The Effect of WWII on the Lifespan of the Black Population

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Abstract: We investigate how two major events during World War II, the draft and the large set of Federal contracts to support the war effort, affected the longevity of the Black population. Previous work has found that these events appear to have improved the economic conditions of Black men after the war. We document that war contracts indeed increased the age at death of Black men, but not of White men, lowering racial disparities in lifespan. The results for Black women are similar but less robust. Although WWII veterans lived longer than civilians, our causal estimates of the effects of serving during the war are imprecise.

I. Introduction

The welfare of the Black population increased more during the 1940s than during any other decade since (Brouillette et al., 2021). Previous work has documented that the wages of Black individuals increased substantially during the 1940s, and Black-White gaps fell (Margo 1995, Collins 2000). Their health improved too. During the 1940s life expectancy grew by almost 8 years for Black individuals, accounting for almost half of all gains up to the 1980s (Preston et al. 2003). The events that took place during WWII explain much of this improvement. The war led to major disruptions in the labor market, creating a sharp decline in domestic labor supply as 16 million individuals (mostly men) were drafted to fight, of whom about 450,000 died. At the same time the government spent an unprecedented amount of money on manufacturing contracts aimed at supporting the war effort. The combination of these forces led to temporary labor shortages that opened new opportunities for Black workers, increasing both their employment in skilled occupations and their wages. These economic gains persisted long after the war.

In this paper, we investigate the long-term effects of the war on the lifespan of the Black population. We study all Black adults observed in the 1940 census and in WWII enlistment records. We then track individuals' longevity by linking them to a large wiki-style family tree that contains information on their ages at death from multiple sources. We match these data to place characteristics in 1940, including draft rates and WWII contracts. The resulting data allow us to investigate two questions: first, whether civilians that were living in cities that received larger contracts lived longer lives as a result, and second, how serving affected the lifespan of veterans.

Given that prime age adults experienced substantially better labor market outcomes in the decades that followed WWII as a result of WWII contracts, we hypothesize that they also lived longer lives as a result, as income is strongly predictive of life expectancy (Chetty et al. 2016). However, they may not have. Previous research on the effects of income on health and mortality has yielded surprisingly mixed results, with some studies finding positive and significant effects while other have found negative and significant effects (see Lleras-Muney 2022 for a review). Whether stable, higher-skilled and better paid jobs increased health may depend in part, for example, on whether individuals use their greater incomes to purchase goods that are detrimental to their health such as cigarettes and alcohol. Additionally, because a large number of Black families moved North, northern locations stopped providing opportunities to Black families, as Derenoncourt (2022) documents. So, although the economic lives of Blacks were better in these locations until the 1960s, it may not have been in subsequent decades. Another important factor is that many of the WWII jobs that Blacks obtained and were trained for during WWII were the most dangerous, as had been the case before the war (Maloney and Whatley 1995). For example, many Blacks worked in Alcoa aluminum plants using substances like PCB which were later shown to cause cancer. Thus, it is unclear whether the WWII contracts and the economic changes that they caused led Blacks to live longer.

A similar ambiguity exists with respect to the effects of serving in the military. Serving in the military substantially increases the risk of dying during the war and is generally associated with declines in health among survivors, particularly because of combat-related mental and physical injuries, as well as substance abuse (Wilmoth et al. 2018, Bruhn et al. 2022). About 1.1 million

Black soldiers served during the War and 700 are estimated to have died in combat. This death rate is low (similar to the death rates of civilians of the same age) and lower than that of Whites (of approximately 3 percent). The mortality rate of Black soldiers during WWII was low because the segregated army rarely sent Black troops to combat zones. However, while the risk of dying in combat was not that high, Black soldiers may have experienced events that damaged them physically and psychologically compared to their civilian peers. For example, Black soldiers served in a segregated army and suffered many indignities as a result, though it is not clear whether this was any less true among the civilians who stayed in the US.

On the other hand, being a veteran might have helped Black soldiers who survived. The army promotes exercise, resilience and strong bonds between soldiers – factors which are associated with better health (Wilmoth et al. 2018). The GI Bill helped returning soldiers to further their education and provided them with other benefits that likely increased their socio-economic status. The army also trained many soldiers, including Black soldiers, in many general and specific skills which could yield a premium in the civilian labor market. Indeed, WWII veterans earned higher salaries than non-veterans after the war, suggesting to many that there was a WWII veteran premium in the labor market (Angrist and Krueger 1994). However, the causal effect of serving during WWII on socio-economic status is difficult to estimate, because individuals in poor health were ineligible to serve, complicating the interpretation of the observed differences between veterans and non-veterans (as we discuss in the literature review below). Nevertheless, these observations suggest it is possible that serving in WWII benefitted Black soldiers' health. Overall, it is unclear whether serving in the war increased or decreased lifespan.

Identifying the effects of WWII on lifespan is challenging. We propose to look at associations first, and then we will use empirical strategies pursued in previous studies to address the potential non-randomness of contracts and of service in the military. To estimate the effects of WWII contracts we will follow the approach in Aizer et al. (2024) and control for the predictors contracts as well as comparing the effects for Blacks and Whites. No work that we are aware of has investigated the impact of WWII contracts on health and longevity in the US.

To estimate the effect of serving in the military we build on the work Bound and Turner (2002) and Turner and Bound (2003) and exploit the variation across cohorts in the share of individuals that served to predict service in the military during the war. Because our records include exact date of birth, we can implement a regression kink design. Our study includes more than 26,000 Black men who served in WWII making it the largest sample to date investigating the long-term effect of the war on lifespan.[1] To our knowledge, our empirical approach to uncover causal estimates of serving in WWII has not been implemented before.

There are important measurement issues that arise when linking historical datasets, and these issues are particularly salient in the case of the Black population for whom matching rates are low. We document these issues and discuss their implications extensively in this exploratory paper.

II. Historical Context and Literature Review

II.a Effects of WWII on Black outcomes

The economic outcomes of Blacks improved substantially during the 1940s. There have been several attempts to determine the causes of Black-White wage convergence observed in the 40s that identify WWII as a significant cause. Maloney (1994) and Margo (1995) both conduct decompositions of the Black-White wage convergence in the 40s and find that a substantive cause of such convergence was wage compression, with Margo (1995) and Vickers and Ziebarth (2022) suggesting such compression was partly caused by National War Labor Board wage controls imposed during the war.

The economic gains of the Black population were largely driven by changes in the type of occupations Blacks had. Margo (1995) shows that occupational shifts played a large part in the convergence of the Black wage gaps among men. Similarly, Bailey and Collins (2006) find that wage Black-White wage convergence among women from 1910-1970 was principally attributable to changes in the distribution of occupation.

[1] For comparison the study by Landes et al. includes 14,049 black veterans from all wars (ages 18-84 in 1986-2011).

Indeed, in cities where industries receiving WWII contracts were (for the first time) subject to anti-discriminatory legal pressures, Black workers obtained access to previously unavailable semi-skilled jobs and garnered greater wages as a result. The federal government spent an unprecedented amount of funds in the production of goods to support the war effort. In 1943, 1944 and 1945, these expenditures amounted to roughly 40% of GDP. These monies were allocated to firms in the form of war contracts. President Roosevelt issued Executive Order 8802 in 1941, which made employment discrimination by federal agencies on the basis of race illegal. Thus, firms receiving war contracts were required to follow federal anti-discriminatory rules.

Consistent with the importance of the war contracts in improving the lot of Black workers, using data from the Palmer survey covering six large cities, Collins (2000) shows that wartime employment in defense industries were associated with greater wages and more (semi-)skilled work among Blacks in 1950. Collins (2001) also considers how Black employment in defense industries changed because of the Fair Employment Practice Committee. He estimates that the change in the ratio of non-White to White employment in defense industries was positively associated with the size of the Fair Employment Practice Committee caseload, at least outside the South.

Aizer et al. (2022) estimate that war contracts accounted for 25% of the overall reduction in the racial wage gap between 1940 and 1970 and further explain why their effects were so persistent. These contracts were associated with more permanent declines in discrimination: Blacks were integrated into unions and more generally into society, at least outside the South. Moreover, these gains translated into greater schooling for the next generation of Blacks (Aizer et al., 2022), particularly in places where large plants were opened (Garin and Rothbaum, 2022). This expanded set of opportunities attracted many Black workers towards these locations and led to a large increase in migration North in the 1940s and in the post war decades (Boustan, 2009). This migration spread these gains to a larger set of individuals: Aizer et al. (2022) estimate that without migration the gains for Black workers would have been substantially smaller.

In contrast to the findings for Blacks, WWII contracts did not in general improve the lot of White men and women. These expenditures led to increases in population, but were not otherwise associated with greater economic growth (Lewis, 2007; Fishback and Cullen, 2013; Jaworski, 2017; Brunet, 2018; Li and Koustas, 2019). Although women did benefit in the short run from greater employment opportunities during the war, the return of soldiers and the subsequent baby boom led many women to leave the labor force, and thus the effects of expenditures on White women were not long-lived (Aizer et al. 2022).

The draft also contributed to the economic progress of Blacks. The draft lowered the labor supply of White men holding well paid jobs. Although this shortage was temporary in most locations, in some it was not. About 450,000 White men died in the war. Ferrara (2022) estimates a DID model using US enlistment records matched to mortality records and county-level employment data from the South for 1920 - 1960 and finds that the death of a White soldier with a semiskilled pre-war occupation was associated with an increase in Black semi-skilled employment. Interestingly while draft rates and casualty rates are associated with improved Black men's employment and wages in semi-skilled jobs during and after the war, the benefits of war employment for women were not as long lived, as many were displaced by returning soldiers (Goldin 1991; Acemoglu, Autor, and Lyle 2004).

The draft had other more direct impacts on the economic status of Blacks. Upon their return WWII soldiers were eligible for the GI Bill, which provided all veterans with tuition and living expenses to further their education. It also provided WWII veterans with access to unemployment insurance and low-cost housing mortgages. Veterans of any war are also eligible for a number of benefits including non-disability-related pensions (since the Veterans' Pension Act of 1959) and access to health care. Previous work documents Black veterans were not given the same level of access to these programs as White veterans (Woods II, 2013). Nevertheless, there is evidence that Blacks did benefit from them. Using data from the 1970 Census and a regression discontinuity design, exploiting the jump in the probability of men having veteran status between birth cohorts, Turner and Bound (2003) estimated that G.I. benefits increased both expected years of college and the probability of college completion among Whites, and among Blacks outside the South. Thomas (2017) estimated a similar model (and also leverages

variation in enlistment rates by birthplace and cohort) and found that the GI Bill increased high school completion, poverty, and employment similarly for Black and White men both in the South and outside of it.

Serving in WWII may have also increased the wages of Black veterans through other channels. In addition to increased education, soldiers received training and thus may have acquired discipline and other skills. Some of these skills could be transferable to civilian life. Although the Army remained segregated throughout WWII, some Black soldiers received significant training as part of their service. The Air Force trained 1,000 Black soldiers as pilots in Tuskegee (Vaughan 2016). Another 7,000 Black men were trained as officers. WWII veterans in particular may have also benefitted from increased social status given the outcome of the war (Teachman and Tedrow 2004).

However, despite the gains for some Blacks in education, and their training and experiences during the war, there is no consistent evidence WWII military service translated into higher wages. Although veterans earned more than non-veterans after they served, they are also positively selected because only those with basic education and in good health are allowed to serve. About 30% of registered individuals examined for the draft were rejected due to mental or physical defects.[2] This rejection rate was larger among Blacks (~40%) than Whites (~28%), with Blacks much more likely to be rejected because of "illiteracy and mental deficiency" and syphilis (Goldstein 1951). Thus, comparisons of the wages of veterans and non-veterans are difficult to interpret.

A few studies have estimated the wage effects of serving in WWII. Angrist and Krueger (1994) conclude that, although WWII veterans earn more than non-veterans, this result is entirely due to positive selection into service. They do not study Black and White populations separately. Using data from the Palmer Survey, conducted by the Bureau of the Census in 1951 which collected the work histories of individuals residing in 6 cities, Collins (2000) evaluated the effect of veteran status on the occupational standing and income of Black Americans. He concluded that being a veteran did not improve either the short-term occupational standing of Blacks or their weekly

[2] Rejection rates were even larger among volunteers (35%).

earnings in 1950. Using data from the National Longitudinal Study of Mature Men, Teachman and Tedrow (2004) found that, in 1965, Black veterans received an hourly wage premium (though not a premium for annual wages or occupation) while Whites did not. More recent work using well identified causal approaches suggests that serving in the military does increase wages for Blacks, but these findings pertain to more recent periods, so they are not clearly applicable to WWII veterans (Greenberg et al. 2022). On net, the evidence does not suggest WWII veterans earned more as a result of their service, though the two studies that look at Blacks have only modest samples and limited ability to estimate causal effects.

In sum, a substantial literature documents that WWII contracts led to economic gains for Black workers and their families at least in the 2-3 decades following the war. Serving during the war may also have improved conditions among veterans, though this is less well established.

II.b. Hypothesized effects of WWII events on lifespan.

How might these events have affected the long-term health and longevity of the Black population? There are no papers we are aware of examining how WWII contracts affected the health or longevity of the Black population. Based on the estimated effects on socio-economic outcomes, the predictions are ambiguous. On the one hand in places with greater WWII contracts Blacks prospered for the next 2-3 decades. On the other hand, these gains faded and potentially reversed. Moreover, as discussed earlier economic improvements do not always translate into health improvements. Thus, it is unclear whether Blacks would live longer as a result, a question we examine empirically. Since WWII contracts do not appear to have affected White's economic outcomes, we will use Whites as a placebo check: we expect no effects on them. We also expect to see smaller effects on Black women, since the literature documents they were less affected by war contracts than men.

A few papers have investigated the long-term health impact of WWII military service with mixed findings due to the difficulty of separating selection (only the healthy are allowed to serve) from the effects of service. Elder et al. (2009) find that WWII veterans have higher mortality rates after they serve. Wilmoth et al. (2010) use the Health and Retirement Survey to

document that although veterans are healthier early in life and have lower mortality rates, their health declines at a faster pace than for non-veterans after age 65. Bedard and Deschênes (2006) show that WWII veterans were more likely to die young, and argue that increased smoking rates, facilitated by the Army's practice of providing cigarettes, were the cause.

These studies do not separately study Blacks. It is not clear whether previous estimates, even if causal, would apply to Black veterans. Training in the Army was less common than for Whites potentially generating fewer benefits in the post-war labor market. Similarly, discrimination during service and in the application of the GI Bill after the war meant fewer benefits for Black WWII veterans. On the other hand, Black soldiers were less likely to see combat during WWII (and thus may have suffered fewer injuries and traumas) but they may still have benefitted from the prestige of having served in the war. A recent study by Kleykamp (2007) found that employers looked more favorably on some Black veterans than Black nonveterans, at least in the modern US.

Landes et al. (2017) analyze data from the 1986-2009 (2011) National Health Interview Survey-Linked Mortality Files, which track survey respondents until 2011 to determine their vital status. This is the only paper we are aware of that reports estimates of the effect of WWII on black mortality. They find no relationship between mortality and veteran status among White or Black individuals born between 1923 and 1928, and were thus likely to have served in WWII, although individuals who serve in non-war times do seem to have a mortality advantage, particularly Black ones. These findings suggest a loss associated with serving during a war, but these estimates are only correlational. This study, like other older papers (e.g. Rothberg et al. 1990) which tend to document that Black veterans die at much lower rates than civilians, does not account for selection. We investigate the causal effects of the war on both Black and White soldiers.

III. Data Construction and Description

WWII expenditures and other city-level characteristics. Data on war contract expenditures by county comes from the War Production Board's Major War Supply Contracts and Major War

Facilities Projects, Jun 1940-September 1945, and is provided in the "1947 County Data Book, available through ICPSR 02896" (Haines and ICPSR, 2010). The data records the amount of WWII expenditures for each area.[3] War contracts (excluding food and food processing) worth over $50,000 are assigned to the county of the primary production plant. We compute war expenditures per capita by dividing by the 1940 population which is also taken from the County databooks. We map county level expenditures onto cities using the metro definitions in the IPUMS data set which allow us to match each county to a unique metropolitan area.

These expenditures typically went to urban rather than rural areas, so we concentrate attention on 152 cities with expenditures as shown in Figure A.1. Average expenditures in cities with expenditures were $1,841 (s.d. $1,769) per person, more than double GDP per capita in 1940 (which was about $780), but there is large variation across areas, with the South receiving fewer contracts than the rest of the country.

To complement these data, we also obtain metro level from Aizer et al. (2022). These data contain estimated draft rates at the city level, as well as city-level characteristics computed from the 1940 census (manufacturing shares, average education, share non-White, employment, wages, population and shares employed in semi-skilled jobs or defense industries). The weighted means for these controls are presented in Table A.0 for the 152 cities we study.

Civilian Metro Sample. We concentrate attention on all Black and White men and women between 20 and 50 years of age living in 1940 in one of the 152 metropolitan areas where WWII contracts were allocated. There are a total of 2,802,191 Blacks and 31,442,111 White individuals living in these cities in 1940. We match their 1940 Census records to their profiles on FamilySearch in order to obtain their age at death. FamilySearch is a public wiki-style genealogical platform that has profiles for over 1.2 billion deceased individuals.

Each profile varies in the amount of detail about the individual but many profiles contain information on birth and death dates from a variety of sources. These sources are identified as

[3] The data contain four variables separating expenditures by type. We sum them all to create total expenditures. We then use the total population in 1940 reported in the same county data set to create the expenditures per capita.

individuals do genealogical research for their ancestor or volunteers help with community projects. FamilySearch has a set of algorithms that provide record hints to people using the platform that provide likely matches between the profiles and one of the 13.2 billion indexed records in the FamilySearch collection. This combination of AI-generated hints combined with the human discernment of millions of individuals provides one of the great strengths of the linked data on FamilySearch. Previous work has shown that the information on age at death that can be derived from this type of platform is quite accurate, when verified against other data sets (Kaplanis et al. 2018, Lleras-Muney et el. 2022, Black et al. 2023).

Among our sample of adults in the 1940 census in one of our 152 cities, we obtain age at death for about 66,000 Black men, 50,000 Black women, 5.3 million White men and 4.5 million White women. The largest limitation of the resulting data is that the representation rates for the Black population are low. We only match about 5.1% of Black men and 3.6% of Black women in the targeted population compared to 34.5% of White men and 28.3% of White women. Nevertheless, and crucially for our approach, WWII expenditures do not predict match rates among Blacks or Whites (Table A.1).

Table 1 shows summary statistics for our civilian metro sample. The mean age at death of Black men is 71.4, compared to 72.3 for White men. Thus, there is a one-year racial gap in the age at death among men. This gap is substantially larger (3.2 years) among women: Black women lived to 75.3 whereas White women lived to 78.5. These gaps are large but smaller than the gap in life expectancy at birth (5.6) or at age 20 (4.8) today.[4] As expected Blacks have substantially lower education than Whites (about 1.5-2 years) and earn about half of what Whites earn. Surprisingly, men are working at roughly the same rates though fewer Black men are working in defense industries in 1940.

The table also shows how the samples compare to the population of the same age living in the same cities in the full 1940 census. We observe that both Blacks and Whites are positively

[4] In 2021 life expectancy at birth was 76.4 for the non-Hispanic White population and 70.8 for the non-Hispanic black population. At age 20, life expectancy was 52.2 for the non-Hispanic White population and 57 for the non-Hispanic black population (Arias et al. 2022).

selected in our sample with substantially higher education and wages than in the census. Individuals in our sample are also more likely to be married and have relatively more children, as it is often the case that married individuals with more descendants are more likely to be represented in genealogical databases. To address this issue and make the results representative, we will reweight the sample in our estimation.

Enlisted and Civilian Sample. First, we match the census and the National Archives and Records Administration (NARA) records to identify veterans. We begin with all men from the IPUMS 1940 Census who were born between 1898 and 1930. This sample is matched to NARA records using a probabilistic matching method with race, marital status, birth year, and name as identifiers. For duplicated matches, only the match with the highest probability of being an accurate match is kept. Remaining matches are kept if the match probability is sufficiently high. This data serves as the veteran data set.

We construct a sample of veterans and non-veterans as follows. We take Black men born between 1910 and 1930 observed in 1940, approximately 2.47M individuals. We match these records to death information from the Family Tree to obtain a sample of about 187K men – a match rate of about 7.6%. Then we identify those who served in WWII by linking them to the NARA enlistment records that we described just above (the veteran data set). The resulting data includes 187K Black individuals for whom we observe the age at death – about 25K (13%) enlisted men and 162K are presumed civilians. We repeat this process for whites. The sample for Whites includes 1.4M enlisted men (about 14.5%) and 7.6M presumed civilians. Since the NARA records only include about 9M individuals out of the 16M that served (the rest were lost), many individuals that we classify as civilians may have served. We refer to them as "presumed civilians". We will address the measurement error in the classification of enlisted men in our empirical strategy.

Table 1B shows the summary stats for these samples. Consistent with previous research showing lower mortality rates for veterans, enlisted Black men lived more than a year longer than presumed civilians. The same is true for Whites though among them the difference is much smaller – only 0.2 years. This is consistent with beneficial effects of serving but also with greater

selectivity among recruits for Blacks. Indeed, the table shows that enlisted Black men have more than one year of schooling compared to presumed civilians, whereas enlisted White men only have about half a year more education. On the other hand, enlisted men of both races had lower wages, perhaps because they were also younger. As expected, enlisted men were also less likely to be married or have children – the selective service made exemptions at various points for men with families. Finally, the geographic distribution of enlisted men differs from that of civilians, which is also to be expected since exemptions were given based on occupation. These differences suggest it is important to account for differential characteristics when estimating the impact of WWII service.

IV. Effects of WWII contracts on lifespan

a. Preliminary evidence

We start by investigating if Blacks living in areas that received more contracts lived longer as a result. To assess this, we first show the density of the age at death for those living in metro areas above and below the median WWII contract ($1,268). For both Black men and Black women, we observe that the distribution of the age at death is shifted slightly to the right for those in above median cities (Figure 1a). The same is not true for Whites (Figure 1b).

While informative this figure ignores the large variation across cities in WWII contracts. Figure 2 shows instead a scatter plot of the average age at death of individuals living in a given metro area in 1940 against the expenditures in that metro area, with the size of the circles representing the number of observations in the area. We see for both Black and White men (Figure 2a) that there is a slightly positive association with the mean age at death rising with expenditures, with a slope that is slightly larger for Black men. There is a slight positive association for Black women and a flatter one for white women, though for both the slot is small.

This preliminary evidence suggests a small improvement in longevity for Blacks in places with more contracts. We now turn to regression analysis to estimate the effects of contracts and to assess if these associations are likely causal.

b. Empirical approach

We exploit cross-sectional variation in WWII contracts to estimate their effects on lifespan by estimating the following regression:

$$AgeAtDeath_{ic} = c + b * WWII\$_{c} + \mu * X_{c} + \theta * X_{i} + e_{i} \qquad (1)$$

where the dependent variable is the age at death conditional on being alive in 1940 for an individual *i* living in city *c* in 1940 and WWII$ is the level of per capita contracts in city *c*, expressed in 1940 dollars. The main coefficient of interest is *b* which captures the effect of increasing expenditures by one dollar on the age at death. We cluster the errors at the city level and estimate regressions separately by sex. We estimate this model using the age at death as the dependent variable, but we also consider an Accelerated Failure Time (AFT) model, common in epidemiology, which uses the log of the age at death as a dependent variable instead. This allows the covariates to accelerate or delay the time until death in proportional (rather than additive) terms. This formulation also facilitates comparisons across groups with different baseline levels of lifespan as the effects of a given covariate can be roughly interpreted as percentage changes.

Without controls the regressions are unlikely to capture causal effects of contracts, because these contracts were not allocated randomly. Previous work has shown that expenditures were mostly determined by the existence of manufacturing. Political considerations and other factors do not appear to have influenced these contracts (Rhode et al. 2018). City draft rates, however, were also highly correlated with expenditures: in places where labor was needed for war production, the draft rates were lower (Aizer et al. 2022). In Table A.2 we show the results of regressing WWII contracts on county characteristics. Consistent with previous evidence we find that manufacturing predicts contracts, as do draft rates, but the share of non-whites, years of education, adult employment or the share employed in semi-skilled jobs do not. Surprisingly wage income and population size, which predict contracts though their effects appear small.

Thus, in our baseline specifications we control for both the manufacturing shares and the draft rates (X_c). We expect these controls to affect the age at death: individuals living in cities with a higher manufacturing base at this time would be richer and live longer lives, especially since infectious diseases were no longer as prevalent in densely populated cities. Therefore, our identification assumption is that once the manufacturing share and the draft rates are controlled for, the remaining variation in the contracts is as good as random and uncorrelated with the error

term in the age at death equation. We also include the fraction Black and other city-level descriptors of the city's economy in 1940 as a robustness check. But we expect these controls will not affect the coefficient on contracts. This is the same identification strategy used by Aizer et al. (2022).

If our identification assumption is correct, then once the determinants of contracts are accounted for, individual covariates should not matter either. We test this by including individual level controls that may affect the age at death (X_i). These include cohort dummies, number of children, marital status, education, wages, region dummies, occupation and industry dummies in 1940.

Since the previous literature has found that WWII contracts did not affect the economic status of Whites, we can use White individuals as a placebo. We expect to find no effects for whites once the key city-level controls (manufacturing shares and draft rates) are included. The results relative to Whites are also of interest since they inform us as to whether WWII contracts shrank racial gaps in the age at death.

This approach will estimate the effects of WWII contracts on people living in those cities in 1940. Many individuals moved to these cities after 1940 – we cannot estimate the effects of contracts on them.

c. The effect of WWII contracts on lifespan: results

Table 2 provides our estimates of the impact of WWII spending on lifespan. If we control for draft rates and cohort dummies only, we find a positive association between expenditures and lifespan for both Black men and women, and a smaller positive effect for White men and no statistically significant effect for White women (Panel A). When we control for all city characteristics in Panel B, the coefficients decline but they remain significant for Black men and women, but not for Whites. In Panel C, we further add individual controls. The coefficients for Whites become essentially zero in magnitude and remain statistically insignificant but they increase in magnitude and remain statistically significant for Black men and women. These results are similar in levels and logs.

Thus, there is some evidence of a benefit of WWII on lifespan for black men, though the fact that the city and individual covariates affect the coefficient on WWII contracts suggest that our identification strategy might be imperfect. However, as expected we do not see economically

or statistically significant effects for Whites. If we take the results in Panel C as our best estimates, then the magnitude implies that an increase in one standard deviation in WWII expenditures (s.d = 1.3) increases longevity by about 0.43 years for Black men and almost 0.59 years for Black women. In contrast the effects for White men are 0.007 years for white men and -0.012 for White women. Since the magnitudes for Whites are so small, differencing their effects does not meaningfully change our conclusions for Blacks.[5]

d. Heterogeneity and Robustness

Our descriptive statistics showed that our samples of Black and White individuals are not representative of the population in the census. To address this issue, we estimate the probability of being in the sample and use IPW methods in a robustness check (panel D of Table 2). In addition, we also all those with an age at death greater than 100 (panel E). Finally in Panel F we drop individuals we identified as having enlisted. The results for Black men are essentially unchanged. But the estimates for Black women become statistically insignificant and drop in magnitude. The same holds true in logs. Therefore, the results for Black women are not as robust as the results for Black men.

The coefficients for White men remain small and insignificant in these alternative specifications. The results imply that Black men lived longer as a result of war contracts, but White men did not. Thus, WWII contracts lowered racial gaps in lifespan among men. The baseline gap in the data overall is 0.91. A standard deviation in contracts lowered this gap by about half, a very significant reduction.

Next, we investigate whether the effects of these contracts differ for various subpopulations. We first look at whether the seemingly positive benefits of the contracts accrued to those that were already working in defense industries in 1940. We find that in fact the opposite is true: the coefficient is only significant for those that were not (Panel B and C of Table 3). This is perhaps not surprising since very few black workers were in this industry before the war – as most previous works suggest, a great benefit of the WWII contracts was that many jobs that were unavailable to Blacks opened up. The results suggest either that these new entrants benefitted the most or that the benefits were the result of spillovers to workers in other industries. Since Whites

[5] Indeed, we can also estimate models where we interact WWII$ with Black. The results are identical to those reported here.

did not benefit, the spillover hypothesis seems less plausible. Thus, the benefits in terms of lifespan appeared to have accrued to those that entered these industries because of the war.

The positive effects for Black men are not solely the result of what happened in a few large cities: dropping the largest 10 cities in our sample yields similar point estimates (Panel D). Panel E suggests that the benefits were also similar in places where blacks were a large share of the existing population of 1940.

We re-estimate results separately for those living in the South in 1940 and for those living elsewhere (Panels F and G). The increases are about three times larger for those originally living in the South compared to others. This result is consistent with the findings in Ferrara and in Aizer et al. (2022) who find WWII improved economic conditions for Black individuals in the South, despite the fact that discriminatory attitudes and segregation were not immediately affected. This suggests that economic gains are the main mechanism behind our results for Blacks.

Finally in Panel H we estimate the model restricting only to deaths observed in 1988-2005, which is what one would have to do if using the CenSoc or other data sets that only include deaths in a given window. We can see that the coefficients for Blacks are much smaller in this sample, particularly for women consistent with what has been reported elsewhere (Lleras-Muney et al. 2022; Goldstein et al. 2023). This result highlights the benefits of working with the the data from FamilySearch which includes deaths across all years.

We also investigate if the results differ by age in 1940. We expect young individuals to have benefitted the most from employment during the war. Indeed, Table 4 shows that the largest effects were for Black men who were 30-34 in 1940 with smaller effects for other age groups. The largest effects for Black women are observed among those who are ages 25-29. The results for White men and women are all statistically insignificant.

In sum, we find the most robust evidence for Black males for whom WWII contracts increased longevity. These gains are concentrated on young adults and likely due to the economic gains associated with WWII contracts for these young cohorts. Moreover, WWII contracts lowered racial gaps in lifespan among men. Black women also appeared to have benefited but the results for them are less robust.

V. Effects of WWII service on age at death

We now investigate the effects of serving in the military during WWII.

a. Preliminary evidence

Figure 3 shows the distribution of the age at death for enlisted men and presumed civilians. We find that among the 1910-1930 birth cohorts, there is no significant increase in the fraction of Black men enlisted in WWII dying at young ages (15-30) as would be expected of men who saw combat. This evidence is consistent with the historical reports cited earlier that documented that Blacks were less likely to be sent to combat and suffered very few combat deaths. By contrast, there is a marked increase among White enlisted men who die at greater rates than presumed civilians.

b. Empirical Approach: OLS and RD Designs

To estimate the impact of WWII service on populations we estimate the following OLS regression

$$AgeAtDeath_i = \ c \ + \beta * I(= 1 \ if \ served \ in \ WWII)_i \ + \ \theta * X_i \ + \ e_i \quad (2)$$

where the age at death for individual *i* is the dependent variable and the main coefficient of interest is β, the coefficient next to the dummy variable equal to one if person *i* served in the military. Other controls include cohort dummies, and variables observed in the 1940 census (number of children, marital status, education, wages, occupation and industry dummies). We also include county FE (instead of state) to better account for individual differences. We estimate robust standard errors to account for heteroskedasticity. We also estimate models that use the log of the age at death as a dependent variable.

We can estimate this model using OLS. However, OLS is likely to generate biased estimates of the effects of service: as discussed earlier, only healthy (and early on literate) individuals were allowed to serve. In an OLS framework we can attempt to account for these differences by including all the individual's observable characteristics and county of enlistment fixed effects. However, there may still be unobservable differences between enlisted and civilian populations. A second issue with the OLS regressions is that we are measuring enlisted status with substantial

error: we constructed a sample of men who are not known to have served, but since not all records of enlisted men survived, many civilians in our sample could have served. This measurement error will likely lead us to obtain attenuated estimates of the effects of service.

To address these issues, we implement three different IV strategies. The first two strategies build on the previous literature. First, we follow the approach in Turner and Bound (2003) and restrict attention to cohorts turning 18 right before and tight after V-day (May 8, 1945). The intuition for this approach is simple: the share drafted fell dramatically after the war was over. Since we observe the exact date of birth in our records, we can compute who would have turned 18 after V-day and investigate how the age at death changes before and after this exact date. To do this, we can estimate the following two reduced form equations:

$$I(=1\ served\ in\ WWII)_{ic} = \ c \ + \delta * I(=1\ if\ born\ after\ Vday)_i \ + f(age) + \ \eta X_i \ + \epsilon_i \quad (3)$$

$$Age_at_death_{ic} = \ c \ + \gamma * I(=1\ if\ born\ after\ Vday)_i \ + g(age) + \ \theta X_i \ + \ \varepsilon_i \quad (4)$$

where the outcomes of interest are whether person *i* served in WWII and their age at death. The key variable of interest the indicator variable equal to one if the person turns 18 after V-day. As is standard in RD designs *f()* and *g()* are functions of age in days which serves as the running variable in both equations. The ratio δ_1/γ_1 is the IV estimate of the effect of serving on the age at death.

But we can also simply obtain an IV estimate of the effect of serving on the age at death by using the indicator as an instrument. To do this we restrict attention to those turning 18 one year before and one year after V-day and we control for age linearly. Then, in addition to presenting estimates of equations 3 and 4, we estimate equation 2 using the indicator for turning 18 after V-day as an instrument. The identification assumption here is that turning 18 after V-day lowered the chances of serving but affected longevity only through its effect on military service.

This approach uses only the variation over time (across cohorts) in the likelihood of enlistment. Alternatively, we can follow Thomas (2017) and leverage variation in enlistment rates across space as well. To do this we compute the share serving in one's state of birth and quarter of birth to use as an instrument. The assumption here is that these shares reflect idiosyncratic differences in the likelihood of serving generated by the workings of local draft

boards – they predict who is more likely to serve, but ideally nothing else about the population. In this specification we include state of birth FE and quarter of birth fixed effects.

Inspired by this concept, we implement a third IV approach that leverages variation in who served in WWI. Again, the intuition here is that local draft boards would operate differently across space and that this would be persistent over time. Based on this idea, we compute the share of veterans serving in WWI in one's county of residence in 1940. In this specification we only control for state of residence.

c. The Effect of Serving in WWII on Lifespan: Results

Table 5 shows the OLS results. Without any controls we find enlisted Black men lived 1.2 years longer than civilians (2.5% in the log specification), and White enlisted men lived 0.16 years longer (0.2% in the log specification). Both are statistically significant. Once we add controls, the coefficient for Black men falls to 0.8 years (now only a 1.8 percent increase) but remains statistically significant. The coefficient drops substantially in magnitude and becomes statistically significant for White men.[6]

These results suggest there were positive gains associated with service for Black men, but detrimental effects for Whites. This could be explained by the fact that Blacks did not see combat but benefitted otherwise from being veterans. However, the fact that adding covariates has such a large impact on the coefficients, suggests a large amount of positive selection could be at play as well. Since selection was larger for Blacks, selection could still explain our findings.

To further eliminate selection as an explanation we now turn to our IV approaches.[7] We start by presenting graphical evidence of the effect of the end of the war on the probability of enlistment and on the age at death. Figure 4 shows the results. Panel A shows that for both races, those turning 18 after V-day have a lower probability of serving. At the discontinuity the effect

[6] The other covariates have the expected signs for the most part. A year of education increases lifespan by about 0.4-0.5 years consistent with the findings in Lleras-Muney et al. (2022). Wages also increase longevity as expected. The coefficients on working are difficult to interpret – we have two measures of working. The only surprising coefficient is on marital status. This coefficient is negative for Black men, which is unusual in the literature.

[7] For the RD we restrict attention to a sub-sample of men: those who are turning 18 around the end of the war and who have exact date of birth. By restricting attention to those with exact date of birth we lose about 30% of the Black population (whether they served or not), and 12-14% of the White population. But the samples with exact date of birth are almost identical in observables to those without exact date of birth, and this is true of enlisted men and presumed civilians of either race (Table A.6).

for Blacks is around 2.5 percentage points, relative to a pre-V-day mean of 15 percentage points, a 16% decline. For Whites the declines are smaller, about 2 percentage points, about 12% relative to the pre-V-day mean of 0.1625.

The figure shows two concerning patterns. First, for Blacks the data are noisy, suggesting that our sample might not be large enough to estimate precise effects for them. Second the data for whites displays substantial seasonality.

Panel b shows the reduced form for the age at death. We also observe that the age at death drops after V-day for both Blacks and Whites. At V-day the drop is about 0.4 years for Blacks and Whites. This visual evidence therefore suggests serving increased lifespan. However here again we observe that the data for Blacks is very noisy, there is substantial seasonality, and that after V-day there is a change in the slope, rather than just a drop.

In table 6 we present the estimation results. In panel a, we should the results without any controls and including only those that turned 18 within a year of V-day. Consistent with the figures there is a drop in the likelihood of serving and a drop in the age at death, for both Blacks and Whites. However, the implied magnitudes are implausibly large resulting in an IV estimate that states that serving increased the age at death by 11-12 years. In panel b when we add controls, including age and other individual controls, we see that the IV estimates change sign and for Blacks are not statistically significant. Alternative specifications using a larger bandwidth or different functional forms result in estimates that are equally unstable. We also implemented a regression-kink design since Figure 4 also suggests that would be a better fit for the data. These estimates (Table A.4) are also very unstable.

Ultimately the results from this approach are not robust – the main reasons were already apparent in Figure 4: the data for Blacks is too noisy and there is significant seasonality which makes the RD estimate sensitive to the exact functional form that is chosen to account for age/cohort patterns and to the bandwidth choice.

Table 7 presents the results of the alternative IV approach which uses the shares of enlisted men as instruments. For this exercise we use the cohorts born from 1923 to 1930 as the previous literature has done. Although these instruments are predictive of enlistment, the reduced firm effects are not statistically significant. As a result, neither are the IV estimates. These estimates are however negative and suggest that serving lowered the age at death. We cannot however rule out positive effects or zero effects.

Table 8 presents the results of the IV approach that uses WWI draft rates as an instrument instead using the same sample of men born 1923-1930. The share of men serving in WWI in a given county does predict service in WWII for both Black and White men. However, the IV results here are negative and statistically insignificant. They are also implausibly large and sensitive to the inclusion of controls.

In sum, although we observe that individuals serving in WWII lived longer lives, it is unclear from our research whether these effects are causal. Our causal estimates leverage three different IV strategies and generally find negative effects of serving in WWII on age at death, but the standard errors are large and we cannot rule out zero or positive effects.

VI. Discussion

WWII was associated with two massive disruptive events. More than 16 million men were drafted to serve in the war, and among those that did not serve many went to work in factories that supported the war effort, which was heavily financed by the federal government. In this paper we investigated how these events affected the lifespan of Black men and women, which previous research has shown benefited economically from these events, at least in the short to medium run. We view lifespan as a summary indicator of lifetime wellbeing.

We find that young Black men that lived in cities receiving more WWII contracts lived significantly longer lives as a result. The same is not true for White men who saw no increases in lifespan as a result. Thus, WWII contracts lowered racial gaps in lifespan among men. The results for women are similar but less robust. Because the effects for Black men are large in the South and concentrated among young workers, they are most consistent with WWII contracts increasing the lifetime earnings of workers, which in turn improved their longevity.

On the other hand, we are unable to ascertain the effects of serving in the military during WWII. Observationally it would appear that Blacks who served lived longer as a result, but we are not fully able to address the substantial selection that took place. Our causal estimates suggest negative impacts (for both Blacks and Whites) but these are estimated with substantial error. Thus, more research is needed to establish how WWII service affected health and longevity.

This research has some limitations. WWII generated substantial migration. However, we cannot investigate how WWII contracts affected the longevity of individuals that moved to

locations with more WWII contracts. This will become possible when we can locate individuals in the 1950 census. At that time, we will be able to identify migrants and compare their experiences to the experiences of those that were already living in the North, or to the experiences of those that stay in the South. Previous research has found that the Great Migration of the Black population was detrimental to their health (Black et al. 2015, Aaronson et al. 2021). Thus, we hypothesize that the gains in longevity of individuals that were in the North already in the 1940s will be larger than the longevity gains for migrants.

Another limitation of this paper concerns the quality of the data for the Black population. Although our samples of Blacks are the largest we know of to study these questions, our match rates for Blacks are very low. Although these match rates are not predicted by expenditures or service status, the fact that our samples are small and positively selected suggests that our results give only a partial answer to the effects of WWII. We have addressed this issue through reweighting but it's possible that in a larger sample the results would be different as we might be missing entire types of individuals in our samples. Most notably our regression discontinuity design for Blacks are underpowered limiting our ability to estimate causal impacts of WWII military service. Other approaches might be needed to answer this question with more precision.

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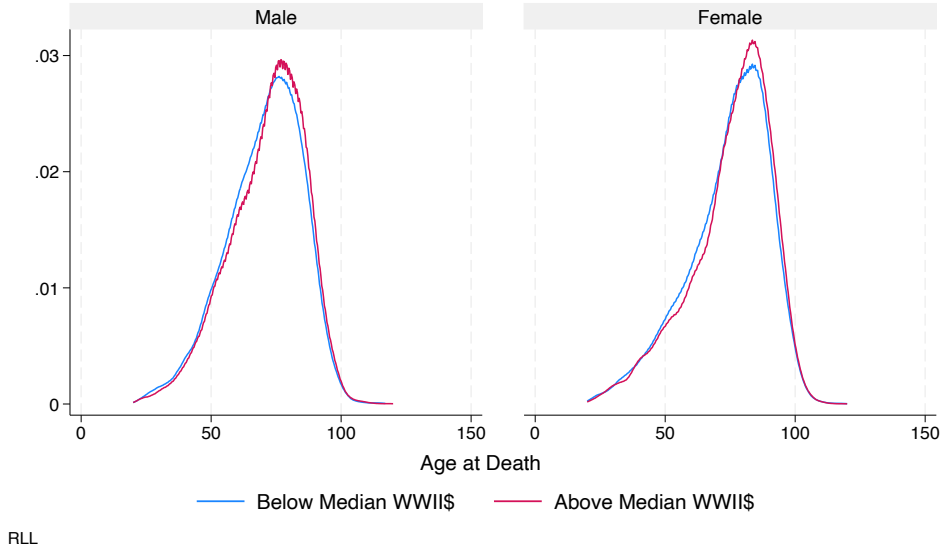
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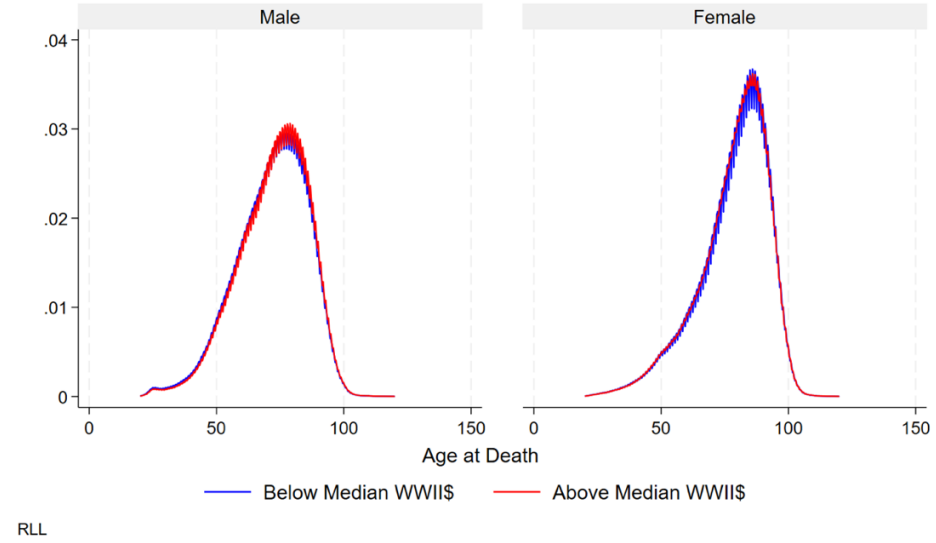
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Figure 1: Age at death for high and low spending metro areas by race

a. Black population



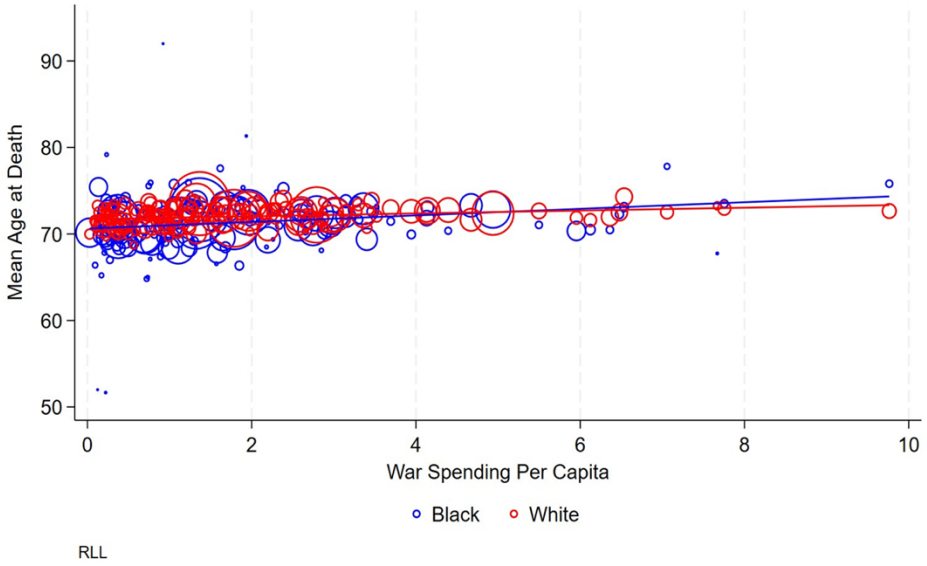
b. White population



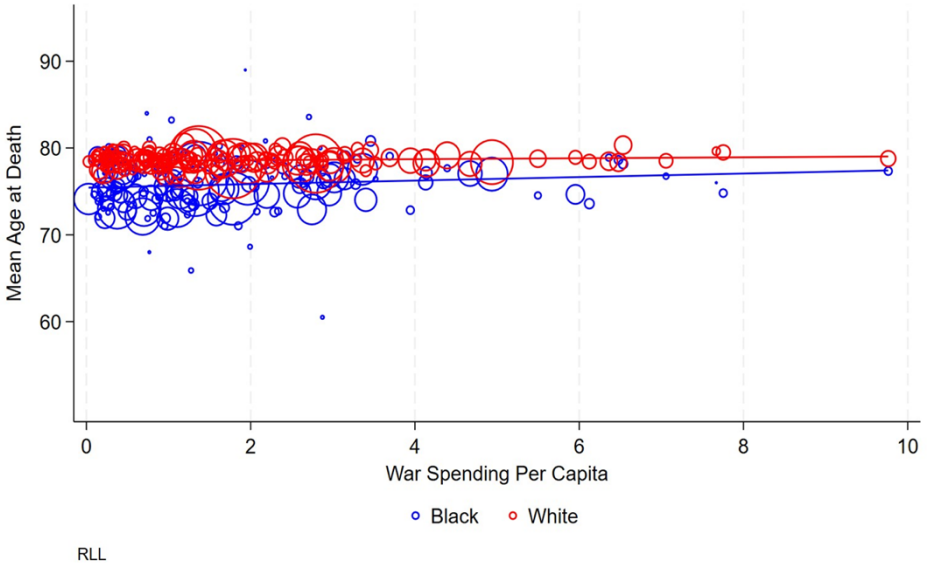
Notes: The figures show the estimated density of the age at death by race, gender and for the individuals living in cities above and below the median WWII$.

Figure 2: WWII expenditures and age at death by race

a. Male population ages 20-50 in 1940

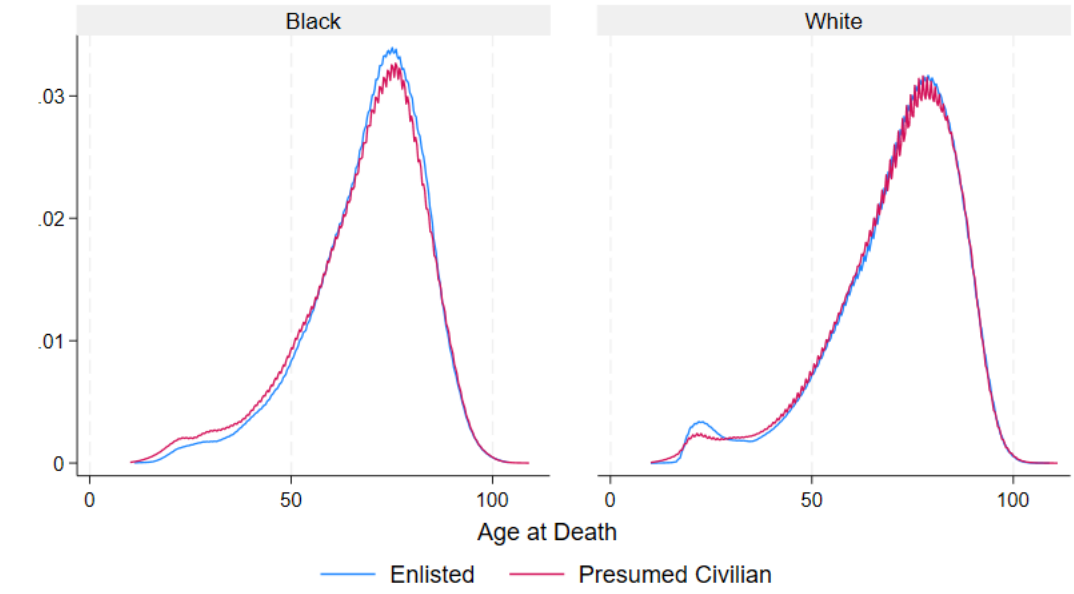


b. Female population ages 20-50 in 1940



Notes: Figure shows the relationship between average age at death in a given metro area and WWII spending in that area. The age at death comes from the RLL data. Circles are proportional to sample size. War spending per capita is given in thousands of (1940) dollars.

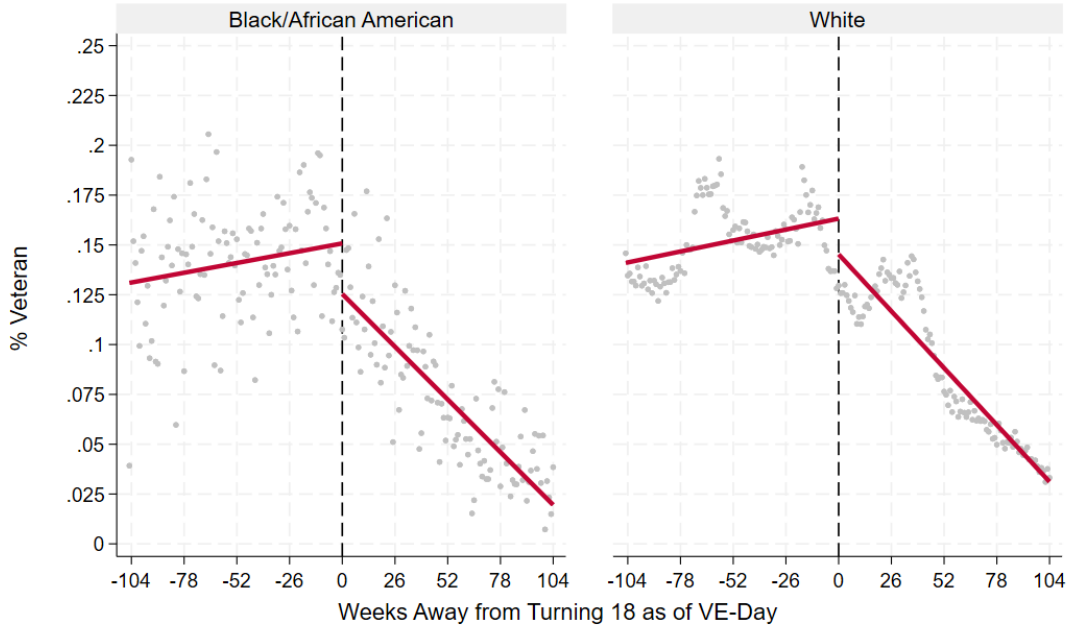
Figure 3: Age distribution by Race and Veteran Status



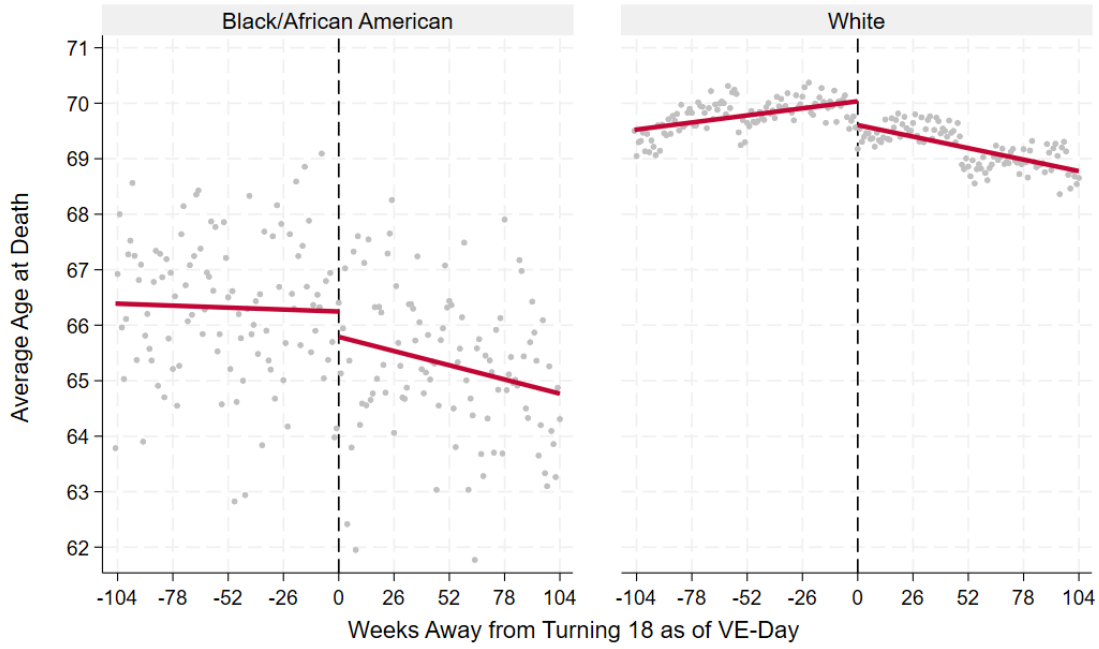
RLL

Figure 4: V-day and outcomes of men born 1910-1930

a. Effect of V-Day on enlistment rates, by race



b. Effect of V-Day on age at death, by race



Notes: The samples are restricted to those born 104 weeks before and after V-day (8 May 1945). The data are averaged by week. The red lines are estimated by OLS to the left and right of the V-day.

Table 1A: Summary statistics for the Black population ages 20-50 living in 152 cities in 1940

	Black Men		Black Women		White Men		White Women	
	1940 census	RLL	1940 census	RLL	1940 census	RLL	1940 census	RLL
Panel A: Individual characteristics								
Age at death		71.37		75.34		72.28		78.51
		[14.35]		[15.43]		[13.75]		[13.60]
Age in 1940	34.51	33.54	33.59	32.45	34.37	34.41	34.06	34.15
	[8.58]	[8.91]	[8.51]	[8.62]	[8.90]	[8.88]	[8.87]	[8.76]
Years of education	7.87	9.07	8.43	9.62	10.76	11.22	10.73	11.17
	[3.55]	[3.74]	[3.43]	[3.51]	[3.47]	[3.24]	[3.28]	[2.99]
Working last year (Income)	0.78	0.8	0.45	0.32	0.79	0.81	0.32	0.25
	[0.41]	[0.40]	[0.50]	[0.47]	[0.41]	[0.39]	[0.47]	[0.44]
Working last year (Occupation)	0.9	0.93	0.51	0.37	0.93	0.95	0.36	0.28
	[0.30]	[0.26]	[0.50]	[0.48]	[0.25]	[0.22]	[0.48]	[0.45]
Works in defense industry in 1940	0.29	0.31	0.05	0.05	0.41	0.42	0.12	0.09
	[0.46]	[0.46]	[0.22]	[0.21]	[0.49]	[0.49]	[0.32]	[0.29]
Wage and salary income in 1939	568	641	188	142	1143	1222	297	225
	[487]	[589]	[303]	[307]	[1,000]	[1,049]	[534]	[474]
Married in 1940	0.69	0.74	0.68	0.76	0.67	0.74	0.71	0.79
	[0.46]	[0.44]	[0.47]	[0.43]	[0.47]	[0.44]	[0.45]	[0.41]
Number of Children in 1940	0.8	1.69	1.02	2.22	0.97	1.26	1.16	1.52
	[1.57]	[2.24]	[1.66]	[2.38]	[1.42]	[1.57]	[1.50]	[1.67]
Northeast	0.32	0.25	0.32	0.25	0.46	0.33	0.46	0.31
	[0.47]	[0.43]	[0.47]	[0.43]	[0.50]	[0.47]	[0.50]	[0.46]
Midwest	0.23	0.24	0.22	0.23	0.3	0.36	0.3	0.36
	[0.42]	[0.43]	[0.41]	[0.42]	[0.46]	[0.48]	[0.46]	[0.48]
South	0.43	0.46	0.44	0.48	0.12	0.16	0.12	0.17
	[0.49]	[0.50]	[0.50]	[0.50]	[0.33]	[0.37]	[0.33]	[0.38]
West	0.03	0.04	0.03	0.04	0.12	0.15	0.12	0.15
	[0.16]	[0.20]	[0.16]	[0.19]	[0.32]	[0.36]	[0.32]	[0.36]
Panel b: City controls (N cities = 152)								
WWII expenditures (in thousands)	1.72	1.69	1.68	1.66	2.04	2.11	2.02	2.1
	[1.28]	[1.30]	[1.25]	[1.29]	[1.38]	[1.49]	[1.37]	[1.50]
% manufacturing in city	0.25	0.25	0.25	0.25	0.28	0.27	0.28	0.27
	[0.09]	[0.09]	[0.08]	[0.09]	[0.08]	[0.09]	[0.08]	[0.09]
Draft Share	0.22	0.22	0.22	0.22	0.22	0.21	0.22	0.21
	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.04]	[0.03]	[0.04]
N observations	1.3M	66,375	1.5M	50,337	15.4M	5M	16M	4.5M

Notes: Working last year (Income) is defined as anyone with positive income in the previous year. Working last year (Occupation) is defined as anyone with an occupation that was not a "non-occupational response." People 14+ who were not institutional inmates reported wages. Defense Industries are mining, manufacturing, transportation, and government industries, with ind1950 codes 203-239, 306-499, 506-568, 906-946.

Table 1B: Summary statistics for Black men born 1910-1930 serving and not serving in WWII

	Black men				White men			
	1940 census	has death record	Enlisted	Presumed civilians	1940 census	has death record	Enlisted	Presumed civilians
Age at death	-	68.20	69.23	68.04	-	70.69	70.83	70.66
	-	[15.30]	[14.12]	[15.46]	-	[15.81]	[15.84]	[15.80]
Age in 1940	19.56	19.06	18.73	19.11	19.81	19.95	19.39	20.05
	[6.10]	[5.80]	[4.41]	[5.98]	[5.99]	[5.89]	[4.66]	[6.07]
Years of education	6.66	7.30	8.29	7.15	9.75	9.90	10.33	9.82
	[3.31]	[3.40]	[3.11]	[3.42]	[3.34]	[3.26]	[2.81]	[3.32]
Wage and salary income in 1939	234.55	207.80	158.85	216.24	488.21	457.30	346.65	477.70
	[324.42]	[325.59]	[270.69]	[333.42]	[626.77]	[610.348]	[498.26]	[626.71]
Works in defense industry in 1940	0.12	0.11	0.10	0.11	0.20	0.20	0.19	0.20
	[0.33]	[0.32]	[0.31]	[0.32]	[0.40]	[0.40]	[0.39]	[0.40]
Married in 1940	0.28	0.25	0.09	0.27	0.24	0.26	0.11	0.29
	[0.45]	[0.43]	[0.29]	[0.44]	[0.43]	[0.44]	[0.31]	[0.45]
Number of Children in 1940	0.30	0.39	0.08	0.44	0.22	0.28	0.08	0.32
	[0.88]	[1.05]	[0.46]	[1.11]	[0.65]	[0.74]	[0.38]	[0.78]
Working last year (Income)	0.40	0.36	0.35	0.36	0.43	0.43	0.43	0.43
	[0.49]	[0.48]	[0.48]	[0.48]	[0.50]	[0.50]	[0.49]	[0.50]
Working last year (Occupation)	0.57	0.56	0.55	0.56	0.55	0.57	0.55	0.57
	[0.49]	[0.50]	[0.50]	[0.50]	[0.50]	[0.50]	[0.50]	[0.49]
Northeast	0.09	0.07	0.11	0.06	0.29	0.19	0.29	0.18
	[0.29]	[0.26]	[0.31]	[0.24]	[0.45]	[0.40]	[0.45]	[0.38]
Midwest	0.09	0.11	0.12	0.10	0.32	0.36	0.32	0.37
	[0.29]	[0.31]	[0.32]	[0.31]	[0.47]	[0.48]	[0.47]	[0.48]
South	0.80	0.81	0.76	0.82	0.29	0.32	0.28	0.33
	[0.40]	[0.39]	[0.43]	[0.39]	[0.45]	[0.47]	[0.45]	[0.47]
West	0.01	0.02	0.02	0.01	0.11	0.12	0.11	0.13
	[0.11]	[0.12]	[0.14]	[0.12]	[0.31]	[0.33]	[0.31]	[0.33]
N observations	2,467,571	187,384	25,067	162,317	21,865,258	8,985,702	1,309,184	7,676,518

Notes: Enlisted men are individuals that we succesfully linked to the NARA records. Others are presumed to be civilians.

Table 2: The effect of WWII contracts on lifespan by race and gender in the RLL data

Dependent variable:	Age at death				Log (Age at death)			
	Men		Women		Men		Women	
	Black	White	Black	White	Black	White	Black	White
Panel A: only control for draft rates & cohort dummies								
WWII spending per capita	0.384449***	0.086937*	0.344477**	-0.01639	0.005766***	0.001360**	0.005110**	-0.00024
	[0.104987]	[0.045054]	[0.143895]	[0.037602]	[0.001627]	[0.000681]	[0.002211]	[0.000538]
Panel B: city-level controls								
WWII spending per capita	0.203719**	0.021497	0.209308*	-0.01964	0.003240**	0.000347	0.003230*	-0.00023
	[0.086204]	[0.030493]	[0.111438]	[0.034000]	[0.001364]	[0.000455]	[0.001719]	[0.000481]
Panel C: Individual + city level controls								
WWII spending per capita	0.338949***	0.005606	0.452850***	-0.00938	0.005512***	0.000068	0.006967***	-9.20E-05
	[0.117087]	[0.027537]	[0.137036]	[0.034209]	[0.001824]	[0.000416]	[0.002053]	[0.000489]
Panel D: ALL controls and IPW								
WWII spending per capita	0.362999***	0.020473	0.189808	-0.00522	0.005987***	0.000282	0.002392	-2.80E-05
	[0.128146]	[0.034986]	[0.178118]	[0.045769]	[0.001998]	[0.000539]	[0.002689]	[0.000661]
N	66,375	66,375	50,337	50,337	5,334,887	5,334,887	4,527,168	4,527,168
Panel E: Panel D + Dropping age at death outliers								
WWII spending per capita	0.337394**	0.017655	0.179301	-0.00649	0.005676***	0.000248	0.002227	-4.30E-05
	[0.130569]	[0.035630]	[0.172387]	[0.045449]	[0.002025]	[0.000548]	[0.002661]	[0.000659]
N for Panel E	66,124	5,319,294	49,728	4,478,933	66,124	5,319,294	49,728	4,478,933
Panel F: Panel D + Dropping people identified as drafted								
WWII spending per capita	0.376266***	0.021066	0.189808	-0.00522	0.006169***	0.000282	0.002392	-2.80E-05
	[0.130221]	[0.034560]	[0.178118]	[0.045769]	[0.002046]	[0.000537]	[0.002689]	[0.000661]
N for Panel F	61,974	4,971,166	50,337	4,527,168	61,974	4,971,166	50,337	4,527,168

Notes: individual controls include age, number of children, marital status, education, wages, region fixed effects, occupation and industry dummies in 1940. City level controls include draft %, industry manufacturing %, industry defense %, industry agriculture %, years of adult education, Black %, employed adult %, population, yearly wage, semi-skilled or higher occupation %

Table 3: Heterogeneity in the effects of WWII contracts on lifespan of Black men and women

	Levels		Logs	
	Males	Females	Males	Females
Panel A: Basic results (Panel C of table 3)				
WWII spending per capita	0.339***	0.453***	0.00551***	0.00697***
	[0.117087]	[0.137036]	[0.001824]	[0.002053]
N	66375	50337	66375	50337
Panel B: defense industry in 1940				
WWII spending per capita	0.20825	0.063183	0.003259	-0.000879
	[0.139740]	[0.369007]	[0.002098]	[0.005764]
N	20813	2365	20813	2365
Panel C: not defense industry in 1940				
WWII spending per capita	0.391589***	0.472076***	0.006423***	0.007331***
	[0.121250]	[0.139893]	[0.001911]	[0.002094]
N	45562	47972	45562	47972
Panel D: dropping largest 10 cities				
WWII spending per capita	0.382695***	0.407183***	0.006262***	0.006627***
	[0.118232]	[0.142983]	[0.001843]	[0.002158]
N	45263	35097	45263	35097
Panel E: cities with above median black population in 1940				
WWII spending per capita	0.404527***	0.503225***	0.006370***	0.007732***
	[0.150185]	[0.173936]	[0.002362]	[0.002607]
N	59653	45486	59653	45486
Panel F: Living in the South in 1940				
WWII spending per capita	0.846421***	0.756128**	0.013182***	0.011535**
	[0.218478]	[0.296889]	[0.003476]	[0.004557]
N	30638	24225	30638	24225
Panel G: Not living in the South in 1940				
WWII spending per capita	0.294618**	0.524185***	0.004940**	0.008268***
	[0.125377]	[0.139042]	[0.001907]	[0.002104]
N	35737	26112	35737	26112
Panel H: only death 1988-2005				
WWII spending per capita	0.072387**	0.050752	0.000833*	0.000627
	[0.034226]	[0.044947]	[0.000425]	[0.000535]
N	20582	21077	20582	21077

Notes: individual controls include age, number of children, marital status, education, wages, state, occupation and industry dummies in 1940. City level controls include draft %, industry manufacturing %, industry defense %, industry agriculture %, years of adult education, Black %, employed adult %, population, yearly wage, semi-skilled or higher occupation %. Basic specification is th same as panel C in table 2

Table 4: Effects of WWII contracts on lifespan, by Age in 1940

	Black				White			
	Levels		Logs		Levels		Logs	
	Males	Females	Males	Females	Males	Females	Males	Females
Panel A: 20-24								
WWII spending p.c	0.20105	0.398293**	0.003544	0.007316***	0.028412	-0.018493	0.000409	-0.000203
	[0.180727]	[0.160381]	[0.003040]	[0.002640]	[0.035908]	[0.037165]	[0.000555]	[0.000532]
N	13966	11940	13966	11940	944529	806429	944529	806429
Panel B: 25-29								
WWII spending p.c	0.400563**	0.627193***	0.007450**	0.009727**	0.012861	-0.011485	0.000162	-0.00008
	[0.195753]	[0.237503]	[0.003078]	[0.003816]	[0.033783]	[0.039088]	[0.000522]	[0.000574]
N	11369	9566	11369	9566	880367	770267	880367	770267
Panel C: 30-34								
WWII spending p.c	0.576930***	0.446321**	0.009034***	0.006472**	0.014689	-0.020356	0.000155	-0.000248
	[0.180339]	[0.195692]	[0.002791]	[0.003045]	[0.030689]	[0.041481]	[0.000463]	[0.000588]
N	11039	8618	11039	8618	898446	791732	898446	791732
Panel D: 35-39								
WWII spending p.c	0.351175*	0.345244	0.005373*	0.005113	-0.0039	-0.007102	-0.000095	-0.00008
	[0.192239]	[0.217174]	[0.002845]	[0.003235]	[0.029401]	[0.037674]	[0.000446]	[0.000534]
N	10264	8044	10264	8044	859226	749258	859226	749258
Panel E: 40-44								
WWII spending p.c	0.204624	0.601163**	0.003164	0.007557**	-0.009655	-0.009085	-0.000159	-0.000128
	[0.142878]	[0.253063]	[0.002187]	[0.003450]	[0.029488]	[0.036110]	[0.000424]	[0.000497]
N	9748	6370	9748	6370	831845	686111	831845	686111
Panel F: 45-50								
WWII spending p.c	0.332276*	0.248675	0.004583*	0.003722	-0.024146	0.012494	-0.000314	0.000179
	[0.168427]	[0.208836]	[0.002398]	[0.002893]	[0.024777]	[0.037346]	[0.000353]	[0.000512]
N	9989	5799	9989	5799	920474	723371	920474	723371
Controls?	yes	yes	yes	yes	yes	yes	yes	yes

Note: individual controls include age, number of children, marital status, education, wages, state, occupation and industry dummies in 1940. City level controls include draft %, industry manufacturing %, industry defense %, industry agriculture %, years of adult education, Black %, employed adult %, population, yearly wage, semi-skilled or higher occupation %. Basic specification is th same as panel C in table 2

Table 5: The effect of serving in WWII on age at death, 1910-1930 birth cohorts

Dependent variable	age at death				Log(age at death)			
	Black men		White men		Black men		White men	
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Enlisted	1.1761***	0.7378***	0.1639***	0.0293	0.0245***	0.0176***	0.0020***	0.0014***
	(0.0961)	(0.1134)	(0.0149)	(0.0188)	(0.0017)	(0.0020)	(0.0003)	(0.0003)
Years of education in census		0.3514***		0.5121***		0.0058***		0.0078***
		(0.0148)		(0.0053)		(0.0003)		(0.0001)
Wage and salary income in 1939		0.0005**		0.0005***		0.0000**		0.0000***
		(0.0002)		(0.0000)		(0.0000)		(0.0000)
Working last year (Income)		-0.5140***		-0.9075***		-0.0077***		-0.0131***
		(0.1225)		(0.0291)		(0.0021)		(0.0005)
Working last year (Occupation)		0.3701***		0.6208***		0.0088***		0.0126***
		(0.1245)		(0.0339)		(0.0023)		(0.0006)
Works in defense industry in 1940		-0.2583*		-0.1888***		-0.0040*		-0.0031***
		(0.1320)		(0.0269)		(0.0022)		(0.0005)
Married in 1940		-0.6536***		-0.0870**		-0.0099***		0.0017***
		(0.1462)		(0.0375)		(0.0025)		(0.0006)
Number of Children in 1940		-0.0152		-0.3046***		-0.0000		-0.0041***
		(0.0512)		(0.0148)		(0.0009)		(0.0002)
County of residence in 1940 FE	No	Yes	No	Yes	No	Yes	No	Yes
Cohort FE	No	Yes	No	Yes	No	Yes	No	Yes
N observations	187,205	187,205	8,980,066	8,980,066	187,205	187,205	8,980,066	8,980,066

Notes: Working last year (Income) is defined as anyone with positive income in the previous year. Working last year (Occupation) is defined as anyone with an occupation that was not a "non-occupational response." People 14+ who were not institutional inmates reported wages. All who reported "Missing" or "N/A" are coded as missing. Defense Industries are mining, manufacturing, transportation, and government industries, with ind1950 codes 203-239, 306-499, 506-568, 906-946. Missing wages were imputed to 0 and we include a dummy for those with missing income.

Table 6: IV estimates for cohorts born 1 year before and after V-day with exact age of birth

	Blacks				Whites			
Depedent variable:	Enlisted	age at death			Enlisted	age at death		
	FS	RF	OLS	IV	FS	RF	OLS	IV
Panel A: no controls								
I(turn 18 after V-day)	-0.0436***	-0.5179**			-0.0338***	-0.4313***		
	(0.0055)	(0.2581)			(0.0027)	(0.0401)		
Enlisted			0.6653*	11.8748*			0.9182***	12.7607***
			(0.3728)	(6.0738)			(0.0631)	(1.1387)
Cragg-Donald F-stat				67.03				1745.88
N		15,188				729,714		
Panel B: All controls								
I(turn 18 after V-day)	-0.0307***	0.4195			-0.0194***	0.7863***		
	(0.0069)	(0.3198)			(0.0025)	(0.0783)		
Enlisted			0.3841	-13.6793			0.7176***	-40.5507***
			(0.4155)	(10.1657)			(0.0653)	(6.3458)
Cragg-Donald F-stat				22.28				328.99
N		15,188				729,714		

Notes: Controls for age linearly (no cohort effects), and we include all the other controls in Table 5. Cluster the standard errors at the week level.

Table 7: IV estimates for cohorts born 1923-1930 with exact date of birth

Depedent variable:	Blacks				Whites			
	Enlisted	age at death			Enlisted	age at death		
	FS	RF	OLS	IV	FS	RF	OLS	IV
Panel A: state of birth and YOB*QOB FE								
% serving in state of birth and YOB*QOB	1.000***	-1.5959			1.0000***	-0.2756		
	-	(1.1957)			-	(0.5370)		
Enlisted			0.4067*	-1.5959			0.2313***	-0.2756
			(0.2306)	(1.1855)			(0.0635)	(0.5346)
Cragg-Donald F-stat								
N		56,142				2,724,341		
Panel B: All controls								
% serving in state of birth and YOB*QOB	0.9945***	-1.5883			1.0028***	-0.5136		
	(0.0103)	(1.2234)			(0.0020)	(0.4977)		
Enlisted			0.1657	-1.5971			0.1705***	-0.5122
			(0.2078)	(1.1958)			(0.0563)	(0.4938)
Cragg-Donald F-stat				1552.26				
N		56,142				2,724,341		

Notes: Controls includes state of birth FE, QOB*YOB fixed efffects, county of residence FE and all other individual controls in Table 5. Standard errors clustered at the state of birth level.

Table 8: IV estimates for cohorts born 1923-1930

Depedent variable:	Blacks				Whites			
	Enlisted	age at death			Enlisted	age at death		
	FS	RF	OLS	IV	FS	RF	OLS	IV
Panel A: State of residence and YOB FE								
% served in WWI in county of residence	1.164***	-18.149***			0.3222**	-4.657*		
	(0.3370)	(6.8671)			(0.1486)	(2.7553)		
Enlisted			0.7560***	-15.5915**			0.2721***	-14.4561
			(0.1538)	(7.4096)			(0.0280)	(11.4081)
Cragg-Donald F-stat				67.24				183.07
N		82,409				3,414,314		
Panel B: All controls								
% served in WWI in county of residence	0.670**	-35.438***			0.2289	-16.345***		
	(0.3219)	(7.8119)			(0.1442)	(2.6728)		
Enlisted			0.5976***	-52.8834*			0.2108***	-71.3999
			(0.1537)	(28.0132)			(0.0280)	(47.0757)
Cragg-Donald F-stat				21.47				90.77
N		82,409				3,414,314		

Notes: Controls include state of residence FE and other controls in Table 5. Standard errors clustered at the county of residence level.

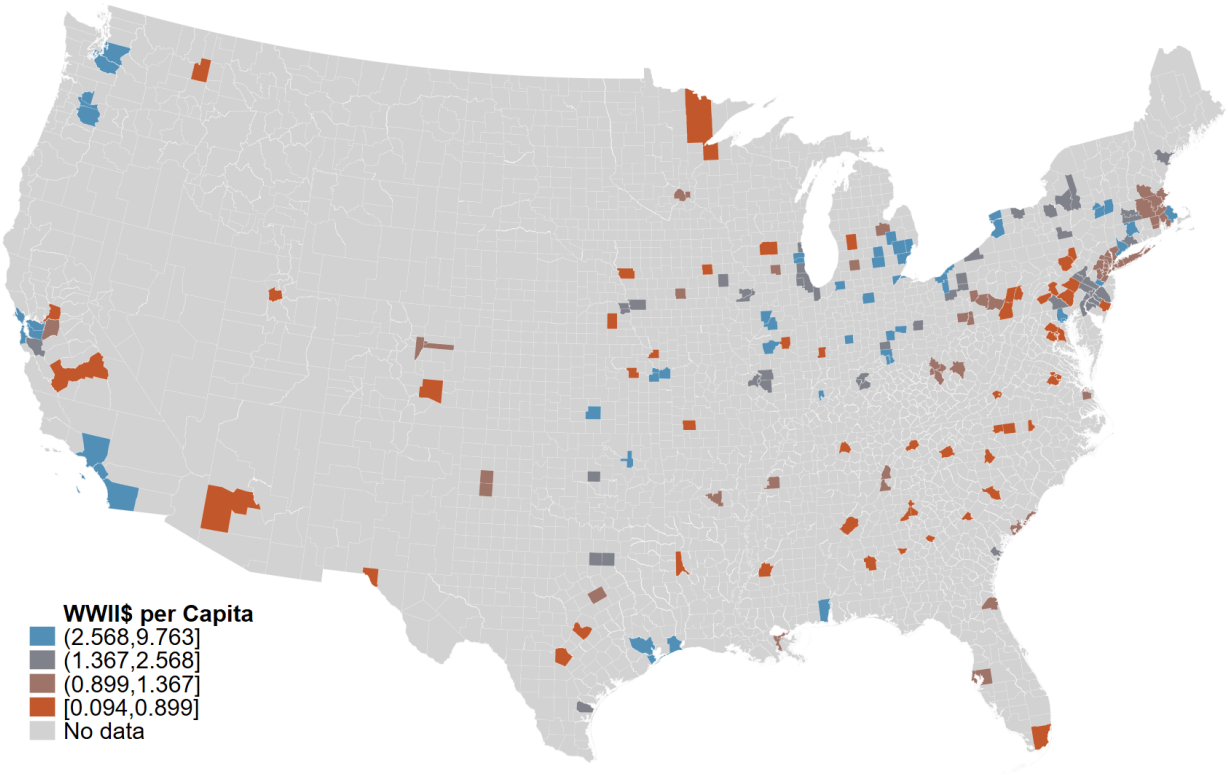
Appendix

1-Appendix Figures

2-Appendix Tables

3-Data Construction details

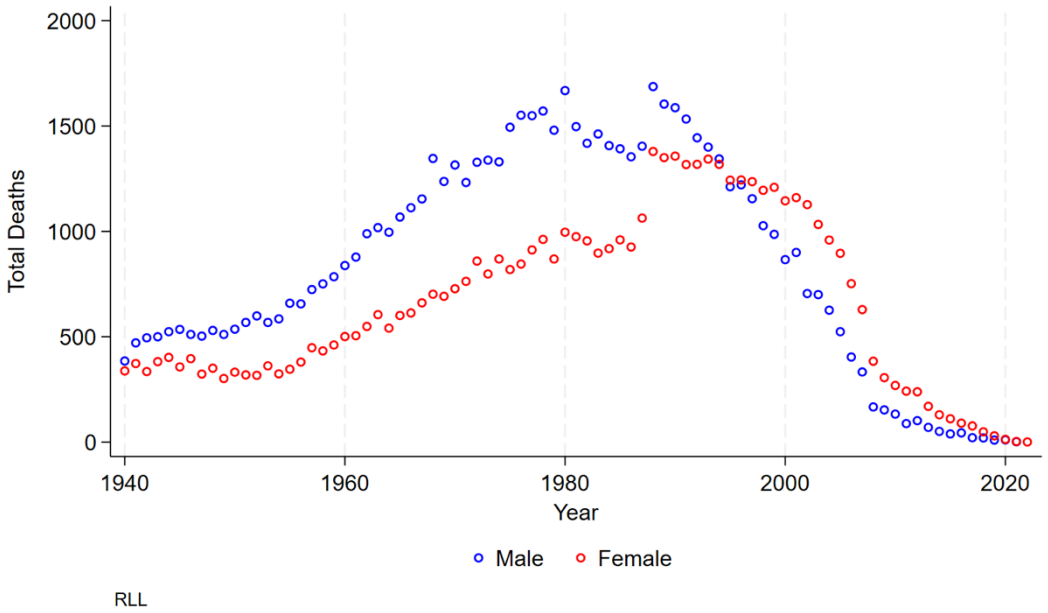
Figure A1. Distribution of WWII contracts across 152 cities.



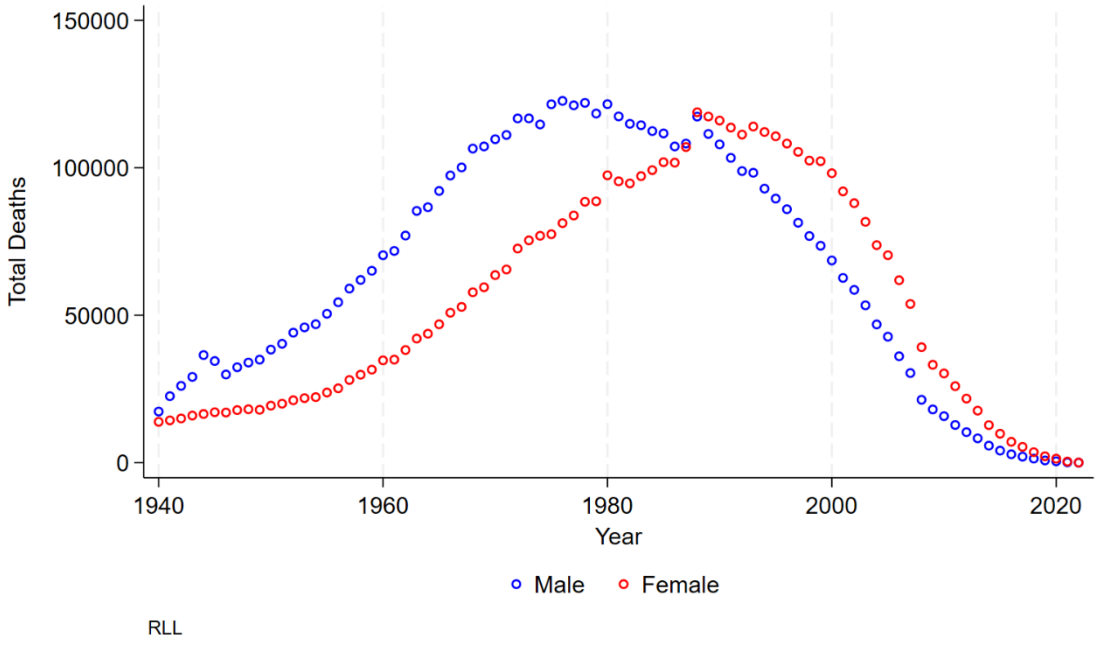
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Figure A.3 Total Deaths by Year (Civilian Metro Sample)

a. Black population



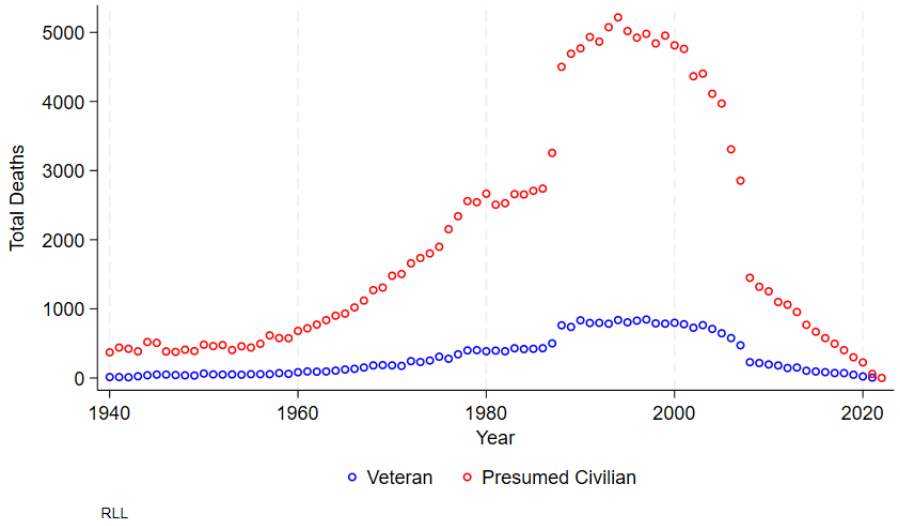
a. White population



Note: the increases in the number of deaths in 1988 (and the drop around 2005) are due to the availability of the NUMIDENT which includes many more dates of death.

Figure A4: distribution of the year of death among veterans and presumed civilians on our data

a. Blacks



b. Whites

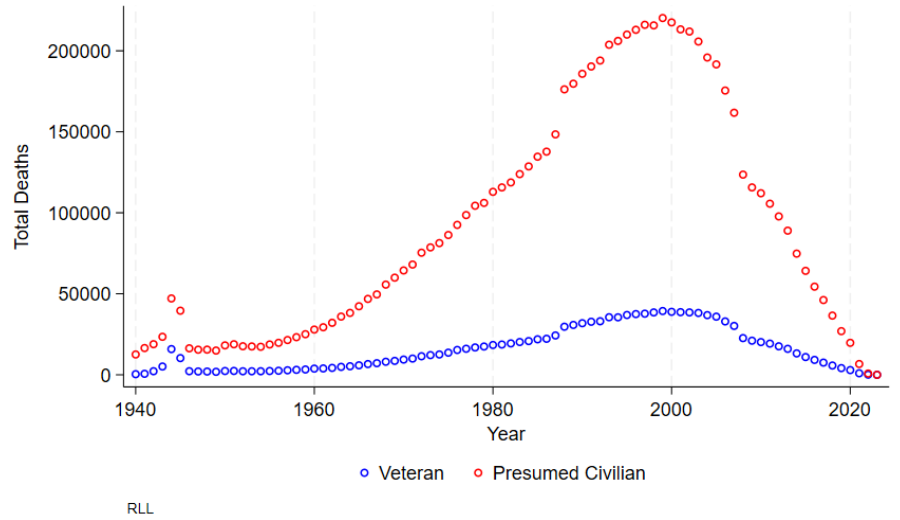


Table A.0 Summary Statistics for city-level controls

	Black Men		Black Women		White Men		White Women	
	1940 census	RLL	1940 census	RLL	1940 census	RLL	1940 census	RLL
Draft Rates	0.22	0.22	0.22	0.22	0.22	0.21	0.22	0.21
	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.04]	[0.03]	[0.04]
% Manufact.	0.25	0.25	0.25	0.25	0.28	0.27	0.28	0.27
	[0.09]	[0.09]	[0.08]	[0.09]	[0.08]	[0.09]	[0.08]	[0.09]
% Defense	0.36	0.36	0.36	0.36	0.38	0.38	0.38	0.38
	[0.08]	[0.07]	[0.07]	[0.07]	[0.07]	[0.08]	[0.07]	[0.08]
% Agri.	0.05	0.05	0.05	0.05	0.04	0.05	0.04	0.05
	[0.04]	[0.05]	[0.04]	[0.05]	[0.04]	[0.04]	[0.04]	[0.04]
Yrs of ed.	8.9	8.95	8.89	8.93	9.19	9.29	9.2	9.29
	[0.65]	[0.68]	[0.65]	[0.68]	[0.62]	[0.67]	[0.63]	[0.68]
% Non-white	0.17	0.17	0.17	0.17	0.07	0.07	0.07	0.07
	[0.13]	[0.13]	[0.13]	[0.13]	[0.08]	[0.08]	[0.08]	[0.09]
% employed	0.6	0.6	0.6	0.6	0.58	0.58	0.58	0.58
	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]
Population	2M	1.6M	2.1M	1.5M	2.6M	1.6M	2.6M	1.5M
	[3M]	[2.6M]	[3.1M]	[2.6M]	[3.4M]	[2.5M]	[3.4M]	[2.4M]
Wage income	1,230	1,221	1,228	1,214	1,280	1,256	1,279	1,252
	[159.44]	[153.04]	[160.42]	[152.50]	[133.03]	[134.90]	[132.99]	[135.47]
% Semiskilled	0.69	0.69	0.69	0.69	0.73	0.72	0.73	0.72
	[0.07]	[0.07]	[0.07]	[0.07]	[0.05]	[0.05]	[0.05]	[0.05]
N	1,301,741	66,375	1,500,450	50,337	15,443,772	5,334,887	15,998,339	4,527,168

Table A.1: WWII$ contracts do not predict match rates

	Blacks				Whites			
VARIABLES	Males		Females		Males		Females	
Panel A: RLL data								
WW2 Spending	-0.0008	-0.002408	-0.00052	-0.001775	0.012733	0.000483	0.010946	0.001749
	[0.001819]	[0.002451]	[0.001369]	[0.001888]	[0.013825]	[0.003917]	[0.012333]	[0.003996]
Controls?	No	Yes	No	Yes	No	Yes	No	Yes
Mean of Y	0.051	0.051	0.034	0.034	0.345	0.345	0.283	0.283
Observations	1301741	1301741	1500450	1500450	15443772	15443772	15998339	15998339

*** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. Individual controls include age, number of children, marital status, education, wages, state, occupation and industry dummies in 1940. City level controls include draft %, industry manufacturing %, industry defense %, industry agriculture %, years of adult education, Black %, employed adult %, population, yearly wage, semi-skilled or higher occupation %.

Table A.2 City-level Predictors of WWII Contracts

	Base Model	Population Weights
Draft %	-6.778	-9.908**
	[4.197]	[4.047]
% Manufacturing	10.875***	10.191***
	[3.087]	[2.436]
% Defense industry	-5.41	-5.961*
	[4.068]	[3.525]
% Agriculture	-7.013	2.212
	[4.684]	[4.904]
Avg. Years of Educt (Adults)	0.072	-0.14
	[0.305]	[0.307]
% Nonwhite	0.059	1.698
	[2.080]	[2.219]
% adults employed	-6.662	-7.671
	[5.519]	[4.741]
Population	0	-0.000***
	[0.000]	[0.000]
Wage income	0.004***	0.004***
	[0.001]	[0.001]
% Semi-skilled occupation	-2.64	5.371
	[5.077]	[4.585]
Constant	3.194	0.37
	[4.388]	[3.982]
Observations	152	152

Notes: In this table we regress WWII contracts on city-level characteristics. See text for sources of data.

Table A.3: Summary statistics for Ols and RD samples used to estimate the impact of WWII service

	Black				White			
	Enlisted men		Presumed		Enlisted men		Presumed civilians	
	has age at death	also has exact DOB	has age at death	also has exact DOB	has age at death	also has exact DOB	has age at death	also has exact DOB
Age at death	69.23	69.20	68.04	68.31	70.83	70.93	70.66	70.86
	[14.12]	[14.06]	[15.46]	[15.00]	[15.84]	[15.80]	[15.80]	[15.64]
Age in 1940	18.73	18.52	19.11	19.00	19.39	19.35	20.05	20.10
	[4.41]	[4.39]	[5.98]	[5.99]	[4.66]	[4.68]	[6.07]	[6.10]
Years of education	8.29	8.27	7.15	7.19	10.33	10.29	9.82	9.82
	[3.11]	[3.08]	[3.42]	[3.41]	[2.81]	[2.81]	[3.32]	[3.31]
Wage and salary	158.85	157.32	216.24	218.26	346.65	341.80	477.70	478.11
	[270.69]	[274.02]	[333.42]	[338.85]	[498.26]	[495.76]	[626.71]	[627.16]
Works in defense	0.10	0.10	0.11	0.11	0.19	0.19	0.20	0.19
	[0.31]	[0.30]	[0.32]	[0.32]	[0.39]	[0.39]	[0.40]	[0.40]
Work last year-Inc	0.35	0.34	0.36	0.35	0.43	0.43	0.43	0.43
	[0.48]	[0.47]	[0.48]	[0.48]	[0.49]	[0.49]	[0.50]	[0.50]
Work last year-Occ	0.55	0.54	0.56	0.55	0.55	0.55	0.57	0.58
	[0.50]	[0.50]	[0.50]	[0.50]	[0.50]	[0.50]	[0.49]	[0.49]
Married in 1940	0.09	0.09	0.27	0.27	0.11	0.12	0.29	0.30
	[0.29]	[0.29]	[0.44]	[0.44]	[0.31]	[0.32]	[0.45]	[0.46]
# children in 1940	0.08	0.08	0.44	0.45	0.08	0.08	0.32	0.33
	[0.46]	[0.46]	[1.11]	[1.11]	[0.38]	[0.40]	[0.78]	[0.80]
Northeast	0.11	0.11	0.06	0.06	0.29	0.27	0.18	0.16
	[0.31]	[0.31]	[0.24]	[0.24]	[0.45]	[0.44]	[0.38]	[0.37]
Midwest	0.12	0.12	0.10	0.10	0.32	0.32	0.37	0.37
	[0.32]	[0.32]	[0.31]	[0.31]	[0.47]	[0.47]	[0.48]	[0.48]
South	0.76	0.75	0.82	0.82	0.28	0.29	0.33	0.33
	[0.43]	[0.43]	[0.39]	[0.39]	[0.45]	[0.46]	[0.47]	[0.47]
West	0.02	0.02	0.01	0.02	0.11	0.11	0.13	0.13
	[0.14]	[0.15]	[0.12]	[0.13]	[0.31]	[0.32]	[0.33]	[0.34]
N observations	25,067	17,906	162,317	118,966	1,309,184	1,129,696	7,676,518	6,806,290

Working last year (Occupation) is defined as anyone with an occupation that was not a "non-occupational response." People 14+ who were not institutional inmates reported wages. All who reported "Missing" or "N/A" are coded as missing. Defense Industries are mining, manufacturing, transportation, and government industries, with ind1950 codes 203-239, 306-499, 506-568, 906-946.

Table 6: Effect of serving in WWII on age at death for Black and White men -- RD kink approach

	Blacks				Whites			
	Default		Linear		Default		Linear	
	Enlisted	Age at death	Enlisted	Age at death	Enlisted	Age at death	Enlisted	Age at death
Panel A: +/- two years								
I(turn 18 after V-day)	0.00098	30.301	0.00052	35.684	0.00035	41.029	0.00034**	18.062**
	(0.00057)	(30.054)	(0.00036)	(38.260)	(0.00019)	(32.597)	(0.00006)	(8.890)
Panel B: +/- 6 months								
I(turn 18 after V-day)	0.00172	40.373	0.00138	34.620	0.00034	60.906	0.00033	42.239
	(0.00363)	(121.13)	(0.00183)	(71.479)	(0.00050)	(112.03)	(0.00023)	(43.222)
Panel C: +/- 3 months								
I(turn 18 after V-day)	0.00038	376.51	0.00067	97.232	0.0033	43.435	0.00106	40.378
	(0.00638)	(6419)	(0.00378)	(594.25)	(0.00201)	(38.476)	(0.00068)	(39.122)
Panel D: +/- 1 month								
I(turn 18 after V-day)	-0.02365	-105.94	-0.00906	-1.9355	0.00566	40.074	0.00358*	37.002
	(0.0457)	(221.64)	(0.01466)	(66.453)	(0.00375)	(40.508)	(0.00198)	(32.879)
Panel E: +/- two years + controls								
I(turn 18 after V-day)	0.00451	50.009	0.00451	50.009	0.00416	-48.812	0.00416	-48.812
	(0.1661)	(245.71)	(0.1661)	(245.71)	(0.0361)	(58.307)	(0.0361)	(58.307)
Panel F: +/- 6 months + controls								
I(turn 18 after V-day)	-0.01315	-201.81	-0.01315	-201.81	0.00068	-336.58	0.00068	-336.58
	(0.03247)	(513.59)	(0.03247)	(513.59)	(0.00508)	(2529.2)	(0.00508)	(2529.2)
Panel G: +/- 3 months + controls								
I(turn 18 after V-day)	-0.02891	-95.854	-0.02891	-95.854	0.00576	-30.144	0.00576	-30.144
	(0.0374)	(137.69)	(0.0374)	(137.69)	(0.00701)	(67.853)	(0.00701)	(67.853)
Panel H: +/- 1 month + controls								
I(turn 18 after V-day)	-0.04685	-85.528	-0.04685	-85.528	0.01404	6.1024	0.01404	6.1024
	(0.06075)	(124.59)	(0.06075)	(124.59)	(0.01083)	(36.928)	(0.01083)	(36.928)

Significance: *10% **5% ***1%

Data Construction Details