in 1924, 1926, and 1928 using the Mortality Detail Files, the Multiple Cause of Death Files (covering the years 1968-1999), and the Census yearly population estimates for these birth cohorts. Figure 4.A reproduces the analysis of Figure 3 with these data. Clearly, the same patterns and differences in age-specific mortality rates for the 1924, 1926, and 1928 cohort are found. In this case, the excess mortality of white men in the 1926 cohort increases from 0.10 to 2.00 per 1000 between the ages of 45-70. Figures 4.B-4.E examine the specific causes of excess mortality in cohorts with higher rates of military participation. In Figure 4.B we show the difference in age-specific mortality rates due to diseases of the cardiovascular system (ICD-9 codes 390.0-459.0, mostly myocardial infarctions). The evidence for this mortality cause is also suggestive of excess mortality in the 1926 cohort that is increasing as the cohort ages relative to the 1928 cohort (from 0.25 to 1.20 deaths per 1000). To a lesser degree the 1924-1926 difference is also augmenting with age.

Figure 4.C displays cohort differences in mortality due to neoplasms of the respiratory system (ICD-9 codes 72.0-74.0, mostly lung cancers). The patterns are striking: the 1926-1928 differential is positive and increasing with age, especially between the ages of 60 and 75, from 0 to 0.3 death per 1000 lives. These differences have a direct correspondence to the fraction of each cohort serving in the military: the 1926 cohort has highest participation rate at 79%, followed by the 1924 cohort at 77% and the 1928 cohort at 65%. For each of the two differences displayed in Figure 4.C, the 1926 cohort has higher rates of lung cancer mortality. Multiple series of evidence

support a causal relationship between smoking and lung cancer mortality or mortality due to cardiovascular failures (see e.g. Department of Health and Human Services 1982, 1983).[36] In what follows we argue that this excess mortality associated with lung cancer and diseases of the circulatory system reflects in part military-induced smoking behavior.

The excess age-specific mortality attributable to lung cancer and heart conditions for the cohort with the higher military participation rate suggests that veteran status may be a mediating variable for smoking behavior. If this is true then we should be confident about our assertion that an important component of the post-service health impact of military service stems from smoking behavior encouraged by military service. Table 12 presents evidence on the differential smoking behavior of veterans and non-veterans. The data are from the CPS Tobacco Usage Supplements (see the data appendix for more details). Throughout we focus on the cohorts at-risk of serving during the Sixth Registration, i.e. the men born in 1925-1928, and given the timing of the Tobacco supplements, these cohorts are observed between the ages of 56 and 74. The first row of Table 12 shows the proportion veterans and non-veterans who smoked at least 100 cigarettes in their lives. From these cohorts, 74 percent of veterans reported having smoked at least 100 cigarettes, while the corresponding figure for non-veterans is 62 percent. The regression-adjusted difference is 0.144 and precisely estimated (std error=0.01).[37] The remaining entries of Table 11 further characterize the differential smoking behavior induced by military service. First, veterans from these cohorts started to smoke half a year younger (p-value=0.001). Moreover, these veterans remain more likely to be current smokers and consume 1 additional cigarette per day, relative to non-veterans. Note that these last two contrasts are not statistically significant however. Nevertheless, the results in rows 1 and 2 confirm the role of military service in inducing smoking behavior and early adoption of smoking.

As a specification test we report age-specific mortality differentials based on causes that are likely independent of smoking. This is important since the lower age-specific mortality of the

[36] In addition, Carmelli and Page (1996) present identical twin pair contrasts of smoking and mortality and conclude that smoking elevates mortality risks by 2.5 relative to not smoking.

[37] The regressions include a quadratic in age, as well as controls for race, education and marital status.

1928 cohort could in principle also be attributable to an idiosyncratic cohort effect, and not to lower military participation (and hence lower smoking incidence). If the men born in 1928 had better health dispositions than men born in other cohorts independently of lower military service rates, then lower age-adjusted mortality rates should also be expected for causes like neoplasms of the digestive system and diabetes. We chose these 2 causes since they the most important "natural" causes of death for these cohorts that are likely independent of tobacco consumption. Other common mortality causes like chronic obstructive pulmonary diseases, pneumonia, and strokes have been linked to smoking behavior. Figures 4.D and 4.E provide no evidence against the hypothesis that the 1926 and 1928 cohorts are comparable on all dimensions, except the military participation rates: Both figures indicate no cohort differential in age-specific mortality due to neoplasms of the digestive system and diabetes (the maximal difference is 0.10 death per 1000).

6. Conclusion

Because of the selection rules at military entry–which are in part based on physical and mental aptitude–a credible analysis of the causal relationship between military service and post-service health requires an exogenous source of variation in the probability of being drafted. In this paper we exploit the fact that over the period 1943-47 men were drafted in chronological order of birth, a well-known institutional feature of the induction process during WWII. This allows us to construct a credible set of instrument for veteran status for a narrow range of cohorts of men, born during 1925-28. Like Angrist and Krueger (1994), we find that date of birth is a strong predictor of military service for these cohorts.

The implied instrumental variable estimates of the impact of military participation of post-service health (as measured by indicators of work disability) are remarkably larger than the corresponding OLS estimates (which indicate essentially no differences in the disability rates of veterans and non-veterans). Our TSLS and bivariate probit estimates indicate that military service significantly increases the disability rate by up to 6 percentage points for veterans relative to non-veterans. Moreover, our results for serious health conditions (work-preventing disabilities) suggest an acceleration of the causal impact of military service on disabilities, from 1 to 6 percentage points, as the cohorts age from their early 40s into their early 60s. This finding is robust to a series of specification tests.

We also document a similar pattern in the age-specific mortality rates of men from these cohorts. Comparisons of post-service age-adjusted mortality rates and proportion of veterans in a cohort provides clear evidence of excess post-service mortality among cohorts with higher military participation rates. For example, a simple regression of the age-adjusted mortality rate (per 1000) between the ages of 45 and 70 on the proportion of veterans in each of the 1925-28 cohorts has a slope of 68.8 (p-value=0.046), indicating that a 10 percentage point reduction in the proportion of veterans is associated with 7 fewer deaths per 1000 between the ages of 45-70. In addition, we also find that the excess age-specific mortality of cohorts with higher military service rates increases with age, like the disability differential. Moreover, the excess post-service mortality for the cohorts with higher rates of military participation is also apparent for specific causes of mortality. Causes that tend to be associated with smoking, in particular, lung cancer and diseases of the circulatory system are more prevalent in cohorts with higher proportions of veterans. We document a sharp age-increasing difference in lung cancer mortality between the 1925-28 cohorts with highest and lowest rates of military participation. As a specification test for these findings, we also compare mortality rates for causes likely independent of smoking, like diabetes and neoplasms of the digestive system. In that case, we find no evidence of differential rates of mortality across cohorts. Finally, we argue that our main results on the long-run health impacts of military service–a progressive worsening of veteran health (as measured by disability and mortality) relative to non-veteran health as the cohort ages–may be partly attributed to the early adoption of risky behavior like smoking.

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FIGURE 1: FRACTION OF VETERANS AND COHORT-SPECIFIC AVERAGE RESIDUAL OF REDUCED-FORM MODELS FOR WORK DISABILITY, MEN BORN 1915-1939

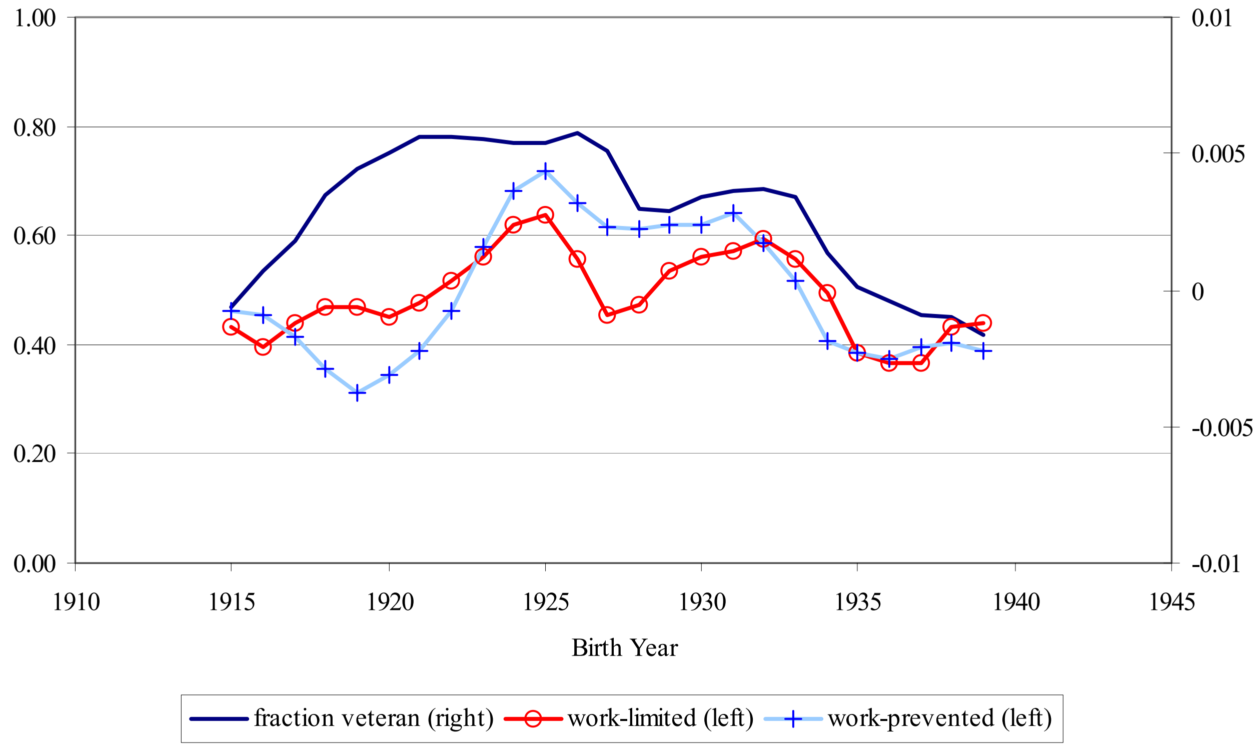


FIGURE 2: PROPORTION OF VETERANS BY YEAR AND QUARTER OF BIRTH, MEN BORN 1920-1940

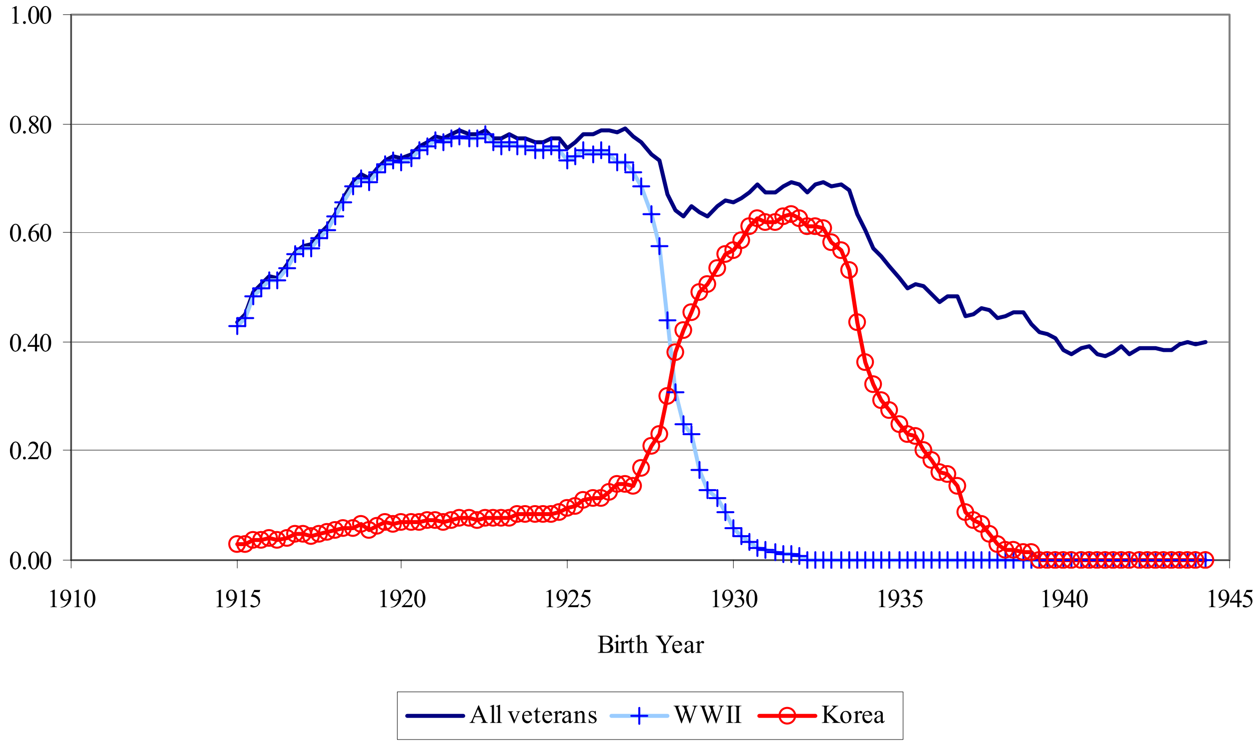


FIGURE 3: DIFFERENCE IN THE AGE-SPECIFIC MORTALITY RATE (PER 1,000) OF MEN BORN IN 1924, 1926 AND 1928 (1924-1926 AND 1926-1928), AT AGES 35-70 [HMD DATA]

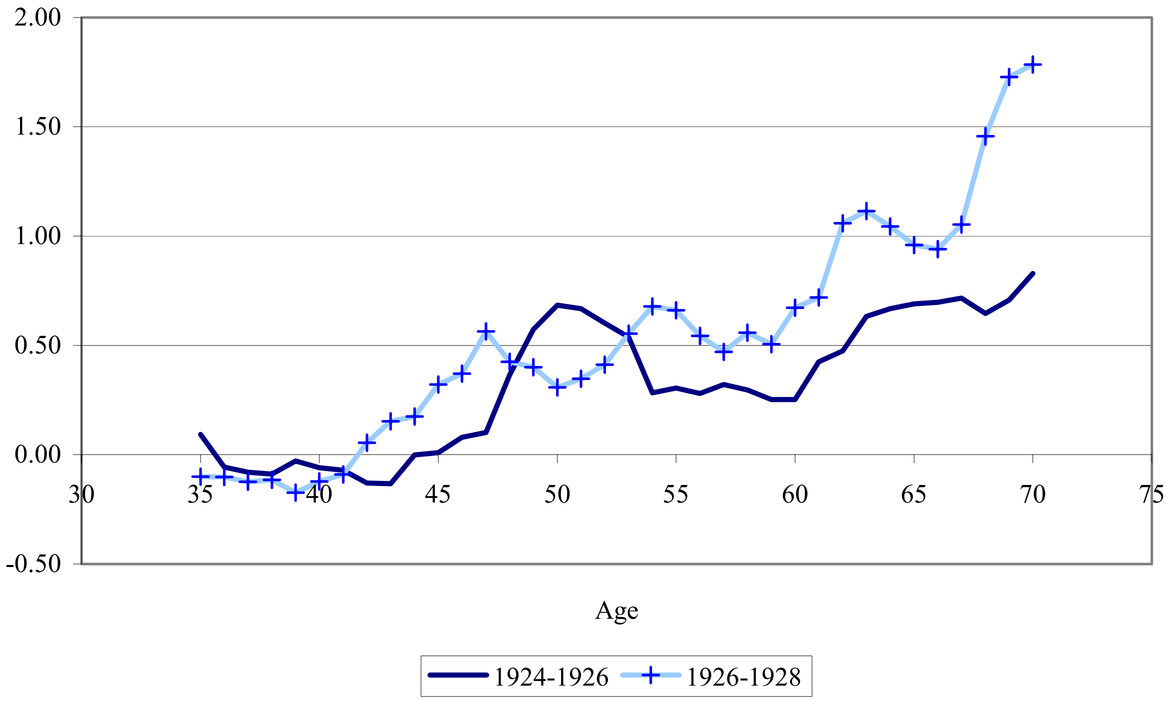
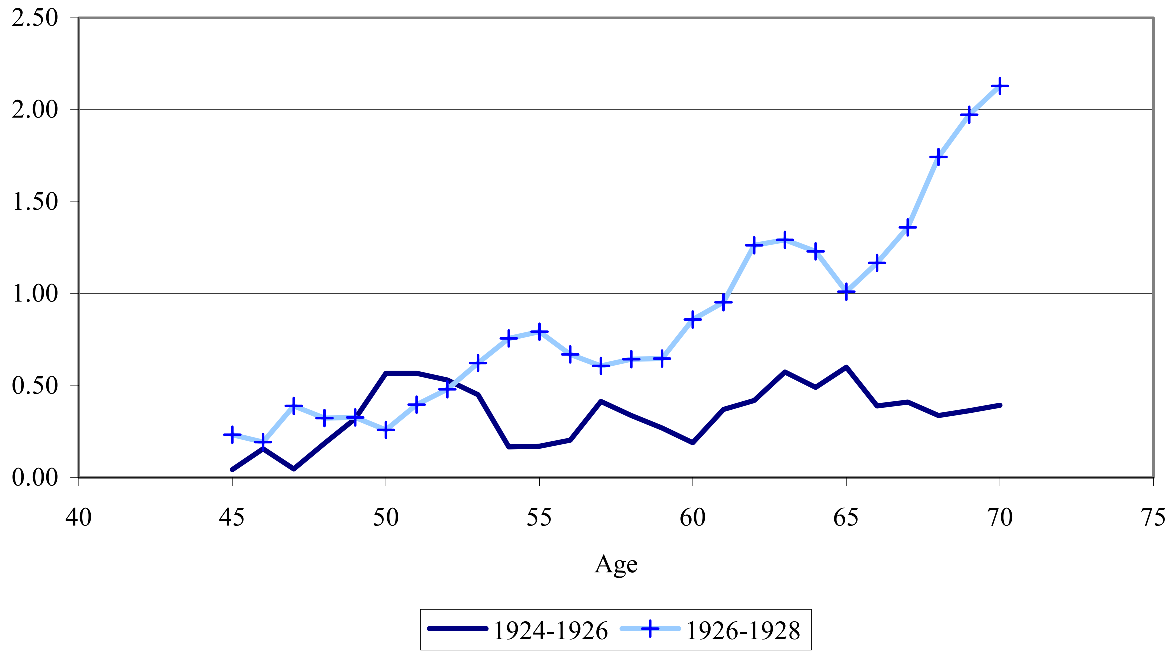


FIGURE 4: DIFFERENCE IN THE AGE-SPECIFIC MORTALITY RATE (PER 1,000) OF WHITE MEN BORN IN 1924, 1926 AND 1928 (1924-1926 AND 1926-1928), AT AGES 45-70

(A) TOTAL MORTALITY



(B) MORTALITY DUE TO CIRCULATORY SYSTEM CONDITIONS

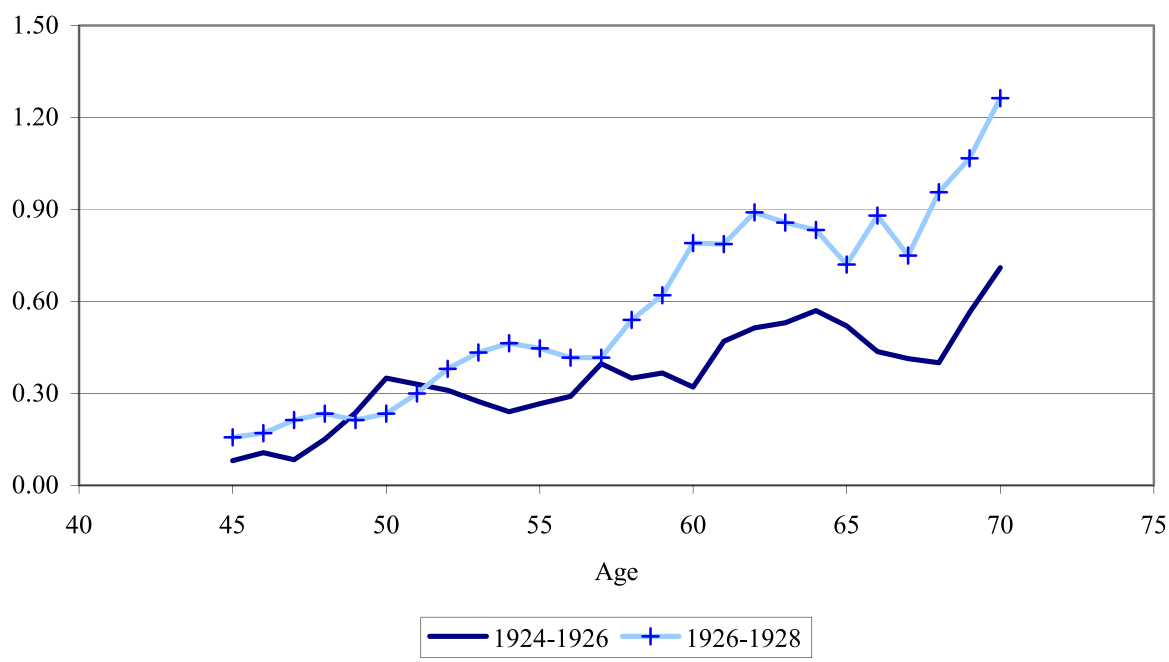
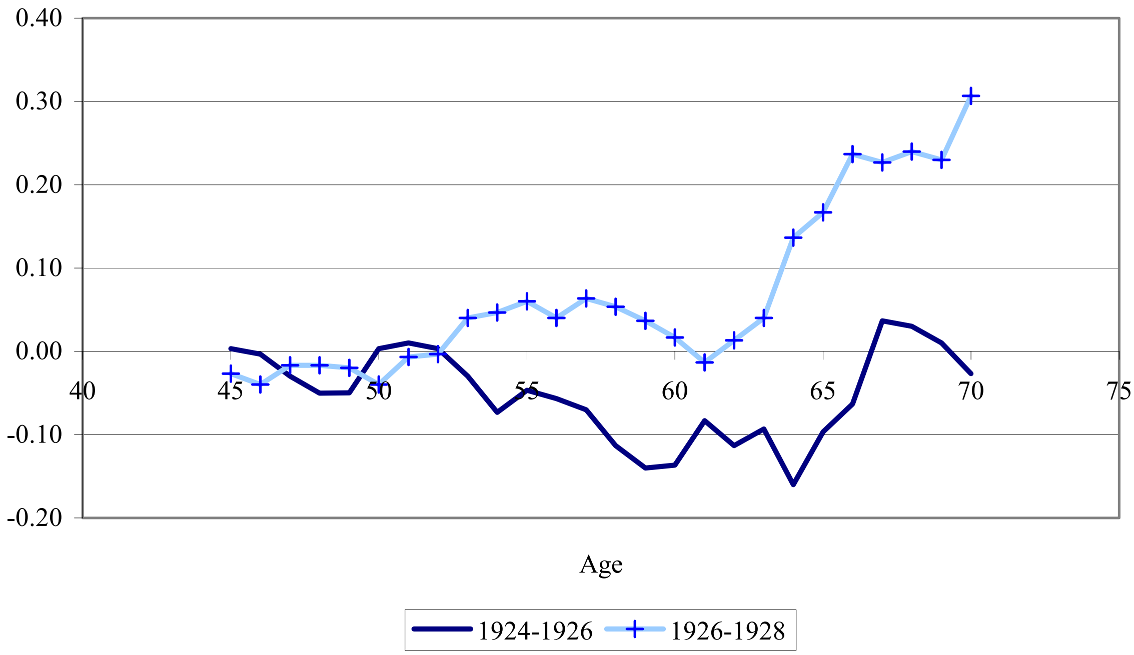


FIGURE 4: DIFFERENCE IN THE AGE-SPECIFIC MORTALITY RATE (PER 1,000) OF WHITE MEN BORN IN 1924, 1926 AND 1928 (1924-1926 AND 1926-1928), AT AGES 45-70 (CONTINUED)

(C) MORTALITY DUE TO NEOPLASMS OF THE RESPIRATORY ORGANS (LUNG CANCER)



(D) MORTALITY DUE TO NEOPLASMS OF THE DIGESTIVE ORGANS

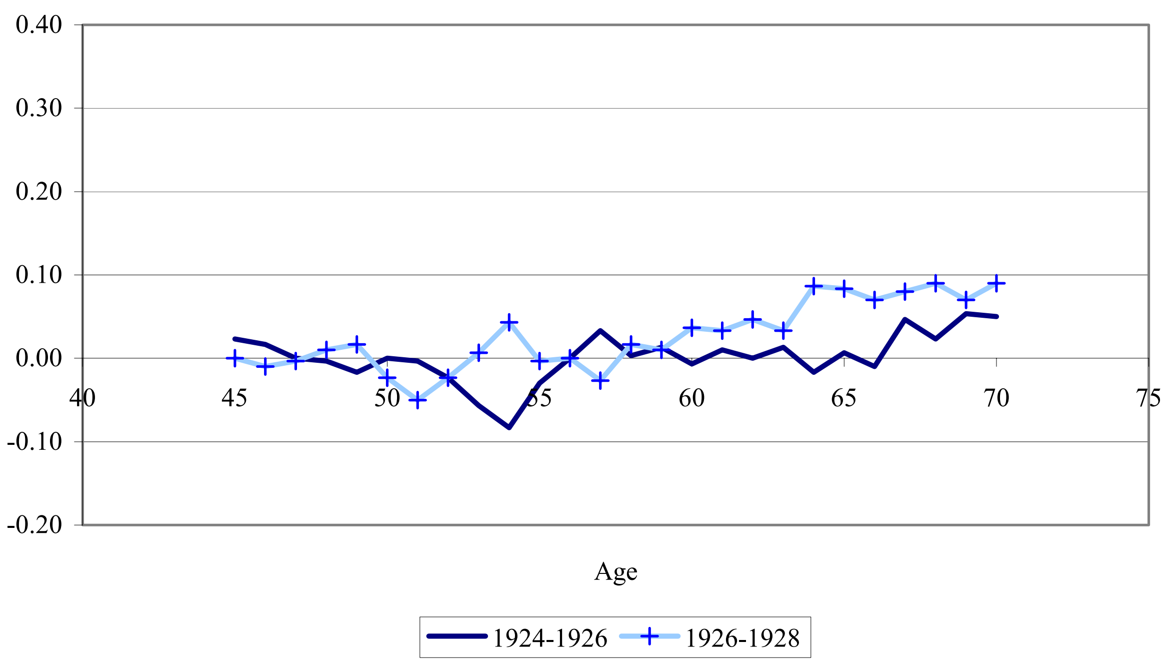


FIGURE 4: DIFFERENCE IN THE AGE-SPECIFIC MORTALITY RATE (PER 1,000) OF WHITE MEN BORN IN 1924, 1926 AND 1928 (1924-1926 AND 1926-1928), AT AGES 45-70 (CONTINUED)

(E) MORTALITY DUE TO DIABETES

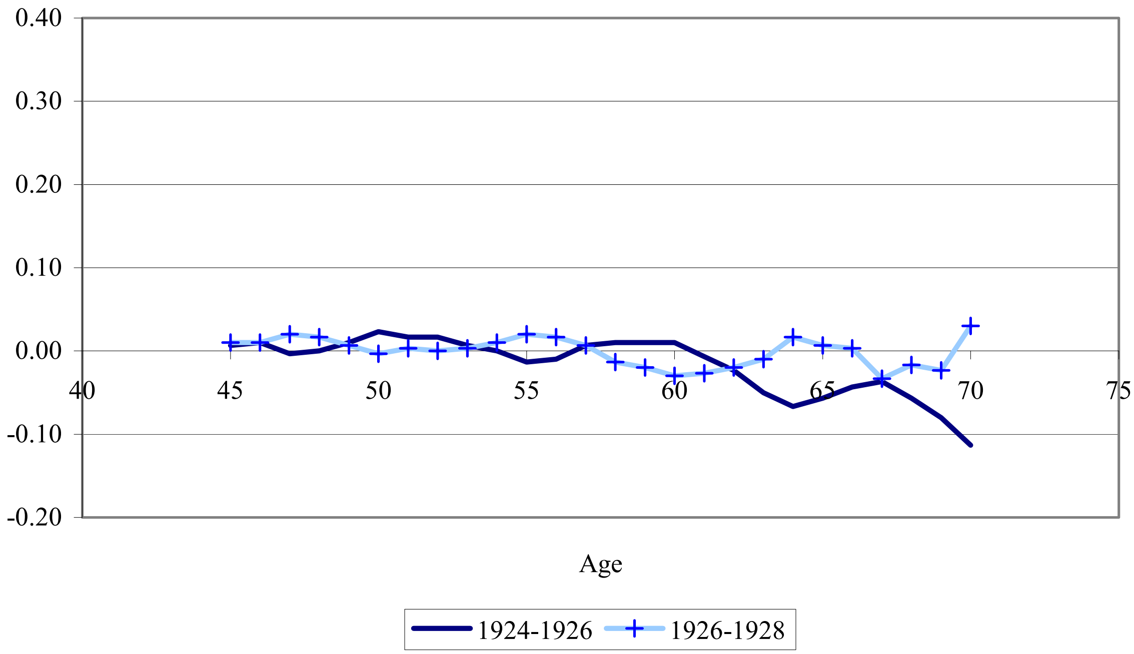


TABLE 1: DESCRIPTIVE STATISTICS, MEN AND WOMEN BORN 1920-1929

	Men			**Women**		
	1970	**1980**	**1990**	**1970**	**1980**	**1990**
Fraction of Veterans:						
WWII Veterans	0.62	0.61	0.63	---	---	0.02
Disability Outcomes:						
Work Limited	0.10	0.13	0.26	0.09	0.12	0.22
Work Prevented	0.03	0.07	0.18	0.04	0.08	0.17
Socio-Economic Characteristics:						
Age	44.5	54.4	64.4	44.5	54.5	64.5
Fraction Black	0.08	0.08	0.07	0.1	0.1	0.08
Born in the South	0.34	0.34	0.33	0.36	0.35	0.35
Years of Education	11.46	11.86	11.62	11.20	11.55	11.47
Currently Married	0.87	0.86	0.83	0.81	0.74	0.63
LFP Rate	0.97	0.89	0.54	0.58	0.57	0.34
LFP Rate, Work-Limited	0.77	0.47	0.27	0.37	0.22	0.14
Weeks Last Year	47.27	43.62	22.11	23.59	25.03	13.51
Annual Income	35,631	33,334	27,802	13,311	9,707	10,596
Observations	200,839	396,624	381,580	216,935	439,702	459,414

Source: 1970, 1980, 1990 Censuses of Population. Sample: All men and women born in the continental United States between 1920 and 1929. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All income measures in 1990 constant dollars. Year of birth is defined as census year-age-1.

TABLE 2: INCIDENCE OF DISABILITIES, MEN AND WOMEN BORN 1915-1949

	Work-Limiting			Work-Preventing		
[A] Men						
Year of Birth	**1970**	**1980**	**1990**	**1970**	**1980**	**1990**
1915-1919	0.15	0.21	0.32	0.05	0.14	0.25
1920-1924	0.11	0.15	0.28	0.03	0.09	0.20
1925-1929	0.09	0.11	0.24	0.02	0.05	0.17
1930-1934	0.07	0.08	0.17	0.02	0.04	0.11
1935-1939	0.05	0.06	0.12	0.01	0.02	0.07
1940-1944	0.05	0.05	0.10	0.01	0.02	0.05
1945-1949	0.07	0.04	0.08	0.01	0.01	0.04
[B] Women						
Year of Birth	**1970**	**1980**	**1990**	**1970**	**1980**	**1990**
1915-1919	0.13	0.19	0.29	0.07	0.15	0.25
1920-1924	0.10	0.14	0.24	0.05	0.10	0.19
1925-1929	0.08	0.11	0.20	0.03	0.07	0.15
1930-1934	0.06	0.08	0.16	0.03	0.04	0.11
1935-1939	0.05	0.06	0.11	0.02	0.03	0.08
1940-1944	0.04	0.04	0.09	0.01	0.02	0.05
1945-1949	0.03	0.03	0.07	0.01	0.01	0.04

Source: 1970, 1980, 1990 Censuses of Population. Sample: All men and women born in the continental United States between 1915 and 1949. Observations with allocated values on key variables deleted. Year of birth is defined as census year-age-1.

TABLE 3: VETERAN / NON-VETERAN DIFFERENCES IN DISABILITIES AND SOCIO-ECONOMIC CHARACTERISTICS, MEN BORN 1920-1929

	1970			1980			1990		
	Veterans	Non-Veterans	Difference	Veterans	Non-Veterans	Difference	Veterans	Non-Veterans	Difference
Disability Outcomes:									
Work-Limited	---	---	---	0.13	0.14	-0.01*	0.25	0.26	-0.01*
Work-Prevented	---	---	---	0.07	0.08	-0.01*	0.17	0.19	-0.02*
Socio-Economic Characteristics:									
Age	44.66	44.08	0.58*	54.53	53.95	0.58*	64.51	63.84	0.67*
Fraction Black	0.06	0.12	-0.06*	0.05	0.13	-0.08*	0.05	0.11	-0.06*
Born in the South	0.31	0.38	-0.07*	0.30	0.39	-0.09*	0.31	0.37	-0.07*
Years of Education	11.87	10.78	1.06*	12.32	11.13	1.19*	12.13	10.86	1.27*
Currently Married	0.89	0.84	0.04*	0.88	0.83	0.05*	0.85	0.80	0.05*
Labor Force Participants	0.97	0.96	0.01*	0.90	0.88	0.02*	0.53	0.62	-0.09*
Work-Limited LFP	---	---	---	0.50	0.44	0.06*	0.27	0.30	-0.03*
Annual Income	37,717	31,983	5,733*	35,385	30,075	5,310*	29,502	26,789	2,712*
Observations	62,402	38,104	---	243,448	153,176	---	290,592	142,032	---

Source: 1970, 1980, 1990 Censuses of Population. Sample: All men born in the continental United States between 1920 and 1929. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All income measures in 1990 constant dollars. Year of birth defined as census year-age-1. Stars indicate statistically significant differences at the 5% level.

TABLE 4: VETERAN / NON-VETERAN DIFFERENCES IN PRE-MILITARY CHARACTERISTICS, MEN BORN 1920-1929

	Veterans	Non-Veterans	Difference
Pre-Military Characteristics:			
Fraction Black	0.11	0.17	-0.07*
Education Before Military**	10.79	9.93	0.86*
Mother's Education	8.30	7.50	0.80*
Father's Education	7.63	6.95	0.68*
Number of Siblings	4.13	4.47	-0.34*
Living on Farm at 16	0.18	0.23	-0.06*
Born in the South	0.31	0.33	-0.02
Observations	4,935	3,374	---

Sample means tabulated from the 1973 Occupational Change in a Generation Survey. Stars indicate statistically significant differences at the 5% level. Men who served between 1940 and 1947 are classified as WWII veterans. **Education before military is replaced by ever-completed educational attainment for non-veterans.

TABLE 5: SAMPLE MEANS OF PRE-MILITARY CHARACTERISTICS, MEN BORN 1925-1928

	Year of Birth:				F-Statistic	F-Statistic
	1925	**1926**	**1927**	**1928**	**(yob)**	**(yob*qob)**
Fraction WWII Veterans:	0.656	0.635	0.612	0.459	15.22*	6.34*
Military Experiences (veterans only):						
Age at Induction	18.59	18.46	18.47	18.67	0.03	0.57
Length of Service	3.84	3.95	3.25	3.42	1.67	1.64
Pre-Military Characteristics:						
Fraction Black	0.13	0.14	0.15	0.14	0.76	0.65
Education Before Military**	10.94	10.65	10.69	10.74	0.12	1.20
Fathers' Education	8.06	8.02	8.22	8.34	0.07	1.02
Mother's Education	7.52	7.5	7.45	7.54	0.93	1.45
Number of Siblings	4.23	4.11	4.02	4.29	1.10	0.72
Born in the South	0.21	0.2	0.19	0.19	0.71	1.00
Living on Farm at 16	0.31	0.34	0.31	0.31	0.43	0.99
Observations	895	830	833	851	---	---

Source: 1973 Occupational Change in a Generation Survey. The p-values are the marginal significance levels for F-tests of equality of means across the 4 birth year groups. Stars indicate statistically significant differences at the 5% level. Men who served between 1940 and 1947 are classified as WWII veterans. **Education before military is replaced by ever-completed educational attainment for non-veterans.

TABLE 6: OLS AND PROBIT ESTIMATES OF THE IMPACT OF MILITARY SERVICE ON POST-SERVICE DISABILITIES

	Work-Limiting			**Work-Preventing**		
	1970	**1980**	**1990**	**1970**	**1980**	**1990**
1. Mean Outcome:	---	0.11	0.24	---	0.06	0.17
2. Unadjusted Difference	---	-0.013	-0.014	---	-0.012	-0.021
WWII Veteran (1=yes)		(0.002)	(0.002)		(0.001)	(0.002)
3. OLS Estimates:	---	-0.011	-0.003	---	-0.007	-0.001
WWII Veteran (1=yes)		(0.002)	(0.003)		(0.001)	(0.002)
4. Probit Estimates:	---	-0.006	0.000	---	-0.001	0.005
WWII Veteran (1=yes)		(0.002)	(0.003)		(0.001)	(0.002)
Observations	---	163,319	158,724	---	163,319	158,724

Source: 1970, 1980, 1990 Censuses of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. Year of birth defined as census year-age-1. Heteroskadasticity-robust standard errors are in parentheses.

TABLE 7: TSLS ESTIMATES OF THE IMPACT OF MILITARY SERVICE ON POST-SERVICE DISABILITIES

	IV=Unadjusted YOB			IV=Adjusted YOB			IV=QOB		
Work-Limiting	**1970**	**1980**	**1990**	**1970**	**1980**	**1990**	**1970**	**1980**	**1990**
1. Wald Estimates:	0.040	0.042	0.067	0.053	0.051	0.077	0.049	0.049	---
WWII Veteran (1=yes)	(0.007)	(0.003)	(0.005)	(0.008)	(0.004)	(0.006)	(0.008)	(0.004)	
2. TSLS Estimates:	0.033	0.036	0.057	0.047	0.046	0.069	0.042	0.043	---
WWII Veteran (1=yes)	(0.007)	(0.004)	(0.005)	(0.008)	(0.004)	(0.006)	(0.008)	(0.004)	
R-squared	---	0.046	0.058	---	0.047	0.057	---	0.048	---
OID Test Statistic		7.634	6.087		8.130	6.840		7.211	
Degrees of Freedom		2	2		2	2		14	
P-value		(0.022)	(0.048)		(0.017)	(0.033)		(0.927)	
Work-Preventing									
3. Wald Estimates:	0.012	0.028	0.067	0.016	0.032	0.068	0.015	0.032	---
WWII Veteran (1=yes)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	
4. TSLS Estimates:	0.008	0.023	0.057	0.012	0.028	0.060	0.011	0.026	---
WWII Veteran (1=yes)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	
R-squared	---	0.061	0.076	---	0.063	0.075	---	0.063	---
OID Test		1.903	2.414		2.183	2.495		3.973	---
Degrees of Freedom		2	2		2	2		14	
P-value		(0.387)	(0.299)		(0.336)	(0.287)		(0.996)	
First Stage F-statistic	2,877.7	12,245.9	12,982.5	2,264.0	9,364.3	8,809.7	491.7	2,051.0	---
Observations	40,158	163,319	158,724	40,275	163,460	159,096	40,275	163,460	159,096

Source: 1970, 1980, 1990 Censuses of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. In columns 1-6 the excluded instruments are year of birth dummies. In columns 7-8 the excluded instruments are interactions of year of birth and quarter of birth dummies. See the text for the definitions of unadjusted and adjusted birth year. Heteroskadasticity-robust standard errors are in parentheses.

TABLE 8: ESTIMATES OF THE IMPACT OF MILITARY SERVICE ON POST-SERVICE LABOR SUPPLY

	Labor Force Participation		**Hours Per Week**		**Weeks Last Year**	
	1970	**1980**	**1970**	**1980**	**1970**	**1980**
Mean Outcome	0.972	0.916	---	39.99	47.55	44.88
1. OLS Estimates:	0.003	0.006	---	-0.294	0.158	0.323
WWII Veteran (1=yes)	(0.002)	(0.001)		(0.079)	(0.104)	(0.078)
2. Wald Estimates:	-0.011	-0.044	---	-2.450	-0.513	-2.555
WWII Veteran (1=yes)	(0.004)	(0.003)		(0.219)	(0.289)	(0.219)
3. TSLS Estimates:	-0.010	-0.039	---	-2.087	-0.407	-2.189
WWII Veteran (1=yes)	(0.004)	(0.004)		(0.207)	(0.273)	(0.205)
First Stage F-statistic	2,877.7	12,245.9		9,364.3	491.7	2,051.0
P-value	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
Observations	40,158	163,460		163,460	40,158	163,460

Source: 1970, 1980 Censuses of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. Estimates based on the adjusted birth year definition. Heteroskadasticity-robust standard errors are in parentheses.

TABLE 9: ALTERNATIVE ESTIMATES OF THE IMPACT OF MILITARY SERVICE ON POST-SERVICE DISABILITIES

	Work-Limiting			**Work-Preventing**			**IV = YOB*QOB, 1980 Only**	
Instrument = YOB	**1970**	**1980**	**1990**	**1970**	**1980**	**1990**	***Limiting***	***Preventing***
1. TSLS Estimates:	0.047	0.046	0.069	0.012	0.028	0.060	0.010	0.008
[All Cohorts]	(0.008)	(0.004)	(0.006)	(0.004)	(0.003)	(0.005)	(0.015)	(0.011)
F-Statistic	2264.3	9,364.3	8,763.9	2264.3	9,364.3	8,763.9	129.8	129.8
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
2. TSLS Estimates:	0.766	1.805	0.695	-0.033	0.887	0.334	0.288	0.056
[Only 1925 and 1926]	(0.50)	(0.81)	(0.20)	(0.19)	(0.43)	(0.15)	(0.144)	(0.100)
F-Statistic	4.6	6.0	41.3	4.6	6.0	41.3	8.5	8.5
	[0.033]	[0.014]	[0.001]	[0.033]	[0.014]	[0.001]	[0.001]	[0.001]
3. TSLS Estimates:	0.081	0.124	0.108	0.038	0.071	0.104	0.044	0.021
[Only 1926 and 1927]	(0.04)	(0.03)	(0.02)	(0.004)	(0.004)	(0.004)	(0.027)	(0.020)
F-Statistic	284.3	819.3	1,709.3	284.3	819.3	1,709.3	76.0	76.0
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
4. TSLS Estimates:	0.023	0.014	0.023	0.005	0.011	0.033	0.007	0.008
[Only 1927 and 1928]	(0.011)	(0.006)	(0.010)	(0.006)	(0.004)	(0.008)	(0.015)	(0.011)
F-Statistic	2,630.3	12,108.8	8,372.2	2,630.3	12,108.8	8,372.2	70.3	70.3
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]

Source: 1970, 1980, 1990 Censuses of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. Estimates based on the adjusted birth year definition. Heteroskadasticity-robust standard errors are in parentheses.

TABLE 10: IV ESTIMATES OF THE IMPACT OF MILITARY SERVICE ON ACTIVITY LIMITATIONS, WITH CONTROLS FOR AGE

	IV=YOB	IV=QOB	IV=YOB*QOB	IV=QOB
TSLS Estimates	0.087	0.095	0.179	0.050
	(0.02)	(0.02)	(0.06)	(0.02)
F-Statistic	976.8	232.9	20.4	163.9
Quadratic Age (in month	No	No	No	Yes
Observations	22,408	22,408	22,408	22,408

Source: National Health Interview Surveys, 1982-1996. Sample: All men born between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. All models include a black dummy, years of education, current marital status dummy, region of residence dummies. Estimates are weighted using the survey weights. The mean of the dependent variable (indicator of activity limitation) is 30.6

TABLE 11: HEALTH CONDITIONS AND DISORDERS AMONG INDIVIDUALS WITH DISABILITIES, MEN BORN 1925-1928

	Work-Limiting			**Work-Preventing**		
	All Men	Vets	Non-Vets	All Men	Vets	Non-Vets
Conditions / Disorders:						
Retarded	0.03	0.00	0.09	0.06	0.01	0.15
Hearing	0.04	0.05	0.03	0.05	0.06	0.04
Speech	0.02	0.01	0.04	0.02	0.01	0.04
Blind	0.05	0.04	0.09	0.07	0.05	0.11
Emotional	0.02	0.03	0.02	0.05	0.06	0.04
Crippled	0.11	0.11	0.14	0.16	0.14	0.19
Arthrithis	0.15	0.15	0.15	0.18	0.19	0.15
Back / Spine	0.28	0.28	0.28	0.31	0.32	0.27
Heart	0.26	0.29	0.20	0.26	0.28	0.21
Nervous	0.09	0.09	0.08	0.15	0.15	0.14
Respiratory	0.11	0.11	0.12	0.15	0.16	0.13
Digestive	0.06	0.07	0.06	0.08	0.10	0.05
Observations	1458	1038	420	1458	353	162

Source: 1976 Survey of Income and Education.
Sample: All men born in the continental U.S. born between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans.

TABLE 12: VETERAN / NON-VETERAN DIFFERENCES IN SMOKING BEHAVIOR

	Veterans	Non-Veterans	Adj. Difference
Ever Smoked 100:	0.737	0.621	0.144
	(0.00)	(0.01)	(0.01)
Age Started to Smoke:	18.03	18.23	-0.477
[ever-smoked 100]	(0.04)	(0.09)	(0.10)
Smoking Now:	0.580	0.610	0.027
	(0.01)	(0.01)	(0.02)
Cigarrettes per Day:	22.13	20.82	0.94
[smoking now only]	(0.30)	(0.51)	(0.68)
Observations	13,026	4,948	---

Source: CPS Tobacco Usage Supplements (1989, 1992, 1993, 1995, 1996, 1998, 1999).
Sample: All Men Born Between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans.

APPENDIX TABLE 1: MILITARY PARTICIPATION RATES, BY YEAR OF BIRTH AND QUARTER OF BIRTH

	[A] All Veterans					
Year of Birth	Quarter=1	Quarter=2	Quarter=3	Quarter=4	F-Statistic	P-Value
1920	0.73	0.74	0.76	0.76	5.0	0.002
1921	0.78	0.77	0.78	0.79	1.7	0.158
1922	0.78	0.78	0.79	0.77	2.4	0.065
1923	0.77	0.78	0.77	0.77	2.0	0.105
1924	0.77	0.77	0.77	0.77	0.0	0.993
1925	0.76	0.77	0.78	0.78	5.6	0.001
1926	0.79	0.79	0.79	0.79	0.8	0.520
1927	0.78	0.77	0.74	0.73	35.8	0.000
1928	0.67	0.64	0.63	0.65	19.8	0.000
1929	0.64	0.63	0.65	0.66	5.8	0.001
	[B] WWII Veterans					
1920	0.73	0.74	0.75	0.76	4.4	0.004
1921	0.77	0.77	0.77	0.78	1.2	0.316
1922	0.77	0.77	0.78	0.76	3.5	0.014
1923	0.76	0.77	0.76	0.76	2.1	0.095
1924	0.75	0.75	0.76	0.75	0.4	0.764
1925	0.73	0.74	0.75	0.75	1.2	0.323
1926	0.75	0.74	0.73	0.73	8.3	0.000
1927	0.71	0.69	0.63	0.58	203.0	0.000
1928	0.44	0.31	0.25	0.23	461.2	0.000
1929	0.16	0.13	0.11	0.09	101.7	0.000

Source: 1980 Census of Population. Sample: All men born in the continental U.S. between 1920 and 1929. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. The F-statistics and p-values are from models including a black dummy, years of education, and state of birth dummies.

APPENDIX TABLE 2: SAMPLE CHARACTERISTICS ASSOCIATED WITH THE TWO DEFINITIONS OF BIRTH YEAR.

	Unadjusted Year of Birth			**Adjusted Year of Birth**		
	1970	**1980**	**1990**	**1970**	**1980**	**1990**
Fraction of Veterans:						
WWII Veterans	0.57	0.57	0.59	0.60	0.61	0.62
Disability Outcomes:						
Work Limited	0.09	0.11	0.24	0.09	0.11	0.24
Work Prevented	0.02	0.06	0.17	0.02	0.06	0.17
Socio-Economic Characteristics:						
Age	42.5	52.5	62.5	42.8	52.7	62.7
Fraction Black	0.08	0.08	0.07	0.08	0.08	0.07
Born in the South	0.34	0.34	0.34	0.34	0.34	0.34
Years of Education	11.53	11.96	11.71	11.51	11.94	11.7
Currently Married	0.87	0.86	0.83	0.87	0.86	0.83
LFP Rate	0.97	0.92	0.64	0.97	0.92	0.62
LFP Rate, Work-Limit	0.77	0.51	0.32	0.77	0.50	0.31
Weeks Last Year	47.54	44.99	27.3	47.5	44.88	26.41
Annual Income	35,744	34,147	30,216	35,766	34,062	29,918
Observations	79,946	163,319	158,724	80,349	163,460	158,986

Source: Source: 1970, 1980, 1990 Censuses of Population. Sample: All men born in the continental United States between 1920 and 1929. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All income measures in 1990 constant dollars. See the text for additional detail on the definition of unadjusted and adjusted birth year.

Appendix Table 3: Reduced-Form and First-Stage Estimates (For Table 7)

	WWII Veteran			Work-Limiting			Work-Preventing		
	1970	**1980**	**1990**	**1970**	**1980**	**1990**	**1970**	**1980**	**1990**
Born 1926	-0.012	-0.007	-0.017	-0.010	-0.013	-0.013	0.000	-0.006	-0.006
	(0.006)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
Born 1927	-0.117	-0.093	-0.145	-0.018	-0.024	-0.027	-0.004	-0.013	-0.019
	(0.006)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
Born 1928	-0.448	-0.441	-0.446	-0.026	-0.028	-0.034	-0.005	-0.016	-0.029
	(0.006)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic on instruments	2264.0	9364.3	8809.7	16.0	67.6	50.8	3.4	41.2	51.2
R-squared	0.200	0.208	0.198	0.035	0.047	0.056	0.050	0.063	0.075
Observations	40,275	163,460	159,096	40,275	163,460	159,096	40,275	163,460	159,096

Source: 1970, 1980, 1990 Census of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. Year of birth is defined as the "adjusted year of birth". See the text for additional detail.

APPENDIX TABLE 4: BIVARIATE PROBIT ESTIMATES OF THE IMPACT OF MILITARY SERVICE ON POST-SERVICE DISABILITY

	IV=Unadjusted YOB		IV=Adjusted YOB		IV=QOB
	1980	**1990**	**1980**	**1990**	**1980**
Work-Limiting					
Bivariate Probit ATE	0.035	0.057	0.045	0.066	0.043
WWII Veteran (1=yes)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)
Estimated Correlation	-0.126	-0.093	-0.159	-0.113	-0.152
	(0.013)	(0.011)	(0.014)	(0.012)	(0.014)
Work-Preventing					
Bivariate Probit ATE	0.025	0.058	0.028	0.063	0.027
WWII Veteran (1=yes)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Estimated Correlation	-0.139	-0.119	-0.158	-0.134	-0.154
	(0.017)	(0.012)	(0.019)	(0.013)	(0.018)
Observations	163,319	158,724	163,460	159,096	163,460

Source: Census of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. See the text for a definition of the instruments. The reported impacts are evaluated at the sample means of all regressors.

APPENDIX TABLE 5: REDUCED-FORM AND FIRST-STAGE ESTIMATES (FOR TABLE 9)

Instrument = YOB	**1970**	**1980**	**1990**
Veteran Status			
Born 1925-1926 (1926=1)	-0.013	-0.007	-0.017
	(0.006)	(0.003)	(0.003)
Born 1926-1927 (1927=1)	-0.105	-0.086	-0.130
	(0.006)	(0.003)	(0.003)
Born 1927-1928 (1928=1)	-0.331	-0.347	-0.297
	(0.006)	(0.003)	(0.003)
Work-Limiting			
Born 1925-1926 (1926=1)	-0.010	-0.013	-0.017
	(0.004)	(0.002)	(0.003)
Born 1926-1927 (1927=1)	-0.009	-0.011	-0.010
	(0.004)	(0.002)	(0.003)
Born 1927-1928 (1928=1)	-0.008	-0.005	-0.011
	(0.004)	(0.002)	(0.002)
Work-Preventing			
Born 1925-1926 (1926=1)	0.000	-0.006	-0.010
	(0.004)	(0.002)	(0.003)
Born 1926-1927 (1927=1)	-0.004	-0.006	-0.008
	(0.002)	(0.002)	(0.003)
Born 1927-1928 (1928=1)	-0.002	-0.004	-0.013
	(0.002)	(0.001)	(0.003)

Source: 1970, 1980, 1990 Census of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. Year of birth is defined as the "adjusted year of birth". See the text for additional detail.

APPENDIX TABLE 6: MILITARY PARTICIPATION, COHORTS BORN 1920-1939.

	All Veterans	WWII	Korea	Both
Year of Birth:				
1920	0.75	0.74	0.07	0.06
1921	0.78	0.77	0.07	0.07
1922	0.78	0.77	0.08	0.07
1923	0.77	0.76	0.08	0.07
1924	0.77	0.75	0.09	0.07
1925	0.77	0.74	0.10	0.08
1926	0.79	0.74	0.13	0.09
1927	0.75	0.65	0.19	0.10
1928	0.65	0.31	0.39	0.08
1929	0.64	0.12	0.52	0.04
1930	0.67	0.04	0.60	0.02
1931	0.68	0.01	0.63	0.00
1932	0.69	0.00	0.61	0.00
1933	0.67	0.00	0.53	0.00
1934	0.57	0.00	0.31	0.00
1935	0.50	0.00	0.23	0.00
1936	0.48	0.00	0.16	0.00
1937	0.45	0.00	0.07	0.00
1938	0.45	0.00	0.02	0.00
1939	0.42	0.00	0.00	0.00

Source: 1970, 1980, 1990 Census of Population. Sample: All men born in the continental U.S. between 1925 and 1928. Men who served between 1940 and 1947 are classified as WWII veterans. Observations with allocated values on key variables deleted. All models include a black dummy, years of education, current marital status dummy, and state of birth and residence dummies. Year of birth is defined as the "adjusted year of birth". See the text for additional detail.