World War II and African American Socioeconomic Progress

Andreas Ferrara*

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Abstract

This paper argues that the unprecedented socioeconomic rise of African Americans at mid-century was causally related to the labor shortages induced by WWII. Combining novel military and Census data in a difference-in-differences setting, results show that counties with an average casualty rate among semi-skilled whites experienced a 13 to 16% increase in the share of blacks in semi-skilled jobs. The casualty rate also had a positive reduced form effect on wages, home ownership, house values, and education for blacks. Using Southern survey data, IV regression results indicate that individuals in affected counties had more interracial friendships and reduced preferences for segregation in 1961. This is an example for how better labor market opportunities can improve both economic and social outcomes of a disadvantaged minority group.

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*University of Warwick, Department of Economics and CAGE. Email: a.ferrara@warwick.ac.uk
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1 Introduction

The gap in the social and economic outcomes and opportunities between blacks and whites has been a constant in the United States.[1] Differences in wages (Bayer and Charles, 2018) and residential segregation (Boustan, 2010) follow stubbornly persistent historic patterns. Changes over the last century have been episodic. The situation for blacks before 1940 was stagnant (Myrdal, 1944), while Margo (1995) and Maloney (1994) documented sharp improvements from the 1940s to 60s which continued through the Civil Rights era (Donohue and Heckman, 1991; Wright, 2013), followed by the decline in black economic fortunes after the mid-1970s (see Bound and Freeman, 1992).

These episodes are reflected in the skill composition of black men and are shown in figure 1. The 1940s and the immediate post-war decades stand out. Between 1940 and 1950, the share of semi-skilled employment among blacks almost doubled. In this one decade alone, blacks made more occupational progress than in the 70 years since the end of the Civil War. Collins (2001) called this period a turning point in African American economic history.

In this paper I study the origins of this turning point, and the effect of the unprecedented occupational upgrade on the economic and social status of blacks in the U.S. My main hypothesis is that higher WWII casualty rates among semi-skilled white workers drove the occupational upgrade of black workers. These deaths and the tight labor market during the war years opened up employment opportunities from which blacks had been barred in the past. I argue that the casualty-induced occupational upgrade not only improved several economic outcomes, but that it also had a positive effect on blacks' social status.

African American economic progress during the 1940-60s has been studied with respect to the narrowing of the black-white wage gap (Margo, 1995; Maloney, 1994; Bailey and Collins, 2006), migration and urbanization (Boustan, 2009, 2010, 2016), home ownership (Collins and Margo, 2011; Boustan and Margo, 2013; Logan and Parman, 2017), and education (Smith, 1984; Turner and Bound, 2003). Our knowledge about the root causes of this sudden success is less developed and especially its relation to the occupational upgrade is less well studied (Margo, 1995).

[1] For an overview of recent trends, especially with respect to the social outcomes and interactions between blacks and whites, see Fryer (2007).

The occupational upgrade at mid-century coincides with several major events, including the Great Migration, the first anti-discrimination policies enforced by the Fair Employment Practice Committee (FEPC), and World War II. This makes it challenging to isolate any single cause. The Great Migration to the North and West, which began during the 1940s, substantially benefited African Americans who migrated (Boustan, 2009, 2016). Panel (b) of figure 1 suggests tough that the occupational gains were not solely concentrated in the North. The FEPC was disbanded shortly after the war and did not have a strong impact in the South (Collins, 2001).

Previous work on the labor market and educational effects of the war has primarily focused on women (Goldin, 1991; Acemoglu et al., 2004; Goldin and Olivetti, 2013; Jaworski, 2014; Shatnawi and Fishback, 2018). Two exceptions are Collins (2000) who studies the role of veteran status in black males' economic mobility during the 1940s, and Turner and Bound (2003) who estimate the educational effects of the G.I. Bill on black veterans. The occupational upgrading, however, was mostly driven non-veterans and especially by the one million blacks who entered semi-skilled employment during the war years (Wolfbein, 1947). The war therefore provides a potential explanation for this development which goes beyond the gains made by veterans.

This paper makes three contributions to the literature. First, I construct a novel data set of military casualty records and combine them with Southern county-level Census data from 1920 to 1970. Difference-in-differences results provide causal evidence that the occupational upgrade of blacks was driven by higher WWII casualty rates among semi-skilled white workers. Using casualty instead of draft rates is motivated by the fact that they are free from the displacement effects created by soldiers returning after the war.[2] The effect of the draft on female labor supply was temporary as returning soldiers displaced most female workers again (see Acemoglu et al., 2004). Casualties instead have the potential to generate the persistent employment effects seen in figure 1.

Results show that counties with an average WWII casualty rate among semi-skilled whites increased the share of blacks in semi-skilled jobs by 13 to 16% relative to the pre-war mean. The effect is persistent and lasts until the end of the sample period in 1970. The results are robust to several specifications, and placebo tests provide evidence that they are not driven by casualties among race or skill-groups.

[2]Given the previous literature of WWII and the draft, I always control for the draft rate as well.

To generalize these results to the entire country, I repeat the previous analysis using individual level Census data from 1920 to 1970 in a triple differences estimation framework with the casualty rate treatment being assigned at the commuting zone level. This is to show that the occupational upgrading of blacks occurred both in the South as well as in the rest of the country. The individual level data also have the advantage that they can be used to more meticulously probe for effect heterogeneity. In particular, I provide evidence that the occupational upgrading was not driven by differential migration or education patterns for blacks, and that the upgrading effect was especially concentrated in manufacturing. There was no effect in placebo sectors that remained segregated throughout and after the war such as retail or telecommunications.

Second, I use the same triple differences estimation framework to show that the outcomes considered by previous studies analyzing black economic progress at mid-century are systematically related with the WWII casualty rate among semi-skilled whites. The outcomes include wages, urbanization, migration, home ownership, house values, and educational attainment for blacks.[3] The relationship between the casualty rates, as driver of the black occupational upgrade, and the economic outcomes is strongest for house values, wages, and education. Effects on home ownership are only short-lived and urbanization does not appear to be affected at all. Blacks living in areas with higher casualty rates had a lower probability for migrating out of their birth state. This is because the improvement employment opportunities reduced the need to relocate to other states. The results are robust to several specifications and inclusion of different types of time trends, and are not driven by differential changes in mobility or educational attainment across blacks and whites, or mere North-South differences. The majority of the outcomes that have been considered in studies of black economic progress at mid-century can therefore be directly linked to the war as one of their common root causes.

Third, I return to the Southern-specific context and estimate the effect of the occupational upgrade on blacks' social standing. For the analysis I use individual-level survey data on 1,068 black and white individuals from 24 Southern counties in 1961. Despite the relatively small sample size, the timing is ideal for studying this question as the data were collected before the major Civil Rights legislation, mainly the Civil Rights Act of

[3]For work on wages see Maloney (1994), Margo (1995), and Bailey and Collins (2006), for migration Boustan (2016), for home ownership Collins and Margo (2011), Boustan and Margo (2013), and Logan and Parman (2017), for education Smith (1984), and Turner and Bound (2003).

1964, as well as before the outbreak of violence during the Civil Rights protests. I instrument the occupational upgrade with the WWII casualty rates in instrumental variables regressions in order to provide causal estimates. Both black and white respondents who live in areas with a casualty-induced occupational upgrade of African Americans are significantly more likely to have an interracial friendship, to live in mixed-race areas, and to favor integration over segregation. Previous work on the Civil Rights movement has argued that it was the Civil Rights Act of 1964 which has brought about the break from past trends in the economic and social segregation of blacks (Wright, 2013). I offer a new viewpoint wherein these breaks already occur during and due to WWII.

OLS and IV results are similar and estimate an increase in respondents' probability of reporting an interracial friendship, of living in a mixed-race area, and a of favoring integration over segregation. The results are sizable relative to the outcome averages. They are not driven solely by black respondents but are similar across the two groups, and they hold up also for small violations of the exclusion restriction.

Studying the relationship between the war and black socioeconomic progress shows how improvements in labor market opportunities for a disadvantaged minority group can positively affect both economic and social outcomes for members of this group. This is a relevant topic for countries with economically and socially segregated minority groups given a literature which shows that such fragmentation is detrimental for societal outcomes (see Alesina et al., 1999). It is also related to the debate about the effectiveness of affirmative action policies (Coate and Loury, 1993). Importantly, the casualty-induced shock to blacks' labor market opportunities here is not coming from the endogenous choices of a policy-maker but from a natural experiment. Hence this setting potentially allows to more cleanly identify the economic and social spillover effects of policies that seek to improve the labor market opportunities for a minority group.

The remainder of the paper is structured as follows. Section 2 provides a brief overview of African American economic history in the 20th century to highlight previous directions of research and to put this paper into context. Section 3 describes the enlistment and casualty data, features of the draft system, how the data are linked, and how they are used to construct WWII casualty rates by skill group and race. It then outlines the difference-in-differences regression framework used to estimate the effect of casualties among semi-skilled whites on the promotion of blacks into semi-skilled work. This is

followed by an extension of the analysis to the whole country using individual level Census data in a triple differences setting. Section 4 uses the same individual level Census data and estimation strategy for the South and the entire U.S. to relate the casualty rate measure at the commuting zone level to previously studied economic outcomes regarding African American economic progress. Section 5 describes the data and instrumental variables framework to estimate the effect of the occupational upgrade on black-white social relations in a cross-sectional survey in the South in 1961. The final section concludes.

2 Black Economic Progress Pre- and Post-WWII

Myrdal (1944) provides an account of the pre-war conditions of blacks in the U.S.: "They own little property; even their household goods are mostly inadequate and dilapidated. Their incomes are not only low but irregular. They thus live from day to day and have a scant security for the future." (p. 205). This is reflected in figure 1. Before 1940, 70-90% of black men were employed in low-skilled occupations. In the Southern states, the share of black men in semi-skilled occupations rose by 8 p.p. between 1870 and 1940 but increased by 11.4 p.p. from 1940 to 1950. Blacks made more economic progress in the decade of WWII than in the last seven decades after the end of the Civil War. This exceptional period has attracted the attention of labor economists and economic historians alike. Economic progress for blacks during the 1940s and 1950s has been documented for wages and inequality, education, urbanization and home ownership, among others.

Margo (1995) and Maloney (1994) make two seminal contributions that assess the factors behind black-white wage convergence between 1940-50 in a wage decomposition exercise. Margo (1995) shows that the decrease in black-white wage differentials can be attributed to the Great Compression,[4] but also to the shift of African American workers into better-paying jobs, migration to the North and better education opportunities for blacks. Also Maloney (1994) reaches this conclusion in a similar decomposition exercise. Bailey and Collins (2006) provide a wage decomposition for African-American women in the 1940s. They also document a rapid decrease in the racial wage gap in this period and attribute it to occupational shifts for this group. However, none of these studies examined the causal roots behind the occupational upgrading.

[4]The Great Compression refers to the significant reduction of the dispersion of wages across and within education, experience, and occupation groups (see Goldin and Margo, 1992).

Education for blacks at mid-century developed more steadily. Results by Smith (1984) do not show a particular uptick in educational attainment during the 1940-50 period. The share of illiteracy among blacks declined from 16.3 to 11.5% between 1930-40, but reduced only from 11.5 to 10.2 % between 1940-52 (Smith, 1984). The base for later economic success was founded in improved access and quality of schooling in the earlier part of the century. Aaronson and Mazumder (2011) show that the spread of Rosenwald schools in the South improved educational attainment of blacks with access to such facilities by one year in rural areas for those born between 1910 and 1925. They can explain 40% of the black-white convergence in education for these cohorts. College education for blacks started to increase slowly after WWII (Collins and Margo, 2006), but only increased at a more rapid pace after the 1960s. Turner and Bound (2003) provide evidence that the G.I. Bill significantly increased college education for both black and white men but not for those black veterans who were born in the South.

Outmigration of blacks from the South to Northern cities and its effects on local labor and housing markets has been well documented. Migration from the rural South to the Northern industrial centers during WWII was an opportunity for economic elevation through better employment opportunities (Boustan, 2016). However, while migrants benefited, the additional competition impeded the wage growth of black workers who already lived in the North (Boustan, 2009). The arrival of Southern blacks also produced a response by whites. Boustan (2010) estimates that 2.7 whites depart for each black arrival in a Northern city. White flight might have contributed to increased black home ownership in the city centers, according to Boustan and Margo (2013). Generally, home ownership has increased significantly for African Americans after WWII, though benefits from the G.I. Bill do not appear to drive this result (Logan and Parman, 2017). Moving North was not always related with positive outcomes. For some, this was correlated with higher levels of child mortality or incarceration instead (Eriksson and Niemesh, 2016; Eriksson, 2018).

While there are good explanations for the evolution of black education and the migration patterns at mid-century, there is still little insight into the unprecedented occupational upgrade of African Americans. It cannot be explained by education because black education expanded more gradually and long before the war. Migration alone is not a sufficient explanation as occupational upgrading not only occurred in the North:

panel (b) of figure 1 documents a very similar pattern for the South. Institutional factors played a role in helping blacks gain better employment or to reduce inequality, but these factors do not appear to play a major role in the South. The Fair Employment Practice Committee (FEPC) generated substantial employment and wage gains for blacks but was ineffective in the South (Collins, 2001). The FEPC was disbanded shortly after the war and nationwide affirmative action policies were only implemented with or after the Civil Rights Act.

Another strand of the literature mainly attributes post-war black economic and social progress to the Civil Rights movement (see Wright, 2013). Several Supreme Court decisions and laws, most notably the Civil Rights Act of 1964, sought to improve the economic and social equality of African Americans. This includes enforcement of voting rights and interracial marriage after the 1965 Voting Rights Act and the 1967 Supreme Court ruling in Loving versus Virginia, respecitvely. The affirmative action policies of the 1960s played an important role in desegregating firms (Miller, 2017). Wright (2013) argues that the Civil Rights movement was the main breaking point from past trends and that it set in motion the process of economic and social integration of blacks. Despite the importance of the Civil Rights Act for the social and economic progress made by blacks, figure 1 suggests that the break in occupational segregation had already occurred during the 1940s.

If migration, improved education, and other regulatory and institutional factors do not explain the sudden and large occupational shift from low- to semi-skilled jobs for African Americans, the question then is what other factor could have been at the root of this phenomenon. A natural starting point is World War II. Using data from the Civil War, Larsen (2015) provides evidence for how war related labor shortages reduced lynchings of blacks and increased political participation. The labor market effects of World War II, and in particular of the draft, have been extensively studied for women (Goldin, 1991; Acemoglu et al., 2004; Goldin and Olivetti, 2013; Jaworski, 2014; Shatnawi and Fishback, 2018). The effect of the war on African Americans' economic progress has received comparatively little attention.

Labor economists at the time, such as Wolfbein (1947), observed that a, "significant shift occurred from the farm to the factory as well as considerable upgrading of Negro workers, many of whom received their first opportunity to perform basic factory oper-

ations in a semiskilled or skilled capacity" (p. 663). He attributed this to the labor shortages during the war. Likewise, Weaver (1945) describes how labor shortages in the aircraft industry opened job opportunities for blacks beyond low-skilled work. From the historic accounts it appears that the war played a significant role in the skill-upgrade of blacks which translated into other economic gains such as higher wages (Maloney, 1994; Margo, 1995; Collins, 2000). This has been an understudied part of black economic history: "The story of black occupational upgrading is somewhat less well known than the story of black migration" (Margo, 1995, p. 472).

3 White War Casualties and the Black Occupational Upgrade

3.1 Computing a Casualty Rate for Semi-Skilled Whites

To compute county-specific casualty rates among semi-skilled whites, I match two data sources, the WWII Enlistment Records and the WWII Honor List of Dead and Missing, for the Army and Army Air Force.[5] The Army kept meticulous records of their drafted and enlisted soldiers during the war. Upon entry, an IBM punch card would store a soldier's name, unique Army serial number, age, education, race, marital status, residence, date and place of entry, and their pre-war occupation codified in three-digit groups using the Dictionary of Occupational Titles of 1939. The National Archives and Records Administration digitized these enlistment records.

The data do not contain soldiers in other service branches such as the Navy, Marines, or Coast Guard. However, the 8.3 million individuals in the Army comprise the majority of the 10 million drafted men during World War II. Due to the high manpower demands by the armed forces there was almost no scope for drafted soldiers to choose a service branch (Flynn, 1993). Volunteering provided more choice regarding the branch of service but was forbidden in 1942 to give the military more control over who entered into service (Flynn, 1993). The removal of volunteering came before the largest battles and casualties were sustained but after the majority of the drafting was completed (see figure 2). It therefore would have been difficult to form a prior as to which service branch was the least dangerous in order to enlist strategically.

[5]The Air Force only became an independent service branch after the war in 1947.

Deferments were only obtained by fathers with dependents, workers in war-related industries and farmers, or conscientious objectors. Out of 40 million men who had been assessed by their local draft boards only 11,896 men registered as conscientious objectors based on religious reasons (Flynn, 1993). Given that the draft was enacted during peacetime, it had to be significantly more just and equal than the prior drafts to pass the substantial resistance by politicians and the public. Going to college or buying out was not possible. Kriner and Shen (2010) show that there is no significant difference in casualty rates across socioeconomic groups.

Generally, the willingness to join the war effort was high. Out of 16 million WWII soldiers some 50,000 deserted compared to the 200,000 out of 2.5 million Civil War soldiers (Glass, 2013). Overall, there is little evidence that draft evasion and avoidance were a major issue during WWII, especially after Pearl Harbor.

To supplement the enlistment data with information about a soldier's survival, I digitized 310,000 entries from the WWII Honor List of Dead and Missing. The casualty records include the name, state and county of residence, cause of death, and the Army serial number. The unique serial number is what identifies soldiers across the two data sources. This limits the need to rely too heavily on name-matching techniques. Figure 3 shows examples of the enlistment and casualty records. More details on merging the enlistment and casualty records is provided in the data appendix. Summary statistics for the matched data for different sample splits comparing blacks and whites, enlisted and drafted, and Northern with Southern soldiers are reported in table 1. The unconditional death probability is the same across all splits except for the comparison of black and white soldiers. Blacks were mainly employed in comparatively safer support and supply activities due to racist attitudes that saw them unfit for fighting (Lee, 1965). Due to racism in the military, blacks were both drafted and killed at a lower rate.

Using the information on residence, race, pre-war occupation and casualty status, the casualty rate among semi-skilled whites in county c can be computed as,

$$\text{Casualty rate}_c = \frac{\text{white semi-skilled casualties}_c \times 100}{\text{white semi-skilled soldiers}_c} \tag{1}$$

which is the percentage of those who went to war and who needed a replacement at their pre-war workplace, but did not return. The denominator was chosen to be the number of serving semi-skilled whites rather than the total number of semi-skilled whites in a county.

Using the latter is potentially problematic because workers in war related industries had a higher chance of receiving deferments. Without exact knowledge about the number of deferred men it is not possible to compute an accurate measure of wartime demand for alternative labor such as women or black workers.[6]

The spatial distribution of this casualty rate measure for counties in Southern states is plotted in figure 4. The casualty rate measure can be constructed for the whole of the U.S. but the outcome variable of interest, i.e. the share of blacks in semi-skilled jobs, can only be computed at the county-level for the mapped Southern states. These states are the only ones to provide occupational counts by race in their county level Census files.

3.2 Evidence from Data on Southern Counties, 1920-70

The outcome of interest is the percentage share of blacks in semi-skilled employment in county c and decade t. Following the U.S. Census Bureau's occupational classification of 1950, semi-skilled jobs are those classified in the craftsmen and operatives categories. Data refer to male workers only. Aggregate data on the number of employed workers by skill group at the county level is available for the U.S. Census files between 1920 and 1970. After 1970 the county level statistics of the Census underwent significant definitional changes for reported occupations, preventing consistent construction of the outcome after 1970.

An additional restriction is that only Southern states tabulated occupational counts by race.[7] For the 16 states plus D.C. there is a total of 1,388 counties which are kept fixed at their 1940 borders. The definition of county borders is not crucial given that over this period there are almost no creations or removals of counties, nor were there substantial boundary changes (see Forstall, 1996).

The raw correlation between casualty rates and the share of blacks in semi-skilled employment in the cross section of counties and across time is shown in figure 5.[8] The

[6]For robustness checks, I later also use the casualty measure with the denominator being all semi-skilled whites in 1940.

[7]These are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Oklahoma, Tennessee, Texas, Virginia, and West Virginia, and Washington D.C. Note that even though I refer to mentioned states as "South", this deviates from the typical definition of the South as the former Confederacy, unless stated otherwise.

[8]Conditional scatter plots that partial out county characteristics in 1940 such as population, share of black males, and the share of agricultural and manufacturing employment are shown in appendix A, figure 15.

plots show a strong linear relationship. The time evolution of the unconditional outcome over quartiles of the casualty rate is plotted in figure 6. The outcome trends across casualty quartiles are parallel before the war. After the war in 1950, the share of blacks in semi-skilled jobs is increasing with the casualty rate quartile, with the exception of the lowest quartile which also experiences a short-lived uptick in the outcome in 1960.

The difference-in-differences specification is,

$$\%\text{ semi-skilled blacks}_{ct} = \alpha_c + \lambda_t + \beta\ \text{Casualty rate}_c \times \text{Post-war}_t + X'_{ct}\phi + \eta_{ct} \qquad (2)$$

which allows for variable treatment intensities. Under the usual parallel trends assumption and in the absence of time-varying confounding factors, the coefficient β captures the causal effect of a one percentage point increase in the WWII casualty rate among semi-skilled whites on the share of blacks in semi-skilled occupations after the war.

Time-invariant determinants of the share of blacks in semi-skilled occupations across counties are absorbed by county fixed effects α_c. Time-varying shocks common to all counties are controlled for by time fixed effects λ_t. Alternative specifications include state-specific flexible time trends ρ_{st} or county-specific linear time trends $\alpha_c t$ to probe for robustness of the results with respect to treatment of the time dimension. This allows for partialling out state- or county-specific secular changes in the outcome that would have occurred in the absence of the casualty shock.

The vector X_{ct} contains controls that seek to capture other potential changes in observables that might determine the share of blacks in semi-skilled jobs and which correlate with the casualty rate among semi-skilled whites. The draft rate accounts for the remaining workforce during the war as well as for the share of the male population under threat of being killed in the war. It also provides an estimate of the male population eligible for benefits under the G.I. Bill after the war (Turner and Bound, 2003). To account for spillover effects, I include the average casualty rate in the adjacent counties of a given county c. The log of WWII related spending per capita captures governmental spending as potential stimulus to the local economies (see Fishback and Cullen, 2013). Data for WWII expenditure comes from the County and City Data Book 1947 published by the U.S. Department of Commerce (2012).

Demographic and political controls include the share of rural population and the share of black men from the Census, and the Republican vote share from data by Clubb et al.

(2006). To control for factors specific to blacks in the South, the number of lynchings between 1900 and 1930 per 1,000 blacks, and the number of slaves in 1860 (both interacted with decade fixed effects) are included. Lynchings had a significant effect on economic growth generated by black inventors (Cook, 2014). I also include the number of Rosenwald schools per 1,000 blacks, which are significant determinants of black education (Aaronson and Mazumder, 2011) and the share of acres flooded by the Mississippi in 1928 interacted with time as a major shock to internal migration of blacks (Hornbeck and Naidu, 2014).

Given that the manufacturing sector at the time was the main employer of operatives and craftsmen, I also include the number of manufacturing establishments per capita, the average firm size measured as the average number of employees per establishment, the log value added per manufacturing worker as measure for productivity, and the share of employment in manufacturing in a given county.

Agriculture was a major employer for black workers before the war, hence I include variables to rule out shocks related to agricultural productivity or capital accumulation driving the shift of blacks to semi-skilled employment. These include the share of land used for agricultural production, the share of acres in cotton, the share of cash tenants as measure for skill available in the agricultural sector that might have been portable to semi-skilled employment, and the average value of machinery per farm. The latter seeks to control for technological changes in the agricultural sector. In particular, the use and quality of tractors expanded, especially in the South and released labor from the farms (see Olmstead and Rhode, 2001).

Finally, to account for the major economic changes brought by the Great Depression in the decade just prior to the war, I include measures of New Deal spending per capita from Fishback et al. (2006). These were distributed as stimulus packages between 1933 and 1935. This includes government loans, money for public works, funds from the Agricultural Adjustment Act (AAA), and by the Federal Housing Administration (FHA), as well as the unemployment rate in 1937. All of these variables are interacted with decade fixed effects. All monetary values are deflated to 2010 U.S. dollars using the CPI provided by the Bureau of Labor Statistics.

An overview of all data sources used to compile the final estimation sample is given in the data appendix. Summary statistics are reported in table 2. All remaining variation in the outcome which is not captured by the previously mentioned right-hand side variables

is absorbed in the error term η_{ct}. Standard errors are clustered at the county level to account for heteroscedasticity and autocorrelation.

3.2.1 Difference-in-Differences Results

The main results from the estimation of eq. (2) are reported in table 3 under different model specifications. The effect of a one percentage point increase in the WWII casualty rate among semi-skilled whites on the county share of blacks in semi-skilled occupations is between 0.51 and 0.64 p.p. This effect is significant at the one percent level across all specifications. For an average casualty rate of 3.13% the average effect size thus ranges between 1.6 to 2 p.p. Given the average share of blacks in this skill group in 1940, a $\beta \times 3.13$ p.p. addition corresponds to an increase of 12.9 to 16.1% relative to the pre-war mean. A recent study by Miller (2017) assesses the affirmative action policies under President Johnson in 1965. Affected firms increased their share of black employees by 0.8 p.p. five years after. While the magnitudes are not directly comparable due to differences in sample composition and measurement of variables, it gives context to the effect sizes estimated here.

There was a similar order by President Roosevelt during the war which established the Fair Employment Practice Committee (FEPC). Collins (2001) analyzed its role in the employment of blacks in war related industries. Even though he finds significant effects in the North, he also notes that the FEPC was ineffective in the South due to a lack of cooperation by local authorities. While I do not have measures of the FEPC's effectiveness, the results here are unlikely to be driven by the affirmative action policies under Roosevelt. The FEPC disbanded shortly after the war and new employment policies of this type did not come into effect until the Civil Rights Act of 1964.

Inclusion of the controls does not alter the results in column (2). A potential concern is that some of these controls could themselves be outcomes of the casualty rate, such as the share of manufacturing employment or the share of blacks in a county. To alleviate these concerns, I fix all controls at their pre-war levels in 1940 and interact them with decade fixed effects in column (3). Again the results remain unchanged. Columns (4) and (5) present specifications with flexible state-specific time trends and county-specific linear time trends, respectively, to absorb secular trends in the outcome over time that might otherwise be picked up by the casualty rate.

The final column reports estimates using the doubly-robust selection procedure by Belloni et al. (2014). Their machine learning covariate selection algorithm tests for the stability of treatment effects and potentially improves inference on such parameters. Suppose that a large set of observed controls includes the most relevant covariates to explain the relation of interest but that these variables are unknown to the econometrician.[9] In a first step, the outcome is regressed on the controls, their squares, and all cross-term interactions, after which the most significant predictors are selected either via LASSO or a simple t-test from a multiple regression if the sample size permits. Here a t-test sufficed. The same is repeated for the treatment, i.e. the casualty rate in this case. In a final step, eq. (2) is re-estimated using the union of controls selected in either of the previous two steps. The idea is that the regression learns the most important predictors of outcome and treatment which would be problematic omitted variables.

To probe for the sensitivity of the previous results with respect to the unobservable components, table 3 reports the coefficient sensitivity test by Oster (2017) for all specifications. She considers a standard linear regression model $Y = \beta X + W_1 + W_2 + \epsilon$, where $W_1 = \Psi w^o$ is a vector of observable controls and W_2 is an index of unobservables. The treatment variable X here is the casualty rate. She then defines the selection relationship as $\delta \frac{Cov(W_1,X)}{Var(W_1)} = \frac{Cov(W_2,X)}{Var(W_2)}$ and solves for δ (the degree to which selection on unobservables is less than or larger than selection on observables) which would be required to produce $\beta = 0$. This uses the coefficient and R^2 movement from the controlled and uncontrolled regressions results in a bounding argument.

Assuming that W_1 and W_2 can fully explain variation in the casualty rate, i.e. $R_{max} = 1$ in a regression of the casualty rate on W_1 and W_2, a reasonable threshold for the previous results in table 3 to be considered robust is $\delta \geq 1$. This implies that the selection on unobservables would need to be at least as important as selection on observables in order to yield a coefficient of zero for the casualty rate. With the exception of column (5) all specifications pass this threshold.

The main assumption underlying eq. (2) is the parallel trends assumption. With a continuous treatment, a typical approach is to generate placebo treatments in order to test whether the casualty rate had an effect on the outcome before there were any casualties. Such differences across high- and low-casualty rate counties would hint towards pre-

[9] These most influential explanatory variables potentially include interactions and squared terms.

existing trends in the outcome which would bias the coefficient β. The placebo tests are implemented by estimating,

$$\% \text{ semi-skilled blacks}_{ct} = \alpha_c + \lambda_t + \sum_{k \neq 1940} \beta_k \text{ Casualty rate}_c \times \text{Year}_k + X'_{ct}\phi + \eta_{ct} \quad (3)$$

for which results are plotted in figure 7. The specification includes controls and the state-specific flexible time trends. The coefficients plot shows that up until the war the average conditional evolution of the outcome over time was parallel across counties with differing casualty rates. The coefficients from the interaction of the casualty rate with the post-war decades in $k > 1940$ are similar to the effect estimated in table 7. The effect remains stable and persists in the three decades after the war. Miller (2017) also finds a persistent effect of the 1960s affirmative action policies which remains even after their removal.

Another way to attempt to falsify the previous results is to consider the effect of casualty rates in other skill groups for both blacks and whites. If the claim here is correct that it was the death of semi-skilled whites that led to the occupational upgrade of African Americans, then we should not see any effect coming from casualty rates in other skill-race groups. The results are reported in table 4 which includes casualty rates by race and skill group in the regression. The estimated coefficients for the semi-skilled white casualty rate are not significantly different from what was estimated in the baseline specification. There is no detectable effect for the casualty rates among low- and high-skilled whites.

Likewise, casualty rates for semi- and high-skilled blacks do not have a significant impact on the outcome. However, there is a smaller but significant negative effect coming from the group of low-skilled blacks. A percentage point increase in the casualty rate for this group decreases the share of semi-skilled blacks by 0.09 to 0.15 p.p. This result is intuitive given that these are the workers who, had they survived, would have replaced the deceased semi-skilled whites after the war.[10]

[10] All further robustness and sensitivity analyses are reported in appendix A, including further specification tests of the parallel trends assumption, selective migration of blacks, selection on observables, selection of soldiers into the military and into death, alternative treatment and outcome denominators, sensitivity of the results by state, and spatial clustering of the casualty rates.

3.3 Further Evidence from Individual Census Data

The previous results show that the occupational upgrading of blacks also occurs in the South and is note merely a phenomenon driven by the Great Migration. Yet it is also insightful to generalize the result to the entire country. Doing so requires to move from the county to the commuting zone level which is the next highest spatial aggregate. Commuting zones are clusters of counties that share a common labor market. There are 722 commuting zones which can be consistently constructed using the spatial information available in the individual level data of the 1920 to 1970 U.S. Census files by Ruggles et al. (2018).[11] Figure 8 plots the WWII casualty rate among semi-skilled whites at the commuting zone level.

I use the 1% micro Census files from 1920 to 1950, the 5% file of 1960, and the 1% form metro sample of 1970. The estimation sample includes the non-institutionalized working age (16-65) male population who are participating in the labor force at the enumeration date, not enrolled in school, not classified as unpaid family workers, and whose ethnicity is classified as black or white. The micro level data provide the advantage of using whites an additional control group. In the following triple difference (DDD) regression I compare the probability of semi-skilled employment between blacks and whites, before and after the war, and across commuting zones with differing casualty rates:

$$\begin{aligned}\Pr\left(\text{semi-skilled}=1\right)_{izt} = {} & \beta_1 \left(\text{casualty rate}_z \times \text{post-WWII}_t\right) \\ & + \beta_2 \left(\text{casualty rate}_z \times \text{black}_{izt} \times \text{post-WWII}_t\right) \\ & + \alpha_z + \lambda_t + \delta \text{black}_{izt} + X'_{izt}\gamma + \epsilon_{izt} \end{aligned} \tag{4}$$

where i, z, and t index individuals, commuting zones, and Census years, respectively. The outcome is an indicator for whether an individual is a semi-skilled worker (craftsman or operative). The coefficients of interest are β_1 for whites and the triple interaction coefficient β_2 for blacks. Controls include age, marital status, year of birth, a self-employment indicator, farm status, and industry fixed effects, and α_z and λ_t are commuting zone and time fixed effects. Standard errors are clustered at the commuting zone level.

The triple differences regression seeks to eliminate potentially confounding trends in

[11] The crosswalks for 1950 and 1970 are available on David Dorn's website (`http://www.ddorn.net/data.htm`), and the crosswalk files for the other years were kindly shared by Felix König.

the employment probability of blacks in semi-skilled jobs across commuting zones that are unrelated to the war casualties. It also accounts for changes in the employment probability of all workers in high-casualty commuting zones which might have happened due to other shocks that occurred at the same time. Compared to the county level regressions, this framework also allows to estimate the casualty rate effect on i) whites, and ii) on blacks and whites in different industries for the entire U.S.

To visualize the relationship, I interact the casualty rate$_z$ and casualty rate$_z \times$ black$_{izt}$ variables with Census year fixed effects in eq. (4), leaving out 1940 as baseline. The resulting coefficients for blacks and whites are plotted in figure 9. There is no significant casualty rate effect before the war for either group and remains insignificant for whites also in the post-war period. This means that there are no differential pre-trends for blacks or whites across high- and low-casualty rate commuting zones. For blacks there is a positive post-war effect starting from 1950 which increases over time and peaks in 1970 with a 5 p.p. rise in the semi-skilled employment probability for every one percentage point increase in the commuting zone WWII casualty rate among semi-skilled whites.

Table 5 reports results from estimating eq. (4) for different model specifications. The triple difference coefficient for black workers is positive and significant in all specifications and ranges between 1.9 to 4.7 p.p. for the whole country and between 1.1 and 3 p.p. for workers in the South. There is no effect on whites with the exception of column (6) where the regression with commuting zone specific time trends shows a small but negative and significant effect for white workers. The null effect on whites is coherent with the historic account by Wolfbein (1947): "the movement of [black] men and women to factories, primarily as semiskilled operatives, was even more pronounced than that of white persons" (p. 665).

The results show that the employment gains for blacks not only occur in the North or West of the country but that also Southern blacks gain significantly in terms of the occupational upgrading. Another advantage of the micro data is that I can further deal with potential migration responses. I therefore interact an indicator for whether an individual lives outside their state of birth with time fixed effects and the black indicator in column (4). The same interactions are applied to the education variable. The results show that even though the coefficients are smaller, they are still positive and significant. It should be noted that migration and education are potential outcomes of the treatment,

hence results from this specification are to be taken with caution. Yet it sheds light on whether the occupational upgrading effect can be explained away by differential migration or educational attainment across black and white workers over time.

Next, I analyze whether the occupational upgrading of blacks is concentrated in particular sectors. Table 6 repeats the analysis for the manufacturing sector as a whole, and for the durable and non-durable manufacturing sub-sectors, as well as for telecommunications, retail, and public administration as placebo groups. Unlike the manufacturing sectors, the jobs in the placebo sectors often involved direct customer contact and therefore employers sought to avoid employment of blacks in such positions (Anderson, 1982). Given that these sectors remained segregated throughout and after the war, they should not show any occupational gains made by blacks. The results provide evidence that black occupational upgrading was particularly pronounced in all manufacturing sectors with a 9 to 11 p.p. increase in the probability of semi-skilled employment for blacks for a one percentage points increase in the WWII casualty rate among semi-skilled whites. Except for a slight negative effect in retail, there is no effect on blacks in the high-skilled sectors and for whites the effect is never significant in any sector.

4 The Relation between World War II and African American Economic Progress in the Post-War Era

Several scholars have studied black economic progress at mid-century with respect to wages (Margo, 1995; Maloney, 1994), cross-state migration (Boustan, 2016) and urbanization (Boustan, 2010), home ownership (Collins and Margo, 2011; Boustan and Margo, 2013; Logan and Parman, 2017), or education (Smith, 1984). If African Americans made progress on all these dimensions and at the same time, then it is likely that there exists at least one underlying common factor. Both Maloney (1995) and Margo (1995) discussed the labor shortages during the war as potential reason for the wage gains made by black workers. According to Margo (1995, p. 472), "the most important example of occupational upgrading was the increase of blacks in semi-skilled operative positions. Such jobs paid far better than farm labor [...] that blacks were accustomed to".

I next study the war, and in particular the role of semi-skilled white casualty rates as driver of the black occupational upgrade, as common denominator for the post-war

progress made by blacks on other economic dimensions analyzed in prior work.[12] I again use the individual level data from the Census between 1920 and 1970 from the previous section. To test the hypothesis that other economic improvements for blacks are related to the war, I re-run eq. (4),

$$\begin{aligned} y_{izt} = &\beta_1 \left(\text{casualty rate}_z \times \text{post-WWII}_t\right) \\ &+ \beta_2 \left(\text{casualty rate}_z \times \text{black}_{izt} \times \text{post-WWII}_t\right) \\ &+ \alpha_z + \lambda_t + \delta \text{black}_{izt} + X'_{izt}\gamma + \epsilon_{izt} \end{aligned} \tag{5}$$

with different economic outcomes y_{izt} which are indicators for whether an individual lives in a metropolitan area, for whether an individual moved out of their state of birth, the log annual real wage, years of completed education, the log house value, and an indicator for whether an individual owns their home. Results for the full sample and for the Southern subsample are reported in panels A and B in table 7, respectively. The corresponding dynamic coefficient plots are shown in figure 10 for the full sample and in figure 11 for the Southern sample. A downside of the Census data is that not all outcomes were recorded before 1940, such as wages, education, or house values, which were only collected for the first time with the 1940 Census.

The results in table 7 show that almost all outcomes for black economic progress in the post-war period considered by prior work are significantly related to the WWII casualty rate among semi-skilled whites. The only exception is the urban indicator for which there is no effect in either sample. This is not to say that African Americans did not increasingly move to the cities, especially in the North, but that the casualty rate was just not a driver for this particular development.

Blacks living in commuting zones with higher casualty rates are 1.3 and 2.2 p.p. less likely to migrate out of their birth state for every percentage point increase in the casualty rate for the Southern and full sample, respectively. With these casualties leading to better employment opportunities for blacks, this decreased the pressure on black workers to leave their state of birth to find better employment elsewhere. The effect of home ownership follows a more complex dynamic response. This is seen in the coefficient plots in figures 10

[12] Appendix B performs this analysis using semi-skilled employment as treatment for comparison purposes. The casualty rate is the more exogenous variable and hence was preferred for the main specification.

and 11 panel (c). The plots show a strong positive initial increase in the home ownership probability in 1950 which then drops in the subsequent decades and becomes negative.

The results on house values, wages, and employment are positive and significant for blacks, irrespective of whether the full sample or the South-only subsample is considered. While the wage gains associated with higher casualty rates are higher in the full sample, house values and educational attainment have improved more in the South although the difference to the full sample coefficients are not significantly different. The educational results can be partially explained with the G.I. Bill which provided subsidies for further education of veterans. However, it would not explain the rise in education levels among Southern blacks who did not benefit from the bill (Turner and Bound, 2003).

Turning to the coefficient plots in in figures 10 and 11, these show an increase in house values for blacks and a penalty for whites. In terms of house value, blacks gain more in the South, whereas the wage response is slightly larger in the full sample. This might be driven by migration to the North where wages were generally higher and especially high for those who migrate there (Boustan, 2009). The effect on education does not produce a negative or only a weakly significant and negative effect for whites but a strong positive effect on blacks. The initial spike could be explained by the G.I. Bill, whereas the later results, which are weaker but with an increasing trend, can be rationalized by younger cohorts of African Americans. The wartime cohort basically showed that semi-skilled employment is now within reach for blacks, meaning that the benefits of acquiring more education before entering the labor were more tangible to the newer cohorts. The coefficient plots in figures 10 and 11 reveal that any negative effect on whites is short-lived and zero otherwise. The wage coefficients display a strong upward trend for blacks, especially in 1970 when the Civil Rights Act of 1964 likely reinforces the wage effect.

5 Black Occupational Upgrading and Black-White Social Relations in the South in 1961

The war elevated African American's economic position by providing them with access to better-paid semi-skilled jobs especially in the manufacturing sector. During the war, this was not always embraced by white workers. In 1944, the Philadelphia Transportation Company began to alleviate labor shortages by allowing blacks to enter semi-skilled oc-

cupations. White workers initiated a strike which was broken when the Army threatened to re-evaluate the draft deferments of striking workers (Collins, 2001). As with the Civil Rights movement, it took some time for whites to adapt to the new workplace realities (see Wright, 2013). What was the longer-term effect of the casualty-induced economic upgrading of blacks on their social status and their relationship with whites?

The answer to this question is not obvious a priori. A well-established concept in the study of network formation is homophily whereby individuals prefer contact with other agents who are more like themselves in terms of age, race, income, and other characteristics (see Currarini et al., 2009). As the economic position of African Americans improved during and after the war, they became more similar to whites in economic characteristics and therefore their relations may have improved. However, if whites perceived blacks as economic rivals, such as in the case of the Philadelphia Transport Company, the exact opposite could have happened.

To study the above question, I use the "Negro Political Participation Study" (NPPS) of 1961 by Matthews and Prothro (1975). The study was conducted in states of the former Confederacy for a random sample of 540 black and 528 white adults in 1961. For the analysis I coded responses to questions regarding the social integration and status of blacks into binary variables.[13] The outcomes are interracial friendships, living in mixed-race neighborhoods, and attitudes towards integration of respondents and their church ministers. A complete list of the specific questions and the coding scheme for the outcome variables is provided in table 8. The summary statistics are reported in table 9.

Despite the relatively small sample size, this data set provides a unique opportunity to study the social standing of African Americans in the South before the riots and violence between 1963 and 1970, and before the major legislative and legal reforms against segregation were passed and implemented. Major desegregation laws, such as the Civil Rights Act of 1964, the Voting Rights Act of 1965, the Fair Housing Act of 1968, or Supreme Court rulings such as Loving vs. Virginia 1967, which invalidated anti-miscegenation laws, were only enacted later. The only exception is the Supreme Court case of Brown vs. Board of Education of Topeka in 1954 wherein segregation at public schools was declared unconstitutional. However, it took more than a decade to have a significant effect (Wright, 2013).

[13]Social integration here refers to any question concerning non-market interactions between blacks and whites, or attitudes towards people from the opposite race.

5.1 Model Specification and Results

Regressing outcomes related to black-white social interaction and attitudes on the share of blacks in semi-skilled occupations as in,

$$\text{social outcome}_{ic} = \beta \Delta \text{share of blacks}_c + \alpha \text{ share of blacks}_{c,1940} + X'_{ic}\delta + \epsilon_{ic} \qquad (6)$$

where i and c index individuals and counties, respectively, and where social outcomes are the ones described in table 8, may not provide unbiased and consistent estimates. A potential issue is reverse causality. The regression in eq. (6) assumes that an individual's economic status affects her social status. The opposite might be true when better job opportunities arise from an increase in social contacts. To address this type of endogeneity problem, I instrument the change in the share of blacks in semi-skilled jobs from 1940 to 1950 (Δshare of blacks$_c$) with the WWII casualty rate among semi-skilled whites:

$$\Delta \text{share of blacks}_c = \phi \text{casualty rate}_c + \pi \text{ share of blacks}_{c,1940} + X'_{ic}\gamma + \rho_c \qquad (7)$$

The casualty rate is defined as before, ρ_c and ϵ_{ic} are stochastic error terms, and X'_{ic} is a vector of individual and county level controls as well as state fixed effects. Controlling for the pre-war level of the share of blacks in semi-skilled jobs accounts for cross-county level differences in market-based discrimination. For a given level of blacks in this skill group, Δshare of blacks$_c$ then provides the additional inflow of blacks into this skill group during the war years. The effect of this inflow might have a different impact when starting from a low or high pre-war level. This simply is a way to leverage the time information on the treatment in cross sectional survey data.

The main assumptions required for identification are that the casualty rate is a sufficiently relevant predictor of Δshare of blacks$_c$ and that it does not correlate with the error term of a given social outcome. A threat to identification would be joint service of blacks and whites in the war. Draft and casualty rates correlate positively. Serving together in battle could have created bonds between black and white soldiers. If those translated to better social relations in the workplace because of their common war experience, this would violate the exclusion restriction. To alleviate such concerns, all regressions control for a respondent's veteran status and the county draft rate.

Further controls that are potential determinants of interracial social relations and that might correlate with semi-skilled employment include gender, age, race, the county an individual grew up in, the number of years an individual has spent in their current county of residence, and place size. Additional county level controls include the percentage of blacks, the share of people born in other counties, the WWII draft rate, the number of lynchings between 1900 and 1930, and the number of Rosenwald schools per 1,000 blacks, as well as the number of slaves in 1860.

Another important control is the location of a respondent's dwelling (rural, rural non-farm, suburban, and urban). Boustan (2010, 2016) shows that in-migration of blacks to the centers of Northern cities led whites to move to the periphery. This phenomenon is known in the literature as white flight. If unaccounted for, blacks would find semi-skilled occupations in the city centers and make friends with whites though not because of their improved economic position but because all the whites who had a distaste for interactions with blacks moved to the suburbs. Summary statistics for the individual level controls by race are reported in table 10.

A significant shortcoming of this data set is that these individuals cluster in only 24 different counties. This is mainly an inference problem due to the sampling scheme employed. First, primary sampling units (counties or collections of counties) were drawn at random within each Southern state, then individuals were sampled from within a chosen area. The data are therefore representative of the Southern population as argued by Matthews and Prothro (1975). The sample counties are mapped in figure 12. Nevertheless, 24 clusters are not enough for the conventionally used cluster-robust variance-covariance estimator to be consistent as it relies on large sample asymptotics. Cluster-robust standard errors are reported in parentheses for purposes of comparison. The standard errors in squared brackets are estimated via the wild cluster bootstrap t-percentile procedure by Cameron et al. (2008) for the OLS models, and via the wild restricted efficient residual bootstrap for IV models by Davidson and MacKinnon (2010). These correct inference for the smaller number of clusters.

OLS and IV results for the regression equation in eq. (6) are reported in table 11. The sample size is kept constant for all regressions using information from the 540 black and 528 white respondents. The first stage F-statistic on the instrument is sufficiently large with a value of 43.8. I also report the efficient F-statistic by Olea and Pflueger (2013),

which is robust to heteroscedasticity and clustering, with a value of 45.8. Most of the IV results are similar to the OLS estimates and show a significant and positive effect of the black skill-upgrade on social relations between blacks and whites. Issues related to omitted variables or selection appear to be less relevant in the context of these outcomes.

A casualty-induced one percentage point increase in Δshare of blacks$_c$ is associated with an 1.8 p.p. increase in a respondent's probability of reporting an interracial friendship. The OLS and IV estimates are virtually the same. An increase in the share of blacks in semi-skilled jobs at the average casualty rate thus increases this probability by 2.9 p.p.[14] Camargo et al. (2010) show that white students who were randomly assigned a black roommate in their first year of college had a 10.5 p.p. higher probability of having an interracial friendship in the second year. Compared to their estimates, the friendship effect at the average casualty rate is abut 28% of the exposure treatment for college students in the early 2000s. This seems reasonable and puts the magnitude of the estimated coefficients into perspective.

Respondents in treated counties stated with a 1.2 p.p. higher probability that they lived in mixed-race areas. Relative to the outcome mean of 12.4% this is a sizable effect. Given that the share of blacks in the county and dwelling location are controlled for, this is not a mere population composition effect but must have been an active choice by respondents. The black occupational upgrade also had significant effects on attitudes towards integration. Each percentage point increase in Δshare of blacks$_c$ is associated with a 1 p.p. higher probability of respondents favoring integrating in the OLS and 2 p.p. higher in the IV estimation.

Breaking this down further, support for integration at school increased by 1 p.p. and by 0.3 (OLS) and 0.8 (IV) p.p. for integration at church. Favoring interracial exposure of their children or in their churches provides significant evidence for the extent of the effects of the improved economic position of blacks on black-white social relations. The results relating to integration at church indicate a willingness to accept the other racial group into the most intimate spheres of social life. Even nowadays there is a strong racial divide in church memberships and service, and Martin Luther King stated in several speeches that 11 o'clock on Sunday is the most segregated hour in American life (see Fryer, 2007).

[14]Section 3.2.1 estimated an increase in the share of blacks in semiskilled jobs of 0.515 for a 1 p.p. increase in the casualty rate. Since the regression includes fixed effects, this would almost the same as running the regression in first differences using Δshare of blacks$_c$ as outcome. Hence the friendship effect at an average casualty rate is $3.1 \times 0.515 \times 1.8 = 2.87$.

There also appears to be an institutional component since respondents in treated counties were 0.5 to 1.5 p.p. less likely to report their ministers preaching in favor of segregation. However, given the data it is not possible to say whether this was a demand or supply effect. Individuals with higher interracial exposure or contacts might have demanded less segregationist priests, while another possibility is that such priests were predominantly assigned to areas were racial tensions were lower.

The results suggest that the casualty-induced skill-upgrade of African Americans not only came with a rise in economic but also in social status.[15]

6 Conclusion

Much has changed since Myrdal's (1944) negative assessment of the economic and social fortunes of African Americans. This is particularly true for the middle of the last century. While writing his book, Myrdal had recognized the importance of the war for the employment of blacks: "The present War is of tremendous importance to the Negro in all respects. He has seen his strategic position strengthened not only because of the desperate scarcity of labor but also because of a revitalization of the American Creed." (1944, p. 409). This paper shows that this scarcity was particularly pronounced in areas with higher WWII casualty rates among semi-skilled whites. These losses opened up new employment opportunities for blacks and contributed to the largest occupational upgrading of African Americans since the end of the Civil War.

Understanding the roots of this unprecedented occupational gain helps to understand African American progress at mid-century. While some path breaking work has assessed black economic progress at mid-century with respect to wages (Margo, 1995; Maloney, 1994; Bailey and Collins, 2006), migration and urbanization (Boustan, 2009, 2010, 2016), home ownership (Collins and Margo, 2011; Boustan and Margo, 2013; Logan and Parman, 2017), or education (Smith, 1984; Turner and Bound, 2003), our knowledge of the origins of the sudden and strong improvements during and after the war has been limited. The analysis here provides evidence that several of the economic outcomes considered by

[15] Appendix C provides further heterogeneity analyses by repeating the estimation for the black and white sub-samples, as well as robustness checks with respect to weighting blacks by their population share in the county, changing the definition of the treatment variable, and to assess sensitivity of the IV estimates with respect to mild violations of the exclusion restriction. It also provides a causal mediation analysis to see whether higher incomes for blacks are a mechanism that mediates the effects found in the main analysis.

previous work can be directly related to the war. In particular, they relate to the casualty rate among semi-skilled whites as driver of the black occupational upgrade. I rule out alternative explanations for this pattern based on migration or increased educational attainment by blacks.

The improvements in the position of blacks go beyond the economic gains. The survey data results provide some insights which indicate that areas with a larger wartime upgrading of blacks into semi-skilled employment also saw a rise in their social status. This ranges from increased interracial friendships to higher acceptance of the other group at school or church. The economic upgrading of a minority group thus has the potential to even affect strongly embedded social values in a conservative setting such as the Bible Belt in the early 1960s.

Even though this paper has quantified the relationships between the war casualties and the occupational upgrade, as well as the economic and social outcomes of blacks, it remained mostly silent on the specific mechanisms behind these relationships. The difficulty is to determine which variables are outcomes, treatments, or mediators. Several channels of causation may exist at the same time. The occupational upgrade not only came with better-paying jobs but also with the opportunity to interact more with white workers in the workplace. Is the improvement in social relations driven by inter-group contact at work or by the relaxation of black households' budget constraints that allow for social activities or for moving to better neighborhoods? Exploring these questions might offer a promising avenue for future research.

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Tables

Table 1: Summary Statistics - WWII Enlistment Records

Panel A

	Black (n = 807,116)				White (n = 7,228,570)			
	mean	st. dev.	min.	max.	mean	st. dev.	min.	max.
Age	25.03	5.80	18	49	24.59	5.69	18	49
Education	9.29	1.86	8	18	10.68	2.24	8	18
AGCT	70.19	19.54	40	187	100.46	22.17	40	199
Married	0.23	0.42	0	1	0.23	0.42	0	1
Height (in.)	68.21	3.51	59	82	68.49	3.25	59	82
Weight (lbs.)	148.42	17.90	94	249	149.59	19.97	88	257
Died	0.019	0.139	0	1	0.029	0.169	0	1

Panel B

	Enlisted (n = 1,670,352)				Drafted (n = 6,622,454)			
	mean	st. dev.	min.	max.	mean	st. dev.	min.	max.
Age	22.859	5.155	18	48	25.156	5.809	18	49
Education	11.456	2.148	8	20	10.306	2.244	8	20
AGCT	133.181	27.585	1	199	95.777	22.773	1	199
Married	0.121	0.326	0	1	0.256	0.436	0	1
Height (in.)	68.821	2.839	59	82	68.328	3.414	59	82
Weight (lbs.)	149.056	19.256	90	257	149.311	20.066	88	257
Died	0.027	0.162	0	1	0.029	0.167	0	1

Panel C

	South (n = 2,249,203)				Non-South (n = 6,043,984)			
	mean	st. dev.	min.	max.	mean	st. dev.	min.	max.
Age	22.288	5.570	18	46	24.844	5.819	18	49
Education	10.157	2.207	8	20	10.680	2.280	8	20
AGCT	90.722	25.958	1	199	99.825	22.727	1	199
Married	0.252	0.434	0	1	0.220	0.414	0	1
Height (in.)	68.658	2.308	59	82	68.364	3.293	59	82
Weight (lbs.)	148.076	19.501	90	256	149.657	19.989	88	257
Died	0.028	0.166	0	1	0.028	0.166	0	1

Note: Summary statistics for data from drafted soldiers in the Army or Army Air Force between 1940 and 1946. AGCT is the Army General Classification Test, an ability test administered during the draft examinations. This measure is only available for a subset of men drafted in 1943. The similarities in the minimum values for the AGCT, education levels, and height across groups are due to the minimum requirements imposed by the Army on the draft. The indicator for a soldier's death equals one for those who were killed in combat or who died due to all other reasons such as battle and non-battle injuries, accidents, self-inflicted wounds or diseases.

Table 2: County Data Summary Statistics, 1920-1970

	obs.	mean	st. dev.	min	max
Main Outcome					
% blacks in semi-skilled jobs	7,737	14.611	14.228	0.000	87.550
% blacks in semi-skilled jobs in 1940	1,386	12.433	12.567	0.000	67.619
Military					
WWII casualty rate of semi-skilled whites	8,303	3.129	2.211	0.000	22.222
Av. casualty rate in neighboring counties	8,286	1.571	1.764	0.000	11.528
Draft rate	8,303	13.143	13.890	0.000	61.592
Log WWII spending per capita	8,303	0.346	1.209	0.000	9.130
Demographics					
Log median family income	5,515	9.780	0.682	7.756	11.469
% with high school degree	5,543	24.440	11.621	3.700	79.500
% rural population	8,299	78.734	24.475	0.000	100.000
% Republican vote share	7,652	14.452	22.562	0.000	100.000
% black population	7,954	22.421	20.706	0.000	90.772
% black male population	8,299	21.341	20.436	0.000	89.893
Lynchings per 1,000 blacks, 1900-30	7,826	0.450	8.607	0.000	500.000
Rosenwald schools per 1,000 blacks	7,826	0.719	1.655	0.000	71.429
% acres flooded by Mississippi, 1928	8,303	0.420	5.015	0.000	100.000
Number of slaves (000s), 1860	8,303	1.377	2.115	0.000	17.957
Agriculture					
% of land in agriculture	8,299	62.198	24.098	0.000	100.000
% acreage in cotton production	8,289	6.050	9.483	0.000	74.414
Share of cash tenants	8,291	7.261	7.915	0.000	78.284
Av. value of machinery per farm (000s)	8,289	2.466	4.758	0.000	219.461
Manufacturing					
Manufact. establishments per 1,000 pop.	7,887	1.240	0.942	0.000	29.728
Av. manufact. firm size	7,461	41.334	39.119	0.000	629.000
Log manufact. value per worker	6,756	12.411	0.956	0.000	14.793
Share of manufact. employment	7,461	5.014	5.329	0.000	100.000
New Deal controls					
New deal loans per capita, 1933-35	8,280	4.562	17.789	0.000	573.874
Relief per capita, 1933-39	8,280	7.613	23.471	0.000	949.111
Public works per capita, 1933-39	8,280	4.868	21.361	0.000	844.372
AAA spending per capita, 1933-39	8,280	5.316	25.560	0.000	852.113
FHA loans insured per capita, 1934-39	8,280	1.124	5.803	0.000	195.790
Unemployment rate, 1937	8,297	10.981	5.831	0.258	42.288

Note: Summary statistics for 1,388 counties in Southern states between 1920 and 1970. Monetary values are deflated to 2010 dollars.

Table 3: County Level Difference-in-Differences Results, 1920-1970

	Outcome: % blacks in semi-skilled jobs (pre-war mean = 12.433)					
	(1)	(2)	(3)	(4)	(5)	(6)
Casualty rate$_c$× Post-war$_t$	0.515***	0.546***	0.508***	0.548***	0.587***	0.636***
	(0.119)	(0.141)	(0.144)	(0.148)	(0.214)	(0.122)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	7,737	5,713	5,692	5,713	5,713	6,429
Counties	1,388	1,320	994	1,320	1,320	1,375
Adj. R^2	0.855	0.877	0.873	0.883	0.915	0.869
Oster's δ	1.273	1.291	1.112	1.486	0.614	1.494

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. Controls include county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Oster's (2017) test for selection on unobservables is reported in the final row by computing the coefficient of proportionality δ for which the coefficient on the semi-skilled casualty rate among whites would equal zero. Standard errors clustered at the county level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Difference-in-Differences with Casualty Rates by Ethnicity and Skill-Group

	Outcome: % blacks in semi-skilled jobs (pre-war mean = 12.433)					
	(1)	(2)	(3)	(4)	(5)	(6)
White Casualty Rates$_c$ × Post-war$_t$						
Low-skilled	-0.029	-0.053	0.071	-0.042	-0.196	-0.052
	(0.134)	(0.203)	(0.154)	(0.195)	(0.301)	(0.173)
Semi-skilled	0.557***	0.619***	0.452***	0.585***	0.646***	0.612***
	(0.134)	(0.161)	(0.161)	(0.167)	(0.237)	(0.148)
High-skilled	-0.093	-0.138	0.027	-0.161	-0.220	-0.090
	(0.169)	(0.193)	(0.190)	(0.194)	(0.341)	(0.187)
Black Casualty Rates$_c$ × Post-war$_t$						
Low-skilled	-0.085**	-0.140**	-0.086*	-0.115*	-0.132	-0.154***
	(0.041)	(0.056)	(0.048)	(0.060)	(0.083)	(0.058)
Semi-skilled	0.057	0.003	0.055	0.014	0.093	-0.011
	(0.054)	(0.057)	(0.054)	(0.047)	(0.093)	(0.055)
High-skilled	-0.051	-0.066	0.008	-0.046	0.008	-0.074
	(0.045)	(0.067)	(0.068)	(0.067)	(0.116)	(0.069)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	7,737	5,713	5,692	5,713	5,713	5,634
Counties	1,388	1,320	994	1,320	1,320	1,299
Adj. R^2	0.855	0.879	0.883	0.884	0.915	0.878
Oster's δ	1.119	1.182	0.833	1.251	0.299	1.152

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate by race and skill group interacted with a post-war indicator. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. Controls include county and decade fixed effects, the county draft rate, draft share of each race and skill group, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Oster's (2017) test for selection on unobservables is reported in the final row by computing the coefficient of proportionality δ for which the coefficient on the semi-skilled casualty rate among whites would equal zero. Standard errors clustered at the county level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Micro Census Triple Differences Results, 1920-1970

	Outcome: $\Pr(\text{semi-skilled}_{izt}) = 1$					
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: All U.S.					
Casualty rate$_z$ × Post-war$_t$	-0.002	-0.002	-0.002	-0.004	-0.003	-0.009**
	(0.007)	(0.007)	(0.004)	(0.004)	(0.005)	(0.004)
Casualty rate$_z$ × Black$_{izt}$ ×	0.047***	0.047***	0.043***	0.019***	0.043***	0.043***
Post-war$_t$	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Observations	4,348,026	4,348,026	4,335,873	3,119,300	4,335,873	4,335,873
Adj. R^2	0.031	0.042	0.044	0.135	0.046	0.047
	Panel B: South only					
Casualty rate$_z$ × Post-war$_t$	-0.012	-0.013	0.005	-0.009	-0.011	-0.011*
	(0.010)	(0.009)	(0.007)	(0.006)	(0.008)	(0.006)
Casualty rate$_z$ × Black$_{izt}$ ×	0.029***	0.030***	0.028***	0.011***	0.028***	0.028***
Post-war$_t$	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Observations	1,272,016	1,272,016	1,269,553	911,418	1,269,553	1,269,553
Adj. R^2	0.061	0.073	0.075	0.140	0.077	0.080
Individual controls		Yes	Yes	Yes	Yes	Yes
Commuting Zone controls			Yes	Yes	Yes	Yes
Migration and education				Yes		
State time trends					Yes	
Commuting zone time trends						Yes

Note: Difference-in-differenece-in-differences regression of a semi-skilled indicator on the commuting zone WWII casualty rate among semi-skilled whites interacted with a post-WWII dummy, and with a black indicator for individuals living in 722 commuting zones in the whole U.S. and 300 commuting zones in the South. The estimation sample contains data from the decennial U.S. micro Census from 1920-70 on non-institutionalized, working black and white males aged 15-65 who are not currently attending school. All regressions include commuting zone and Census year fixed effects. Individual level controls include age, marital status, age and place of birth dummies. Column (4) adds cross-state migration and education controls interacted with race and time fixed effects. Commuting zone level controls are the WWII draft rate, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the commuting zone level in parentheses. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Triple Differences Results by Industry, 1920-1970

Outcome: $\Pr(\text{semi-skilled}_{izt}) = 1$			
	Manufacturing		
	All	Durable	Non-Durable
	(1)	(2)	(3)
Casualty rate$_z$ × Post-war$_t$	-0.004	-0.006	0.016
	(0.007)	(0.006)	(0.012)
Casualty rate$_z$ × Black$_{izt}$ × Post-war$_t$	0.097***	0.086***	0.105***
	(0.005)	(0.004)	(0.006)
Observations	1,378,824	519,224	860,182
Adj. R^2	0.038	0.040	0.042
	Comparison Sectors		
	Telecom.	Retail	Public Admin.
	(1)	(2)	(3)
Casualty rate$_z$ × Post-war$_t$	-0.003	0.000	0.002
	(0.014)	(0.004)	(0.011)
Casualty rate$_z$ × Black$_{izt}$ × Post-war$_t$	0.024	-0.008***	0.001
	(0.016)	(0.003)	(0.006)
Observations	39,510	469,259	361,325
Adj. R^2	0.095	0.027	0.359

Note: Difference-in-differenece-in-differences regression of a semi-skilled indicator on the commuting zone WWII casualty rate among semi-skilled whites interacted with a post-WWII dummy, and with a black indicator. The estimation sample contains data from the decennial U.S. micro Census from 1920-70 on non-institutionalized, working black and white males aged 15-65. Regression results for semi-skill (columns 1-3) and high-skill (columns 4-6) intensive sectors. All regressions include commuting zone and Census year fixed effects. Individual level controls include age, marital status, age and place of birth dummies. Commuting zone level controls are the WWII draft rate, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the commuting zone level in parentheses. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Micro Census Triple Differences Results using the Casualty Treatment

Outcome:	Urban	Migrant	Owns home	ln(house val.)	ln(wage)	Educ.
	Panel A: All U.S.					
Casualty rate$_z$× Post-war$_t$	-0.013	0.009	-0.007**	-0.044**	-0.017**	-0.023
	(0.014)	(0.011)	(0.004)	(0.019)	(0.007)	(0.015)
Casualty rate$_z$× Black$_{izt}$× Post-war$_t$	-0.002	-0.022***	0.000	0.070***	0.039***	0.061***
	(0.002)	(0.005)	(0.003)	(0.012)	(0.005)	(0.018)
Observations	4,335,873	4,335,873	4,211,819	1,527,256	2,696,819	3,119,300
Adj. R^2	0.619	0.323	0.251	0.473	0.501	0.328
	Panel B: South Only					
Casualty rate$_z$× Post-war$_t$	-0.041**	-0.005	-0.002	-0.054**	-0.035***	-0.046**
	(0.016)	(0.007)	(0.005)	(0.026)	(0.012)	(0.022)
Casualty rate$_z$× Black$_{izt}$× Post-war$_t$	0.000	-0.013***	-0.008***	0.092***	0.031***	0.083***
	(0.002)	(0.003)	(0.002)	(0.012)	(0.007)	(0.016)
Observations	1,269,553	1,269,553	1,227,375	428,774	767,386	911,418
Adj. R^2	0.677	0.468	0.241	0.495	0.505	0.356

Note: Difference-in-differenece-in-differences regression of economic outcomes on the commuting zone WWII casualty rate among semi-skilled whites interacted with a post-WWII dummy, and with a black indicator for individuals living in 722 commuting zones in the whole U.S. The estimation sample contains data from the decennial U.S. micro Census from 1920-70 on non-institutionalized, working black and white males aged 15-65 who are not currently attending school. All regressions include commuting zone and Census year fixed effects. Urban and owns home are binary outcomes for whether an individual lives in a city or owns their home. The log house value, log wages, and education variables are only available from 1940 onward. Log house value is also missing for 1950. Individual level controls include age, marital status, age and place of birth dummies. Commuting zone level controls are the WWII draft rate, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the commuting zone level in parentheses. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Interview Questions and Outcome Coding Scheme

- **Interracial Friend**: (Var 0377)
  "Have you ever known a white (colored) person well enough that you would talk to him as a friend?"
  Coded 1 for 1 (Yes), and 0 otherwise.
- **Live in Mixed Area**: (Var 0079)
  "Racial composition of residential area of respondent"
  Coded 1 for value 3 (Mixed).
- **Favor Integration**: (Var 0374) "Are you in favor of integration, strict segregation, or something in between?"
  Coded 1 for 2 (Integration), and 0 otherwise.
- **Favor Mixed Churches**: (Var 0397)
  "Inter-racial contact: churches - Respondent favors:"
  Coded 1 for values 4 (Gradual integration), 5 (Rapid integration) and 6 (Mixed), and 0 otherwise.
- **Favor Mixed Schools**: (Var 0396)
  "Inter-racial contact: schools - Respondent favors:"
  Coded 1 for values 4 (Gradual integration), 5 (Rapid integration) and 6 (Mixed), and 0 otherwise.
- **Priest Pro Segregation**: (Var 0164)
  "Would you say that your minister believes that religion or the Bible favors segregation or integration?"
  Coded 1 for 1 (Favors segregation) and 2 (Qualified favors segregation), and 0 otherwise.

Note: Original questions from the 1961 "Negro Political Participation Study" (Matthews and Prothro, 1975) and the definitions of the outcome variables which are coded from the corresponding questions as binary variables. Outcomes are in bold font, questionnaire variable numbers are reported in parentheses, questions from the survey between in quotation marks, followed by the coding scheme for the binary variables. The code book for ICPSR study number 7255 is freely available at: `http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/7255`

Table 9: Summary Statistics - Outcome Variables by Race

	Black (n = 540)		White (n = 528)		Difference	
	mean	st. dev.	mean	st. dev.	diff.	s.e.
Interracial Friend	0.466	0.499	0.583	0.494	0.117***	0.030
Live in Mixed Area	0.161	0.368	0.085	0.279	-0.076***	0.020
Favor Integration	0.641	0.480	0.036	0.186	-0.605***	0.022
Favor Mixed Churches	0.057	0.233	0.011	0.106	-0.046***	0.011
Favor Mixed Schools	0.059	0.236	0.045	0.208	-0.014	0.014
Priest Pro Segregation	0.061	0.240	0.142	0.349	0.081***	0.018

Note: Binary outcomes of the social and political integration, standing and attitudes of blacks for black and white respondents in the "Negro Political Participation Study" of 1961 (Matthews and Prothro, 1975). Only individuals in the final estimation sample were used to produce these summary statistics. Differences in means and the corresponding standard errors were estimated with t-tests. Significance levels at 10%, 5%, and 1% are denoted by *, **, ***, respectively. The question about repercussions for political activity against blacks were only asked to African American respondents.

Table 10: Summary Statistics - Individual Characteristics by Race

	Black (n = 540)			
	mean	st. dev.	min.	max.
Male	0.382	0.486	0	1
Age	46.319	15.883	5	85
Years of education	4.952	3.248	1	14
Family income	2183.078	1864.756	500	11000
Veteran	0.124	0.330	0	1
Years in county	35.050	19.425	0	89
% blacks in birth county	43.222	16.309	5	85
Rural	0.205	0.404	0	1
Rural, non-farm	0.069	0.253	0	1
Suburban	0.117	0.321	0	1
City/town	0.610	0.488	0	1
	White (n = 528)			
	mean	st. dev.	min.	max.
Male	0.450	0.498	0	1
Age	45.669	15.684	5	89
Years of education	7.323	3.637	1	14
Family income	4929.061	3178.278	500	11000
Veteran	0.237	0.426	0	1
Years in county	29.638	21.130	0	83
% blacks in birth county	24.452	17.935	5	85
Rural	0.227	0.419	0	1
Rural, non-farm	0.114	0.318	0	1
Suburban	0.131	0.338	0	1
City/town	0.528	0.500	0	1

Note: Summary statistics for black and white respondents from the "Negro Political Participation Study" of 1961 by Matthews and Prothro (1975). Statistics produced for individuals from the final estimation sample. Family income is coded in income bins while for the summary statistics the midpoint of each interval was recorded as the dollar values for the corresponding bin.

Table 11: The Skill Upgrade and Black-White Social Relations - OLS and IV Results

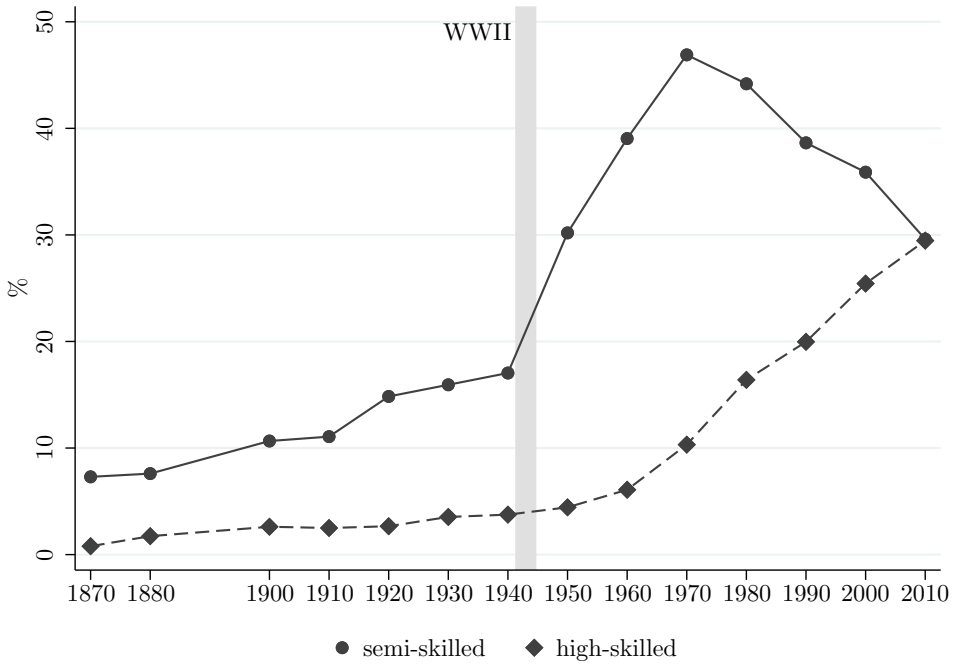
	Pr(Interracial Friend)=1		Pr(Live in Mixed Race Area)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0181	0.0180	0.0155	0.0118
	(0.0059)***	(0.0075)**	(0.0046)***	(0.0046)***
	[0.0079]**	[0.0103]*	[0.0062]**	[0.0075]
Outcome mean	0.5235	0.5235	0.1236	0.1236
R^2	0.1213	0.1213	0.1406	0.1402
	Pr(Favor Integration)=1		Pr(Favor Mixed Schools)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0097	0.0211	0.0105	0.0104
	(0.0031)***	(0.0062)***	(0.0021)***	(0.0032)***
	[0.0053]*	[0.0123]*	[0.0039]***	[0.0047]**
Outcome mean	0.3418	0.3418	0.0524	0.0524
R^2	0.5097	0.5079	0.0683	0.0683
	Pr(Favor Mixed Church)=1		Pr(Priest Pro Segregation)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0027	0.0075	−0.0051	−0.0146
	(0.0015)*	(0.0021)***	(0.0039)	(0.0069)**
	[0.0021]	[0.0033]**	[0.0052]	[0.0104]
Outcome mean	0.0346	0.0346	0.1011	0.1011
R^2	0.0801	0.0780	0.1191	0.1160

Note: The estimation sample is kept constant in all regressions with 540 black and 528 white adults in 24 counties from Southern states in 1961 using data from the "Negro Political Participation Study" (Matthews and Prothro, 1975). The change in the share of blacks in semi-skilled employment from 1940 to 1950 (Δshare of blacks$_c$) in county c is instrumented with the WWII casualty rate among semi-skilled whites in that county. The first stage F-statistic is 43.799 and the Olea and Pflueger (2013) efficient F-statistic is 45.841. Individual level controls include gender, race, age, location of dwelling (urban, suburban, rural), years lived in current county, place size, veteran status, county where a respondent grew up, and state fixed effects. County level controls used are the share of blacks in semi-skilled jobs in 1940, the share of blacks in county c, share of people not born in county c, the WWII draft rate, and variables on racial sentiment such as the number of Rosenwald schools per 1,000 blacks, the number of lynchings from 1900-30 per 1,000 blacks, and the number of black slaves in 1860. Standard errors are clustered at the county level and are reported in parentheses. Standard errors corrected for the small cluster size using the wild cluster bootstrap-t procedure for OLS models by Cameron et al. (2008) and the wild restricted efficient residual bootstrap for IV models by Davidson and MacKinnon (2010) are reported in squared brackets. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

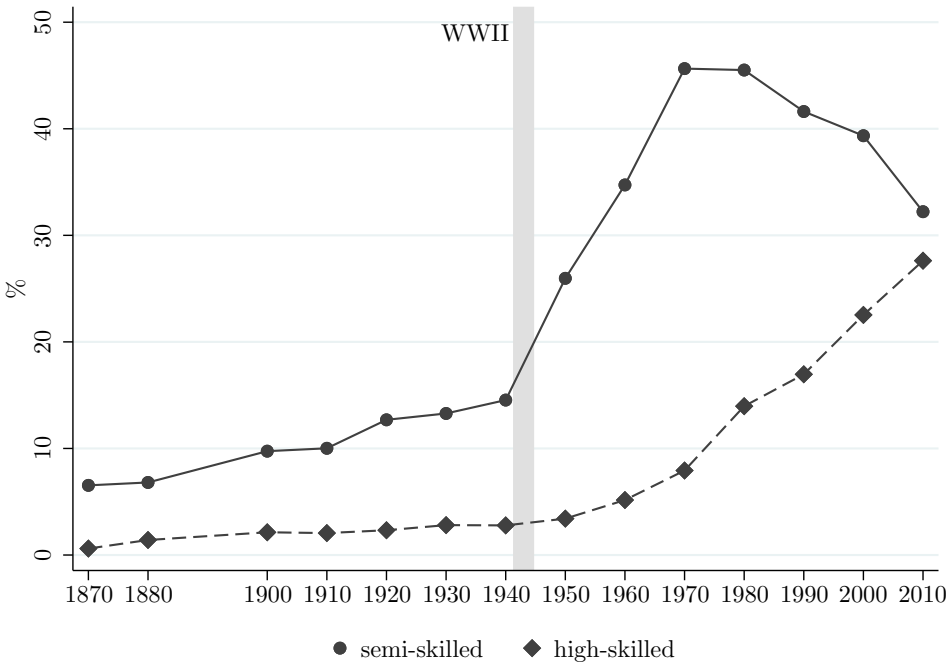
Figures

Figure 1: Share of Semi- and High-Skilled Employment Among Black Men, 1870 to 2010

(a) All U.S.



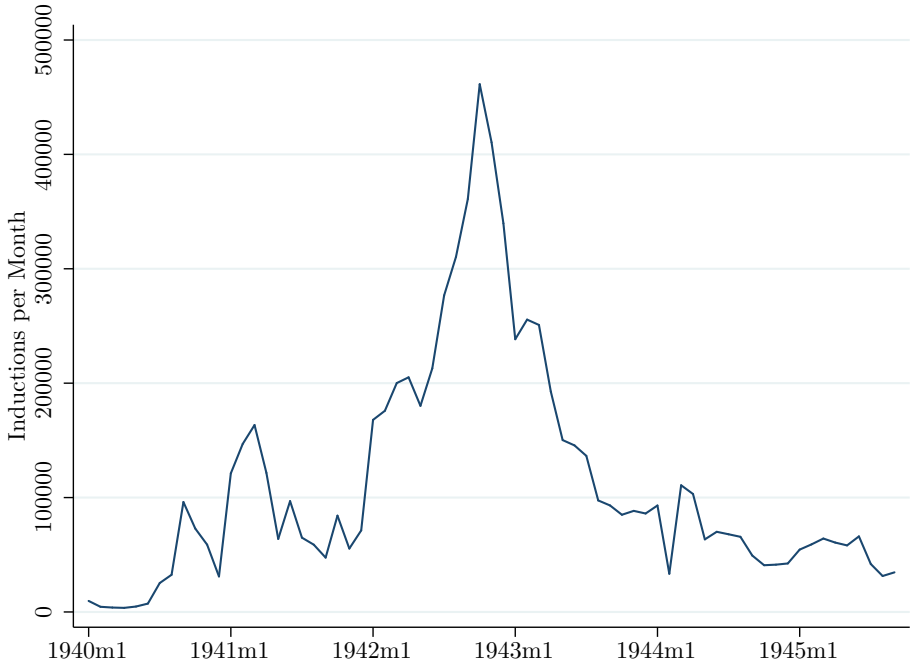
(b) Southern U.S.



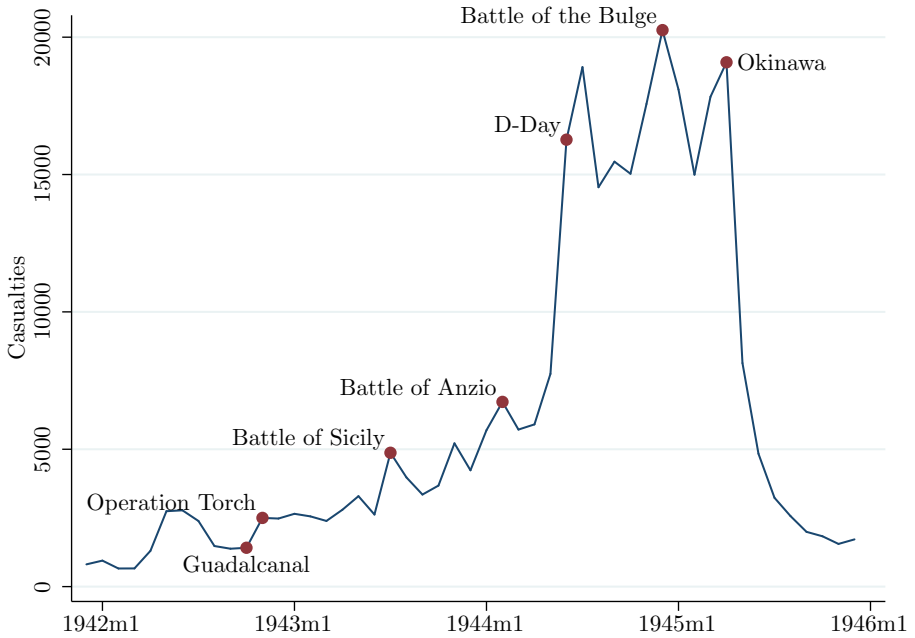
Note: Graphs are based on the public use microdata files of the 1870-2010 Decennial U.S. Censuses by Ruggles et al. (2018). The sample includes black males aged 16 to 65 of the non-institutionalized population who are not attending school at the enumeration date. Semi-skilled jobs (dots) are operatives and craftsmen, and high-skilled jobs (diamonds) are clerks, professionals, and managers. Occupations are defined according to the 1950 Census Bureau occupational classification scheme. The years of U.S. involvement in World War II are marked with light gray background shading. Data for the South includes individuals living in the states of the former Confederacy, as well as Delaware, DC, Kentucky, Maryland, Oklahoma, and West Virginia.

Figure 2: Number of Drafted and Fallen Soldiers by Month and Year

(a) Draft Numbers



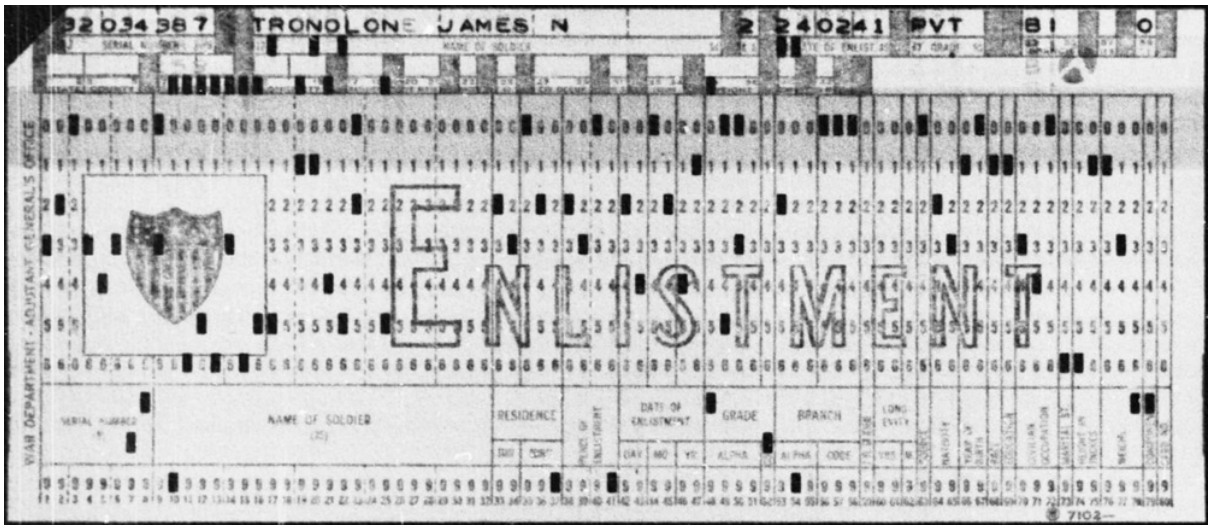
(b) Casualty Numbers



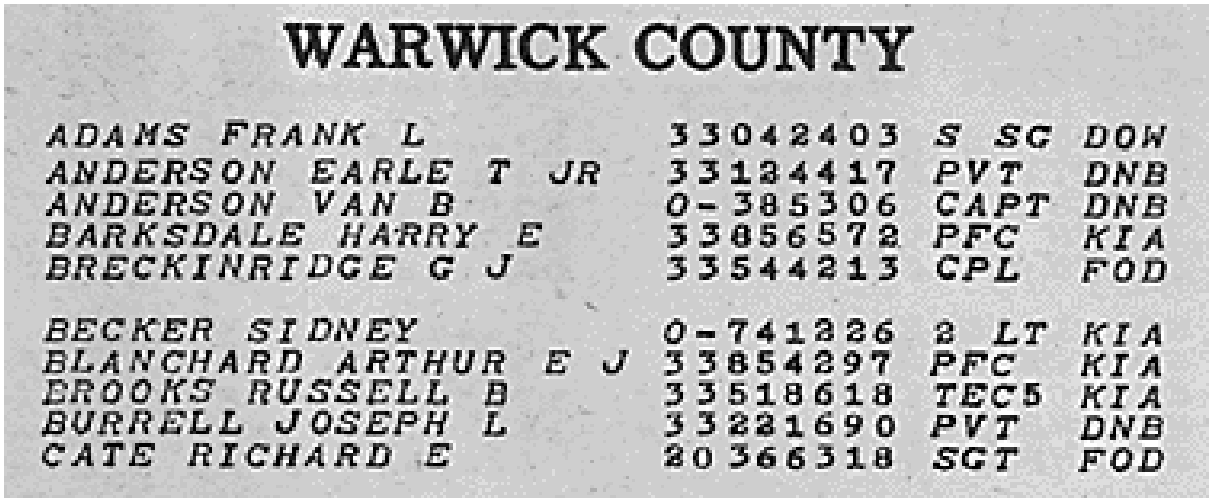
Note: Draft numbers (inductions) also include those who enlisted voluntarily prior to when voluntary enlistment was forbidden in 1942. Both draft and casualty figures are for the Army and Army Air Force only. Panel (b) shows the number of fallen soldiers per month together with major battles and operations involving U.S. Army and Army Air Force personnel. Casualties here refer to all combat and non-combat related deaths. The draft series begins with the enactment of the WWII draft in 1940 whereas the casualty series begins with the attack on Pearl Harbor. Monthly casualty counts come from the Office of the Adjutant General (1946) "Army Battle Casualties and Nonbattle Deaths in World War II - Final Report".

Figure 3: Draft and Casualty Records Example

(a) IBM Draft Punch Card



(b) WWII Honor List of Dead and Missing

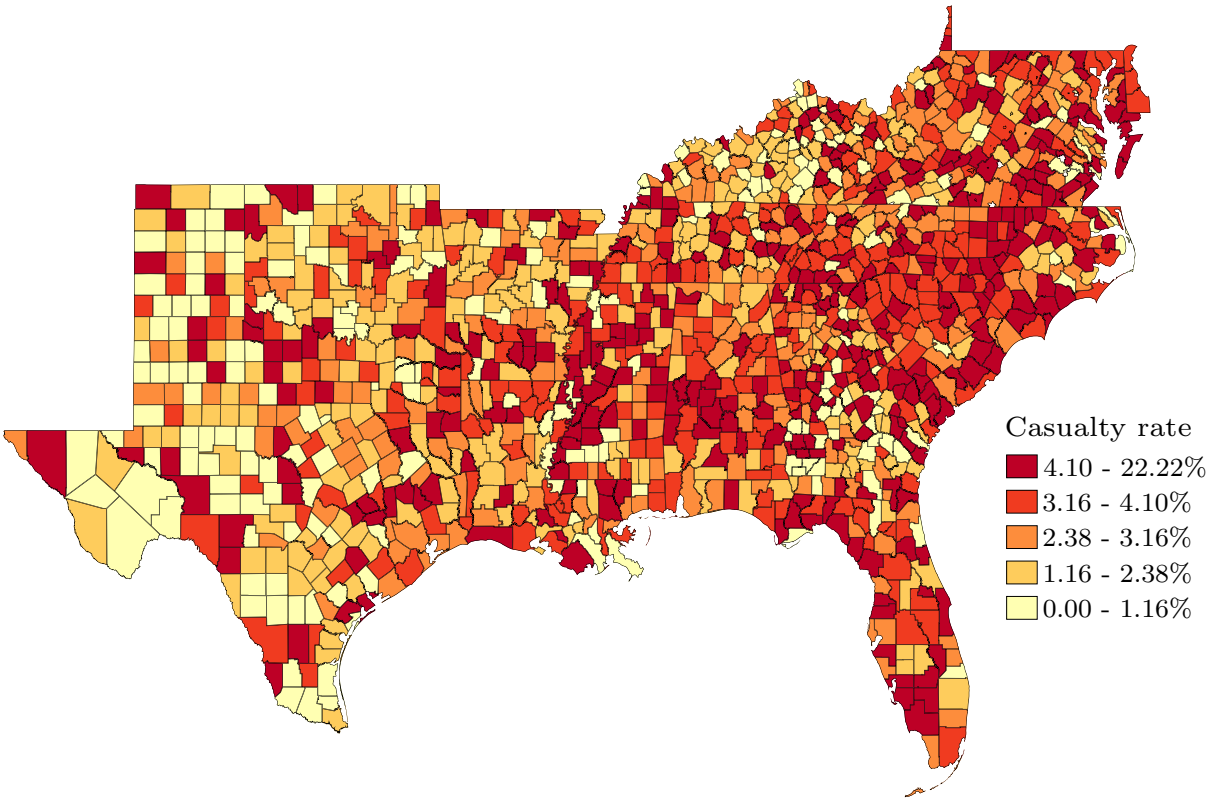


WARWICK COUNTY

ADAMS FRANK L	33042403	S SG	DOW
ANDERSON EARLE T JR	33134417	PVT	DNB
ANDERSON VAN B	O-385306	CAPT	DNB
BARKSDALE HARRY E	33856572	PFC	KIA
BRECKINRIDGE G J	33544213	CPL	FOD
BECKER SIDNEY	O-741326	2 LT	KIA
BLANCHARD ARTHUR E J	33854297	PFC	KIA
BROOKS RUSSELL B	33518618	TEC5	KIA
BURRELL JOSEPH L	33221690	PVT	DNB
CATE RICHARD E	20366318	SGT	FOD

Note: Panel a) shows the enlistment punch card for James Tronolone from Erie, New York, born in 1910. His Army serial number is shown on the top left corner of the card, his rank, date of enlistment, and service branch, among other, on the top right. Panel b) shows an excerpt from the WWII Honor List of Dead and Missing for Warwick County, Virginia. The table displays a soldier's name, their Army serial number, rank, and cause of death. Source: National Archives and Records Administration, Record Group 407: Records of the Adjutant General's Office, 1917- [AGO].

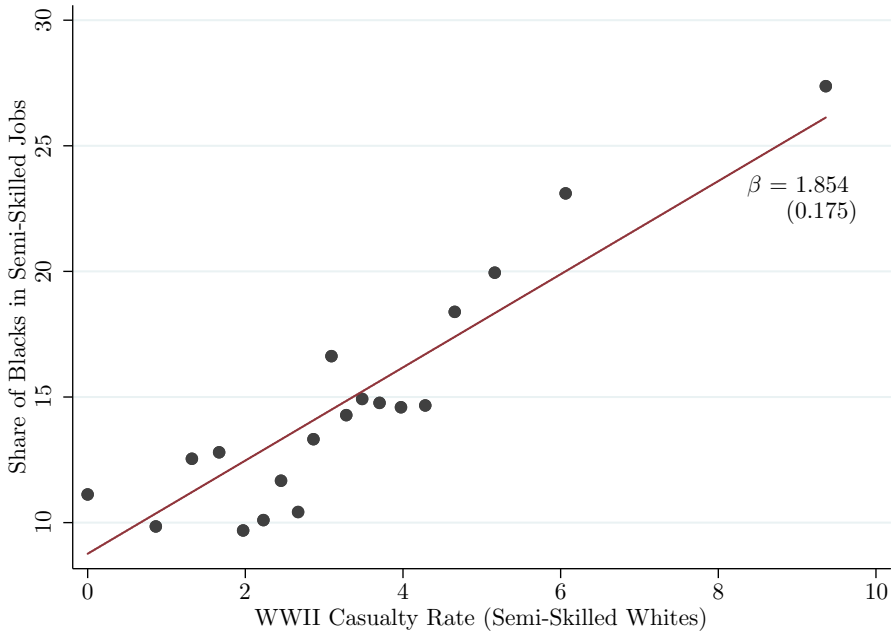
Figure 4: WWII Casualty Rates among Semi-Skilled Whites in the U.S. South



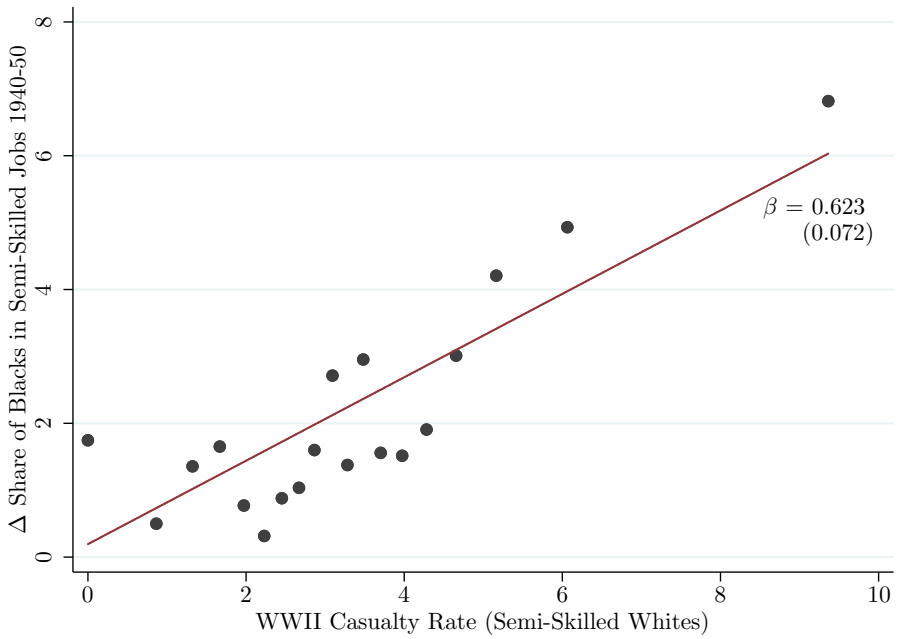
Note: Spatial distribution of WWII casualty rates among semi-skilled white men at the county level in percent. Shaded polygons display the quintiles of the casualty rate distribution with ranges being shown in the legend on the side. Southern states included here are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Oklahoma, Tennessee, Texas, Virginia, and West Virginia.

Figure 5: Scatter Plots for WWII Casualty Rates and the Share of Blacks in Semi-Skilled Jobs in Levels and First Differences

(a) Correlation with the Semi-Skilled Share Level in 1950

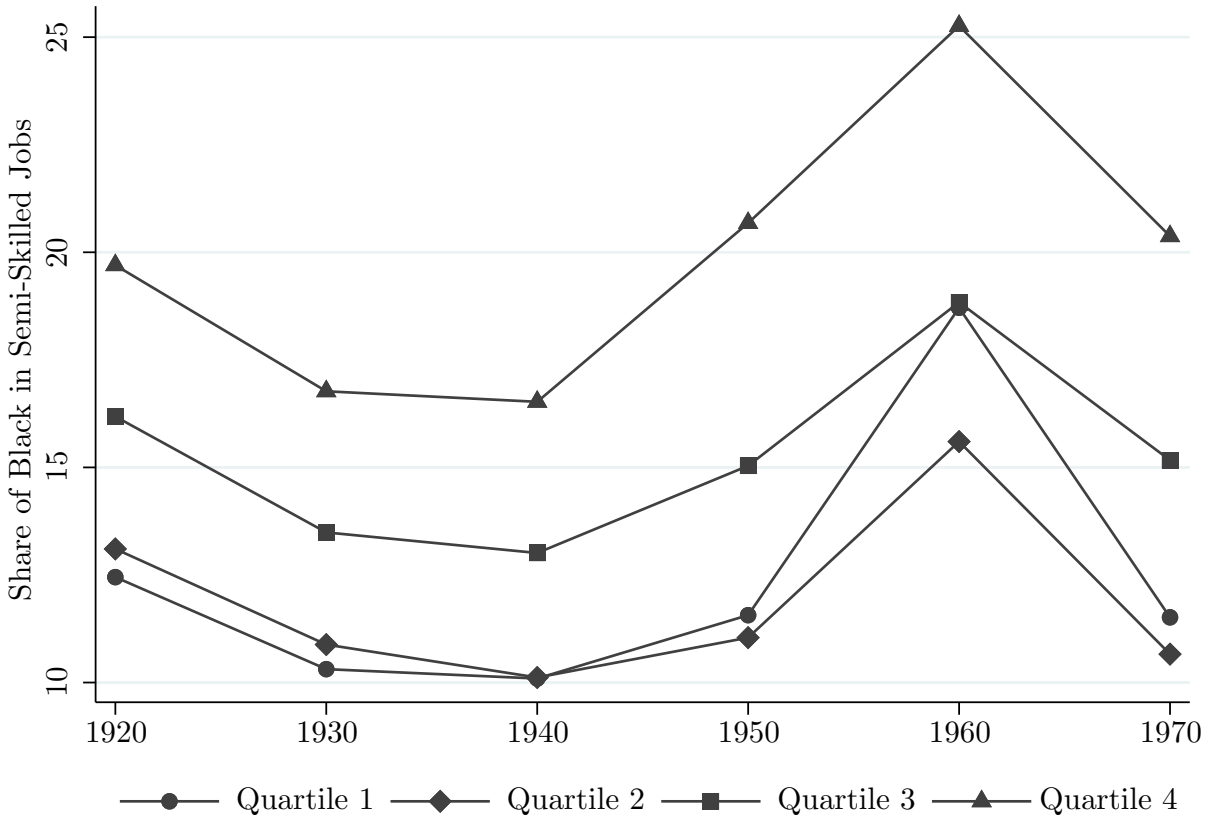


(b) Correlation with the Semi-Skilled Share 1940 to 50 First Difference



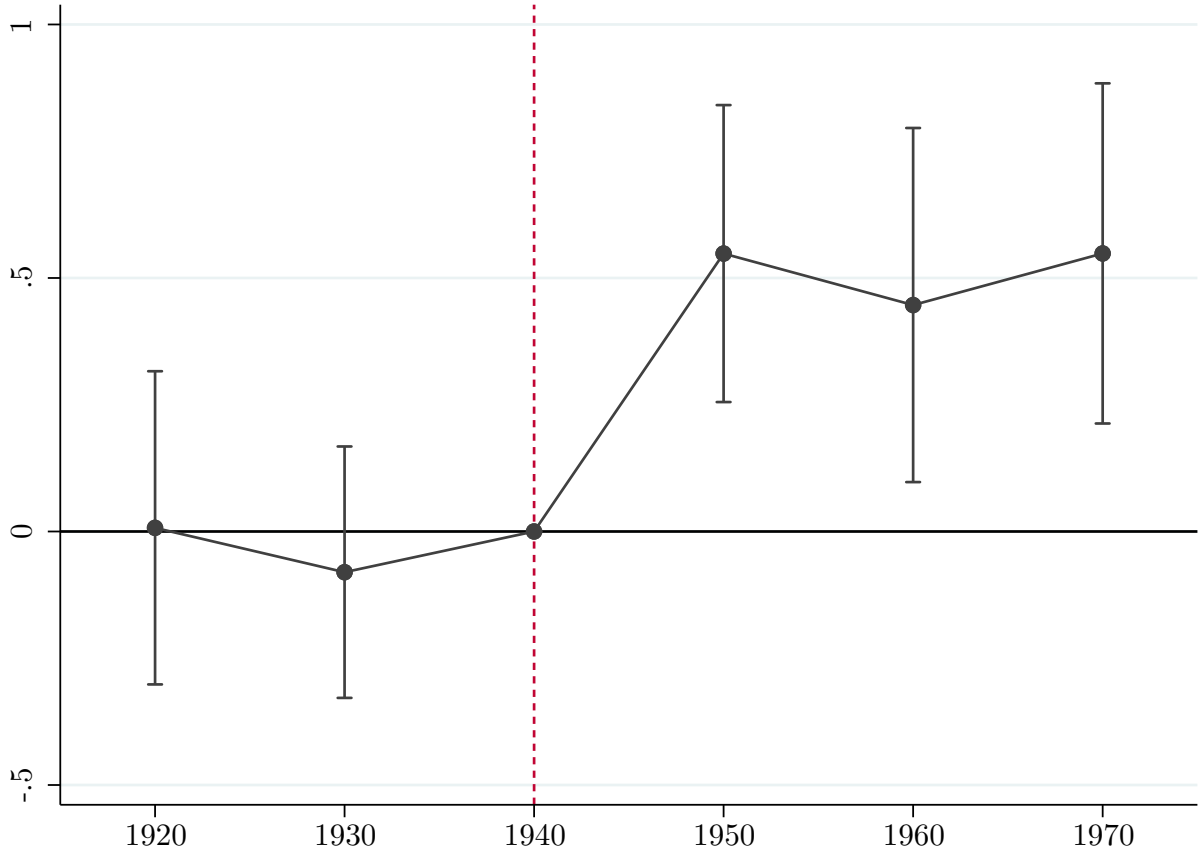
Note: Scatter plots of the relation between the WWII casualty rate among semi-skilled whites and the share of blacks in semi-skilled employment in 1950 across counties (panel a), and the change in the share of blacks in semi-skilled employment from 1940 to 1950 (panel b).

Figure 6: Unconditional Share of Blacks in Semi-Skilled Jobs by Casualty Rate Quartile



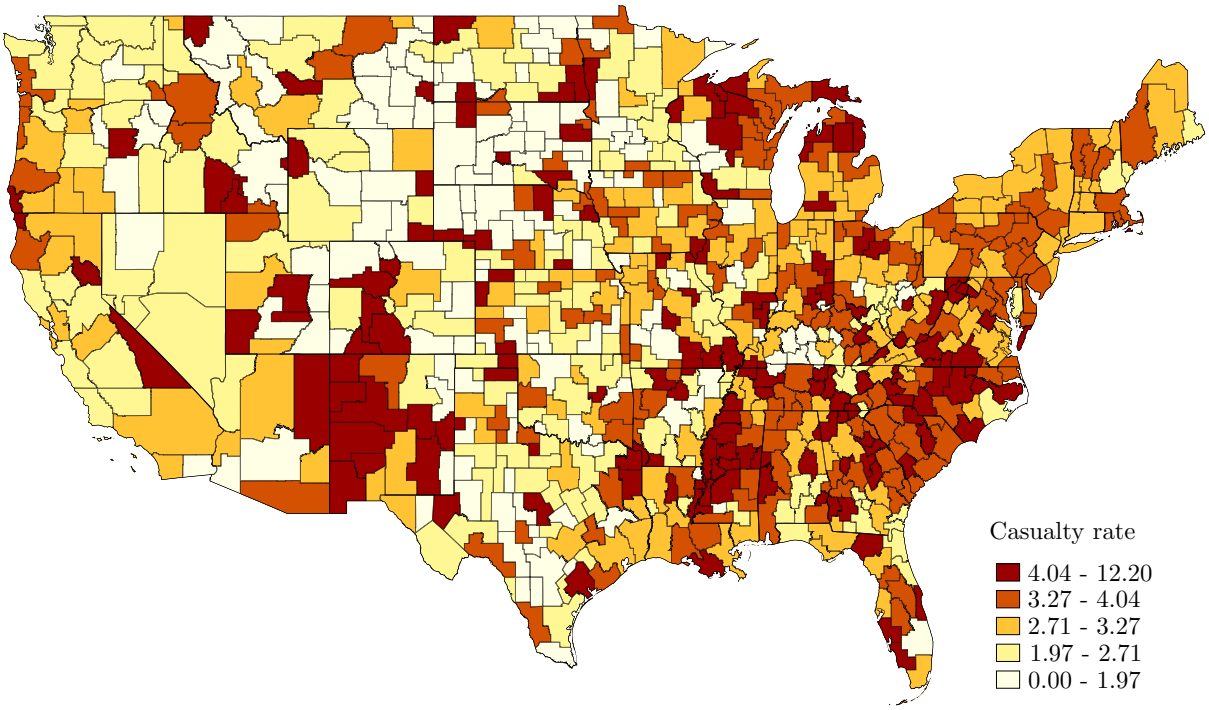
Note: The figure plots the raw outcome data for the share of blacks in semi-skilled jobs for counties in Southern states by quartiles of the WWII casualty rate among semi-skilled whites over time.

Figure 7: Difference-in-Differences Coefficient Plot



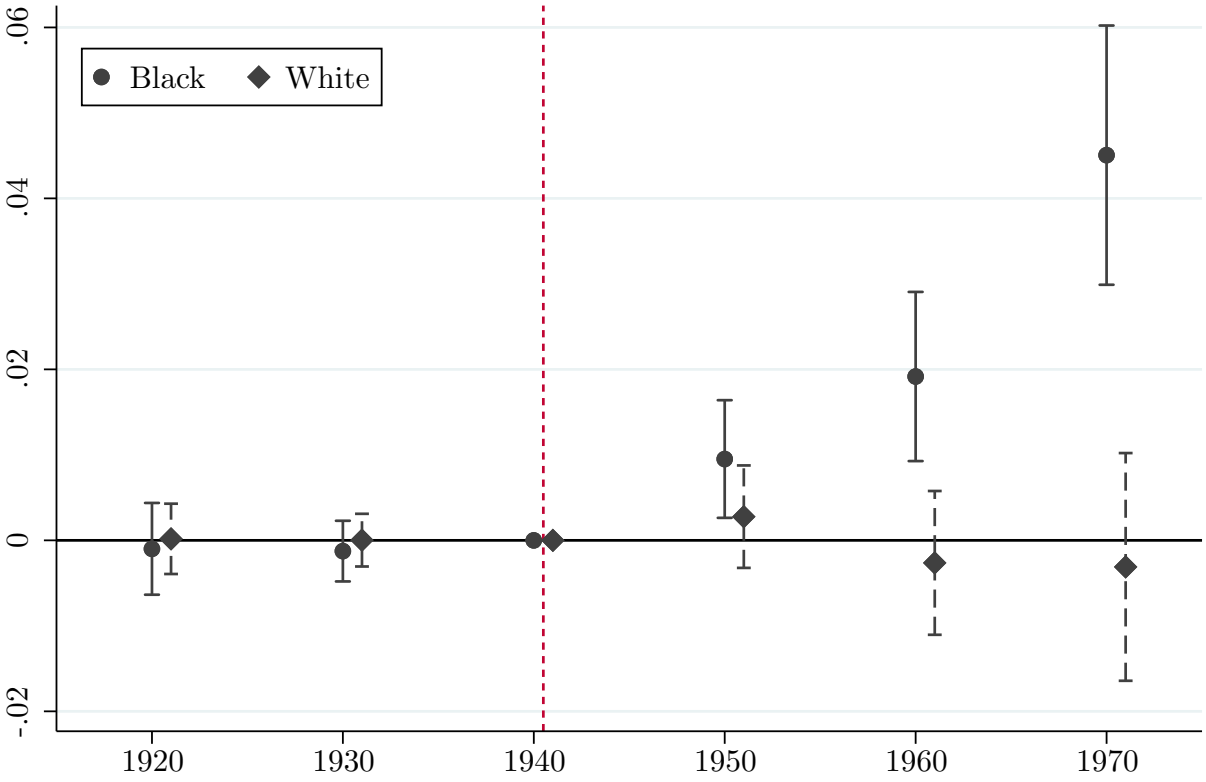
Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with decade fixed effects. The omitted baseline decade is 1940 which is marked by the dashed line. This is the last pre-treatment period. The estimation sample contains counties in Southern states from 1920 to 1970. Coefficients show the effect of a one standard deviation increase in the casualty rate on the outcome in terms of percentage points. Controls include county fixed effects and flexible state-specific time trends, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the county level. Error bars show 95% confidence intervals around each coefficient estimate.

Figure 8: Spatial Distribution of WWII Casualty Rates among Semi-Skilled Whites



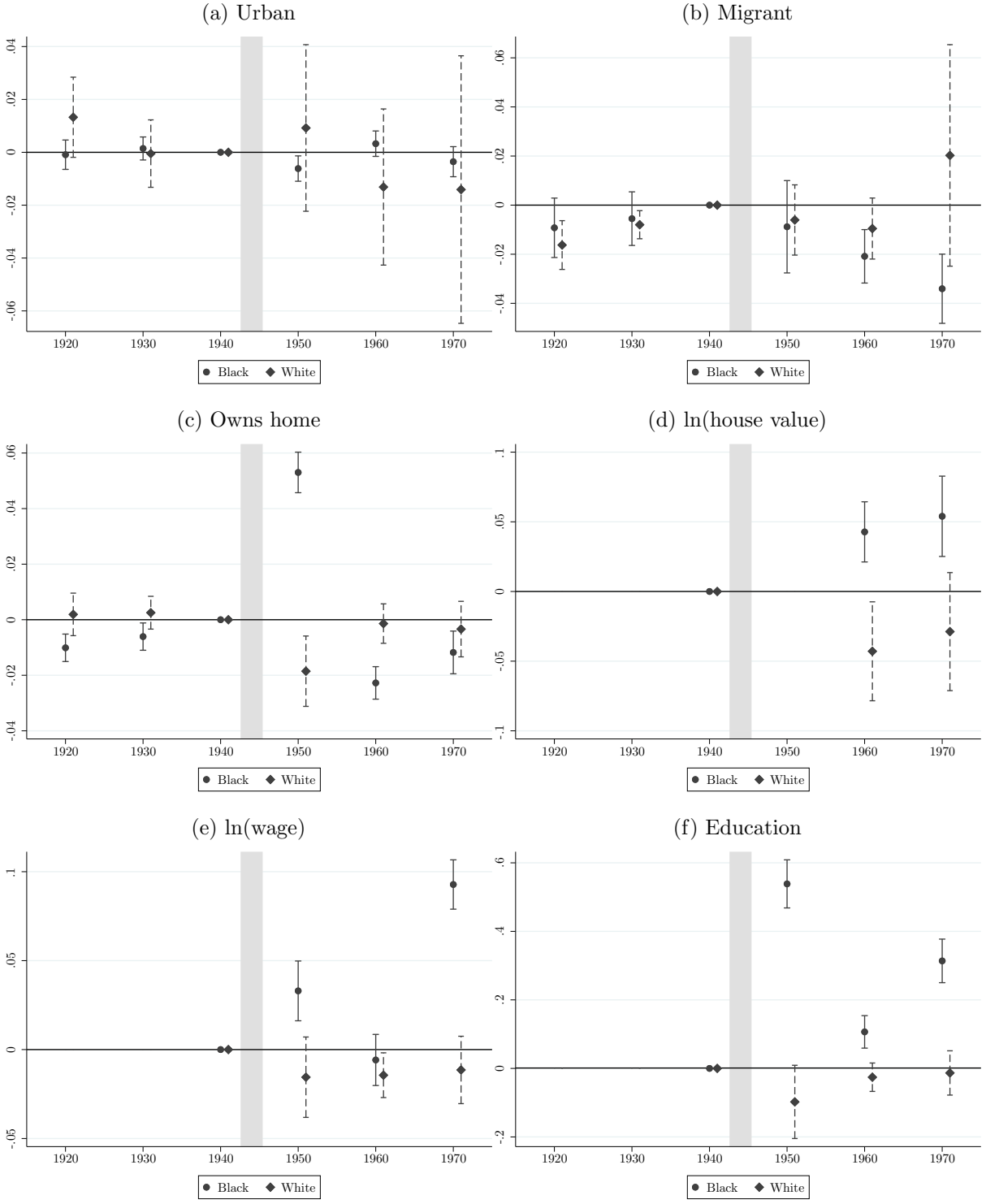
Note: Spatial distribution of WWII casualty rates among semi-skilled white men at the commuting zone level in percent. Shaded polygons display the quintiles of the casualty rate distribution with ranges being shown in the legend on the side.

Figure 9: Triple Differences Coefficients Plot



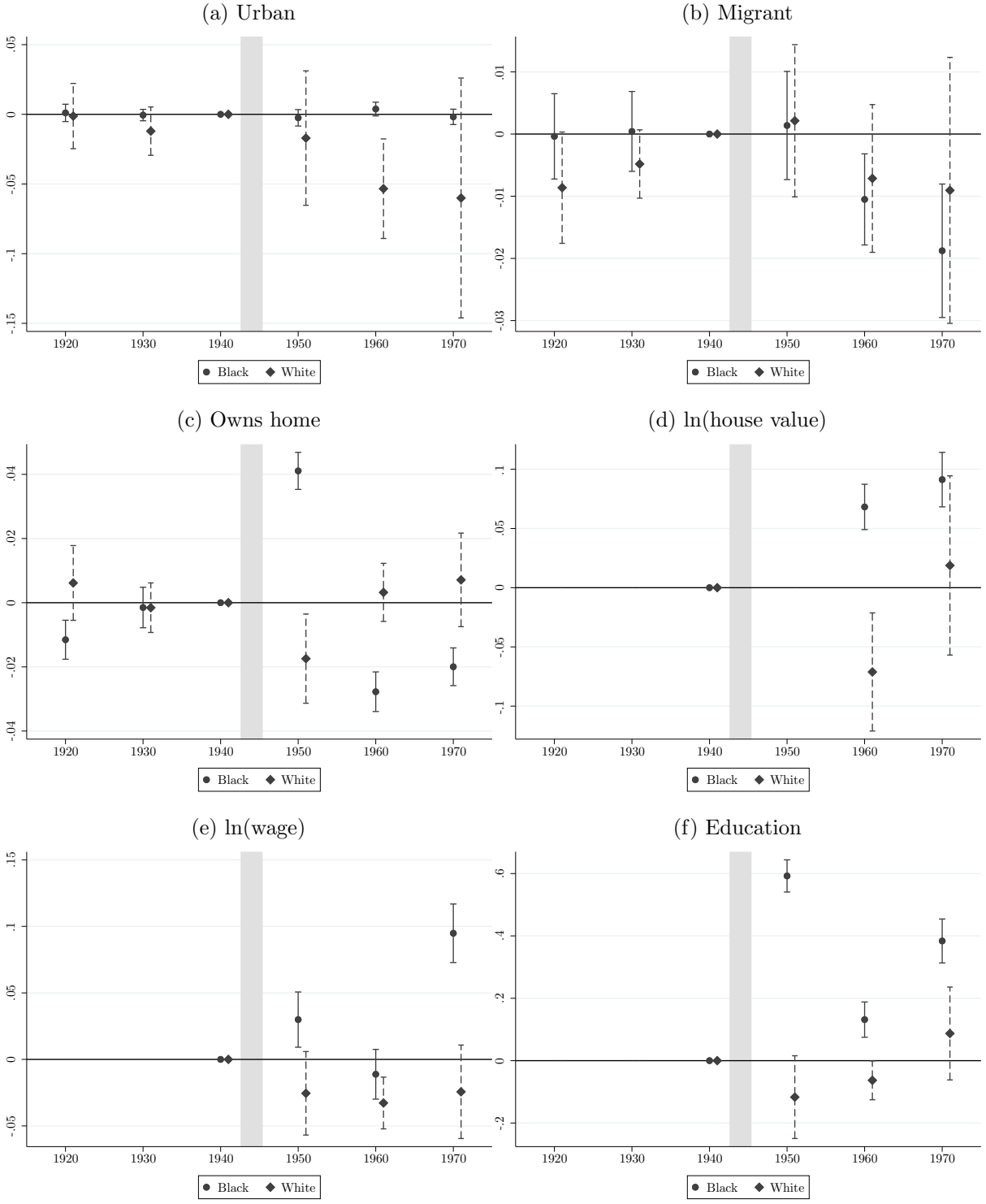
Note: Coefficients plot from a difference-in-difference-in-differences regression of a semi-skilled indicator on the commuting zone WWII casualty rate among semi-skilled whites interacted with decade dummies, and with a black indicator. White coefficients for the interaction of the casualty rate with decade dummies, plotted black coefficients are for the casualty rate interacted with decade dummies and a black indicator. The estimation sample contains data from the decennial U.S. micro Census from 1920-70 on non-institutionalized, working black and white males aged 15-65. All regressions include commuting zone and Census year fixed effects. Controls include age, marital status, year of birth, a self-employment indicator, farm status, and industry fixed effects. The vertical dashed line marks the omitted baseline year of 1940. Standard errors clustered at the commuting zone level. Error bars show 95% confidence intervals around each coefficient estimate.

Figure 10: Triple-Differences Coefficient Plots: WWII Casualty Treatment, all U.S.



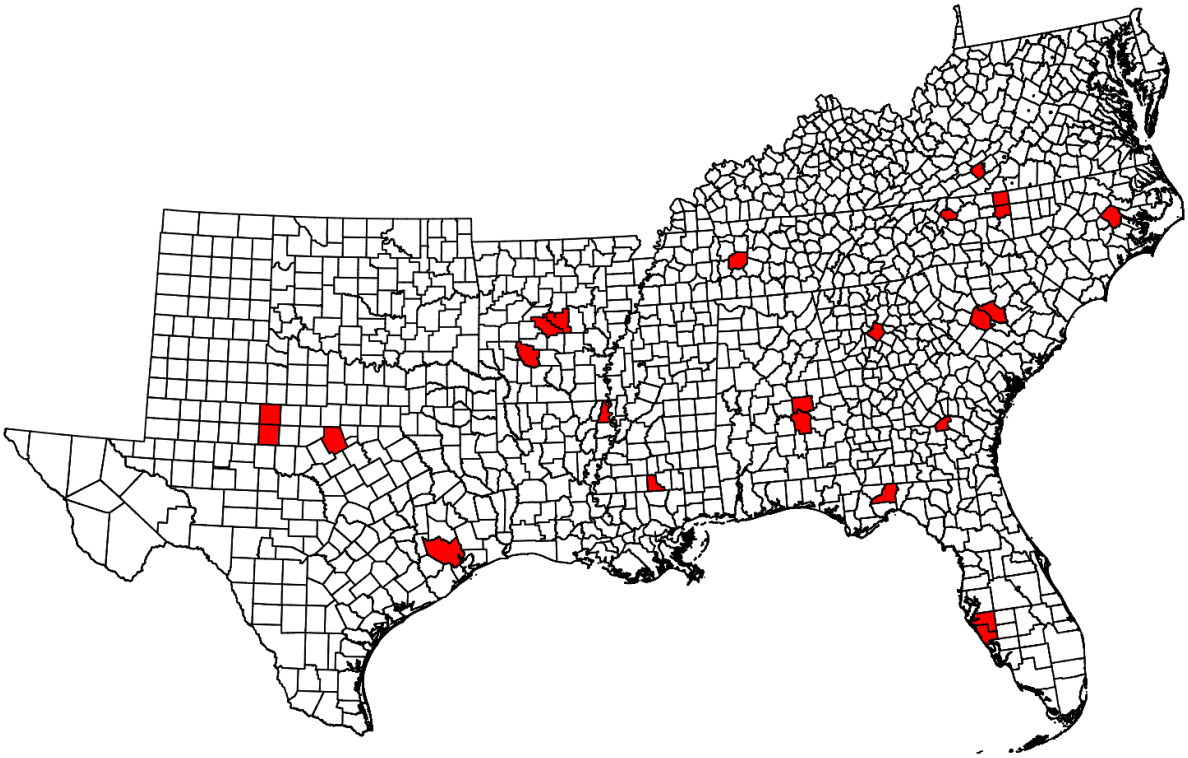
Note: Coefficient plots from the triple differences regression of each of the six outcomes on the the WWII casualty rate × year fixed effects (effect on whites), and WWII casualty rate × year fixed effects × a black indicator (effect for blacks), as well as commuting zone and year fixed effects using individual data from the U.S. Census from 1920-70. The gray area marks years of U.S. involvement in the war. Further controls include the log of WWII spending per capita, the WWII draft rate, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Error bars show 95% confidence intervals. Standard errors are clustered at the commuting zone level.

Figure 11: Triple-Differences Coefficient Plots: WWII Casualty Treatment, South only



Note: Coefficient plots from the triple differences regression of each of the six outcomes on the the WWII casualty rate × year fixed effects (effect on whites), and WWII casualty rate × year fixed effects × a black indicator (effect for blacks), as well as commuting zone and year fixed effects using individual data from the U.S. Census from 1920-70. The gray area marks years of U.S. involvement in the war. The sample includes observations from Southern states only. Further controls include the log of WWII spending per capita, the WWII draft rate, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Error bars show 95% confidence intervals. Standard errors are clustered at the commuting zone level.

Figure 12: Location of NPPS Respondents



Note: Counties included in the "Negro Political Participation Study" by Matthews in Prothro (1975) in 1961. Some states which were chosen for the main analysis are not included in this sample. Matthews and Prothro (1975) only included those states and counties which officially belonged to the former Confederacy. Hence border states such as Kentucky, Maryland, Delaware and West Virginia are not included. Oklahoma was Indian Territory at the time and therefore also was not included in the list of Confederate states belonging to the NPPS sampling scheme.

Appendices

A Black occupational upgrade

A1) Robustness and Heterogeneity

A1.1: Parallel Trends Assumptions

In addition to the lags and leads of the casualty treatment and their effects on the share of blacks in semi-skilled jobs in figure 7, figure 13 provides the same plot under different model specifications. This includes the model without covariates (i.e. the raw data less time and county fixed effects), with controls, with controls fixed at their 1940 values and interacted with time dummies, and controls selected by the Belloni et al. (2014) algorithm. The insignificance of the pre-trends and the post-war treatment effect do not hinge on any particular model specification but are indistinguishable from the coefficients plot presented in the main section.

A1.2: Selection on Observables

Table 12 estimates the DiD model in eq. (2) and gradually expands the covariate set. Observing the movement of the coefficient of interest shows that the casualty rate coefficient stabilizes at around 0.59 p.p. There is no one particular control which significantly alters the results after being included. The typical argument is that the treatment effect remains stable with respect to the inclusion of observed factors, it would remain stable also with respect to unobserved factors. However, as discussed in the main section with reference to Oster's (2017) test, this is not necessarily true if, for instance, observables and unobservables are unrelated to each other but separately affect the relationship between treatment and outcome.

A downside of the coefficient stability test is that invariance of the top-row coefficient might be due to measurement error in the controls. Following Pei et al. (2018), a more powerful alternative is to take the added control to the left-hand side of the equation and test for imbalances with respect to the treatment variable. This is equivalent to running regressions with and without the added control and comparing both estimates via a SUR regression. This is a generalized Hausman test. The corresponding χ^2 test statistics and p-values are reported in the bottom two rows of table 12. The test reveals no significant imbalances in the controls which are related to the casualty rate.

A1.3: Selective Migration of Blacks

Even though the casualty rate need not be random in this estimation framework, a potential threat to identification are time-varying confounding factors or systematic manipulation of individuals' treatment status. With the war period being a major episode of migration for blacks from the South (Boustan, 2016), a plausible issue could arise if blacks migrated from low- to high-casualty counties to find semi-skilled employment. In this case, the casualty rate effect picks up an additional migratory response.

To test for this possibility, I re-estimate eq. (3) using the share of blacks and the share of black men in a given county as dependent variable. The results for this cross-county migration test are shown in figure 14. None of the estimated coefficients are significant, neither statistically nor economically. This finding is consistent with the previous balancing test by Pei et al. (2018) in table 12 for the share of black men. The result also suggests that if blacks gained semi-skilled employment due to the war-induced lack of white workers in this skill-group, then they must have done so in their current counties of residence.

Even if the 1950 interaction in figure 14 was significantly different from zero, it would imply that the share of blacks in a given county increased by 0.05 p.p. for a one percentage point increase in the casualty rate. Relative to a pre-war average of 22.36%, such an increase would not be considered an economically significant migratory response. The result for the share of black men is the same. This is not to say that African Americans were not migrating during this period. They just did not do so differentially across high- and low-casualty rate counties. Appendix B uses data from the micro Census to provide further evidence that the findings here are not driven by migration patterns by black workers.

A1.4: Selection of Soldiers

Table 13 reports DiD results of eq. (2) including average soldier characteristics by county interacted with a post-war indicator. These characteristics include the average age, years of education, AGCT score (an aptitude test which is the predecessor of the AFQT), share of married, and share of voluntarily enlisted soldiers. This is to preclude the possibility that soldiers from particularly patriotic counties volunteer and die, but that these are also the types of counties where people become more attached to each other and less prejudiced on racial grounds in times of hardship.

The results are unchanged by including these variables. In addition, figure 17 shows that there are no marked differences in voluntary enlistments between a) the South and the rest of the country and b) above and below median casualty rate counties within the South. While soldiers are certainly selected (e.g. illiterates were service ineligible), the selection into the military and into death does not appear to affect the relationship between the WWII casualty rates among semi-skilled whites and the share of blacks in this skill group.

A1.5: Alternative Treatment Denominators and Denominator Bias

In this section I consider an alternative definition of the treatment variable as compared to eq. (1) which used the number of semi-skilled white soldiers as denominator. The rational was to account for unobservable draft deferments. Results using as denominator all semi-skilled white workers,

$$\text{Casualty rate}_c = \frac{\text{Number of fallen semi-skilled white soldiers}_c}{\text{Number of semi-skilled white workers}_c} \times 100 \tag{8}$$

are reported in table 14. This casualty variable has a mean of 0.55, standard deviation of 1.39, minimum of zero, and maximum of 25.54. In all specifications the casualty rate effect is positive and significant at the one percent level. Compared to the baseline specification the coefficients are larger and slightly more volatile with respect to their magnitude when county-specific linear time trends are included. The corresponding coefficients plot for the lags and leads of this treatment variable is shown in figure 16.

Another concern is that there might be a spurious relationship between the share of blacks in semi-skilled occupations the the casualty rate among semi-skilled whites due to a correlation between the denominators which is driving the estimated change. To account for this, I fix the outcome denominator in eq. (1) at it's pre-war level in 1940. This will result in shares that are not necessarily bound in the $[0, 1]$ interval but are indicative for whether results are sensitive with respect to changes in the denominator. Table 15 reports the estimation results. All but the last column show a positive effect which is significant at the five percent level or less.

A1.6: Sensitivity of Results by State

To test whether results are driven by any given state, I re-estimate the DiD specification in eq. 2 using the sample with counties from the $S-1$ states. The results from this jackknife-

type leave-one-out procedure are shown in figure 18. The figure plots the estimated WWII casualty rate DiD coefficient for each iteration with the left-out state in a given regression being displayed on the vertical axis. The resulting coefficients are indistinguishable from each other as well as from the main result in table 3.

A1.6: Spatial Clustering of Casualty Rates

U.S. military units were raised locally during WWII, a practice that was abandoned after D-Day. This policy as well as the patterns observed in the map in figure 4 may hint towards spatial dependencies in the outcome. Such spatial correlation would pose problems for inference whereby standard errors are underestimated. To test for such spatial autocorrelation, I compute Moran's (1950) I statistic for global spatial correlation and the Getis-Ord $G_i^*(d)$ statistic (Getis and Ord, 1992) to test for local spatial correlation. Moran's I is computed as

$$I = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}C_iC_j}{\sum_{i=1}^{n} C_i^2} \tag{9}$$

where i indexes counties with a total number of n counties, j indexes all other counties with $i \neq j$, C is the WWII casualty rate among semi-skilled whites, and w is a spatial weight matrix. Like the standard correlation coefficient, Moran's I lies in $[-1, 1]$. The z score for the corresponding test statistic is given by:

$$z(I) = \frac{I - E(I)}{\sqrt{Var(I)}}$$

Results from this test are reported in table 17 for distance thresholds of 200, 400, and 600km. Columns (1) to (3) show the casualty rate has a small but statistically significant positive spatial autocorrelation at the 1% level across counties. Moran's I ranges between 0.049 and 0.078. However, once the casualty rate is demeaned by its state-specific averages, Moran's I drops to between -0.003 and -0.008 and becomes insignificant except for the 400km distance threshold where it is marginally significant at the 10% level. This implies that once state fixed effects are controlled for, the casualty rate measure is as good as randomly assigned across geographic space. In the main DiD specifications, these fixed effects would be absorbed by the county fixed effects.

Spatial correlation, however, may exist at a more concentrated level. To test for more

local correlations, I provide estimates of the Getis-Ord $G_i^*(d)$ statistic:

$$G_i^*(d) = \frac{\sum_{j=1}^{n} w_{ij}(d)C_j}{\sum_{i=1}^{n} C_j} \tag{10}$$

where the notation is as before except that now the spatial weight matrix depends on a certain radius d within which the statistic is computed.[16] Clusters of counties with significantly higher casualty rates are referred to as hot spots. Conversely, those with significantly lower casualty rates are called cold spots.

Table 18 reports the results from the Getis-Ord test for the same 200, 400, and 600km distance bands as before. The table reports the number of counties within a given z-score interval. Casualty rates show local spatial independence if the z-score of $G_i^*(d)$ falls within -1.96 and 1.96. Lower z-scores than the lower bound of -1.96 indicate cold spots while higher values than 1.96 indicate hot spots. Again, columns (1) to (3) indicate local spatial correlation with a significant number of counties displaying cold spots (365 counties) and 409 counties having hot spots, out of a total of 1,387 counties. Once state fixed effects are partialled out, almost all counties lose this local spatial autocorrelation as is shown in columns (4) to (6).

Even though spatial correlation appears to be accounted for by geographic fixed effects, I replicate the main findings in table 3 and compute Conley (1999) standard errors to correct for spatial dependence.[17] Table 19 reports the results and shows that the significance of previous results is not driven by spatial autocorrelation.

A1.7: Alternative Regression Specification

Studying the relationship between war casualties and semi-skilled employment for blacks in shares relates directly to the opening graph in figure 1. An alternative way of looking at this relation is to run the regression in eq. 2 using the levels and taking first differences:

$$\begin{aligned}\Delta\text{blacks in semi-skilled jobs}_{ct} = \beta&\text{white semi-skilled casualties}_c \times \text{post-war}_t \\ &+ \gamma_t + X'_{ct}\xi + \eta_{ct}\end{aligned} \tag{11}$$

[16] For both Moran's I and the Getis-Ord $G_i^*(d)$ binary spatial weights matrices were used. Changing these to exponential or power function type spatial weight matrices does not alter the results. Additional results with alternative spatial weight matrices are not reported here but are available on request. The Stata routine `getisord` by Kondo (2016) was used to compute this test.

[17] Thiemo Fetzer's `reg2hdfespatial` Stata routine was used to run these regressions.

I control for the total county population and the number of drafted men in addition to the other controls which are the same as in section 3. The results from estimating eq. (11) are reported in table 16. On average, a fallen white semi-skilled worker is replaced by four to six African Americans. This is a consistent result across all specifications and shows up with significant coefficients. The exception is column (5) which includes county-specific linear time trends.

The next question is then why there is not a one-to-one substitution between white and black workers. There are several potential explanations. A pessimistic view would be that blacks are less productive and hence it requires more workers from this group to substitute a white worker. Boustan (2009) finds that blacks who migrate North are not perfect substitutes for white workers. She estimates an elasticity of substitution between black and white males of similar skill of 8.3 to 11.1. However, this is likely not only driven by characteristics of African American workers but also by institutional factors such as wage discrimination. Her estimated elasticities are lower than those from the literature on the substitutability between natives and foreigners. This literature finds elasticities in the range of 20 to 47 (see Pari and Sparber, 2009).[18]

A more optimistic view is provided by a learning-by-doing argument on part of the employers. Now that employers face labor shortages, they invest more into their ability to screen potential job candidates from a minority group which they had not considered for employment previously. This is the setting of Miller (2017) with the introduction of affirmative action policies. He also finds that the share of blacks keeps rising in firms that were affected by the affirmative action policies during the mid 1960s. Likewise, blacks may invest more into their education or ability to relocate to the cities. Now that manufacturing employment has become a viable option, this changes the incentives to invest on part of the workers. If this line of reasoning was plausible, we should see a gradually increasing rise in semi-skilled employment for blacks after the war. This is shown in figure 20 which plots the raw levels of black men in semi-skilled jobs over time for counties which are above or below the median number of semi-skilled white WWII casualties.

Overall the findings from this exercise confirm the main results.

[18]Source: Peri, G. and Sparber, C. (2009) "Task Specialization, Immigration, and Wages", American Economic Journal: Applied Economics, Vol. 1(3), pp. 135-169.

Table 12: Sensitivity Analysis Using Observable County Characteristics

Outcome: % blacks in semi-skilled jobs												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Casualty rate	0.518***	0.524***	0.471***	0.541***	0.559***	0.579***	0.583***	0.592***	0.591***	0.594***	0.587***	0.589***
	(0.117)	(0.117)	(0.119)	(0.112)	(0.114)	(0.122)	(0.120)	(0.121)	(0.124)	(0.124)	(0.124)	(0.130)
Draft Rate	-0.120***	−0.115***	−0.127***	−0.156***	−0.156***	−0.156***	−0.146***	−0.144***	−0.147***	−0.150***	−0.147***	−0.154***
	(0.036)	(0.036)	(0.037)	(0.038)	(0.038)	(0.036)	(0.036)	(0.036)	(0.037)	(0.038)	(0.038)	(0.039)
Log mil. spending p.c.		−0.216***	−0.227***	−0.128**	−0.139**	−0.133**	−0.142**	−0.140**	−0.138**	−0.135**	−0.140**	−0.160**
		(0.059)	(0.058)	(0.055)	(0.056)	(0.060)	(0.059)	(0.059)	(0.061)	(0.061)	(0.061)	(0.062)
Neighbor casualties			0.706***	1.235***	1.222***	1.198***	1.281***	1.306***	1.288***	1.284***	1.273***	1.165***
			(0.200)	(0.196)	(0.197)	(0.203)	(0.201)	(0.202)	(0.206)	(0.205)	(0.205)	(0.207)
% black men				0.422***	0.408***	0.420***	0.455***	0.449***	0.457***	0.458***	0.460***	0.455***
				(0.037)	(0.037)	(0.038)	(0.037)	(0.038)	(0.039)	(0.039)	(0.039)	(0.042)
Manufacturing firms					0.599***	0.589***	0.349*	0.350*	0.364*	0.375**	0.384**	0.380**
					(0.208)	(0.218)	(0.181)	(0.182)	(0.190)	(0.186)	(0.189)	(0.192)
Av. manufact. firm size						−0.007**	−0.008**	−0.008***	−0.008**	−0.007**	−0.007**	−0.007**
						(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
% cotton in agriculture							−0.163***	−0.157***	−0.154***	−0.155***	−0.157***	−0.154***
							(0.023)	(0.023)	(0.024)	(0.024)	(0.024)	(0.026)
% cash tenants								0.041**	0.037*	0.034	0.030	0.042*
								(0.021)	(0.022)	(0.022)	(0.022)	(0.023)
Rosenwald schools									−0.386**	−0.380*	−0.355*	−0.349
									(0.196)	(0.197)	(0.198)	(0.242)
New Deal Relief p.c.										0.011**	0.006	0.006
										(0.005)	(0.004)	(0.004)
Unempl. Rate 1937											0.095***	0.090***
											(0.029)	(0.031)
% Republican Vote												0.028***
												(0.008)
Observations	7,737	7,737	7,721	7720	7,313	6,986	6,981	6,981	6,769	6,747	6,747	6,216
Counties	1,388	1,388	1,388	1388	1,387	1,387	1,387	1,387	1,379	1,379	1,379	1,363
Adj. R^2	0.856	0.856	0.857	0.870	0.870	0.869	0.873	0.873	0.869	0.869	0.869	0.873
Balancing Test χ^2	1.890	0.121	0.576	0.346	0.112	0.790	1.014	0.452	0.469	0.0496	1.454	0.108
Balancing Test p-val	0.169	0.728	0.448	0.556	0.738	0.374	0.314	0.502	0.493	0.824	0.228	0.743

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. All regressions include county and decade fixed effects. The covariate balancing test by Pei et al. (2018) is reported in the bottom two rows of the table where the null hypothesis is that a new added control does not vary systematically across high- and low-casualty rate counties. The variables on WWII military spending, WWII casualties in neighboring counties, New Deal Relief per capita, and the unemployment rate in 1937 are interacted with a post-war indicator. Standard errors clustered at the county level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: Difference-in-Differences Results with Average Soldier Characteristics

	Outcome: % blacks in semi-skilled jobs (pre-war mean = 12.433)					
	(1)	(2)	(3)	(4)	(5)	(6)
Casualty rate$_c$× Post-war$_t$	0.515***	0.530***	0.504***	0.527***	0.539**	0.465***
	(0.119)	(0.142)	(0.143)	(0.148)	(0.217)	(0.136)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	7,737	5,713	5,692	5,713	5,713	6,429
Counties	1,388	1,320	994	1,320	1,320	1,375
Adj. R^2	0.855	0.879	0.876	0.884	0.915	0.863
Oster's δ	1.273	1.220	1.122	1.409	0.542	0.995

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. Controls include county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937, as well as the average soldier characteristics in each county including age, education, AGCT score, share of married, and share of voluntarily enlisted. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Oster's (2017) test for selection on unobservables is reported in the final row by computing the coefficient of proportionality δ for which the coefficient on the semi-skilled casualty rate among whites would equal zero. Standard errors clustered at the county level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14: Difference-in-Differences Results with Alternative Treatment Denominator

	Outcome: % blacks in semi-skilled jobs (pre-war mean = 12.433)					
	(1)	(2)	(3)	(4)	(5)	(6)
Casualty rate$_c$× Post-war$_t$	1.071***	1.770***	1.568***	1.870***	2.607***	1.962***
	(0.280)	(0.386)	(0.295)	(0.392)	(0.561)	(0.349)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	7,737	5,713	5,692	5,713	5,713	6,429
Counties	1,388	1,320	994	1,320	1,320	1,375
Adj. R^2	0.856	0.879	0.874	0.885	0.916	0.877
Oster's δ	1.946	1.514	0.953	1.487	0.853	1.568

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The casualty rate in county c here is one hundred times the total number of killed semi-skilled whites over the number of total semi-skilled whites in 1940. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. Coefficients are expressed in terms of a one standard deviation increase in the casualty rate. Controls include county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Oster's (2017) test for selection on unobservables is reported in the final row by computing the coefficient of proportionality δ for which the coefficient on the semi-skilled casualty rate among whites would equal zero. Standard errors clustered at the county level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 15: Difference-in-Differences Results with Fixed Outcome Denominator

	Outcome: % blacks in semi-skilled jobs (pre-war mean = 12.433)					
	(1)	(2)	(3)	(4)	(5)	(6)
Casualty rate$_c$× Post-war$_t$	1.167***	1.046***	0.595**	0.703**	1.218**	0.345
	(0.283)	(0.358)	(0.276)	(0.337)	(0.538)	(0.281)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	7,737	5,713	5,692	5,713	5,713	6,429
Counties	1,388	1,334	994	1,334	1,334	1,374
Adj. R^2	0.856	0.879	0.874	0.885	0.916	0.877
Oster's δ	1.946	1.514	0.953	1.487	0.853	1.568

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The casualty rate in county c here is one hundred times the total number of killed semi-skilled whites over the number of total semi-skilled whites in 1940. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. The denominator of the outcome (number of semi-skilled workers) is fixed at 1940 values to reduce denominator bias. Controls include county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Oster's (2017) test for selection on unobservables is reported in the final row by computing the coefficient of proportionality δ for which the coefficient on the semi-skilled casualty rate among whites would equal zero. Standard errors clustered at the county level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 16: Difference-in-Differences Results with First Differenced Outcome

	Outcome: Δ No. of blacks in semi-sk. jobs (pre-war mean = 232.842)					
	(1)	(2)	(3)	(4)	(5)	(6)
No. semi-sk. white deaths$_c$	5.116***	4.432**	6.678**	4.295*	7.382	4.320***
× Post-war$_t$	(1.779)	(2.241)	(3.243)	(2.399)	(6.757)	(1.613)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	6,006	4,677	4,513	4,677	4,677	4,687
Counties	1,388	1,289	994	1,289	1,289	1,289
Adj. R^2	0.377	0.375	0.383	0.388	0.280	0.390

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. Controls include decade fixed effects, county population, number of drafted soldiers, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 17: Spatial Independence Test of WWII Casualty Rates

	Distance threshold					
	200km	400km	600km	200km	400km	600km
	(1)	(2)	(3)	(4)	(5)	(6)
Moran's I	0.078***	0.064***	0.049***	-0.008	-0.005*	-0.003
	[16.473]	[26.595]	[31.875]	[-1.557]	[-1.775]	[-1.235]
Observations	1,387	1,387	1,387	1,387	1,387	1,387
State FE				Yes	Yes	Yes

Note: Moran's I for testing spatial independence of the WWII casualty rate among semi-skilled whites. For each I, the z-score is reported in squared brackets using a binary spatial weight matrix. Each county is identified by the latitude and longitude of its centroid. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 18: Testing for Hot and Cold Spots of WWII Casualty Rates

	Distance threshold					
Getis-Ord $G_i^*(d)$	200km	400km	600km	200km	400km	600km
z-score interval	(1)	(2)	(3)	(4)	(5)	(6)
$z \leq$ -2.58	232	347	347	0	0	0
-2.58 $<$ z $\leq$ -1.96	133	49	33	8	2	0
-1.96 $<$ z $<$ 1.96	613	371	262	1,370	1,378	1,386
1.96 $\leq$ z $<$ 2.58	130	80	59	8	7	1
2.58 $\leq$ z	279	540	686	1	0	0
Observations	1,387	1,387	1,387	1,387	1,387	1,387
State FE				Yes	Yes	Yes

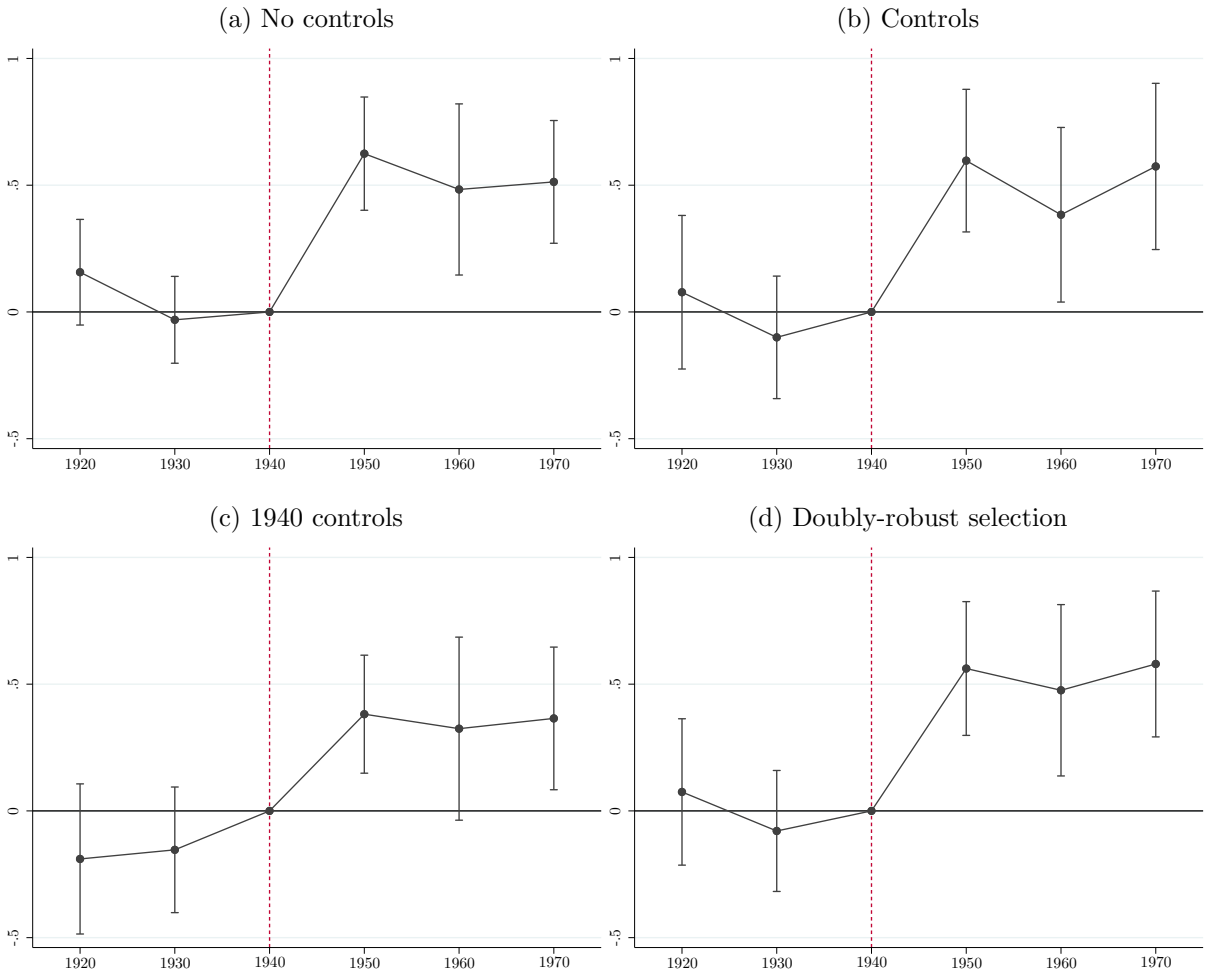
Note: Getis-Ord $G_i^*(d)$ test for testing local spatial independence of the WWII casualty rate among semi-skilled whites. Local spatial independence is given when the z-score on the corresponding test statistic lies within -1.96 $<$ z $<$ 1.96. Unusually low casualty rate clusters (cold spots) are found for counties with z-scores of z $\leq$ -1.96. Conversely, unusually high casualty rate clusters (hot spots) are found for counties with z-scores of 1.96 $\leq$ z. The number of counties in each z-score bin is provided in the rows of the table. Each county is identified by the latitude and longitude of its centroid.

Table 19: County Level Difference-in-Differences Results with Conley Standard Errors

	Outcome: % blacks in semi-skilled jobs (pre-war mean = 12.433)					
	(1)	(2)	(3)	(4)	(5)	(6)
Casualty rate$_c$× Post-war$_t$	0.515	0.545	0.508	0.548	0.587	0.589
s.e. (200km)	(0.072)	(0.075)	(0.078)	(0.075)	(0.080)	(0.067)
s.e. (400km)	(0.077)	(0.074)	(0.078)	(0.075)	(0.074)	(0.078)
s.e. (600km)	(0.079)	(0.076)	(0.079)	(0.078)	(0.073)	(0.077)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	7,737	5,713	5,692	5,713	5,713	5,723
Adj. R^2	0.013	0.169	0.158	0.214	0.192	0.015

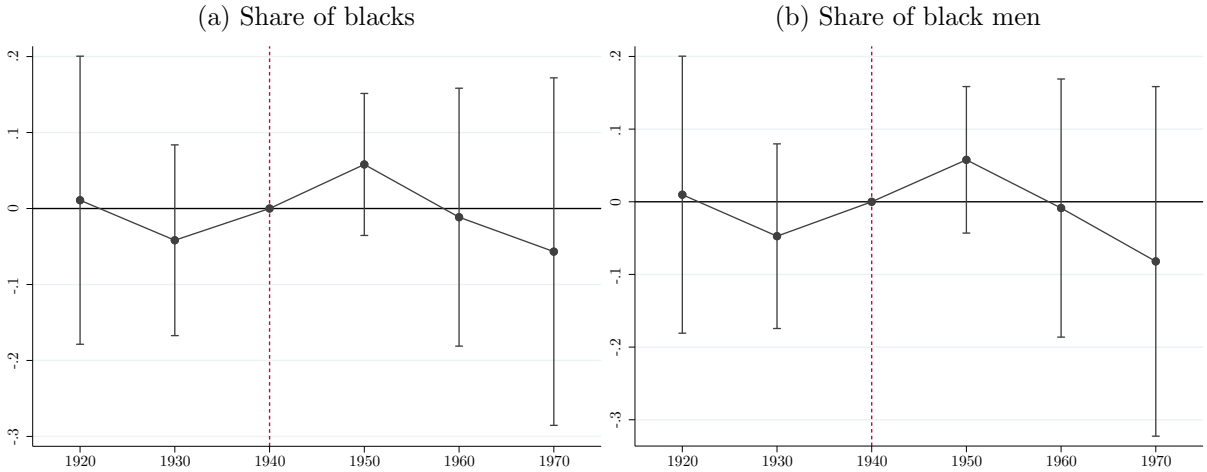
Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. Controls include county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Standard errors adjusted for spatial correlation using Conley (1999) standard errors with a distance threshold of 200, 400, and 600km.

Figure 13: Difference-in-Differences Coefficient Plots using Alternative Specifications



Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with decade fixed effects. The omitted baseline decade is 1940 which is marked by the dashed line. This is the last pre-treatment period. The estimation sample contains counties in Southern states from 1920 to 1970. Coefficients show the effect of a one standard deviation increase in the casualty rate on the outcome in terms of percentage points. All regressions include county and decade fixed effects unless stated otherwise. If used by a given specification, controls include the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. The 1940 controls plot fixes all controls at their level in that year and interacts them with decade fixed effects. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm to select the most relevant controls. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the county level. Error bars show 95% confidence intervals around each coefficient estimate.

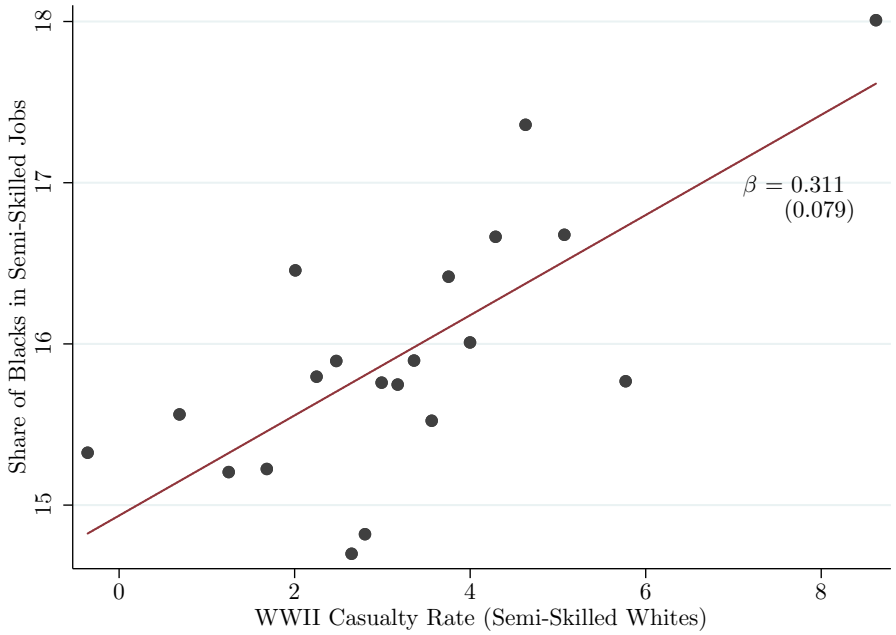
Figure 14: Difference-in-Differences Cross-County Migration Test



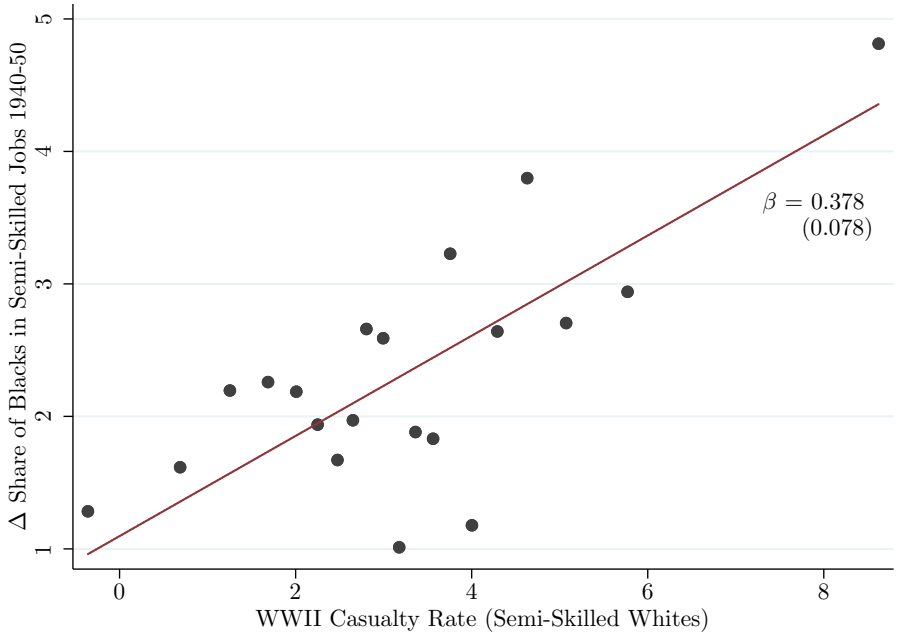
Note: Difference-in-differences regressions of the county-level share of blacks and the share of black men in percent on the WWII county casualty rate among semi-skilled whites interacted with decade fixed effects. The omitted baseline decade is 1940 which is marked by the dashed line. This is the last pre-treatment period. The estimation sample contains decennial U.S. Census data on counties in Southern states from 1920 to 1970. Coefficients show the effect of a one standard deviation increase in the casualty rate on the outcome in terms of percentage points. Controls include county fixed effects, flexible state-specific time trends, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the county level. Error bars show 95% confidence intervals around each coefficient estimate.

Figure 15: Scatter Plots for WWII Casualty Rates and the Share of Blacks in Semi-Skilled Jobs in Levels and First Differences

(a) Correlation with the Semi-Skilled Share Level in 1950



(b) Correlation with the Semi-Skilled Share 1940 to 50 First Difference



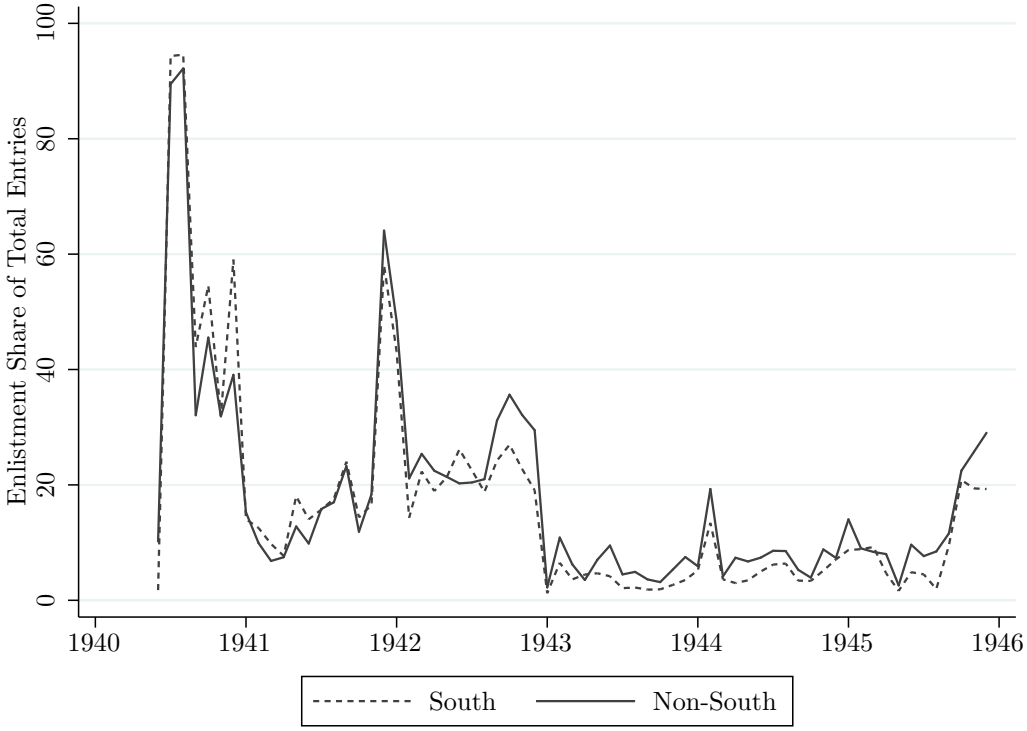
Note: Scatter plots of the relation between the WWII casualty rate among semi-skilled whites and the share of blacks in semi-skilled employment in 1950 across counties (panel a), and the change in the share of blacks in semi-skilled employment from 1940 to 1950 (panel b). Controls partial out county characteristics in 1940 including the county population, share of black men, and the shares of agricultural and manufacturing employment.

Figure 16: Difference-in-Differences Coefficient Plot with Alternative Treatment

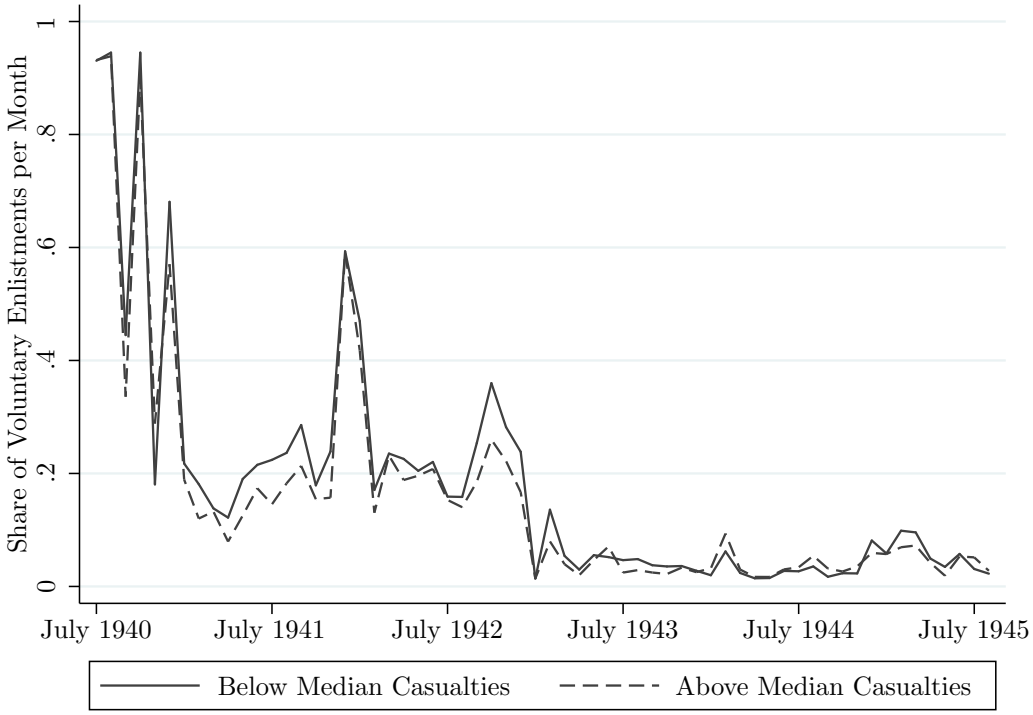
Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with decade fixed effects. The denominator in the computation of the casualty rate here is the number of all semi-skilled whites in 1940 in county *c*. The omitted baseline decade is 1940 which is marked by the dashed line. This is the last pre-treatment period. The estimation sample contains counties in Southern states from 1920 to 1970. Coefficients show the effect of a one standard deviation increase in the casualty rate on the outcome in terms of percentage points. Controls include county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the county level. Error bars show 95% confidence intervals around each coefficient estimate.

Figure 17: Voluntary Enlistment Rates

(a) South vs. Non-South

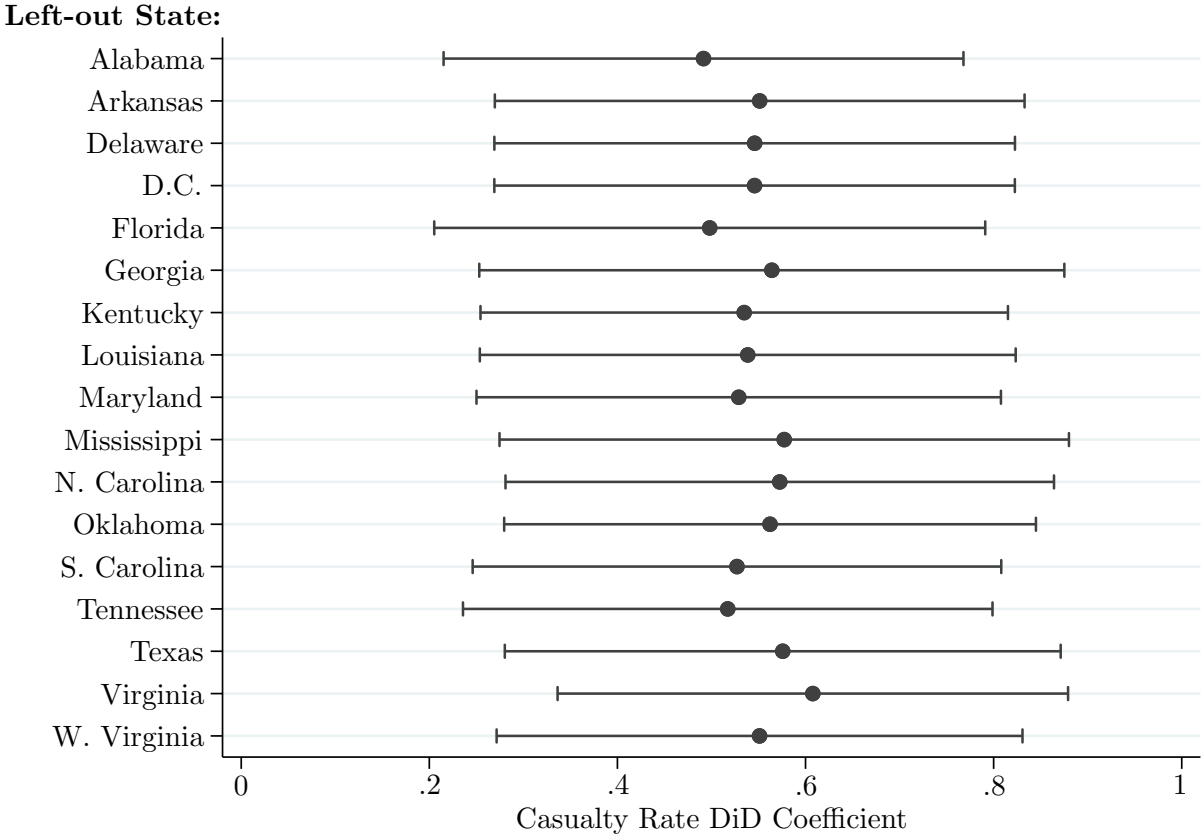


(b) Within South



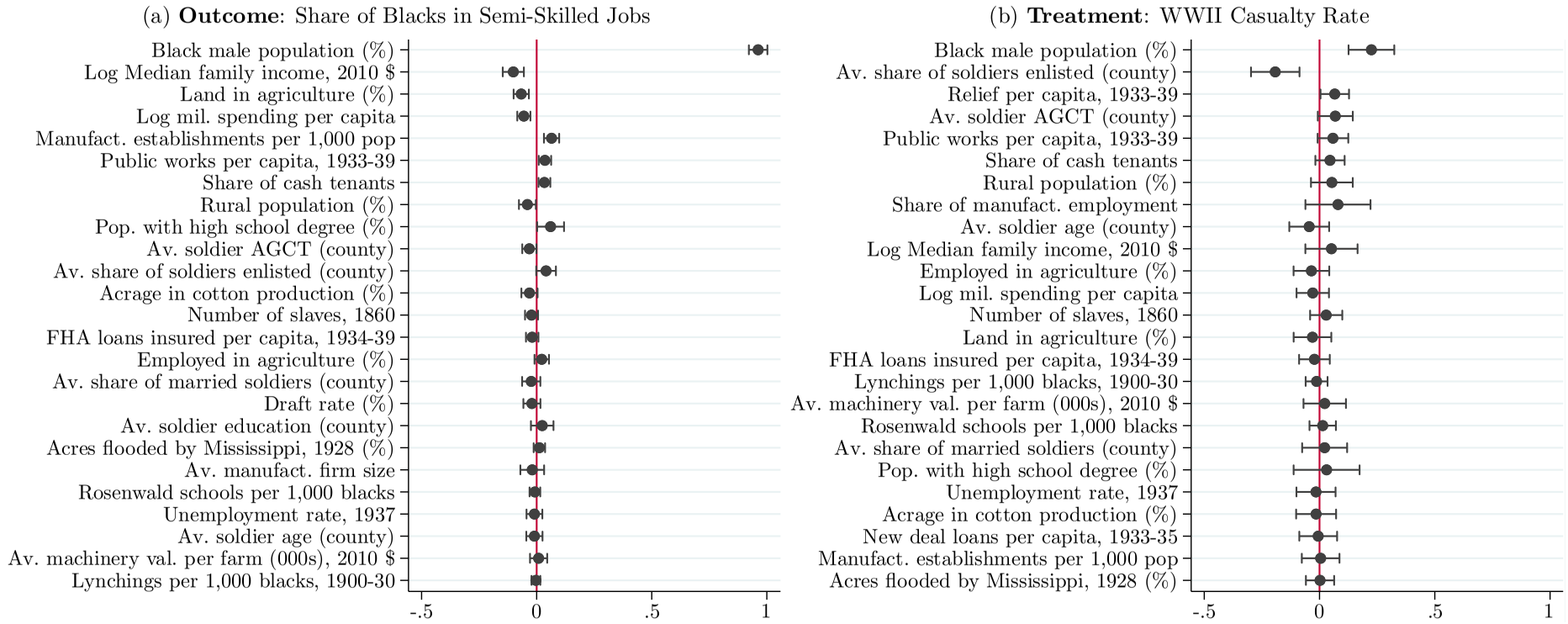
Note: Share of voluntary enlistments out of total new entries into the Army and Army Air Force by month. The drop at the end of 1942 is because voluntary enlistment was forbidden to avoid hurting the war economy due to overenthusiastic enlistments as was the case in the United Kingdom. After December 1942 only men aged 38 or older were allowed to volunteer if they demonstrated their physical and mental fitness for service.

Figure 18: Leave-One Out DiD Sensitivity Check



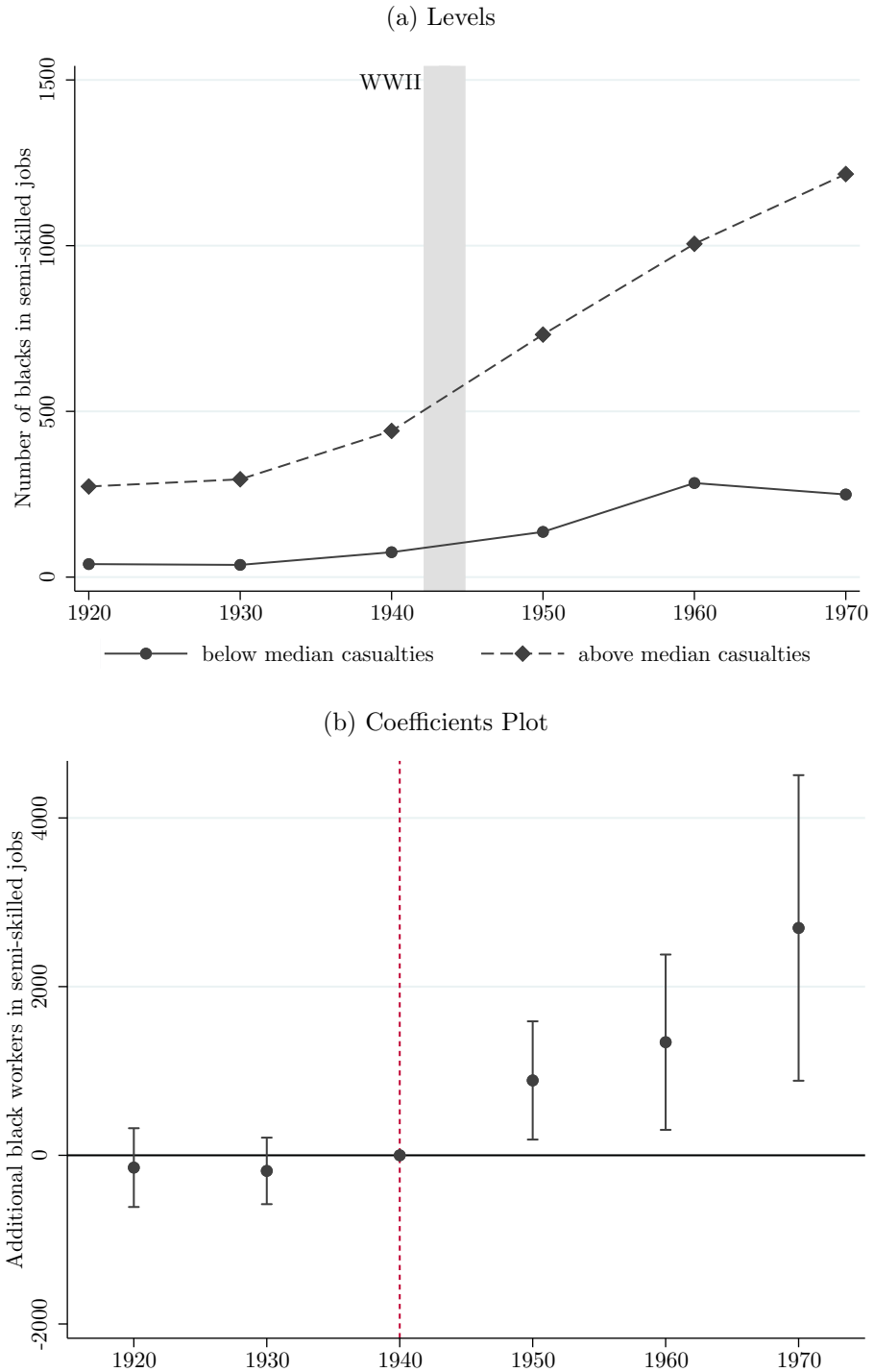
Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The estimation sample uses decennial U.S. Census data on counties in Southern states from 1920 to 1970. Each regression leaves out all counties from a specific state at a time to assess whether results are driven by any one single state. The omitted state is listed on the left. Each regression includes county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors are clustered by county. Error bars show 95% confidence intervals.

Figure 19: Observable Determinants of Outcome and Treatment



Note: Cross-sectional correlation ranking of pre-war controls from 1940 with the post-war outcome (share of blacks in semi-skilled jobs) and treatment (WWII casualty rate among semi-skilled whites) variables in 1950. All variables are de-meaned and standardized to have unit variance. Beta coefficients are ranked by the absolute value of their t-statistic to show the most important correlates from top to bottom. All regressions include state fixed effects for which coefficients have been dropped for this plot. Error bars show 95% confidence intervals.

Figure 20: Black Semi-Skilled Employment in Levels - Conditional and Unconditional



Note: Panel (a) plots the number of black men employed in semi-skilled occupations for 1,388 Southern counties from 1920-70. Counties are split into two groups, those with above and below median WWII casualties among semi-skilled whites. The gray shaded area marks years with U.S. involvement in the war. Panel (b) plots the coefficients of the above median casualty indicator interacted with decade fixed effects, omitting 1940 as the baseline. The dashed line marks the last pre-treatment period. The regression controls for county and decade fixed effects, the log of WWII military spending per capita, the draft rate, average casualty rate in neighboring counties, number of manufacturing establishments per capita, average manufacturing firm size, average value added per manufacturing worker, the share of manufacturing employment, the share of black men, share of cotton production in agriculture, counties flooded by the Mississippi in 1928, Republican vote share, the share of land mass used in agriculture, the share of cash tenants, and flexible state-specific time trends. Error bars show 95% confidence intervals. Standard errors are clustered at the county level.

B Commuting Zone Appendix

B1) Semi-Skilled Employment and Economic Outcomes

While the casualty rate is arguably the more exogenous shock, it might still be instructive to examine the effect of semi-skilled employment of blacks before and after the war on other economic outcomes. A first test amounts to running the following difference-in-difference-in-differences (DDD) regression:

$$\begin{aligned} y_{izt} = & \beta_1 \left(\text{semi-skilled}_{izt} \text{post-WWII}_t\right) \\ & + \beta_2 \left(\text{semi-skilled}_{izt} \times \text{black}_{izt} \times \text{post-WWII}_t\right) \\ & + \alpha_z + \lambda_t + \delta \text{black}_{izt} + X'_{(i)zt}\gamma + \epsilon_{izt} \end{aligned} \tag{12}$$

where y_{izt} is the given economic outcome for individual i in commuting zone z in decade t. The regression includes fixed effects for race black_{izt}, commuting zone α_z, and census year λ_t, as well as individual- and commuting zone-level controls $X'_{(i)zt}$. Individual level controls include dummies for age, marital status, and place of birth. Commuting zone controls include all the controls used also in section 3 which are aggregated to the county- to the commuting zone-level. Standard errors are clustered by commuting zone.

Estimating a triple differences regression, using whites as additional control group, has the attraction that it also estimates the response by whites with respect to the economic upgrading of blacks. This provides an estimate for whether whites lose out relative to blacks, whether both groups are affected by the shift of blacks into semi-skilled employment, or whether black economic progress is entirely independent of the economic fortunes of white workers. Table 20 reports the results from this regression for six outcomes. The first three are indicators for urban and cross-state migration status, and home ownership. A cross-state migrant here is a person who does not reside in their state of birth.

While the post-war skill-upgrade has positive effects for African Americans, it is typically associated with negative effects for whites. This finding points towards potential selection which would be consistent with the previous literature. For instance, in both the full U.S. and Southern samples, semi-skilled post-war employment has a positive and statistically significant impact on the urban status of blacks, their wages, and house values,

but affects whites in the opposite direction. Boustan (2010) shows that for every black arrival into a Northern city center 2.7 whites leave. If the more skilled or wealthy whites can more easily switch jobs or their homes, then the remaining whites are a selected part of the white population that was too constrained to satisfy their racial preferences - or that was more tolerant to begin with.

Blacks who secure a semi-skilled job after the war are looking at a substantial wage increase of 28.4 p.p. in the full sample and 33.2 p.p. in the Southern sample. The skill-upgrade is only significantly related to the probability of home ownership in the full sample with a 1.2 p.p. rise. However, when African Americans manage to own their home, this is now of substantially higher value for those who experience the skill-upgrade. The associated home value increase is 30.9 p.p. in the whole U.S. and 41.1 p.p. in the South. For whites there is a negative effect on house values which might be due to outmigration of wealthier whites driving down home values (Boustan and Margo, 2013) or a decline in housing segregation that reduces prices for homes of whites (Logan and Parman, 2017).

Table 20: Micro Census Triple Differences Results using the Semi-Skilled Treatment

Outcome:	Urban	Migrant	Owns home	ln(house val.)	ln(wage)	Educ.
	Panel A: All U.S.					
Semi-Skilled$_{izt}$× Post-war$_t$	-0.012***	-0.013**	-0.001	-0.245***	-0.072***	-1.832***
	(0.002)	(0.006)	(0.003)	(0.005)	(0.007)	(0.035)
Semi-Skilled$_{izt}$× Black$_{izt}$× Post-war$_t$	0.015***	0.015**	0.012*	0.269***	0.250***	1.757***
	(0.005)	(0.008)	(0.007)	(0.015)	(0.010)	(0.054)
Observations	4,335,873	4,335,873	4,211,819	1,527,256	2,696,819	3,119,300
Adj. R^2	0.619	0.323	0.251	0.487	0.503	0.457
	Panel B: South Only					
Semi-Skilled$_{izt}$× Post-war$_t$	-0.013***	0.014	-0.012**	-0.309***	-0.100***	-1.843***
	(0.004)	(0.009)	(0.005)	(0.011)	(0.014)	(0.069)
Semi-Skilled$_{izt}$× Black$_{izt}$× Post-war$_t$	0.018***	-0.015**	0.009	0.344***	0.287***	1.902***
	(0.005)	(0.006)	(0.006)	(0.019)	(0.013)	(0.079)
Observations	1,269,553	1,269,553	1,227,375	428,774	767,386	911,418
Adj. R^2	0.676	0.467	0.241	0.508	0.507	0.452

Note: Difference-in-differenece-in-differences regression of economic outcomes on the commuting zone WWII casualty rate among semi-skilled whites interacted with a post-WWII dummy, and with a black indicator for individuals living in 722 commuting zones in the whole U.S. The estimation sample contains data from the decennial U.S. micro Census from 1920-70 on non-institutionalized, working black and white males aged 15-65 who are not currently attending school. All regressions include commuting zone and Census year fixed effects. Urban and owns home are binary outcomes for whether an individual lives in a city or owns their home. The log house value, log wages, and education variables are only available from 1940 onward. Log house value is also missing for 1950. Individual level controls include age, marital status, age and place of birth dummies. Commuting zone level controls are the WWII draft rate, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the commuting zone level in parentheses. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B2) Further Robustness Checks for Migration Responses

Are the results here driven by migration? To test for this possibility, tables 21 and 22 repeat the DDD analysis for the sub-samples of those who do not reside in their state of birth and birth-state stayers in the country as a whole and in the South only, respectively. While wage gains are typically larger for those who move, the casualty rate effect increases the house values only for birth-state stayers in the full sample. The likely reason for this relates to blacks moving to lower quality housing in the city centers of the industrial centers in the North. When considering the Southern sample, movers also outperform stayers in terms of house value. This difference is not statistically significant though. Even though moving is an endogenous choice, the results here provide evidence that the economic benefits are not only reaped by this particular group of individuals. Also stayers gain. Even though the wage increases associated with the white WWII casualty rate are lower for stayers, the increases in house value and educational attainment are comparable across movers and stayers.

Table 21: Movers vs. Birth-State Stayers, all U.S.

Outcome:	Urban	Owns home	ln(house value)	ln(wage)	Education
	Panel A: Cross-State Migrants				
Casualty rate$_z$× Post-war$_t$	-0.020	-0.000	-0.045**	-0.021**	-0.024
	(0.018)	(0.004)	(0.021)	(0.010)	(0.036)
Casualty rate$_z$× Black$_{izt}$×	-0.001	0.004	0.024	0.055***	0.240***
Post-war$_t$	(0.003)	(0.005)	(0.020)	(0.006)	(0.032)
Observations	1,607,330	1,515,377	557,539	1,074,029	1,208,481
Adj. R^2	0.665	0.263	0.430	0.462	0.409
	Panel B: Birth-State Stayers				
Casualty rate$_z$× Post-war$_t$	-0.006	-0.007*	-0.038*	-0.012	-0.039
	(0.014)	(0.004)	(0.022)	(0.009)	(0.029)
Casualty rate$_z$× Black$_{izt}$×	-0.002	-0.012***	0.083***	0.027***	0.308***
Post-war$_t$	(0.003)	(0.003)	(0.010)	(0.007)	(0.028)
Observations	2,728,543	2,696,442	969,717	1,622,790	1,910,819
Adj. R^2	0.611	0.255	0.492	0.523	0.453

Note: Difference-in-differenece-in-differences regression of economic outcomes on the commuting zone WWII casualty rate among semi-skilled whites interacted with a post-WWII dummy, and with a black indicator for individuals living in 722 commuting zones in the whole U.S. The estimation sample contains data from the decennial U.S. micro Census from 1920-70 on non-institutionalized, working black and white males aged 15-65 who are not currently attending school. All regressions include commuting zone and Census year fixed effects. Urban and owns home are binary outcomes for whether an individual lives in a city or owns their home. The log house value, log wages, and education variables are only available from 1940 onward. Log house value is also missing for 1950. Individual level controls include age, marital status, age and place of birth dummies. Commuting zone level controls are the WWII draft rate, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the commuting zone level in parentheses. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 22: Movers vs. Birth-State Stayers, South

Outcome:	Urban	Owns home	ln(house value)	ln(wage)	Education
	Panel A: Cross-State Migrants				
Casualty rate$_z$× Post-war$_t$	-0.041*	0.005	-0.049	-0.021	0.041
	(0.025)	(0.006)	(0.033)	(0.015)	(0.074)
Casualty rate$_z$× Black$_{izt}$×	-0.004	-0.004	0.095***	0.062***	0.355***
Post-war$_t$	(0.003)	(0.004)	(0.017)	(0.008)	(0.037)
Observations	400,974	368,162	132,123	262,253	298,105
Adj. R^2	0.713	0.265	0.465	0.491	0.439
	Panel B: Birth-State Stayers				
Casualty rate$_z$× Post-war$_t$	-0.037***	-0.004	-0.054**	-0.035***	-0.097**
	(0.013)	(0.005)	(0.027)	(0.012)	(0.040)
Casualty rate$_z$× Black$_{izt}$×	-0.001	-0.011***	0.085***	0.018***	0.306***
Post-war$_t$	(0.003)	(0.002)	(0.011)	(0.007)	(0.030)
Observations	868,579	859,213	296,651	505,133	613,313
Adj. R^2	0.661	0.240	0.471	0.498	0.405

Note: Difference-in-differenece-in-differences regression of economic outcomes on the commuting zone WWII casualty rate among semi-skilled whites interacted with a post-WWII dummy, and with a black indicator for individuals living in 300 commuting zones in the U.S. South. The estimation sample contains data from the decennial U.S. micro Census from 1920-70 on non-institutionalized, working black and white males aged 15-65 who are not currently attending school. All regressions include commuting zone and Census year fixed effects. Urban and owns home are binary outcomes for whether an individual lives in a city or owns their home. The log house value, log wages, and education variables are only available from 1940 onward. Log house value is also missing for 1950. Individual level controls include age, marital status, age and place of birth dummies. Commuting zone level controls are the WWII draft rate, log WWII spending per capita, share of black men, share of rural population, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. Standard errors clustered at the commuting zone level in parentheses. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C NPPS Additional Results

C1) Robustness and Heterogeneity

C1.1: Splitting the Sample into Black and White Respondents

Tables 23 and 24 re-estimate the OLS and IV regressions for eq. (6) for the black and white samples, respectively. Given that the sample size is essentially halved, this is reflected in the very wide standard errors. The main aim of this exercise is to explore from which group the estimated effect sizes in the main table originate. In most cases the absolute size of the coefficients is larger in the sample of black respondents. However, comparing the coefficients to the sample means within each group shows that the relative magnitudes are comparable across blacks and whites. The only outcome where black and white respondents differ is the favor integration at church outcome which yields a slightly negative but close to zero IV coefficient for whites. This is the only result which is mainly driven by black respondents.

C1.2: Weighted Regressions

Despite the attempt by the authors of the initial study to produce a representative sample of the Southern population, blacks and whites were sampled in equal proportion. This does not reflect the population shares in their counties of residence. To account for this, table 25 weights black and white respondents by their population share in their residence county. This does not overturn the previous findings.

C1.3: Alternative Treatment Definition

Another concern is that the treatment change from 1940 to 1950 is not relevant for black-white social outcomes in 1961. I therefore re-estimate eq. (6) by taking the change from 1940 to 1960. While the instrument does gain strength, the point estimates are not significantly different from the main results. The results from this exercise are reported in table 26

Table 23: The Skill Upgrade and Black-White Social Relations - Black Sample

	Pr(Interracial Friend)=1		Pr(Live in Mixed Race Area)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0325	0.0525	0.0125	0.0009
	(0.0119)**	(0.0159)***	(0.0155)	(0.0175)
	[0.0189]*	[0.0274]*	[0.0245]	[0.0255]
Outcome mean	0.4657	0.4657	0.1611	0.1611
R^2	0.1377	0.1359	0.2693	0.2683
	Pr(Favor Integration)=1		Pr(Favor Mixed Schools)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0146	0.0267	0.0078	−0.0039
	(0.0091)	(0.0140)*	(0.0059)	(0.0060)
	[0.0139]	[0.0244]	[0.0104]	[0.0082]
Outcome mean	0.6407	0.6407	0.0593	0.0593
R^2	0.2671	0.2664	0.1110	0.1084
	Pr(Favor Mixed Church)=1		Pr(Priest Pro Segregation)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0049	0.0209	0.0046	−0.0119
	(0.0031)	(0.0085)**	(0.0046)	(0.0068)*
	[0.0042]	[0.0162]	[0.0055]	[0.0100]
Outcome mean	0.0574	0.0574	0.0611	0.0611
R^2	0.1015	0.0964	0.0497	0.0446

Note: The estimation sample is kept constant in all regressions with 540 black adults in 24 counties from Southern states in 1961 using data from the "Negro Political Participation Study" (Matthews and Prothro, 1975). The change in the share of blacks in semi-skilled employment from 1940 to 1950 (Δshare of blacks$_c$) in county c is instrumented with the WWII casualty rate among semi-skilled whites in that county. The first stage F-statistic is 22.905 and the Olea and Pflueger (2013) efficient F-statistic is 24.207. Individual level controls include gender, race, age, location of dwelling (urban, suburban, rural), years lived in current county, place size, veteran status, county where a respondent grew up, and state fixed effects. County level controls used are the share of blacks in semi-skilled jobs in 1940, the share of blacks in county c, share of people not born in county c, the WWII draft rate, and variables on racial sentiment such as the number of Rosenwald schools per 1,000 blacks, the number of lynchings from 1900-30 per 1,000 blacks, and the number of black slaves in 1860. Standard errors are clustered at the county level and are reported in parentheses. Standard errors corrected for the small cluster size using the wild cluster bootstrap-t procedure for OLS models by Cameron et al. (2008) and the wild restricted efficient residual bootstrap for IV models by Davidson and MacKinnon (2010) are reported in squared brackets. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 24: The Skill Upgrade and Black-White Social Relations - White Sample

	Pr(Interracial Friend)=1		Pr(Live in Mixed Race Area)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0207	0.0129	0.0135	0.0168
	(0.0066)***	(0.0089)	(0.0047)***	(0.0046)***
	[0.0090]**	[0.0120]	[0.0058]**	[0.0072]**
Outcome mean	0.5825	0.5825	0.0852	0.0852
R^2	0.1811	0.1800	0.3912	0.3906
	Pr(Favor Integration)=1		Pr(Favor Mixed Schools)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0053	0.0017	0.0091	0.0068
	(0.0022)**	(0.0033)	(0.0019)***	(0.0033)**
	[0.0041]	[0.0046]	[0.0032]***	[0.0048]
Outcome mean	0.0360	0.0360	0.0455	0.0455
R^2	0.1632	0.1617	0.1213	0.1207
	Pr(Favor Mixed Church)=1		Pr(Priest Pro Segregation)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0014	−0.0008	−0.0081	−0.0095
	(0.0011)	(0.0014)	(0.0044)*	(0.0045)**
	[0.0020]	[0.0025]	[0.0065]	[0.0066]
Outcome mean	0.0114	0.0114	0.1420	0.1420
R^2	0.1298	0.1279	0.1973	0.1973

Note: The estimation sample is kept constant in all regressions with 528 white adults in 24 counties from Southern states in 1961 using data from the "Negro Political Participation Study" (Matthews and Prothro, 1975). The change in the share of blacks in semi-skilled employment from 1940 to 1950 (Δshare of blacks$_c$) in county c is instrumented with the WWII casualty rate among semi-skilled whites in that county. The first stage F-statistic is 54.895 and the Olea and Pflueger (2013) efficient F-statistic is 57.400. Individual level controls include gender, race, age, location of dwelling (urban, suburban, rural), years lived in current county, place size, veteran status, county where a respondent grew up, and state fixed effects. County level controls used are the share of blacks in semi-skilled jobs in 1940, the share of blacks in county c, share of people not born in county c, the WWII draft rate, and variables on racial sentiment such as the number of Rosenwald schools per 1,000 blacks, the number of lynchings from 1900-30 per 1,000 blacks, and the number of black slaves in 1860. Standard errors are clustered at the county level and are reported in parentheses. Standard errors corrected for the small cluster size using the wild cluster bootstrap-t procedure for OLS models by Cameron et al. (2008) and the wild restricted efficient residual bootstrap for IV models by Davidson and MacKinnon (2010) are reported in squared brackets. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 25: The Skill Upgrade and Black-White Social Relations - Weighted Regressions

	Pr(Interracial Friend)=1		Pr(Live in Mixed Race Area)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0202	0.0160	0.0153	0.0149
	(0.0060)***	(0.0074)**	(0.0053)***	(0.0049)***
	[0.0081]**	[0.0098]	[0.0079]*	[0.0086]*
Outcome mean	0.5235	0.5235	0.1236	0.1236
R^2	0.1486	0.1483	0.1692	0.1692
	Pr(Favor Integration)=1		Pr(Favor Mixed Schools)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0070	0.0117	0.0093	0.0091
	(0.0030)**	(0.0044)***	(0.0019)***	(0.0031)***
	[0.0053]	[0.0073]	[0.0035]***	[0.0044]**
Outcome mean	0.3418	0.3418	0.0524	0.0524
R^2	0.5162	0.5157	0.0796	0.0796
	Pr(Favor Mixed Church)=1		Pr(Priest Pro Segregation)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0024	0.0034	−0.0068	−0.0123
	(0.0012)*	(0.0014)**	(0.0042)	(0.0055)**
	[0.0020]	[0.0021]*	[0.0060]	[0.0084]
Outcome mean	0.0346	0.0346	0.1011	0.1011
R^2	0.0788	0.0787	0.1525	0.1515

Note: The estimation sample is kept constant in all regressions with 540 black and 528 white adults in 24 counties from Southern states in 1961 using data from the "Negro Political Participation Study" (Matthews and Prothro, 1975). The change in the share of blacks in semi-skilled employment from 1940 to 1950 (Δshare of blacks$_c$) in county c is instrumented with the WWII casualty rate among semi-skilled whites in that county. Observations are weighted by the respondent's racial group's population share in their county. The first stage F-statistic is 43.799 and the Olea and Pflueger (2013) efficient F-statistic is 45.841. Individual level controls include gender, race, age, location of dwelling (urban, suburban, rural), years lived in current county, place size, veteran status, county where a respondent grew up, and state fixed effects. County level controls used are the share of blacks in semi-skilled jobs in 1940, the share of blacks in county c, share of people not born in county c, the WWII draft rate, and variables on racial sentiment such as the number of Rosenwald schools per 1,000 blacks, the number of lynchings from 1900-30 per 1,000 blacks, and the number of black slaves in 1860. Standard errors are clustered at the county level and are reported in parentheses. Standard errors corrected for the small cluster size using the wild cluster bootstrap-t procedure for OLS models by Cameron et al. (2008) and the wild restricted efficient residual bootstrap for IV models by Davidson and MacKinnon (2010) are reported in squared brackets. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 26: The Skill Upgrade and Black-White Social Relations - 1940 to 1960 Differenced Treatment

	Pr(Interracial Friend)=1		Pr(Live in Mixed Race Area)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0132	0.0133	0.0105	0.0088
	(0.0049)**	(0.0059)**	(0.0035)***	(0.0037)***
	[0.0071]*	[0.0079]*	[0.0048]**	[0.0059]
Outcome mean	0.5235	0.5235	0.1236	0.1236
R^2	0.1202	0.1202	0.1380	0.1379
	Pr(Favor Integration)=1		Pr(Favor Mixed Schools)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0099	0.0157	0.0053	0.0077
	(0.0030)***	(0.0043)***	(0.0025)**	(0.0025)***
	[0.0053]*	[0.0087]*	[0.0041]	[0.0036]**
Outcome mean	0.3418	0.3418	0.0524	0.0524
R^2	0.5102	0.5096	0.0639	0.0634
	Pr(Favor Mixed Church)=1		Pr(Priest Pro Segregation)=1	
	(OLS)	(IV)	(OLS)	(IV)
Δsemi-skilled blacks$_c$	0.0033	0.0056	−0.0041	−0.0108
	(0.0010)***	(0.0012)***	(0.0033)	(0.0049)**
	[0.0015]**	[0.0019]***	[0.0040]	[0.0077]
Outcome mean	0.0346	0.0346	0.1011	0.1011
R^2	0.0808	0.0802	0.1189	0.1169

Note: The estimation sample is kept constant in all regressions with 540 black and 528 white adults in 24 counties from Southern states in 1961 using data from the "Negro Political Participation Study" (Matthews and Prothro, 1975). The change in the share of blacks in semi-skilled employment from 1940 to 1960 (Δshare of blacks$_c$) in county c is instrumented with the WWII casualty rate among semi-skilled whites in that county. The first stage F-statistic is 86.147 and the Olea and Pflueger (2013) efficient F-statistic is 90.164. Individual level controls include gender, race, age, location of dwelling (urban, suburban, rural), years lived in current county, place size, veteran status, county where a respondent grew up, and state fixed effects. County level controls used are the share of blacks in semi-skilled jobs in 1940, the share of blacks in county c, share of people not born in county c, the WWII draft rate, and variables on racial sentiment such as the number of Rosenwald schools per 1,000 blacks, the number of lynchings from 1900-30 per 1,000 blacks, and the number of black slaves in 1860. Standard errors are clustered at the county level and are reported in parentheses. Standard errors corrected for the small cluster size using the wild cluster bootstrap-t procedure for OLS models by Cameron et al. (2008) and the wild restricted efficient residual bootstrap for IV models by Davidson and MacKinnon (2010) are reported in squared brackets. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C2) Sensitivity of IV Results to Small Violations of the Exclusion Restriction

The typical IV framework in eq. (6) assumes that the instrument does not have a direct partial effect on the outcome such that in,

$$\text{social outcome}_{ic} = \phi \Delta \text{share of blacks}_c + \gamma_z \text{casualty rate} + X'_{ic}\lambda + \epsilon_{ic} \tag{13}$$

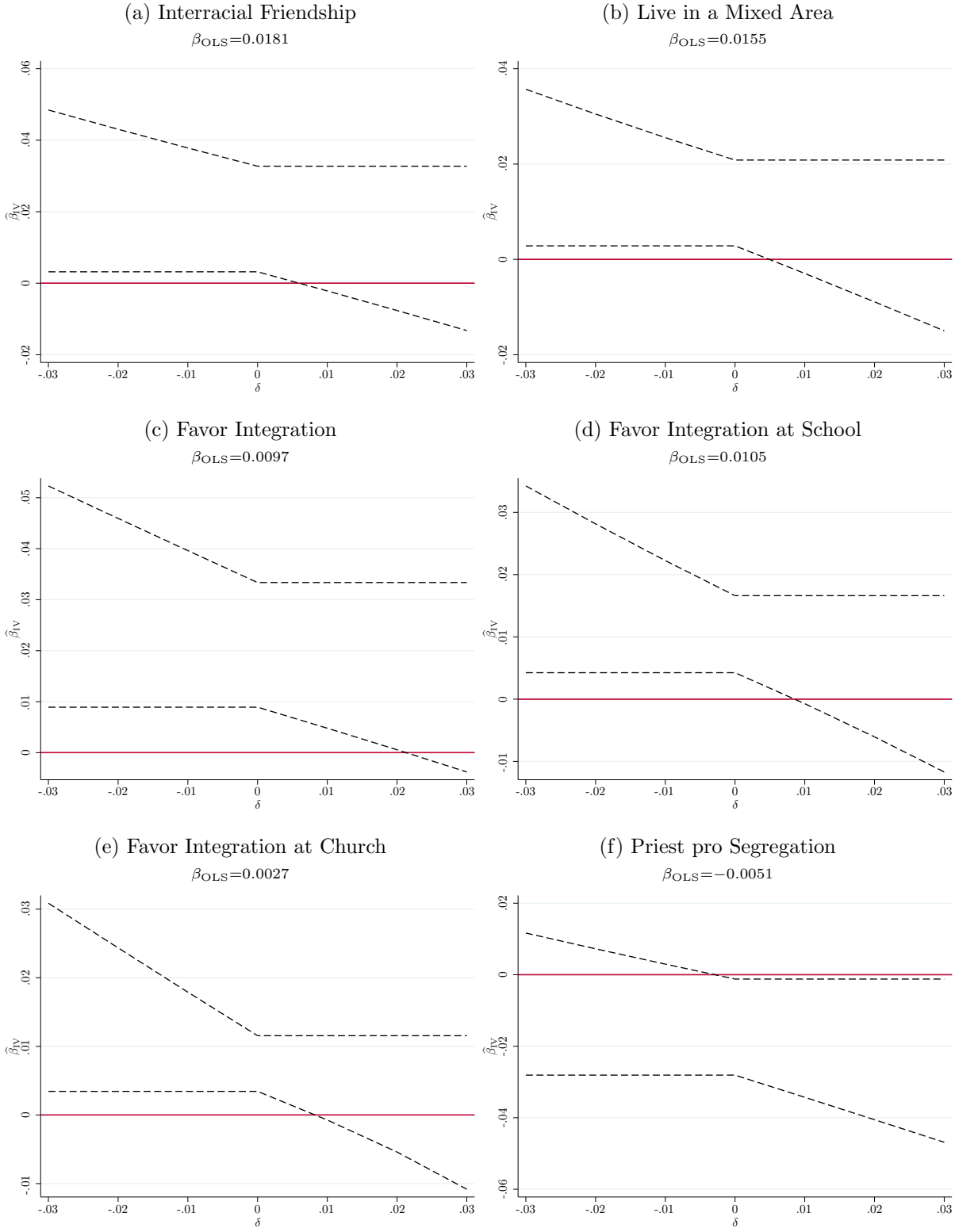
the coefficient $\gamma_z = 0$ in the structural model. While this assumption cannot be directly tested, Conley et al. (2012) construct a bounding exercise which tests the sensitivity of IV estimates with respect to small violations of the exclusion restriction. A small violation means that the instrument is not perfectly exogenous but "plausibly exogenous", i.e. $\gamma_z \neq 0$ but is close to zero.

For this test, the econometrician needs to specify a range of possible values that γ_z can take with $\gamma_z \in [-\delta, \delta]$ for some δ. Their union of confidence intervals (UCI) procedure re-estimates eq. (13) for every value of γ_z in the specified range which allows to place bounds on β_{IV} in eq. (6). These then provide 95% confidence intervals for the value that β_{IV} could take under a given size of the violation.

A main disadvantage of this method is that the bounds may be wide. In principle, they can be tightened by providing further structure on the distribution of γ_z. For the sake of this sensitivity analysis I refrain from imposing such structural assumptions and provide the most conservative bounds instead. The plots for the sensitivity analysis are shown in figure 21 for each of the considered outcomes for $\delta = 0.5$. The figure reports the corresponding OLS coefficients for comparison.

For instance, the outcome on interracial friendships tolerates a direct partial effect of the instrument on the outcome of 2.5 p.p. before the IV estimate cannot be distinguished from zero at the 95% level. A coefficient of 2.5 p.p. for the instrument would be 29% of the corresponding OLS coefficient, hence one might not regard this as "small" violation of the exclusion restriction but rather a large direct partial effect of the instrument that would be required to threaten set identification. For the outcome on interracial friendships at work the bounds are less forgiving and already make the IV indistinguishable from zero for a small positive instrument coefficient in absolute terms.

Figure 21: Conley et al. (2012) IV Bounds

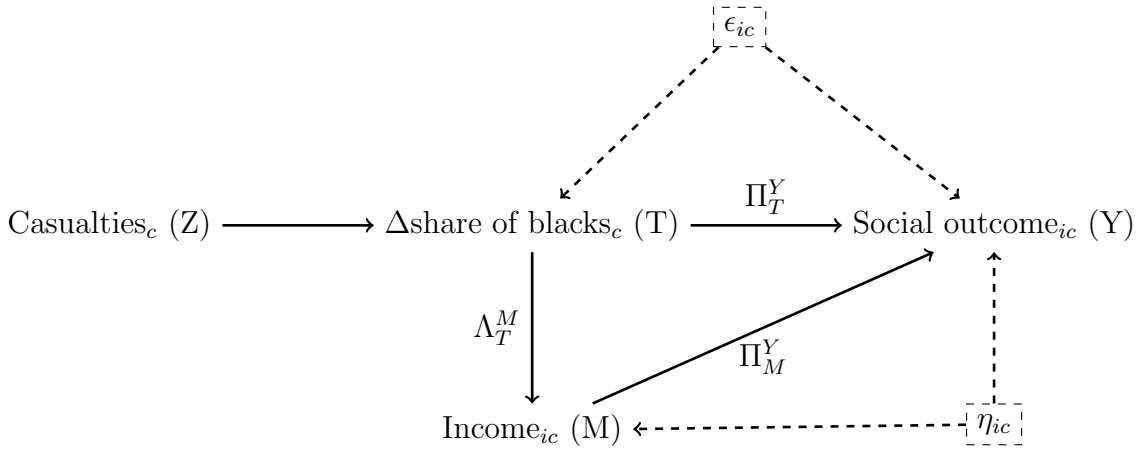


Note: Conley et al. (2012) bounds on the IV coefficients from regressing each outcome (a)-(f) on the change in the share of semi-skilled blacks in county c from 1940 to 1950 using individual level data from the "Negro Political Participation Study" (Matthews and Prothro, 1975) for 540 black and 528 white adults in 24 counties in Southern states in 1961. The change in the share of semi-skilled blacks is instrumented with the WWII casualty rate among semi-skilled whites. The bounds are constructed to allow for a non-zero direct partial effect of the instrument (γ_z) on each outcome where an interval of plausible ranges of this coefficient is chosen as $\gamma_z \in [-\delta, \delta]$ with $\delta = 0.3$. To make values of γ_z for which $\widehat{\beta}_{\text{IV}}$ cannot be distinguished from zero comparable, I report the baseline OLS coefficients under each outcome heading. The bounds provide 95% confidence intervals within which $\widehat{\beta}_{\text{IV}}$ can be estimated for small violations of the exclusion restriction. Standard errors are clustered at the county level.

C3) Mediation Effects Through Income

There are potentially several mechanisms behind the effect of the occupational upgrade of blacks on social outcomes. One channel to be considered here is the effect of increased incomes due to employment in higher paying jobs. The main analysis did not include incomes in the regressions. In the previous context, this would have been a bad control, i.e. a control variable which is also an outcome of the treatment (the black occupational upgrade). To test how much of the effect of the occupational upgrade on social outcomes comes from increases in incomes, I use the causal mediation framework introduced by Dippel et al. (2017).

Figure 22: Directed Acyclical Graph for Causal Mediation Effects



Note: Causal mediation analysis schematic. The treatment T, which is instrumented with Z, has a total effect on the outcome Y which can be decomposed into its direct effect Π_T^Y, and its indirect effect through a mediator variable M. This indirect effect is the product of the effect of T on M (Λ_T^M) and the effect of M on Y (Π_M^Y). Solid lines connect observables, dashed lines unobservables such as the two error terms ϵ and η which guide the (potential) endogeneity of T and M.

The idea of the framework is illustrated in figure 22. The standard IV model is nested in this framework in which the casualty rate instrument Z affects the social outcome Y through the change in the share of blacks in semi-skilled jobs treatment T. Potential endogeneity of T comes from a correlation with the error ϵ. Unlike in the standard framework, which assumes a single causal channel, the treatment may also partially affect Y through its effect on incomes, the so-called mediator (M). A particularly appealing feature of the Dippel et al. (2017) framework is that is allows for M to be potentially endogenous through a correlation with a second error term, η.

They show that the total effect of Δshare of blacks$_c$, instrumented by the casualty rate, on the outcome can be decomposed as,

$$\underbrace{\Lambda_T^Y}_{\text{total effect}} = \underbrace{\Pi_T^Y}_{\text{direct effect}} + \underbrace{\Pi_M^Y \times \Lambda_T^M}_{\text{indirect effect}} \tag{14}$$

where Λ_T^M is the second stage coefficient from the IV regression of M on T using Z as instrument. Π_M^Y is the second stage coefficient from the IV regression of Y on M using Z as instrument, conditioning on T. The same regression identifies Π_T^Y which is the second stage coefficent on T.

In addition to the standard identifying assumptions, consistent estimation of the causal effect of T on Y and the causal mediation effect of M on Y requires the exclusion restriction $Z \perp\!\!\!\perp M$ and that $\epsilon \perp\!\!\!\perp \eta$. Suppose workers dislike blacks and try to keep them out of semi-skilled employment via union involvement and that factory owners dislike blacks and hence are neither friends with them, nor would they pay fair wages. This would be a case in which the two error terms are potentially correlated. Given that such a scenario is far from impossible, the required assumption on the error correlations might be very strong.

Table 27 shows the results from this causal mediation analysis. The table displays the total effect Λ_T^Y, which can be compared to previous regression results, and the share of this total effect which is mediated through the effect of the occupational upgrade on blacks' incomes, $\frac{\Pi_M^Y \times \Lambda_T^M}{\Lambda_T^Y}$. The results show that income does not matter at all in the determination of interracial friendships. The effect is therefore likely driven by other mediators which have not been explored or are unobserved. An example of another potential mediator is exposure of black and white workers in the factories or at clubs or other social activities which are available in the cities.

The mediation effect is larger for other outcomes, such as attitudes towards integration for which 46% of the occupational upgrade effect are mediated through income. The same holds for favoring integration at church with a mediation effect of 58.6% of the total effect, and for the probability that a respondent's priest preaches in favor of segregation (62.2%). However, it should also be noted that none of these mediation effects are estimated precisely enough as that they could be taken as statistically significantly different from zero. While this part of the analysis is indicative, it is certainly not conclusive.

Table 27: Causal Mediation Analysis Results

	Pr(Interracial Friend)=1	Pr(Live in Mixed Race Area)=1
Δsemi-skilled blacks$_c$	0.018**	0.011**
	(0.023)	(0.029)
% mediated through income	0.001	−0.442
	(0.998)	(0.344)
	Pr(Favor Integration)=1	Pr(Favor Mixed Schools)=1
Δsemi-skilled blacks$_c$	0.020***	0.011***
	(0.001)	(0.001)
% mediated through income	0.460	0.026
	(0.203)	(0.909)
	Pr(Favor Mixed Church)=1	Pr(Priest Pro Segregation)=1
Δsemi-skilled blacks$_c$	0.008***	−0.013*
	(0.000)	(0.052)
% mediated through income	0.586	0.622
	(0.186)	(0.274)

Note: The estimation sample is kept constant in all regressions with 540 black and 528 white adults in 24 counties from Southern states in 1961 using data from the "Negro Political Participation Study" (Matthews and Prothro, 1975). The change in the share of blacks in semi-skilled employment from 1940 to 1950 (Δshare of blacks$_c$) in county c is instrumented with the WWII casualty rate among semi-skilled whites in that county. The table displays the percentage share of this estimated main effect that is mediated through increased incomes of blacks due to the skill upgrade from low- to semi-skilled occupations. Controls include gender, race, age, location of dwelling (urban, suburban, rural), years lived in current county, place size, veteran status, county where a respondent grew up, and state fixed effects. County level controls used are the share of blacks in semi-skilled jobs in 1940, the share of blacks in county c, share of people not born in county c, the WWII draft rate, and variables on racial sentiment such as the number of Rosenwald schools per 1,000 blacks, the number of lynchings from 1900-30 per 1,000 blacks, and the number of black slaves in 1860. Standard errors are clustered at the county level, p-values reported in parentheses.

Data Appendix

Merging Enlistment and Casualty Records

Merging the 8.3 million observations from the WWII Army enlistment records with the casualty records based on the Army serial number matches 78% of all casualties. These are observations which found a unique match across both data sets. For robustness I computed the soundex string distance of first- and surname and kept those matches for which it was sufficiently small in order to be sure that the match was correct. Less than one percent of these initial matches were returned to the pool of unmatched observations because of significant differences in the names that indicated a clear mismatch despite a perfect match on the serial number. The match rate is not perfect because of mistakes in the serial number made by the Optical Character Recognition (OCR) software on part of the casualty tables for which the scans are of less than ideal quality.

The remaining casualties were matched via the probabilistic string matching algorithms provided by Wasi and Flaaen (2015). A one-to-one match was used to link each casualty with a potential enlistment record based on name and serial number stratified by state of residence. Names are matched via a tokenization and serial numbers via a bigram algorithm. The match with the highest combined matching score was kept. This results in a final match rate of 94%. From a random sample of 1,000 matches the error rate was 0.6% as judged by correctness of the name, serial number, and residence. The OCR quality of the remaining 6% of casualty observations was too poor in order to clearly identify whether a given match was correct. These cases were dropped.

Sources of the U.S. Census County Data, 1920-1970

The main data source are the county aggregates of the U.S. Decennial Census of Population and Housing from 1940 to 1970 and the 100% full count micro data of the Census. For the years 1940 to 1970, the Census publishes occupational counts at the county level where Southern states report them separated for black and white workers. For instance, see table 23a on page 278 of the 1940 Census for Georgia shown in figure 23 which are the raw data from which I digitized the employment information at the county level for blacks by county and skill group. Occupations are defined according to the har-

monized 1950 definition by the U.S. Census Bureau. The categories include professional, semi-professional, farmers, proprietors and managers, clerical and sales, craftsmen and foremen, operatives, domestic services, farm laborers, and laborers. Semi-skilled occupations here are taken to be the groups of craftsmen and operatives. These definitions change considerably with the 1980 Census which makes it impossible to keep a consistent measurement of the outcome variable.

Figure 23: Data Source for Semi-Skilled Employment of Blacks

Table 23a.—NONWHITE EMPLOYED WORKERS 14 YEARS OLD AND OVER, BY MAJOR OCCUPATION GROUP AND SEX, BY COUNTIES: 1940

COUNTY AND SEX	Total employed (except on public emergency work)	Professional workers	Semiprofessional workers	Farmers and farm managers	Proprietors, managers, and officials, exc. farm	Clerical, sales, and kindred workers	Craftsmen, foremen, and kindred workers	Operatives and kindred workers	Domestic service workers	Service workers, except domestic	Farm laborers (wage workers) and foremen	Farm laborers, unpaid family workers	Laborers, except farm	Occupation not reported
Appling.....Male....	646	8	-	105	3	3	17	59	7	27	93	23	300	1
Female..	252	22	-	12	1	-	-	2	160	20	7	5	-	3
Atkinson.....Male....	504	3	-	44	3	-	3	19	1	7	54	12	355	3
Female..	136	8	-	2	-	-	-	1	106	8	2	5	1	3
Bacon.....Male....	288	1	-	48	3	11	6	16	2	4	23	5	168	1
Female..	92	4	-	3	-	-	-	1	67	7	3	4	2	1
Baker.....Male....	1,151	1	-	543	-	-	3	6	4	1	319	203	69	2
Female..	360	15	-	45	-	-	-	1	75	3	40	179	-	2
Baldwin.....Male....	1,984	23	3	392	14	13	141	147	50	246	306	124	515	6
Female..	1,484	67	-	33	2	3	2	43	923	241	41	119	2	6
Banks.....Male....	150	-	-	90	-	-	-	1	3	3	21	28	3	1
Female..	25	1	-	5	-	-	-	-	7	-	-	12	-	-
Barrow.....Male....	585	2	-	202	1	-	9	26	10	33	196	64	39	3
Female..	373	9	-	4	4	-	-	1	250	13	21	71	-	-
Bartow.....Male....	947	11	-	213	4	3	19	151	43	70	170	59	195	9
Female..	631	28	-	9	1	2	-	5	496	38	12	36	1	3
Ben Hill.....Male....	1,117	15	3	204	16	10	47	153	6	59	270	65	265	4
Female..	608	26	-	13	14	2	-	10	489	33	11	4	2	4
Berrien.....Male....	683	4	-	74	5	5	17	49	9	9	149	23	337	2
Female..	274	3	-	4	2	-	-	2	202	12	33	15	-	1
Bibb.....Male....	7,379	138	14	216	115	170	640	1,924	263	947	547	53	2,311	39
Female..	6,625	231	4	18	51	58	19	443	4,858	754	29	37	101	23

Note: Raw data source from the 1940 Census of Population and Housing for the state of Georgia (p. 278). Occupational information is reported for each skill group by county and gender.

Before 1940 the county level aggregates do not report these statistics. However, it is possible to construct them from the 100% full count micro data of the Census for 1920, 1930, and 1940. Before 1920 there is no reliable employment status data. This information is important to construct the correct county aggregates. For each county, these are the sum of all currently employed workers in a given occupational group. The emphasis lies on currently employed. Given the overlap of the full count Census and the county level aggregates in 1940, this is the only definition of workers which gives a complete overlap between the two data sources with respect to the constructed and the actual county level data.

The difference-in-differences results in table 3 and the related tables are not driven by potential definitional mistakes. Table 28 shows that the estimated results largely unchanged when using the county level aggregates for 1940 to 1970 only. The specification

with covariates fixed at their 1940 levels estimates a slightly smaller effect while inclusion of the county-specific time trends takes away more significance. This is mostly due to the reduced size of the pre-treatment time window but the coefficient remains as before.

Table 28: County Level Difference-in-Differences Results, 1940-1970

	Outcome: % blacks in semi-skilled jobs (pre-war mean = 12.433)					
	(1)	(2)	(3)	(4)	(5)	(6)
Casualty rate$_c$× Post-war$_t$	0.529***	0.617***	0.343***	0.586***	0.534*	0.552***
	(0.117)	(0.155)	(0.132)	(0.162)	(0.285)	(0.123)
Controls		Yes		Yes	Yes	Yes
1940 controls × time			Yes			
Flexible state time trends				Yes		
Linear county time trends					Yes	
Doubly-robust selection						Yes
Observations	4,985	3,626	3,684	3,626	3,626	4,655
Counties	1,388	1,229	985	1,229	1,229	1,377
Adj. R^2	0.885	0.901	0.905	0.908	0.919	0.880
Oster's δ	0.951	1.023	0.545	1.109	0.599	0.996

Note: Difference-in-differences regressions of the county-level share of blacks in semi-skilled occupations on the WWII county casualty rate among semi-skilled whites interacted with a post-war indicator. The estimation sample contains decennial U.S. Census data on counties in Southern states from 1940 to 1970. Controls include county and decade fixed effects, the county draft rate, average casualty rate in the neighboring counties, log WWII spending per capita, share of black men, share of rural population, log median family income, share of pop. with high school degree, no. of manufacturing establishments per capita, average manufacturing firm size, log manufacturing value added per worker, share of employment in manufacturing, share of land in agricultural production, share of acres in cotton production, share of cash tenants, average value of machinery per farm, lynchings per 1,000 blacks between 1900 and 1930, no. of Rosenwald schools per 1,000 blacks, share of acres flooded by the Mississippi in 1928, no. of slaves in 1860, Republican vote share, New Deal spending per capita 1933-35 (loans, public works, AAA, FHA loans), and the unemployment rate in 1937. Time-invariant controls are interacted with decade fixed effects. Monetary values are deflated to 2010 U.S. dollars. The doubly-robust selection method implements the Belloni et al. (2014) machine learning covariate selection algorithm for testing the stability of treatment effects with respect to the observables. Oster's (2017) test for selection on unobservables is reported in the final row by computing the coefficient of proportionality δ for which the coefficient on the semi-skilled casualty rate among whites would equal zero. Standard errors clustered at the county level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The Census data also contain information on each county's population but also on the local economies. This includes information on the number of manufacturing establishments, number of manufacturing workers, and value added. From the I compute the following controls:

Manufacturing firms per 1,000 pop $= \frac{\text{No. manufacturing establishments}_{ct}}{\text{Total population}_{ct}/1{,}000}$

Av. manufacturing firm size $= \frac{\text{Total manufacturing workers}_{ct}}{\text{No. manufacturing establishments}_{ct}}$

Manufact. value added per worker $= \ln\left(1 + \frac{\text{Total manufacturing value added}_{ct}}{\text{Total manufacturing workers}_{ct}}\right)$

Share of manufacturing workers $= \frac{\text{Total manufacturing workers}_{ct} \times 100}{\text{Total population}_{ct}}$

Share of black men $= \frac{\text{Total no. of black men}_{ct} \times 100}{\text{Total no. of men}_{ct}}$

Share of blacks $= \frac{\text{Total no. of blacks}_{ct} \times 100}{\text{Total population}_{ct}}$

Data on the number of slaves in 1860 by county come from the 1860 U.S. Decennial Census of Population and Housing. Additionally, information on median family income was taken from the Census files. For 1940, the median family income was computed from the 1940 100% Census micro data. Whenever information on manufacturing or income variables was not available or incomplete in the Census, these were supplemented with information from the County and City Data Books from 1947 to 1972 published by the U.S. Census Bureau.

Control Variables

Agricultural Controls

Information on agricultural variables at the county level for each decade was taken from the U.S. Agricultural Census prepared by:

- Haines, M., Fishback, P.V., and Rhode, P. (2016) "United States Agriculture Data, 1840 - 2012", Study No. ICPSR35206-v3, Inter-university Consortium for Political and Social Research 2016-06-29, Ann Arbor, MI

Constructed variables from this data set are:

acres in farm land $= \frac{\text{farm acres}_{ct} \times 100}{\text{land acres}_{ct}}$

average value of machinery per farm $= \frac{\text{value of farm machinery}_{ct} \times \text{CPI}_t}{\text{No. farms}_{ct}}$

share of cash tenants$_{ct} = \frac{\text{No. cash tenants}_{ct} \times 100}{\text{Total no. tenant farmers}_{ct}}$

share of cotton in agriculture$_{ct} = \frac{\text{No. acres in cotton production}_{ct} \times 100}{\text{Acres in farm land}_{ct}}$

Lynchings

Data on the number of lynchings for a given county between 1900 and 1930 come from Project HAL: Historical American Lynching. Their definition of a lynching follows the conditions outlined by the National Association for the Advancement of Colored People (NAACP). The conditions for a murder to qualify as lynching are that there must be evidence that someone was killed; the killing must have occurred illegally; three or more persons must have taken part in the killing; and the murderers must have claimed to serve tradition or justice. The lynchings variable here is defined as: $\frac{\text{No. lynchings 1900-1930}_c}{\text{No. of black pop}_{ct}/1{,}000}$. The data are freely available at:

- `http://people.uncw.edu/hinese/HAL/HAL%20Web%20Page.htm`
  (retrieved on November 2nd, 2017)

Mississippi Flooded Acres, 1928

This data comes from Hornbeck and Naidu's (2014) deposit at the American Economic Review website. The variable used here is defined as: $\frac{\text{flooded acres}_{c,1928} \times 100}{\text{total acres}_{c,1930}}$. The data can be accessed at:

- `https://www.aeaweb.org/aer/data/10403/20120980_data.zip`
  (retrieved on November 3rd, 2017)

Party Vote Shares

Data on the Republican vote share come from:

- Clubb, J.M., Flanigan, W.H., and Zingale, N.H. (2006) "Electoral Data for Counties in the United States: Presidential and Congressional Races, 1840-1972", ICPSR08611-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2006-11-13. `https://doi.org/10.3886/ICPSR08611.v1`

The data report congressional and presidential vote share by party for each election between 1840 and 1972. The Republican vote share here is taken to be the share of votes obtained by the Republican party in congressional elections in a Census year. If there was no election in given Census year, the nearest election was assigned.

Rosenwald Schools

The Rosenwald School variable here is defined as: $\frac{\text{No. Rosenwald Schools}_c}{\text{No. of black pop}_{ct}/1{,}000}$.
The number of Rosenwald Schools per county was obtained from:

- http://rosenwald.fisk.edu/index.php
  (retrieved on November 2nd, 2017)

WWII Related Spending

War related spending during World War II was taken from the 1947 County and City Data Book. A digital version is provided by:

- United States Department of Commerce. Bureau of the Census. "County and City Data Book [United States] Consolidated File: County Data, 1947-1977. ICPSR07736-v2". Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2012-09-18. https://doi.org/10.3886/ICPSR07736.v2

The war related spending per capita variable here is computed as:

$$\text{Log mil. spending per capita} = \ln\left(1 + \frac{\left(\text{\$ combat equip.+\$ other equip.+\$ ind. facilities+\$ mil facilities}\right)_{c,1940}}{\text{Total population}_{c,1940}}\right)$$