Market Forces and Employer Racial Preferences: Evidence from Wartime Shortages *

Joan J. Martínez (UC Berkeley), Ellora Derenoncourt (Princeton University)

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Abstract

This paper examines whether market forces can mitigate employer racial preferences when labor markets tighten. Using a novel dataset of 16.8 million historical job advertisements from nationwide, local, and historically Black newspapers spanning 1900-1970, we exploit quasi-experimental variation in white labor supply induced by World War II military casualties. This setting provides a unique opportunity to identify the elasticity of discriminatory behavior with respect to labor supply. We hypothesize that labor market tightening increases the shadow price of discrimination by altering the relative scarcity premium on preferred workers—a mechanism distinct from competitive pressure that remains largely unidentified in the empirical literature. Using an exposure research design that leverages variation in white soldier casualties across local labor markets, we find that areas experiencing declines in white labor supply saw significant and persistent reductions in job advertisements expressing preferences for white workers. These findings provide some of the first causal evidence that binding constraints on preferred worker availability can reduce discriminatory practices through purely economic mechanisms. This insight extends to contemporary labor markets facing demographic shifts such as aging workforces, where similar forces may operate.

Keywords: Labor Market Discrimination, Market Tightness, Labor Supply Shocks, World War II, Employer Behavior

JEL Classification: J71, J15, J23, E24, N32, D22

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1 Introduction

To what extent can market forces mitigate overt racial preferences when labor markets tighten? Understanding the connection between labor market tightness and discriminatory hiring preferences has become increasingly relevant as labor markets face binding constraints. An important but empirically elusive prediction in the economics of discrimination is that employer preferences become increasingly costly to maintain as preferred labor grows scarce. While Becker's (1957) model predicts that competition should eventually eliminate discrimination, the specific elasticity of discriminatory behavior with respect to labor supply remains largely unidentified. This paper examines whether labor supply constraints—specifically, through a war-induced reduction in the relative availability of White workers—causally affected employers' racial preferences in hiring. By exploiting variation in racial hiring preferences during a period predating civil rights legislation, we overcome a key identification challenge in the discrimination literature: disentangling market mechanisms from regulatory forces. Our approach leverages novel historical data on explicit racial preferences in job advertisements combined with plausibly exogenous labor supply shocks to identify the causal response of discriminatory practices to changes in the relative scarcity premium on preferred workers. This research design provides a clean test of whether economic constraints alone can discipline discriminatory behavior—a core theoretical prediction that has proven empirically elusive despite its centrality to models of taste-based discrimination.

The first part of the study documents the extent of stated racial preferences in hiring practices used by employers starting in 1900, before laws prohibiting such practices were passed. Recent research has documented the extent of non-discriminatory public accommodations in the pre-Civil-Rights-Era (Cook et al., 2022). Much less is known about employer-level labor market discrimination in the same period. While previous research provides ample anecdotal evidence of employers' explicit racial preferences in this period, it remains unclear how prevalent these preferences were prior to their prohibition through civil rights legislation. In addition, it is unknown to what extent these preferences contributed to the occupational sorting prevalent in U.S. labor markets (Hellerstein et al., 2008), the lack of workforce diversity (Hsieh et al., 2019), and racial wage gaps (Bayer and Charles, 2018; Blau and Beller, 1992; Charles and Guryan, 2008; Derenoncourt and Montialoux, 2020). This paper fills this void by using information from 16 million job ads from 13 major US newspapers between 1900 and 1970 to characterize the

prevalence of racial preferences for African Americans versus workers of European descent in the labor market.

In the second part of the study, we use an event study design to exploit variation in casualties among White soldiers across local labor markets due to WWII. The identification leverages plausibly exogenous spatial and time variation in White soldier casualty rates, which our reduced-form estimates from the 1940-1950 decennial censuses demonstrate led to persistent reductions in the relative supply of White male labor through at least 1950. This quasi-experimental setting allows us to identify the causal effects of war-induced labor supply shocks on racial dynamics in labor markets. To implement this research design, we construct a balance yearly panel of occupation county-cells spanning from 1930-1960 and estimate dynamic treatments effects using the variation in white casualty rates across local labor markets over time. This approach enables us to trace the temporal evolution of employers' racial preferences in response to exogenous shocks to the relative labor supply of White workers, while controlling for fixed differences across labor markets and common annual shocks. Our findings indicate that White soldier casualties affecting local labor markets led to statistically significant reductions in employers' racial preferences in job advertisements. Local labor markets that affected by higher military casualty rates experienced a 2.7 percentage point decrease in the likelihood of job advertisements in that market explicitly using racial preferences.

Although it is illegal to discriminate on the basis of race in job postings today, historical records indicate that employers did so openly in the twentieth century (Darity and Mason, 1998; Kohl and Stephens, 1991; Kuhn and Shen, 2023; Walsh et al., 1975).[1] The literature indicates that one explanation is rooted in supply-side workforce attributes, which play a significant role in shaping employers' preferences. It has been well-documented that inequality in educational opportunities and resources, frequently attributable to historical discrimination through Jim Crow laws, has resulted in limited access to quality education among minority groups, leading to less competitive qualifications and skill sets when entering the labor market (Card and Krueger, 1992; Donohue et al., 2002; Wolpin, 1992). In addition, many of the causes of racial preferences in hiring stem from demand-side factors, such as information asymmetry in evaluating job candidates (Lang and Lehmann, 2012; Nunley et al., 2015); customer or consumer preferences

[1] Title VII of the Civil Rights Act expressly prohibits discrimination on the basis of race, color, religion, sex, or national origin by employers. This law applies to job postings, hiring procedures, and all other employment-related matters. In order to enforce this law, there has been significant follow-up litigation and grassroots activism. See for example Smith (2008) and (Donohue and Siegelman, 1991).

(Giulietti et al., 2019; Laouénan, 2017); social networks and referrals (Miller and Schmutte, 2021; Beaman and Magruder, 2012); stereotypical evaluation of job applications (Bertrand and Mullainathan, 2004; Oreopoulos, 2011; Darolia et al., 2016; Rooth, 2010); and taste-based racial practices (Bjørnshagen, 2022; Altonji, 2005; Ewens et al., 2014).

We introduce a novel dataset of racial prejudice among employers that covers the period of 1900 to 1970. We processed text features extracted from job postings published in nationwide newspapers that include the New York Times (1900-2009), The Washington Post (1900-2004), the Boston Globe (1900-1989), Chicago Tribune (1900-1997), the Los Angeles Times (1900-1996), eight additional local newspapers in the southern states, and historically black newspapers.[2] Our final dataset contains information 16.8 million job postings built using advanced natural language processing tools that allow us to identify explicit racial references in published job descriptions. The evolution of racially explicit language and references in job postings indicate that employers' racial preferences for White workers were predominant and more common than preferences against (or for) Black workers throughout our period of analysis.

Starting in the interwar period between World War I and World War II, employers' racial preferences for Black and White workers begun to shift, at the same time as the occupational exclusion of African American workers from fields formerly dominated by White workers began to wane. Black workers were systematically excluded from applying to a large share of jobs; however, this restriction erode particularly sharply around World War II. This finding aligns with previous research that established the significance of labor shortages during the war for breaking down occupational barriers for Black workers (Maloney, 1994; Ferrara, 2022; Freeman et al., 1973). The share of job postings that specifically required that applicants be White ranged from 10 percent in 1920 to 20 percent in 1930 before falling back down to 10 percent during WWII. From 1920 to 1940, 5 percent of job openings indicated a preference for Black applicants; however, this percentage steadily decreased after WWII. After World War II, explicit racial preferences across occupations experienced, to different extents, a general decline no longer favoring White workers in low-skilled and semi-skilled occupations.

This study primarily contributes to the literature on labor market discrimination. Con-

[2]Historically black newspapers are publications that were established primarily by and for African Americans. These newspapers played a crucial role in advocating for civil rights, documenting African American history and culture, and providing black communities with a forum for expression. The Chicago Defender, founded by Robert S. Abbott in 1905, is a prominent Black newspaper in the United States included in the dataset. It played a significant role in the Great Migration by encouraging African Americans to move north and providing information about employment and civil rights issues (Wolseley, 1986).

temporary discriminatory practices among employers have been extensively studied, and the literature provides convincing evidence from audit studies at the job application stage, which primarily focus on measuring discrimination through experimental methods (see, for example, Bertrand and Mullainathan (2004); Nunley et al. (2015); Kline and Walters (2021); Neumark (2018)) or assessing the impact of policy changes affecting the employment probability of racial minorities. This paper provides complementary insights by analyzing the language and content of job postings, which reveals the extent to which employers signaled their preferences for certain racial groups in a systematic manner, potentially discouraging minority applicants and perpetuating occupational segregation. The paper also identifies which industries or job classifications tend to have these preferences more strongly. Despite legislative advancements promoting equal opportunity and combating discrimination, this analysis demonstrates how preferences may have become more subtle and pervasive over time by tracking the evolution of discriminatory language and measures used in job postings.

The second contribution is methodological and relates to the literature on the analysis of language in job postings using text as data (some examples include, Kuhn et al. (2020); Garg et al. (2018); Atalay et al. (2020)). We created a new data source that quantifies hiring preferences on the basis of race. Using text data from historical sources covering more than a century of published classified pages, we train a classification model to identify job advertisements and use Natural Language Processing (NLP) tools to analyze racial hiring preferences in the content of such advertisements. By sifting through vast quantities of textual data, this method can be used to analyze large datasets, thereby enhancing research capabilities and revealing new findings.

The organization of the paper is as follows. Section 2 contextualizes the historical factors that shape the evolution of preferences in hiring during the period of analysis. Section 3 explains the construction of the new dataset on racial preferences in job postings. Section 4 presents the characterization of how racial preferences in job advertisements have contributed to limited access for certain racial groups, hindering their representation in specific professions. Section 5 estimates the effects of war-induced labor market shortages on prejudice among employers, measured by the occurrence of racially discriminatory job advertisements displaying preferences for White Workers. Section 6 concludes.

2 Historical Context

2.1 Market Forces: War-Induced Labor Mobilization

World War II started the largest military mobilization in U.S. history, drawing 16 million Americans to serve in the armed forces (U.S. Department of Veterans Affairs, 2020; Defense Casualty Analysis System, 2020). This large demand for military personnel triggered substantial changes in U.S. labor markets, mobilizing approximately one third of the working population to participate in the war effort, including wartime industrial production and military roles (Harrison, 1988). The mobilization implied a reorganization of the workforce with well-documented consequences for women's labor participation (Bailey, 2006; Goldin, 1991; Goldin and Olivetti, 2013; Goldin, 1983; Rose, 2018), and more recently studied structural changes affecting the African American workforce (Bailey and Collins, 2006; Aizer et al., 2020; Ferrara, 2022; Schweitzer, 1980).

The War produced severe casualties, the highest in US history, with over 405,000 of those in service lost (U.S. Department of Veterans Affairs, 2020; Defense Casualty Analysis System, 2020). Recent empirical evidence has shown that these casualties, predominantly among White male soldiers, created labor market voids that facilitated the entry of African American workers into better-paid, semi-skilled jobs previously accessed by them (Ferrara, 2022).

Wartime mobilization created labor shortages that were specially pronounced in industries critical to war production, leading to an unprecedented opportunity that allowed fr increased participation of African Americans in a greater range of occupations and industries (Maloney, 1994). Around four million African Americans migrated from the South during the Second Great Migration which spanned from 1940–1970 (Boustan, 2016). During this era, the participation of Black workers in the defense industry increased, partially enabled by the passing of legislation that aimed to prevent discrimination in the defense industry, such as Executive Order 8802 (Delmont, 2022).

The historical records of the full-count Decennial Census of 1940 provide an empirical characterization of the extent of wartime labor mobilization across racial groups. Appendix Table B.1 displays the average share of men per county that were participating in labor and military activities according to military enlistment and casualties sources listed in Section 3. In Panel A, we observe the indicators calculated for workers of all racial groups. Columns 1 and 2 show that, across all age groups, labor force participation remained relatively high (above 70 percent),

with prime age workers (18-65) showing a participation rate of 90 percent at the onset of of World War II. Young adults (21-35) exhibit particularly high engagement in the labor market, similarly to adults (36-45). The enlistment rates are notably higher among younger age groups, reflecting the demographic targeting of military recruitment during the war. This is consistent with the largely-documented *temporarily* decline in the youth labor force during the war that allowed for increased labor participation of women, other racial groups, and immigrants due war mobilization. The casualty rates, while low overall, provide a crucial variable for understanding *permanent* local labor market disruptions. Panel B and C reveal significant variations in employment and enlistment rates between White and Black workers, with White workers generally showing higher rates of enlistment and lower casualty rates across all age groups.

The labor mobilization of African Americans that started with World War II marked the beginning of significant changes in labor market dynamics that were subsequently sustained by the Civil Rights Act of 1964 and related anti-discrimination legislation. These legal frameworks improved the economic status of African Americans in the 1960s, facilitating educational opportunities (Landry and Marsh, 2011; Freeman et al., 1973), equitable access to public facilities and schools (Cook et al., 2022; Hersch and Shinall, 2015), and their integration in the workplace (Stainback et al., 2005). While the impacts of these legislative and institutional measures are well documented, less attention has been placed on the role of market forces in reducing racial disparities in employment (Margo, 1995; Cunningham and Lopez, 2021; Ferrara, 2022; Aizer et al., 2020). Our subsequent analysis aims to bridge this gap, by focusing on how the distribution of prejudice against Black workers was affected by war-induced changes in the relative labor supply of White and Black workers.

2.1.1 Post-War Shifts in Labor Supply of White and Black Workers

Using decennial census data, we use a reduced-form estimation to quantify the long-term effects of WWII mobilization of White men on the labor supply of White and Black men in 1950, assessing whether these effects remained significant five years after the war's conclusion.

Our approach models the working-age white male population in 1950 at the county-occupation as a function of white military casualties and enlistments during 1940–1947, while controlling for pre-war (1940) characteristics including the lagged outcome, urban population proportion, average education, and female labor force participation.[3] All variables were standardized to

[3]We include occupation and state fixed effects to account for structural differences across local labor markets.

have mean zero and standard deviation one. This specification allows us to distinguish between the exogenous shock of war casualties and the potentially endogenous patterns of military enlistment, providing insights into how these different aspects of wartime mobilization reshaped local labor market demographics.

Table 3a reports the estimates of the effects on casualties and enlistment rates on the male white working-age employed population calculated for 1950. The first row reports the coefficient on White casualties, which is consistently negative across all age groups. This effect suggests that higher rates of wartime casualties affecting local labor markets correlate with a significant decline in male labor force participation rates lasting until the 1950s. This effect is most pronounced among young adults (aged 21-35 in 1950), shown in Column 3, and senior men (ages 45-65), as shown in Column 5, where a one-unit standard-deviation increase in the number of casualties is associated with a 0.15 standard deviations reduction of men 18-65 years old in the labor force by 1950. This result is consistent with the hypothesis that high casualty levels had long-lasting impacts on the local workforce availability. In the second row, the enlistment coefficient shows a different pattern across age groups. For young adults (aged 21-35) and adults aged 36-45, shown in Columns 3 and 4 respectively, higher enlistment numbers are associated with significantly larger working-age populations by 1950, with standardized coefficients of 0.25 and 0.2. The relationship is also positive for the senior group (ages 45-65). However, for the youngest cohort (18-20), the coefficient (0.033) is smaller and not statistically significant, suggesting that areas with higher enlistment rates may have experienced different post-war population dynamics across age groups.

In contrast, the analysis for Black workers shows a non discernible different pattern in Table 3b. White soldier casualties have positive but statistically insignificant effects on the Black working-age population across all age groups in 1950, with coefficients ranging from 0.008 for adults age 36–45 to 0.123 for young adults age 21-35. Similarly, the coefficients for White enlistment show no statistically significant relationship with Black population levels. This pattern of results, when contrasted with the significant negative effects on White working-age population documented in Table 3a, provides compelling evidence of a long-lasting relative reduction in White labor supply compared to Black labor supply across local labor markets that persisted until at least 1950. These findings indicate that wartime casualties disproportionately affected the demographic composition of local labor markets by primarily reducing the availability of White workers while leaving the Black labor force relatively unchanged. This conclusion extends

to the equilibrium quantities of employed workers presented in Appendix Table B.4.

2.2 Racial Discrimination in Labor Markets Through Classified Ads

Classified job advertisements have served as a primary channel for recruiting workers during the last century, with the number of job listings published in major newspapers considerably increasing since 1940, as shown in Appendix Figure B.1. Historically, these advertisements have reflected broader social norms and legislative frameworks with regards to worker characteristics such as race. Prior to landmark anti-discrimination legislation in employment, help wanted job listings openly used racial terms to require racial or ethnic characteristics for job eligibility. This practice institutionalized racial discrimination among employers.

The enactment of the Civil Rights Act of 1964 marked a legislative milestone that led to a large change in the structuring of job postings. According to Darity and Mason (1998), by January 1965, newspapers largely ceased to publish help-wanted ads that explicitly favored "white" or "colored" applicants. Despite these changes, covert forms of *indirect* discrimination persisted. Advertisements favoring candidates from certain European nationalities, without a direct mention of race, continued to appear. To understand both explicit prohibition of Black applicants and indirect racial preferences favoring White workers, we introduce a novel dataset of prejudiced racial preferences in labor demand throughout the twentieth century.

3 Data

3.1 Data Sources

Historical Newspapers. The raw text sources come from ProQuest's *Historical Newspapers* archive.[4] The original files available at ProQuest are unstructured text data derived from newspaper images digitized through an optical character recognition (OCR) software. We access the unstructured text data using by queries that for the selection of specific newspapers and time periods. For our study, we limit our query search to thirteen national newspapers editions covering the period from January 1, 1900, to December 31, 1970, detailed in Appendix Table B.2. The resulting text files encompass all published sections in a newspapers – including front pages, news, and Op-Eds – and are indexed at the page level, including include metadata fields such as publication date and record type (for instance, *classified ads*, *news*).

[4]The digital archive contains more than 52 million digitized pages from more than 200 publications. Additional information is available at https://about.proquest.com/en/products-services/pq-hist-news/.

Our study focuses on job postings from the classified and advertisement sections of newspapers to assess employers' racial preferences in recruitment practices. The use of newspaper data offers substantial benefits, primarily the ability to construct a detailed, annually updated measure of racial prejudice in hiring across a broad spectrum of industries and employers. This approach constitutes a significant advance over prior studies, which typically narrow their analyses to a single industry or firm, thereby limiting the generalizability of their findings. By contrast, our dataset provides a comprehensive indicator of prejudice among employers who have historically relied on classified ads for recruitment during the 20th century.

The analysis faces three primary challenges in extracting job postings information from the original newspapers data. To address these challenges, we employ a hierarchical approach, leveraging natural language processing and computational linguistics techniques to extract, isolate, and analyze the content of job advertisements. These methods are detailed in Online Appendix A, with a procedural overview in Appendix Figure A.1. First, the text data retrieved is highly unstructured, and job postings are embedded withing continuous text streams on each page without clear delimiters. To address this, we first parse text across all newspaper pages to identify those belonging to the Classifieds section. Next, within the Classifieds, we use a heuristic topic modeling approach and train a classification model to distinguish job ads from other listings such as real estate, services, and vehicle sales (see Online Appendix A.1). Second, the content of job postings requires extensive cleaning and formatting to correct OCR errors and prepare it for feature extraction, including racial groups, locations and occupations. We utilize pre-processing techniques that compare words in job postings against extensive dictionaries that facilitate the correction of misrecognized words, as detailed in Online Appendix Sections A.1.2 to A.1.4. Third, the substantial volume of data (containing approximately 16.8 million job ads) demands considerable computational resources, as many processing steps involve detailed word-by-word analysis. We enhance computational efficiency throughout each processing step, ensuring speed, reproducibility, and accuracy in data handling.

WWII Enlistment and Casualty Army Records. We use the WWII Army Enlistment Dataset published by UC Berkeley's CenSoc Project. This is a harmonized version of the the National Archives and Records Administration's (NARA) Electronic Army Serial Number Merged File, spanning 1938-1946. It contains the enlistment records of over 9 million individuals who served in the Army, Army Air Corps, Women's Auxiliary Corps and Enlisted Reserve

Corps, and who enlisted from 1938 through 1947. Casualty information is restricted to male personnel sourced from the *World War II Honor List of Dead and Missing Army and Army Air Forces Personnel* digitized by Ferrara (2022).[5] We linked these two sources of data using the army serial numbers of the military personnel. Our analysis uses an estimation sample that is restricted to records with a valid serial number, non-missing occupation codes, and complete county of residence information. Additionally, we focus on casualties recorded between between 1940 and 1945. Table 1 contains descriptive statistics of the estimation sample consisting of 6.8 million enlisted soldiers and 199,778 casualties.

Full-count U.S. Decennial Censuses. We use the information from the full-count U.S. decennial censuses spanning from 1900 to 1950 in various parts of our analysis. We use census data from 1900 to 1950 to examine the racial gaps in labor force participation across occupations, providing a comprehensive view of long-term trends. For our primary analysis, we use the 1940 and 1950 censuses, which contain detailed employment indicators. These data allows us to evaluate the causes of shifts in the distribution of racial preferences, particularly during and after wartime periods, offering insights into the underlying causes of market forces.

3.2 Measuring Racially Charged Terms in Recruiting

Identifying racially charged terms poses a significant semantic challenge, as terms like "white" or "black" can ambiguously refer to colors for describing objects or to racial categories. To illustrate this, Table B.3 shows the classification of examples of true positive and false positive occurrences of these terms when they are used in job postings.

We address this in a systematic approach that that starts with a string search to detect potential racial terms in the job ads. The full list of terms looked up on this search is provided in Online Appendix Table A.1. We classify terms as "white" to indicate individuals of European and North American descent and "black" to refer to individuals of African descent. This initial term search accounts for variations in capitalization and non-alphabetic symbols introduced by OCR errors. To refine the classification and distinguish between racial and non-racial uses of these terms, we examine the content surrounding each occurrence. We define a local window of text that includes the terms immediately preceding and following the candidate racial term. These neighboring terms are then categorized based on their grammatical and semantic roles.

[5]The lists were compiled per state and show military personnel in alphabetical order, including each casualty soldier that was killed, died, or remained missing from May 27, 1941, to January 31, 1946 according to NARA.

For example, terms such as *mechanic, packers, porter* (occupations), *Canadian* (nationalities), or *young, experienced* (personal descriptors), are flagged as likely referring to racial categories. Focusing on these contextual terms ensures that candidate terms like "white" and "black" are accurately identified as racial descriptors, minimizing false positives.

3.3 Descriptive Statistics and Data Validation

Our job posting dataset contains 16.8 million listings of thirteen historical newspapers that include nationally circulating, sub-nationally circulating, and historically black newspapers. Appendix Table B.2 reports the summary statistics of the sample of job postings, where columns 3 to 5 show the percentage of postings, per newspaper, containing explicit racial terms and information on address and zip code.

Appendix Figure B.2 compares the the occupation shares in the job postings dataset with those in the employed population aged 14 to 65 years old, according to the Decennial Census from 1910 to 1960. We define the occupations at the two-digit SOC level and report these shares by decade. Consistent with prior research, Administrative Support and Sales positions are overrepresented in newspaper job postings, while Production, Transportation and Construction jobs are reported more often among workers according to census data. Overall, the breakdown by occupation is consistent with the decade-to-decade shift in the distribution of the workforce across occupations. On average, the correlation between the occupational shares in job postings and census data is 63 percent per decade. Appendix Figure B.3 shows further validation using the four-digit SOC code.

For our analysis, we construct two samples with the job listings summarized in Columns 5 and 7 of Table B.2. The first is the full sample which includes all job postings that have a valid SOC code. We use this sample to characterize trends in the presence of prejudice in job recruitment, as discussed in Section 4. The second sample, our estimation sample, is restricted to job listings that provide both occupation and geographical zip code information. This allows us to identify the counties where the advertised jobs are located. We utilize this sample to conduct the analyses in Section 5 of our study.

4 Racial Preferences in Recruitment, 1900-1970

Figure 1 shows an annual time series of the shares of job postings that explicitly specify racial preferences. This series primarily reflect employers' preferences for certain racial groups although, in the case of Black workers, some postings may represent exclusion rather than preference. Consequently, we interpret these trends as indicative of employers' recruitment requirements in labor demand for for Black and White workers. Throughout the observed period, the explicit preference for White workers exceeds that for Black workers. This patterns suggest that employer's standards were less about outright barring black applicants, and more about discouraging their applications by explicitly stating a preference for White candidates.

The first two decades exhibit the highest preference levels for White workers, followed by notable declines in 1915, 1934, and at the end of World War II in 1945. After these periods, the prevalence of racial preference for White workers fell substantially and stabilized at lower levels. The share representing racial preferences for Black workers shows a sharp decline around 1916-1917, coinciding with the U.S.'s entry into World War I , and another significant drop at the end of World War II. [6]

Figure 2 shows the racial gap in job postings shares for the nine occupation groups at the two-digit level that have higher representation in the census (see the remaining occupations in Appendix Figure B.4). We observe that the main trend across all occupations is a declining racial gap in the demand for workers, particularly after the second world war. We accompany this section's examination of the job ads with an analysis of their counterpart in terms of labor force participation as observed in the Decennial Census (see Appendix Figure B.5).

The occupational sectors from which Black workers were systematically excluded experienced substantial changes prior to WWI and WII. Business and Financial Operations, Office and Administrative Support Occupations, Production, and Sales and Related Occupations were sectors steadily excluding Black workers during the first half of the 1900s. The disparity between White and Black applicants in Business and Financial was most pronounced in 1930 but narrowed to 4 percentage points in the 1940s and 3 percentage points in the 1960s. Office and Administrative Support and Production occupations also experienced a dramatic decline in hiring preferences, with the most drastic closing of the gap in job postings in Personal Care

[6] We conducted a structural change analysis that detected significant breakpoints in 1909, 1919, 1934, 1945, and 1958 for the series pertaining racial preferences for Black workers. These breakpoints align with major historical events, such as pre- (1934) and post-World-War-II years (1945) and civil rights movements beginning around 1958.

and Service Occupations. Moreover, our results suggest that the need for candidates of a specific race is most prevalent in job advertisements for jobs in the Food Preparation and Serving groups, where White workers are in greater demand relative to Black workers in the 1930s. During 1900–1920, there was a greater relative preference for Black workers in this occupational group, but this preference reverted to favoring White workers in the 1930s and 1940s.

Occupations that were related to war-time effort such as Production and Transportation and Material Movingshowed a declining trajectory of racial prejudice. Production was the sector that absorbed most of the Black civilian workforce during the war era, most likely due to in-migration into cities from farming jobs. Specially in Transportation and Material Moving, the White-Black labor force ratio declined sharply after the war (see Appendix Figure B.5), which is consistent with the decline in explicit racial prejudice communicated in recruiting. In Farming occupations, which experienced the largest decline in the Black civilian workforce during the war (Bureau of Labor Statistics, 1945), the racial gap in explicit references for race remained relatively stable at less than 5 percent after the war. Two sectors where the participation of Black working men improved substantially after the war – starting from a participation share of less than two percent in 1940 (Bureau of Labor Statistics, 1945) – were clerical and sales jobs. As shown in Appendix Figure B.5, there was a large decrease in the relative White-Black labor force participation in Office and Administrative Support occupations, consistent with the decline in racial references in recruiting after the war. A similar pattern is seen in Sales and Related occupations. The racial preferences in Personal Care Services remained relatively high even after the war, with the gap in racial preferences widening in favor of white workers – although during the war period, employment among men and specially Black women increased considerable in this sector. Similarly, the racial gap in Food Preparation and Serving occupations remained open after the war and the relative labor force participation of White-Black workers did not drop as much as for Personal Services.

5 Effects of World War II Mobilization on Local Labor Markets

5.1 Identification

Our empirical strategy examines how war-induced labor mobilization affected racial preferences in hiring across local labor markets. We measure exposure to White soldiers casualties by constructing occupation-county specific casualty rates that leverage granular information on

pre-war civilian occupations from WWII Casualty and Enlistment Records. This approach permits a refined mapping between military service and specific local labor markets that has been unutilized in previous work. The unit of analysis is the local labor market, defined at the occupation-county level, which allows us to control for occupation-specific and geographic unobservable when estimating responses to labor supply shocks.

Our identification strategy relies on spatial and timing variation in White soldier casualties affecting local labor markets, that we argue is unrelated to pre-war trends in racial hiring preferences. Specifically, our research design exploits the quasi-random variation in casualty rates experienced by White soldiers, who were more likely to serve in combat positions during WWII (Frymer, 2004). This contrasts with Black soldiers, who experienced differentially lower enlistment and casualty rates due to existing segregation in the military and relegation to non-combat positions (Delmont, 2022; Ferrara, 2022). Figure 4 illustrates the geographic variation in White soldiers' casualties across labor markets during the war, with higher casualty rates evident in the South (Mississippi, Alabama, Georgia), Central Midwest (Missouri, Arkansas), and Northeast (parts of Pennsylvania and New York). This variation provides a unique natural experiment to identify how significant declines in the labor supply of White men, while keeping labor demand largely unaffected, causally influenced racial prejudice in recruitment practices.

5.2 Market-Level Prevalence of Prejudice in Recruitment

Our empirical strategy allows us to measure the long-term effects of wartime casualties on racial preferences expressed in job postings, focusing on advertisements indicating predilection for White candidates. Using an event study approach, we estimate the dynamic effects of White soldier casualties during World War II on the share of job postings with White racial preferences across various occupation-county cells:

$$Y_{m,t} = \sum_{k=0,k\neq -1}^{41} \delta_k \cdot z_{m,t-k} + \delta_{-1} \cdot z_{m,t+1} + \alpha_g(m) + \alpha_t + \epsilon_{m,t} \tag{1}$$

The outcome variable $Y_{m,t}$ represents the proportion of job postings stating racial preferences for White candidates in each local labor market (occupation-county cell) m in year t. The treatment indicator $z_{m,t-k}$ is activated if the specified lag k corresponds to the year since the initial impact of the casualties, with δ_k measuring the effect at each event time k. The estimates capture how racial preferences in job postings evolve over time, before and after the casualty

events across 26,490 local labor markets for the period of analysis is 1930 to 1960.[7]

Figure 5 presents the event study results, showing a discernible and stable decline in White racial preferences following exposure to White soldier casualties. The pre-treatment period displays relatively stable levels of racial preference postings, with no significant deviations from zero, confirming the absence of pre-existing trends which we formally reject following the methods proposed by Callaway and Sant'Anna (2021). In the post-treatment period, there is a clear shift, with treatment effect estimates consistently below zero across multiple periods, indicating a persistent decline in employers' propensity to express White racial preferences. Local labor markets impacted by casualties of White soldiers experienced a reduction of 2.7 percentage points in the likelihood of job postings exhibiting explicit racial preferences.

To test the robustness of our findings, we estimate an alternative specification presented in Figure B.6, which measures treatment intensity as the ratio of white casualties to total casualties rather than to white enlistments. This approach tests whether the observed decline in discriminatory job postings reflects white-specific labor supply constraints or broader wartime disruption effects. The persistence of negative and statistically significant effects under this alternative measurement demonstrates robustness to different parameterizations of the treatment variable. While the pre-treatment coefficients exhibit somewhat greater volatility than in our primary specification, the consistent post-treatment pattern reinforces our interpretation that employers' racial preferences responded specifically to white labor scarcity rather than to aggregate casualty rates.

Table 4 extends our event study analysis with difference-in-differences estimates of WWII white soldier casualty effects on racial discrimination in job advertisements. Our empirical approach employs two complementary specifications to ensure robustness across different levels of analysis. First, we implement a market-level analysis (columns 1-3) that examines the aggregate share of discriminatory job postings within each local labor market over time. This specification identifies the effect by comparing changes in discriminatory posting rates across markets with different casualty exposure intensities before and after December 1941. Second, we estimate a job-level specification (columns 4-6) that utilizes individual job advertisement observations, allowing us to incorporate posting-specific characteristics while still exploiting the exogenous variation in local labor market casualty rates. Both specifications include local labor market

[7]The starting year selected to exclude from the analysis the impacts of the large unemployment rates and labor market dynamics attributed to the Great Depression.

fixed effects to account for time-invariant factors that might correlate with both casualties and discriminatory practices, as well as time fixed effects to absorb common temporal trends. The extensive set of controls and fixed effects ensures that our estimates capture the causal effect of white casualty-induced labor shortages on discriminatory hiring practices rather than other confounding factors.

The results in Table 4 consistently show that white soldier casualties led to a significant reduction in racial preferences for white workers. At the aggregated labor market level (columns 1-3), we find that a one standard deviation increase in white casualties led to a 1.2-1.3 percentage point decline in the share of job advertisements expressing preferences for white workers. Similarly, at the individual advertisement level (columns 4-6), we observe a 1.1-1.6 percentage point reduction in the probability that a job posting would express preference for white workers. These effects remain robust to the inclusion of newspaper controls and task content controls.

The overall pattern underscores how wartime labor shortages induced by White soldier casualties created economic pressures that weakened employers' ability to maintain discriminatory preferences. The persistence of these effects across multiple specifications, geographic regions, and measurement approaches strengthens our causal interpretation that economic incentives—specifically, the increased costs of maintaining discriminatory preferences in the face of labor supply constraints—played a significant role in reducing explicit racial discrimination in job advertisements during the post-war period.

6 Conclusions

We examine the dynamics of employer racial prejudice in U.S. labor markets from 1900 to 1970 by constructing a novel dataset of 16.8 million job postings from historical newspapers. Our analysis employs a research design that exploits the exogenous variation in WWII military casualties among White soldiers across local labor markets to examine how market forces affected discriminatory recruitment practices. We hypothesize that wartime declines in White labor supply reduced employers' ability to maintain racial preferences in hiring. Our identification strategy leverages quasi-random variation in White soldier casualties (1940-1945), focusing on the geographic and occupational distribution of these labor market shocks across 29,290 occupation-county cells. Using an event study approach spanning 1930-1960, we find that local labor markets impacted by White soldier casualties experienced a statistically significant re-

duction of 2.7 percentage points in the share of job postings exhibiting explicit preferences for White workers, with effects persisting for at least 15 years post-war. Difference-in-differences estimates further corroborate these findings, showing that a one standard deviation increase in the casualties-to-enlistment ratio led to a 1.2-1.3 percentage point decline in discriminatory job advertisements at the labor market level, representing approximately a 10 percent reduction relative to the pre-treatment mean of 12.5 percent. These treatment effects remain robust to alternative specifications, including measuring casualties relative to total casualties rather than White enlistments. Our findings demonstrate how wartime labor shortages created economic pressures that meaningfully reduced employers' expression of racial preferences, highlighting a mechanism through which market forces can mitigate racial bias in hiring practices even in the absence of anti-discrimination legislation, which was only implemented decades later with the Civil Rights Act of 1964.

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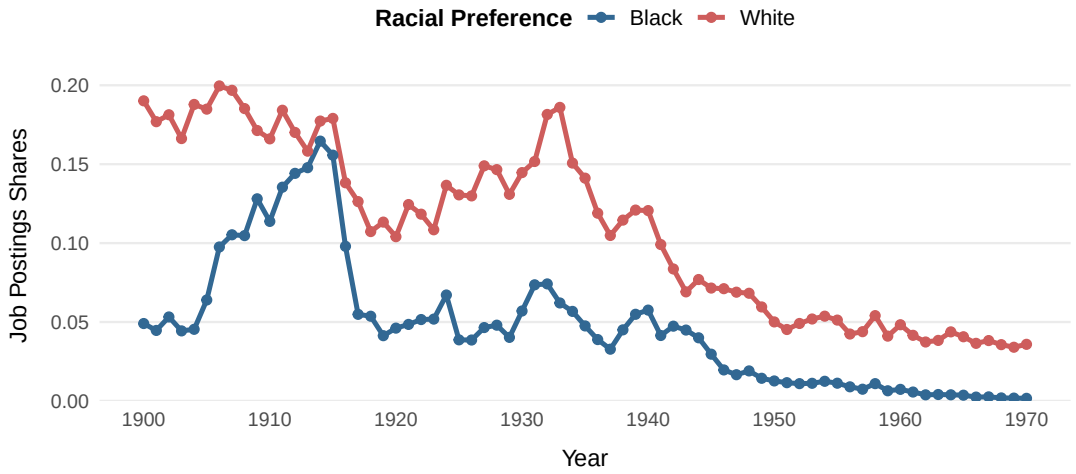
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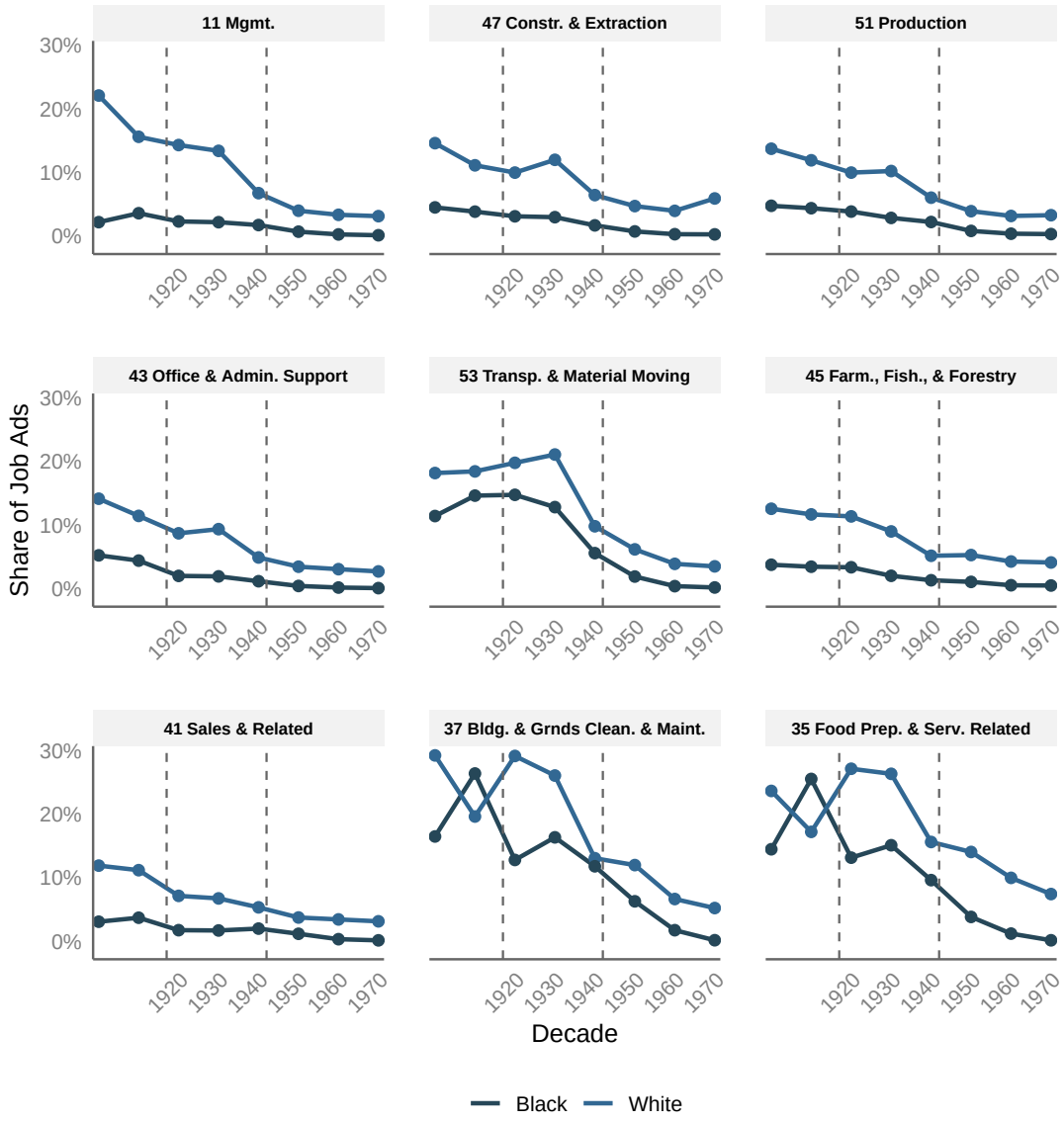
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Figure 1: Share of Job Postings With Racial Preferences by Occupation



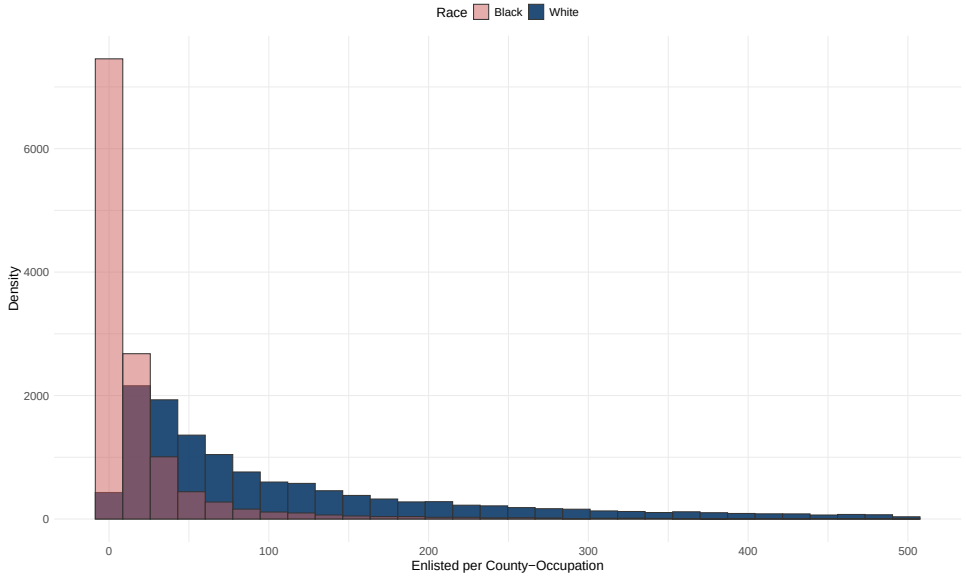
Notes: The graph depicts the proportion of job postings that include racial preference as a percentage of the total number of job postings per year. "African," "colored," "black," and "negro" are the terms used as racial identifiers for the category "black." "American," "Belgian," "British," "Canadian," "Caucasian," "Danish," "English," "European," "French," "German," "Irish," "Italian," "Polish," "Russian," "Scottish," "Spanish," and "Swedish" are the words used to identify racial preferences for the category "white." Using regex patterns that include lowercase singular and plural forms of the listed terms, these terms are recognized in the content of job advertisements.

Figure 2: Racial Gap in Job Postings with Racial Preferences by Occupation

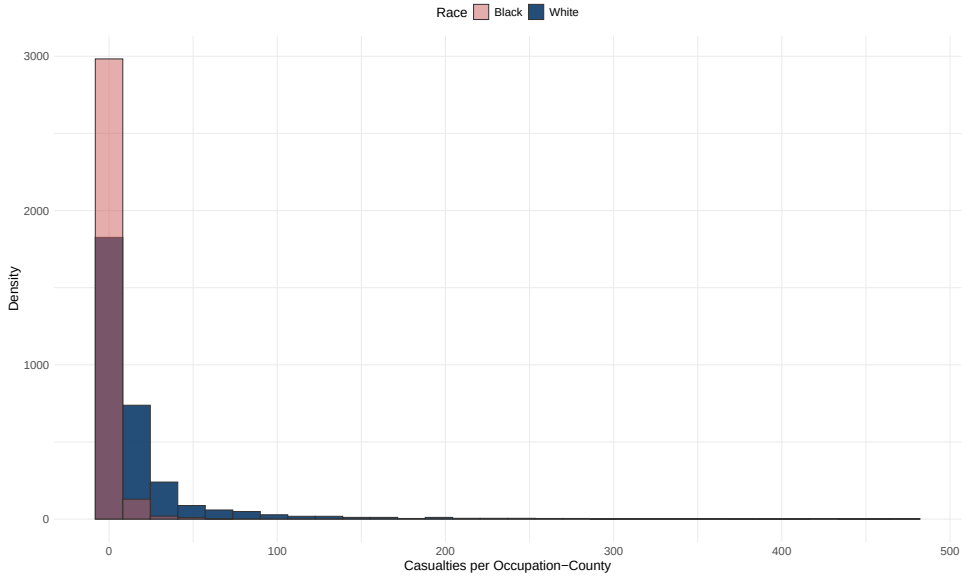


Notes: The graph displays the proportion of job postings within each occupational category (categorized by two-digit SOC codes) that specify a racial preference. The graphs are ordered by the occupations with the highest participation rates in job postings, with occupations appearing first if they have a greater share of total job postings. The remaining occupational groups are shown in Appendix Figure B.4.

Figure 3: Distribution of Casualties and Enlisted Soldiers across Local Labor Markets, 1940



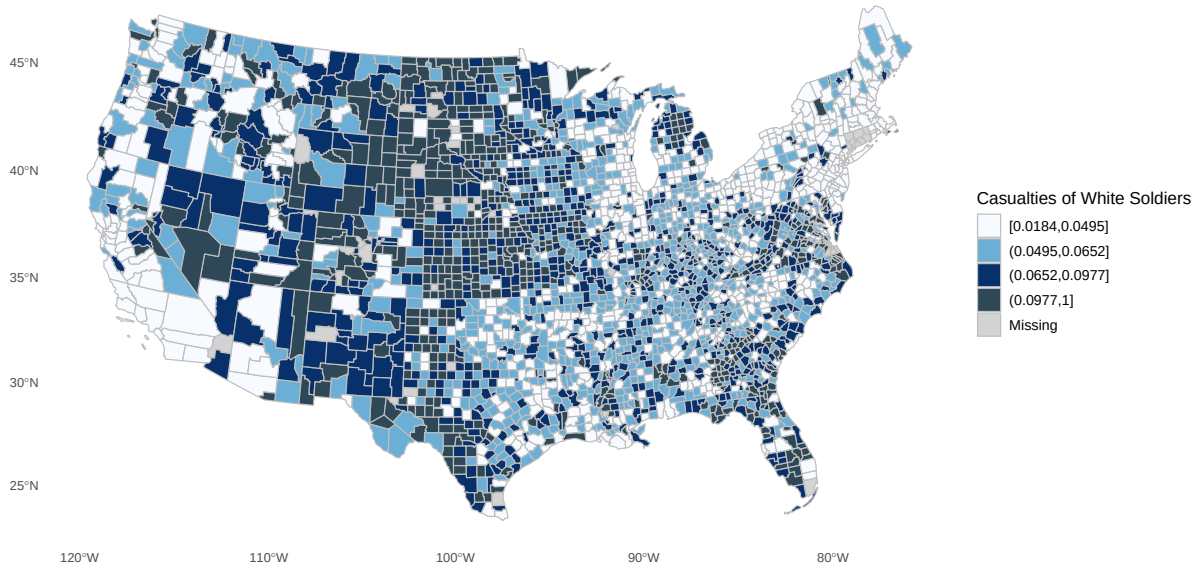
(a) Enlistments



(b) Casualties

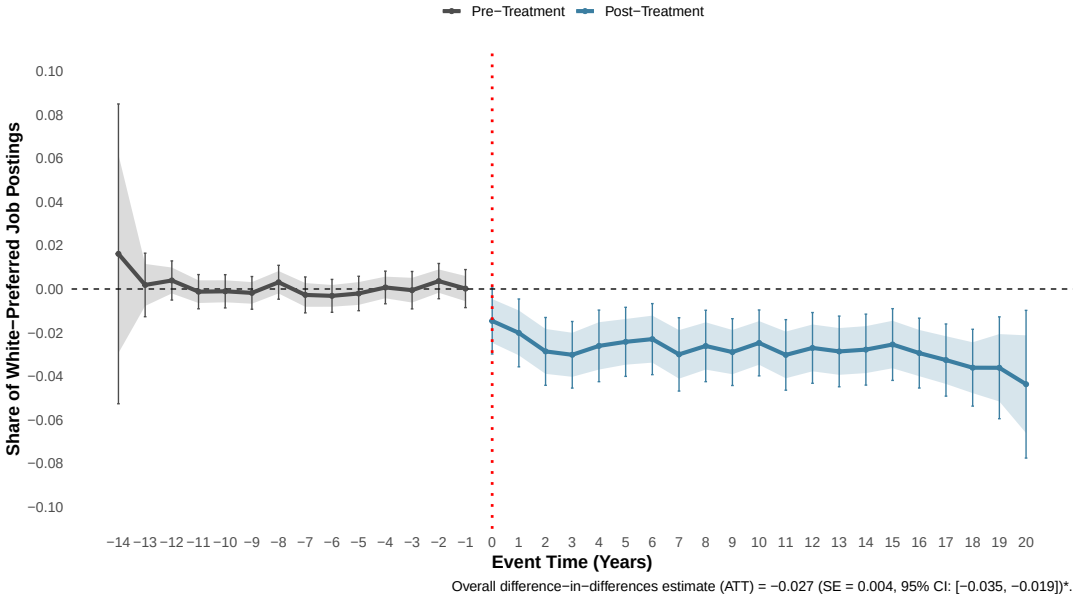
Notes: The figure shows the distribution of enlistments and casualties across local labor markets, stratified by racial group and calculated for 1940. Panel (a) shows the number of enlistments by county-occupation pair, while panel (b) shows the corresponding casualties.

Figure 4: Geographic Variation in WWII Casualty Rates Among White Soldiers



Notes: The map displays the average proportion of WWII casualties among White soldiers by occupational category within U.S. counties, calculated as $\sum_g C_{g,l}/|G(c)|$, where g represents occupational groups, and c represents counties. The term $G(c)$ denotes the number of occupational groups in a given country c. Data is missing for some areas, as indicated in gray. Analysis excludes soldiers of other racial groups and non-military casualties.

Figure 5: Event Study of WWII White Casualties on Racial Preference in Job Advertisements



Notes. This figure displays event study estimates of the group-time average treatment effects (ATT) on discriminatory hiring practices. The outcome variable is the share of job postings in a local labor market expressing preference for white workers. Treatment intensity is measured by the ratio of white WWII casualties to white enlistments at the local labor market level. Estimation follows Callaway and Sant'Anna (2021), accommodating continuous treatment intensity and staggered adoption. The parallel trends hypothesis cannot be rejected (p=0.138). The average treatment effect is -0.027 (SE=0.004, 95% CI: [-0.035, -0.019]) across 29,290 local labor markets. The specification includes controls for newspaper characteristics and incorporates time and local labor market fixed effects. Standard errors are clustered at the local labor market level.

Table 1: Descriptive Statistics for the Sample of WWII Enlistment Records, 1940–1945

	All Enlisted		Draftees		Casualties	
	Mean (1)	Std. Dev. (2)	Mean (3)	Std. Dev. (4)	Mean (5)	Std. Dev. (6)
A. Demographics						
Men	0.98	0.13	1.00	0.00	1.00	0.03
Women	0.02	0.13	0.00	0.00	0.00	0.03
White	0.89	0.32	0.87	0.33	0.92	0.28
Black	0.09	0.28	0.10	0.30	0.06	0.24
ANHPI	0.01	0.08	0.01	0.08	0.01	0.09
Latino	0.01	0.07	0.01	0.07	0.00	0.02
Missing	0.01	0.10	0.01	0.08	0.01	0.08
B. Education						
Some High School or Less	0.59	0.49	0.64	0.48	0.63	0.48
High School Graduate	0.27	0.44	0.24	0.43	0.27	0.45
Some College	0.10	0.30	0.08	0.27	0.07	0.26
College Graduate	0.04	0.20	0.04	0.19	0.02	0.13
C. Enlistment Year						
1940	0.04	0.19	0.00	0.05	0.05	0.22
1941	0.14	0.35	0.13	0.33	0.17	0.38
1942	0.44	0.50	0.43	0.50	0.42	0.49
1943	0.21	0.41	0.26	0.44	0.24	0.43
1944	0.09	0.29	0.11	0.31	0.10	0.29
1945	0.08	0.27	0.07	0.25	0.02	0.13
D. Occupations						
Production	0.24	0.42	0.24	0.43	0.25	0.43
Farming, Fishing, Forestry	0.14	0.34	0.15	0.36	0.17	0.38
Transportation and Material Moving	0.13	0.34	0.15	0.35	0.14	0.35
Office and Admin Support	0.10	0.31	0.09	0.29	0.09	0.29
Construction and Extraction	0.10	0.30	0.11	0.31	0.11	0.31
Sales	0.06	0.23	0.06	0.23	0.05	0.22
Installation and Repair	0.05	0.22	0.04	0.21	0.05	0.21
Food Preparation and Serving	0.03	0.17	0.03	0.18	0.03	0.17
Arts, Design, Media	0.03	0.16	0.02	0.12	0.03	0.16
Management	0.03	0.16	0.03	0.17	0.02	0.13
Observations	6,858,598		5,193,823		199,778	

Notes: This table shows summary statistics of the estimation sample of enlisted World War II soldiers and casualties from 1940-1945. Occupations accounting for less than two percent of soldiers' occupational share are not reported in the table.

Table 2: County Average Labor, Employment, and Military Service Participation Among Men by Demographic Group, 1940

	Labor Force (1)	Employment (2)	Enlistment (3)	Draftee (4)	Casualty (5)
A. Everyone					
Everyone 18-65	0.90	0.84	0.14	0.11	0.00
	(0.04)	(0.06)	(0.26)	(0.22)	(0.01)
Young 18-20	0.72	0.61	0.36	0.25	0.01
	(0.08)	(0.11)	(0.44)	(0.32)	(0.02)
Young adult 21-35	0.93	0.87	0.24	0.19	0.01
	(0.05)	(0.06)	(0.49)	(0.42)	(0.01)
Adult 36-45	0.94	0.90	0.04	0.04	0.00
	(0.05)	(0.06)	(0.09)	(0.09)	(0.00)
Senior 46-65	0.89	0.84	0.00	0.00	0.00
	(0.05)	(0.06)	(0.00)	(0.00)	(0.00)
B. White					
Everyone 18-65	0.81	0.75	0.12	0.09	0.00
	(0.16)	(0.14)	(0.20)	(0.16)	(0.01)
Young 18-20	0.63	0.53	0.32	0.22	0.01
	(0.15)	(0.13)	(0.36)	(0.24)	(0.02)
Young adult 21-35	0.83	0.77	0.21	0.16	0.01
	(0.17)	(0.15)	(0.38)	(0.32)	(0.01)
Adult 36-45	0.85	0.81	0.04	0.03	0.00
	(0.16)	(0.15)	(0.07)	(0.07)	(0.00)
Senior 46-65	0.80	0.76	0.00	0.00	0.00
	(0.15)	(0.14)	(0.00)	(0.00)	(0.00)
C. Black					
Everyone 18-65	0.09	0.09	0.01	0.01	0.00
	(0.15)	(0.15)	(0.06)	(0.06)	(0.00)
Young 18-20	0.09	0.08	0.03	0.03	0.00
	(0.15)	(0.14)	(0.12)	(0.10)	(0.00)
Young adult 21-35	0.09	0.09	0.02	0.02	0.00
	(0.16)	(0.16)	(0.12)	(0.12)	(0.00)
Adult 36-45	0.09	0.09	0.00	0.00	0.00
	(0.15)	(0.15)	(0.02)	(0.02)	(0.00)
Senior 46-65	0.08	0.08	0.00	0.00	0.00
	(0.14)	(0.14)	(0.00)	(0.00)	(0.00)

Notes: This table reports the average proportions of men residing in a county in 1940 that were part of any of the groups indicated in the column headers in the table. The proportions reported were calculated as an average across all counties using the full-count Decennial Census from 1940. Standard deviations of these shares are presented in brackets.

Table 3: Effects of Casualties and Enlistment on Employed Population

(a) White Population

	Everyone 18-65 (1)	Young 18-20 (2)	Young adult 21-35 (3)	Adult 36-45 (4)	Senior 45-65 (5)
White Casualties	-0.155**	0.061	-0.155*	-0.119	-0.176***
	(0.069)	(0.091)	(0.082)	(0.079)	(0.066)
White Enlisted	0.196***	0.033	0.25***	0.2***	0.191***
	(0.072)	(0.1)	(0.089)	(0.076)	(0.074)
1940 Lagged Outcome	0.000***	0.004***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
1940 Urban population, proportion	0.013***	0.026***	0.022***	0.012***	0.004
	(0.003)	(0.005)	(0.004)	(0.004)	(0.003)
1940 Education years, average	0.009*	0.01	0.015***	0.011**	0.002
	(0.005)	(0.008)	(0.006)	(0.004)	(0.005)
1940 Female Labor Force	-0.042*	0.049**	-0.096***	-0.027	0.029*
	(0.025)	(0.021)	(0.034)	(0.019)	(0.016)
Mean Outcome	0.000	0.000	0.000	0.000	0.000
Ad. R-Squared	0.963	0.929	0.945	0.956	0.967
Observations	21,876	21,876	21,876	21,876	21,876

Notes: This table estimates the effects of military casualties and enlistment rates of White male soldiers on the number of working age White population in a local labor market (county-occupation), segmented by age group. In the estimation equation, $L_{glt} = \beta_1 \text{WhiteCasualties}_{gl} + \beta_2 \text{WhiteEnlisted}_{gl} + \beta_3 L_{gl,t-1} + \beta_4 \text{UrbanPop}_{gl,1940} + \beta_5 \text{EducYears}_{gl,1940} + \beta_6 \text{FemaleLaborForce}_{gl,1940} + \alpha_g + \alpha_s + \varepsilon_{glt}$, the outcome variable, variable of interest and controls have been standardized to have mean 0 and standard deviation 1. The regressions control for the lagged outcome in 1940, military casualties of black soldiers in levels, and 1940 values of female labor force, average education years, the proportion of urban population and state and occupation fixed effects. Robust standard errors are in parentheses, with significance indicated by $*$ p $<$ 0.1, $**$ p $<$ 0.05, and $***$ p $<$ 0.01.

(b) Black Population

	Everyone 18-65 (1)	Young 18-20 (2)	Young adult 21-35 (3)	Adult 36-45 (4)	Senior 45-65 (5)
White Casualties	0.095	0.123	0.177	0.008	0.06
	(0.166)	(0.133)	(0.202)	(0.149)	(0.148)
White Enlisted	0.083	-0.014	0.062	0.152	0.044
	(0.15)	(0.123)	(0.181)	(0.139)	(0.133)
1940 Lagged Outcome	0.002***	0.027***	0.004***	0.006***	0.006***
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
1940 Urban population, proportion	-0.02***	-0.006	-0.031***	-0.009	-0.004
	(0.007)	(0.008)	(0.009)	(0.007)	(0.007)
1940 Education years, average	0.095***	0.088***	0.118***	0.045***	0.074***
	(0.015)	(0.022)	(0.019)	(0.01)	(0.013)
1940 Female Labor Force	0.079**	0.092**	0.085*	0.045	0.089***
	(0.036)	(0.036)	(0.043)	(0.038)	(0.034)
Mean Outcome	0.000	0.000	0.000	0.000	0.000
Ad. R-Squared	0.874	0.792	0.822	0.885	0.883
Observations	21,876	21,876	21,876	21,876	21,876

Notes: This table estimates the effects of military casualties and enlistment rates of White male soldiers on the number of working age Black population in a local labor market (county-occupation), segmented by age group. In the estimation equation, $L_{glt} = \beta_1 \text{WhiteCasualties}_{gl} + \beta_2 \text{WhiteEnlisted}_{gl} + \beta_3 L_{gl,t-1} + \beta_4 \text{UrbanPop}_{gl,1940} + \beta_5 \text{EducYears}_{gl,1940} + \beta_6 \text{FemaleLaborForce}_{gl,1940} + \alpha_g + \alpha_s + \varepsilon_{glt}$, the outcome variable, variable of interest and controls have been standardized to have mean 0 and standard deviation 1. The regressions control for the lagged outcome in 1940, military casualties of black soldiers in levels, and 1940 values of female labor force, average education years, the proportion of urban population and state and occupation fixed effects. Robust standard errors are in parentheses, with significance indicated by $*$ p $<$ 0.1, $**$ p $<$ 0.05, and $***$ p $<$ 0.01.

Table 4: Effects of White Soldier Casualties on Racial Preferences for White Workers

	Aggregated Labor Market Level			Individual Job Advertisement Level		
	(1)	(2)	(3)	(4)	(5)	(6)
$WhiteCasualty_{cj} \cdot Post_{j(t)}$	-0.013***	-0.012***	-0.012***	-0.016***	-0.014***	-0.011**
	(0.003)	(0.003)	(0.003)	(0.006)	(0.005)	(0.005)
$Post_{j(t)}$				-0.004	-0.003	-0.006
				(0.007)	(0.007)	(0.007)
Local Market, Year FE	×	×	×	×	×	×
Newspaper controls		×	×		×	×
Tasks contents controls			×			×
Pre-treatment Mean	0.125	0.125	0.125	0.146	0.146	0.146
Adj. R-squared	0.073	0.073	0.073	0.035	0.050	0.052
Observations	149,633	149,633	149,633	1,360,259	1,360,259	1,360,259

Notes: This table reports difference-in-differences estimates of WWII white soldier casualty effects on racial discrimination in job advertisements using two complementary approaches. In columns 1-3, we estimate local labor market-level effects:

$$S_{mt} = \beta_1(C_m \times \text{Post}_t) + \beta_2 C_m + \beta_3 \text{Post}_t + X'_{mt}\gamma + \mu_m + \lambda_t + \epsilon_{mt} \tag{2}$$

where S_{mt} represents the share of job postings expressing white racial preferences in local labor market m (county-occupation pair) in year t. In columns 4-6, we estimate advertisement-level effects:

$$D_{jmt} = \alpha_1(C_{m(j)} \times \text{Post}_t) + \alpha_2 C_{m(j)} + \alpha_3 \text{Post}_t + Z'_{jmt}\delta + \mu_{m(j)} + \lambda_t + \nu_{jmt} \tag{3}$$

where D_{jmt} is a binary indicator for whether individual job posting j in local labor market m at time t expresses preference for white workers. In both specifications, C_m is the standardized measure of pre-war white soldier casualties and Post_t indicates post-December 1941. All specifications include labor market fixed effects (μ_m) and year fixed effects (λ_t). Columns 2-3 and 5-6 add task content controls (proportions of analytic, interactive, manual, and combined tasks); columns 3 and 6 further add newspaper circulation controls. Market-level analysis spans 1920-1960 while advertisement-level analysis covers 1930-1960. Robust standard errors clustered by local labor market in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Online Appendix

A Data Appendix

A.1 Processing Unstructured Newspaper Pages into Delimited Job Postings

We begin by processing the raw text data from newspapers for detecting which text corresponds to classifieds pages. We preprocess the raw textual data at the level of the newspaper-page, using regular expressions that recognize deterministically the following fields: page title, publication date, publication title, publisher city and publication identifiers. We filter the pages that according to the metadata of ProQuest are of the types "*Display Ad*" or "*Classified Ad*" as any type of advertisement and job posting only appears in these two types of pages.[8]

In the classifieds page, numerous listings are unrelated to job postings. To isolate the relevant content, we apply a topic filtering routine to each page, targeting contents that are job-related. The objective is to discard all text that cover non-job-related topics, such as sales, services, and other types of classified advertisements.

Structuring into Classified Ad. We recognize individual job posting by delimiting the start and end of a posting, using recognized job titles and common closure phrases cited in Atalay et al. (2020). This process involves detecting capitalization patterns and terms that typically conclude advertisements, such as addresses noted by zip codes and address markers such as *ave*, *blvd*, *hgwy*, *street*, *road* o *drive*. [9] The result is a candidate job posting text sequence, which contains a newspaper name, page type, publication date, page number, ad title, and the text content, in addition to the metadata on the page number, identifiers and newspaper title.

Topic Modeling for Filtering Classifieds that are Job Postings. We use topic modeling to identify the classified ads in a content page, that correspond to job postings. Our task of filtering job-related ads from non-job-related ads is formalized as an unsupervised machine learning problem, involving the discovery of latent topics and the subsequent classification of job ads to these *topics* based on their contents. Intuitively, a topic can be understood as a set of words that collectively suggest a shared theme.

To identity job related content in the job postings, we implement two alternative methods for topic detection. First, we use Latent Dirichlet allocation (LDA) for discovering K topics, where each topic aligning with the contents of the words in the text is modeled as a probability, t_k, over contents. The number of topics, K, is treated as a hyper parameter and selected based on log-perplexity, which serves as a measure of goodness of fit for topic coherence.[10] Once the hyper parameter, K is identified for each classified page, we estimate the probability that each classified page is job-related by examining the distribution, t_{K^*}.

[8] Using the textual data from these pages, we perform a word-by-word pre-processing in the remaining pages by separating punctuation, removing non-grammatical characters, and correcting words based on their frequency occurrence across all pages.

[9] Common end phrases include *in confidence* , *submit resume*, *equal opportunity*, *for further information contact*, and *affirmative employer*.

[10] For choosing K, we also inspect the highest-scored words by topic to examine the topics discovered across the classified pages containing multiple types of job ads. We choose the number of topics that is the minimum after which the log perplexity does not improve substantially. Alternatively, Atalay et al. (2020) selects K by identifying the point where increasing K splits a single job-related topic into multiple, overly specific job-related topics. This approach aims to recover the minimum job-ad-related topics ads that are grouped cohesively.

The preparatory steps for implementing the LDA strategy are summarized as follows:

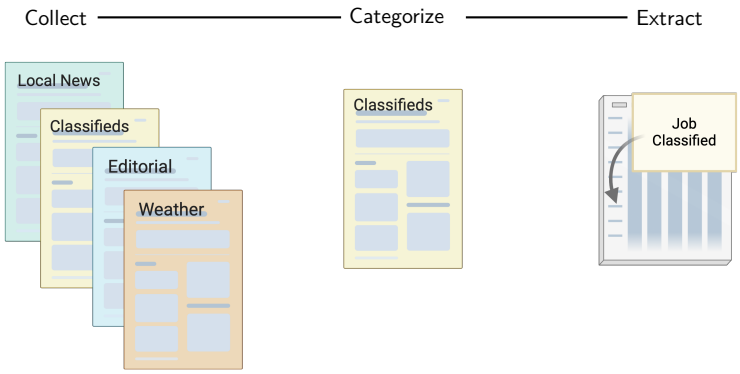
1. Cleaning: text is converted to lowercase, punctuation is removed, and words not commonly found in standard English dictionaries are excluded.

2. NLP Pre-processing: tokenization, stop-word filtering, and stemming are applied.

3. Vectorization: text is converted a bag-of-words representation using Python's *gensim* *doc2bow* functionality.

After pre-processing, we use *gensim*'s LDA to generate models with 2 to 18 topics. We evaluate each model using log-perplexity and topic coherence from a held-out set, selecting the optimal number of topics, K^*, as the point after the log-perplexity improvements stabilize. Using the topic distribution probability mass, t_k, we apply three heuristics to identify candidate job postings: (1) we retain job ads with a non-zero probability mass on the identified job-related topics; (2) retain the job ads with probability mass greater or equal than the mean (across all topics); and (3) retain job ads with the greatest probability mass on job topics. For analysis, we adopt the first heuristic and structure the data by decade.

Figure A.1: NLP Transformation of Newspaper Content into Structured Job Advertisements



Notes. This schematic representation summarizes the text preprocessing, classification of newspaper pages, and job classifieds extraction using computational linguistics and language natural processing techniques. We parse page titles and other metadata with high reliability, focusing exclusively on 'Display Ad' and 'Classified Ad' pages to filter relevant content efficiently.

A.1.1 Job Titles: Standard Occupational Classification (SOC)

We assign standard occupational classification (SOC) titles and codes to job titles found in job postings. We use a deterministic string-matching search approach to compare the words in job titles against the SOC list published by O*NET in 2010.[11] Additionally, we calculated the cosine-similarity between all terms included in the job title header and the full list of SOC occupations. Prior to this similarity procedure, we pre processed, cleaned the job titles using a stop-word removal, stemming, and vectorization for semantic comparison. The word vectorization that is necessary for calculating the distance measure of cosine similarity (CS) is

[11]The SOC classification used is available at https://www.onetcenter.org/dictionary/22.1/excel/.

performed using the package Word2Vec.[12] The highest similarity scores direct the assignment of SOC titles to job titles.

A.1.2 Racial Preferences

The terms employed in the string search to detect references to racial preferences for white or black workers in advertisements are listed below.

Table A.1: Classification of Terms by Racial Categories

Race Category	**Terms**
White	american, belgian, british, canadian, caucasian, danish, english, european, french, german, irish, italian, polish, russian, scottish, spanish, swedish, white
Black	african, afro, afric, africk, black, black, blk, colored, colour, negro, negroes

Notes: The table lists the terms used to classify the occurrence of racial categories in job postings. The string search based on these terms account for variation in spelling, common OCR misrecognitions of characters (for instance, "i" read as "1"), singular and plural forms, as well as differences in capitalization.

A.1.3 County Names: Geolocation Extraction and Validation

We identify and validate the job locations advertised in job postings using a two-step procedure. Initially, we use string-matching techniques on the raw text to compile a list of potential addresses. This process iterates over all words in the content of the job posting—excluding the header, which usually contains job titles— searching for terms associated with address markers such as "road", "street", or "avenue". If the search is successful and an address marker is found, the surrounding text is examined using a probabilistic model that assesses the likelihood of inclusion in an address. This is based on the typical sequence of address components: Unit Number, Street, City, State, and Zip Code.

With the potential addresses identified, we clean and refine these candidates using various heuristics. This procedure results in a list of all candidate addresses associated with each job posting. We then use a geolocalization verification service application programming interface (API) to verify these addresses against a comprehensive dataset of U.S. locations.[13] The service returns a list of fully structured addresses, ranked based on their reliability of the mapping between the provided candidate address and the output address. Each successfully verified address is included in the job posting dataset with geographical information that includes the postal code and county name, which are later used in our analysis.

[12] Word2Vec models learn high-dimensional vector representations of words to map similarly used words to approximate vectors. In our routine, we clean the job ad titles, combine the titles with the ad content, and train a continuous continuous-bag-of-words Word2Vec model on text from all newspapers to learn the word embeddings for our ads.

[13] Geoapify's geocoding API service is available at https://www.geoapify.com.

A.1.4 Job Skills

We generate binary variables that indicate the presence of specific skills: non-routine analytical, non-routine interactive, routine cognitive, routine manual, and non-routine manual. These classifications are based on a task-based framework as proposed by Spitz-Oener (2006). We conduct a mapping procedure between the job titles of the job postings and a list of terms included in Appendix Table A.2 using a cosine similarity and string matching techniques.

Table A.2: Classification of Skills by Cognitive and Manual Routines

Category	**Terms**
Non-routine Analytics	research, analyz, evalu, plan, design, sketch, devising rul, interpreting rul, budget, letter, styliz, implement, evalu, develop, plan, analys, architectur, instal, determin, freehand, sketcher, compil, deign, rsrch, devis, administ, research, modifi, mechan, desi, assess, correl, synthes, implement, valid, render, defin, sketchbook, conceptu, creat, valid, synthes, analys, render, resolv, monitor, review, design, interpret, rule, fetter, summar, research, recommend, monitor, collect, configur, analyz, identifi, identifi, compil, develop, assess, formul, layout, construct, investig, architect, prepar, formul, evalu, interpret, render, document, defin, mock, gather, recommend, evalu, pylon, summar, illustr, artist, determin, coordin, dylan, gather, airbrush, analyz, design, analysi, illustr, sketch, deploy, examin, design, resign
Non-routine Interactive	tise, legisl, assist, manag, lobbyist, educ, azov, articul, direct, propos, seil, develop, guy, vertislng, advertlslag, iobbi, structur, sale, facilit, execut, support, advtsg, administ, negoti, advt, lobbv, execut, explain, odv, inform, advtg, lobbyist, advertlsln, adv, brief, coordin, lobb, congression, advert, delight, seli, present, intergovernment, review, advis, communic, soil, advert, arrang, overse, public, grassroot, legisl, academ, leach, media, market, advertis, irrever, priorit, teeth, negoti, initi, supervis, nightlif, consult, prepar, present, inform, lobbi, coordin, organ, teach, sell, buy, advis, entertain, present, manag, negoti, lobbi, coordin, organ, sell, purchas, advis, advertis, entertain, present, present
Routine Cognitive	gaug, modif, measur, bkkpo, bkkp, isol, bookkpg, micromet, correct, payrol, measur, ajp, calcul, calip, correct, calcul, bkkpg, correct, blu, revis, dkkpg, bookkeep, adjust, reconcil, calcul, calcul, stenographi, bkkpng, bkkping, comput, resolv, cleric, bill, fix, calcul, measur, rectifi, beekeep, gaug, calcul, bookkeep, correct, measur, calcul, correct, measur
Routine Manual	quip, eqp, troll, instrument, minim, eouip, eaulp, equlp, ntrol, eguip, quid, equlo, eoulp, equtp, gulp, machin, apparatus, uip, equipag, eqpmt, control, steril, eauio, eqpt, engulf, equip, conhol, devic, ulp, control, eq, equlpt, instrument, equ, equio, oper, equlpmt, oper, machineri, epuip, oper, control, equip, oper, control, equip, equip
Non-routine Manual	accommod, inspect, calibr, accomod, overhaul, rebuild, serv, instal, restor, serv, instal, diagnos, reassembl, mechan, repair, overhaul, accommod, repair, renov, restor, accommod, repair, renov, restor, servic, accommod, accommod

Notes: The table lists the terms from Spitz-Oener (2006) used to categorize job tasks derived from job titles, according to the classification found in O*NET or SOC.

B Additional Tables and Figures

B.1 Tables

Table B.1: County Average Male Proportions of Labor, Employment and Military Service Participation By Demographic Groups, 1940

	Labor Force (1)	Employment (2)	Enlistment (3)	Draftee (4)	Casualty (5)
A. Everyone					
Everyone 18-65	0.90	0.84	0.14	0.11	0.00
	(0.04)	(0.06)	(0.26)	(0.22)	(0.01)
Young 18-20	0.72	0.61	0.36	0.25	0.01
	(0.08)	(0.11)	(0.44)	(0.32)	(0.02)
Young adult 21-35	0.93	0.87	0.24	0.19	0.01
	(0.05)	(0.06)	(0.49)	(0.42)	(0.01)
Adult 36-45	0.94	0.90	0.04	0.04	0.00
	(0.05)	(0.06)	(0.09)	(0.09)	(0.00)
Senior 46-65	0.89	0.84	0.00	0.00	0.00
	(0.05)	(0.06)	(0.00)	(0.00)	(0.00)
B. White					
Everyone 18-65	0.81	0.75	0.12	0.09	0.00
	(0.16)	(0.14)	(0.20)	(0.16)	(0.01)
Young 18-20	0.63	0.53	0.32	0.22	0.01
	(0.15)	(0.13)	(0.36)	(0.24)	(0.02)
Young adult 21-35	0.83	0.77	0.21	0.16	0.01
	(0.17)	(0.15)	(0.38)	(0.32)	(0.01)
Adult 36-45	0.85	0.81	0.04	0.03	0.00
	(0.16)	(0.15)	(0.07)	(0.07)	(0.00)
Senior 46-65	0.80	0.76	0.00	0.00	0.00
	(0.15)	(0.14)	(0.00)	(0.00)	(0.00)
C. Black					
Everyone 18-65	0.09	0.09	0.01	0.01	0.00
	(0.15)	(0.15)	(0.06)	(0.06)	(0.00)
Young 18-20	0.09	0.08	0.03	0.03	0.00
	(0.15)	(0.14)	(0.12)	(0.10)	(0.00)
Young adult 21-35	0.09	0.09	0.02	0.02	0.00
	(0.16)	(0.16)	(0.12)	(0.12)	(0.00)
Adult 36-45	0.09	0.09	0.00	0.00	0.00
	(0.15)	(0.15)	(0.02)	(0.02)	(0.00)
Senior 46-65	0.08	0.08	0.00	0.00	0.00
	(0.14)	(0.14)	(0.00)	(0.00)	(0.00)

Notes: This table reports the average proportions of individuals residing in a county in 1940 that were part of any of the groups indicated at the column headers of the table. The proportions reported were calculated as an average across all counties using the full-count Decennial Census from 1940. Standard deviations of these shares are presented in brackets.

Table B.2: Newspaper Job Postings Sample

	Sample period		Variables			Job Postings Sample	
	Start (1)	End (2)	Explicit Racial Terms (3)	Address (4)	Zip Code (5)	Percent (6)	Number (7)
A. National circulation newspapers							
Los Angeles Times	1900	1970	0.04	0.24	0.12	0.21	3,501,259
Chicago Tribune	1900	1970	0.06	0.24	0.17	0.21	3,484,354
The Washington Post	1900	1970	0.18	0.39	0.26	0.04	749,429
The New York Times	1900	1970	0.07	0.37	0.17	0.28	4,681,172
The Boston Globe	1900	1970	0.07	0.37	0.28	0.03	478,051
B. Non national newspapers							
Austin American-Statesman	1900	1970	0.14	0.16	0.10	0.01	173,443
The Baltimore Sun	1900	1970	0.12	0.35	0.22	0.12	2,093,305
Hartford Courant	1900	1970	0.05	0.36	0.30	0.03	519,306
The Atlanta Constitution	1900	1970	0.07	0.30	0.16	0.02	355,639
New-York Tribune	1900	1962	0.18	0.38	0.21	0.05	781,752
C. Historically Black newspapers							
Los Angeles Sentinel	1932	1970	0.09	0.29	0.20	0.00	14,395
Norfolk Journal and Guide	1916	1970	0.10	0.47	0.34	0.00	1,989
Atlanta Daily World	1932	1970	0.06	0.40	0.23	0.00	6,935
Total	1900	1970	0.08	0.31	0.18		16,841,029

Notes: This table provides descriptive statistics of job advertisements published in 13 newspapers from January 1900 to December 1970. The periods of available job postings are presented in columns 1 and 2. Columns 3 to 5 indicate the share of job postings containing geographical and explicit racial terms calculated over the number of ads on each newspaper. Columns 6 reports the share of job postings from each individual newspaper over the total sample. Column 7 indicates the overall number of job postings in the sample, which consists of advertisements that have been parsed, cleaned, and assigned occupation codes.

Table B.3: Examples of Job Postings With Racial References From the Boston Globe, 1920-1940

Publishing year	Content
A. Job ads with explicit racial references	
1925	"**Colored porter** temporary must clean and well mention age weight height references and wages expected globe office wanted"
1925	"Wanted female young **colored girl** desires position general plain **cook** references tel unirersity t w accommodators at once for laundry or housework agcy tel i sudt dtr aplcoimoi atos agency Arlington"
1925	"...desires work honest aod reliable **man-colored** needs as **butler** write or call Jones htard st Cambridge Massachussets to best connect or day window ru etc i ft lire rk or kindtin boston fa mn s globe office"
1930	"**Wanted maid** for general housework canadian or **colored preferred** no laundry Aspinwall"
1930	"**bookkeeper** hubbrd fsutw sl **colored** girl wants parttime work kenmore day work wanted by an experienced woman arlinton"
B. Job ads without explicit racial references (no identifying terms)	
1925	"requires experienced **packers** department store training preferred apply at temporary employment office washington street d floor"
1925	"wanted-sewing machine **mechanic** wate at once experi enced on and inger mnchineu giood position for riislt man apply powdrell alexanlder causeway st"
1930	"mother s helper wanted **housework** and care of children call alter Milton..."
C. Job ads without explicit racial references (with identifying terms)	
1941	Production Man **white sailor caps**. Thoroughly experienced factory man with complete knowledge factory systems and deigning excellent opportunity write particulars ...

Notes: The table presents job postings from the Boston Globe newspapers published between 1920 and 1940. It highlights occurrences of the racial terms "black" and "white" alongside the referenced occupations.

Table B.4: Effects of Casualties and Enlistment on Labor Force

(a) White Population

	Everyone 18-65 (1)	Young 18-20 (2)	Young adult 21-35 (3)	Adult 36-45 (4)	Senior 45-65 (5)
White Casualties	-0.156**	0.057	-0.146	-0.112	-0.185**
	(0.078)	(0.099)	(0.089)	(0.081)	(0.08)
White Enlisted	0.2**	0.055	0.251**	0.191**	0.199**
	(0.088)	(0.113)	(0.103)	(0.077)	(0.092)
1940 Lagged Outcome	0.000***	0.003***	0.000***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
1940 Urban population, proportion	0.014***	0.025***	0.023***	0.013***	0.005
	(0.004)	(0.005)	(0.004)	(0.004)	(0.003)
1940 Education years, average	0.008	0.006	0.014**	0.01**	0.001
	(0.005)	(0.008)	(0.006)	(0.005)	(0.005)
1940 Female Labor Force	-0.021	0.076***	-0.073*	-0.015	0.05**
	(0.029)	(0.025)	(0.037)	(0.022)	(0.02)
Mean Outcome	0	0	0	0	0
Ad. R-Squared	0.956	0.928	0.94	0.952	0.96
Observations	21,876	21,876	21,876	21,876	21,876

Notes: This table estimates the effects of military casualties and enlistment rates of White male soldiers on the number of working age White population in a local labor market (county-occupation), segmented by age group. In the estimation equation, $L_{glt} = \beta_1 \text{WhiteCasualties}_{gl} + \beta_2 \text{WhiteEnlisted}_{gl} + \beta_3 L_{gl,t-1} + \beta_4 \text{UrbanPop}_{gl,1940} + \beta_5 \text{EducYears}_{gl,1940} + \beta_6 \text{FemaleLaborForce}_{gl,1940} + \alpha_g + \alpha_s + \varepsilon_{glt}$, the outcome variable, variable of interest and controls have been standardized to have mean 0 and standard deviation 1. The regressions control for the lagged outcome in 1940, military casualties of black soldiers in levels, and 1940 values of female labor force, average education years, the proportion of urban population and state and occupation fixed effects. Robust standard errors are in parentheses, with significance indicated by $*$ p $<$ 0.1, $**$ p $<$ 0.05, and $***$ p $<$ 0.01.

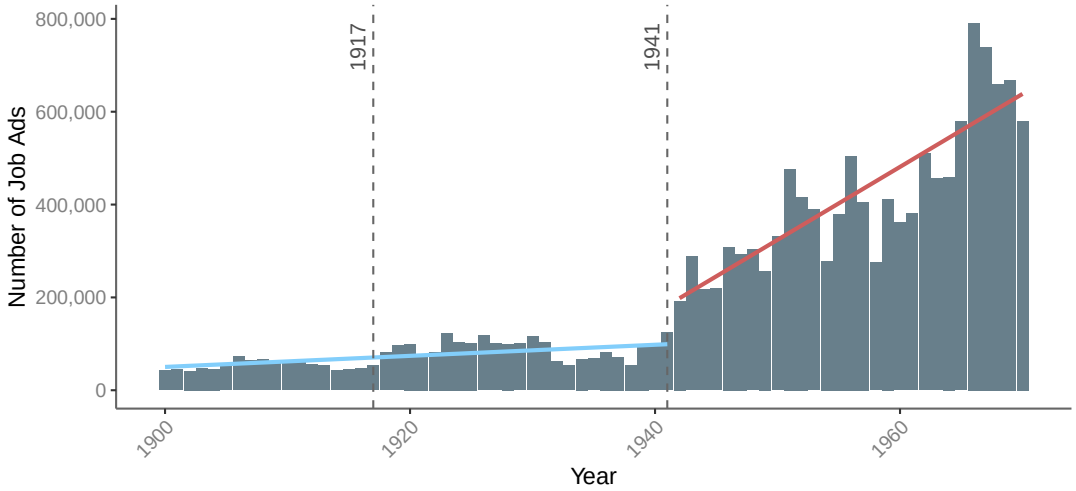
(b) Black Population

	Everyone 18-65 (1)	Young 18-20 (2)	Young adult 21-35 (3)	Adult 36-45 (4)	Senior 45-65 (5)
White Casualties	0.084	0.12	0.163	0.003	0.048
	(0.169)	(0.138)	(0.205)	(0.154)	(0.146)
White Enlisted	0.091	0.003	0.071	0.157	0.055
	(0.154)	(0.127)	(0.184)	(0.145)	(0.132)
1940 Lagged Outcome	0.001***	0.023***	0.003***	0.005***	0.006***
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
1940 Urban population, proportion	-0.019***	-0.015*	-0.032***	-0.008	-0.004
	(0.007)	(0.008)	(0.008)	(0.006)	(0.006)
1940 Education years, average	0.081***	0.088***	0.105***	0.037***	0.063***
	(0.013)	(0.023)	(0.016)	(0.009)	(0.011)
1940 Female Labor Force	0.086**	0.103***	0.092**	0.053	0.096***
	(0.037)	(0.035)	(0.044)	(0.04)	(0.034)
Mean Outcome	0	0	0	0	0
Ad. R-Squared	0.877	0.809	0.828	0.88	0.891
Observations	21,876	21,876	21,876	21,876	21,876

Notes: This table estimates the effects of military casualties and enlistment rates of White male soldiers on the number of working age Black population in a local labor market (county-occupation), segmented by age group. In the estimation equation, $L_{glt} = \beta_1 \text{WhiteCasualties}_{gl} + \beta_2 \text{WhiteEnlisted}_{gl} + \beta_3 L_{gl,t-1} + \beta_4 \text{UrbanPop}_{gl,1940} + \beta_5 \text{EducYears}_{gl,1940} + \beta_6 \text{FemaleLaborForce}_{gl,1940} + \alpha_g + \alpha_s + \varepsilon_{glt}$, the outcome variable, variable of interest and controls have been standardized to have mean 0 and standard deviation 1. The regressions control for the lagged outcome in 1940, military casualties of black soldiers in levels, and 1940 values of female labor force, average education years, the proportion of urban population and state and occupation fixed effects. Robust standard errors are in parentheses, with significance indicated by $*$ p $<$ 0.1, $**$ p $<$ 0.05, and $***$ p $<$ 0.01.

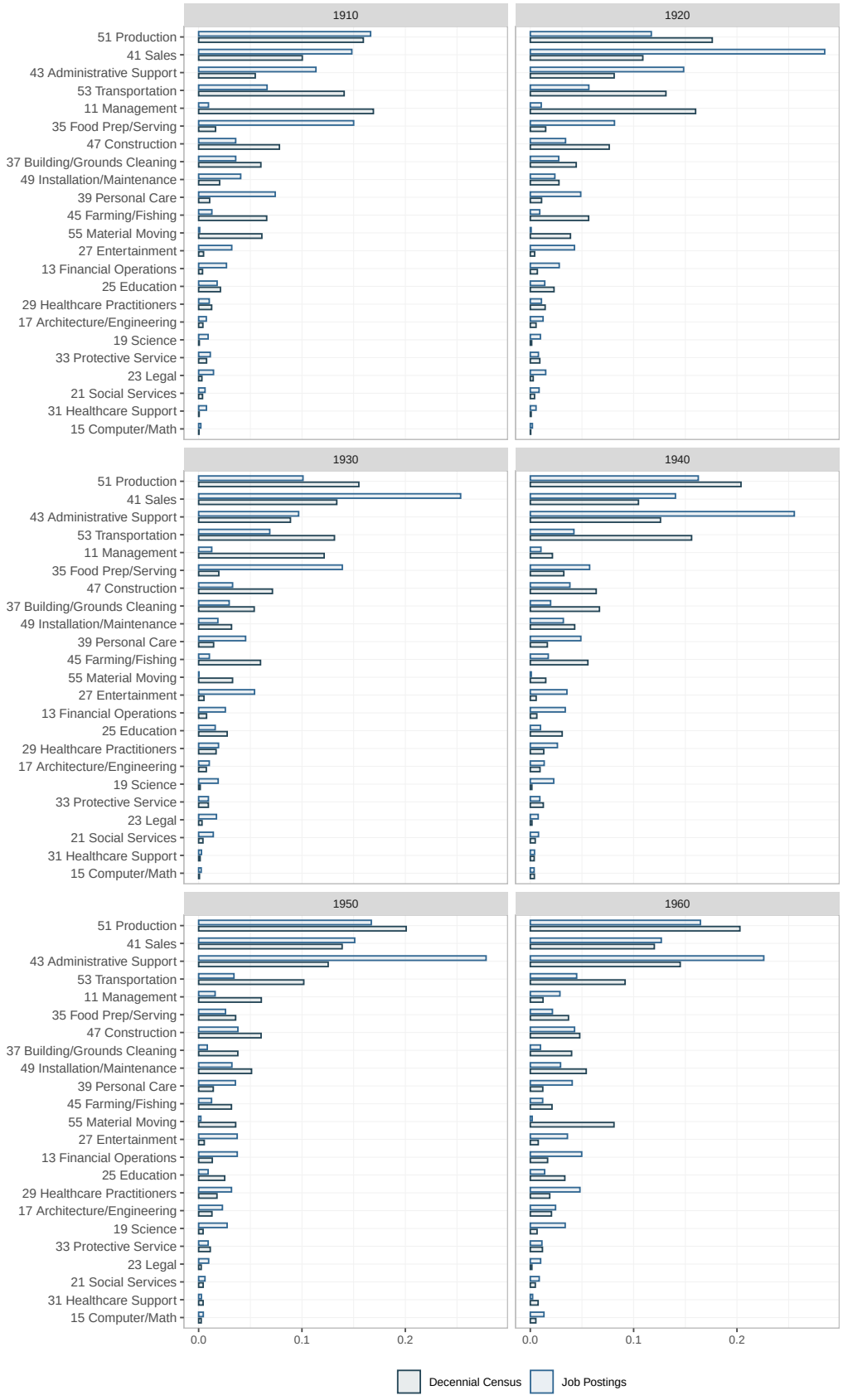
B.2 Figures

Figure B.1: Number of Job Postings



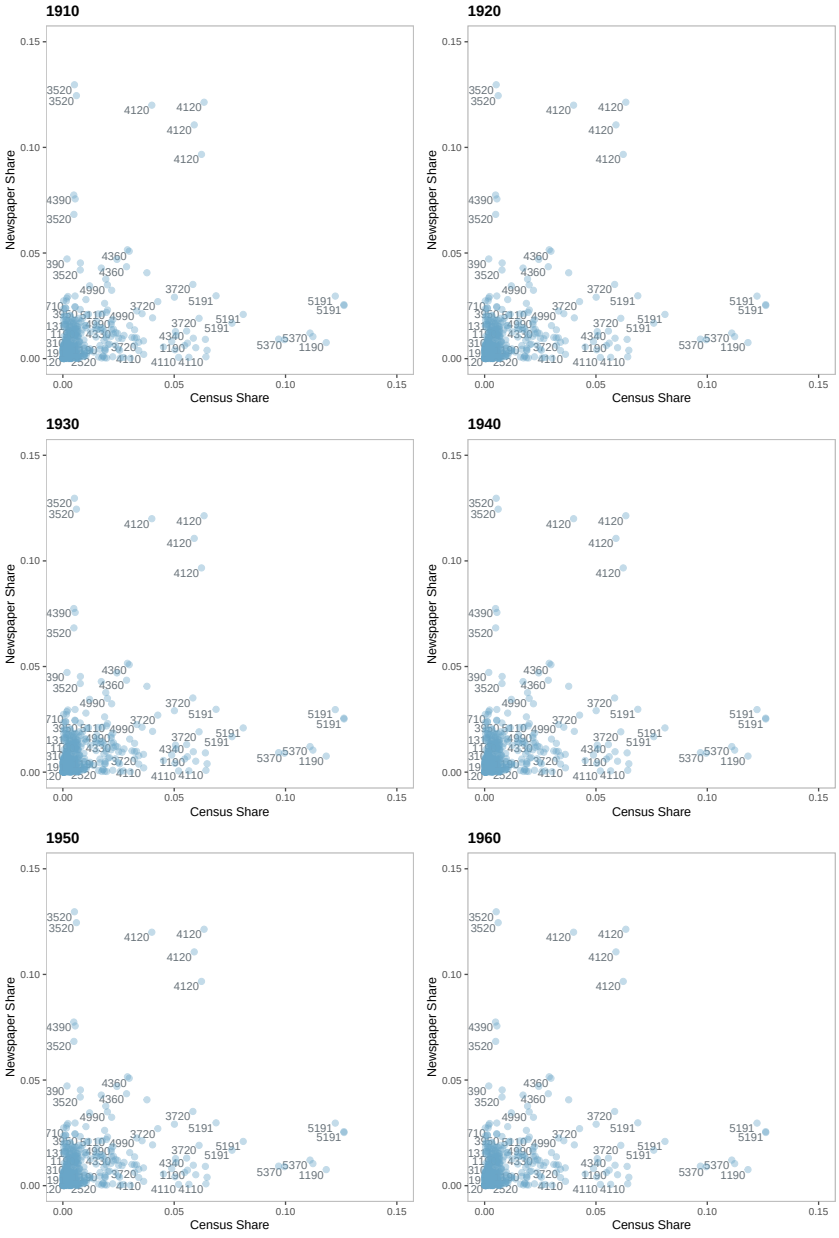
Notes: This graph displays the annual number of job postings from 1900 to 1970, as compiled from out dataset of nationwide, local and historically Black newspapers. The market increases around 1917 and 1941 correspond to the US entry into World War I and World War II, respectively.

Figure B.2: Occupation Shares of Job Postings and Decennial Census, 1910–1960



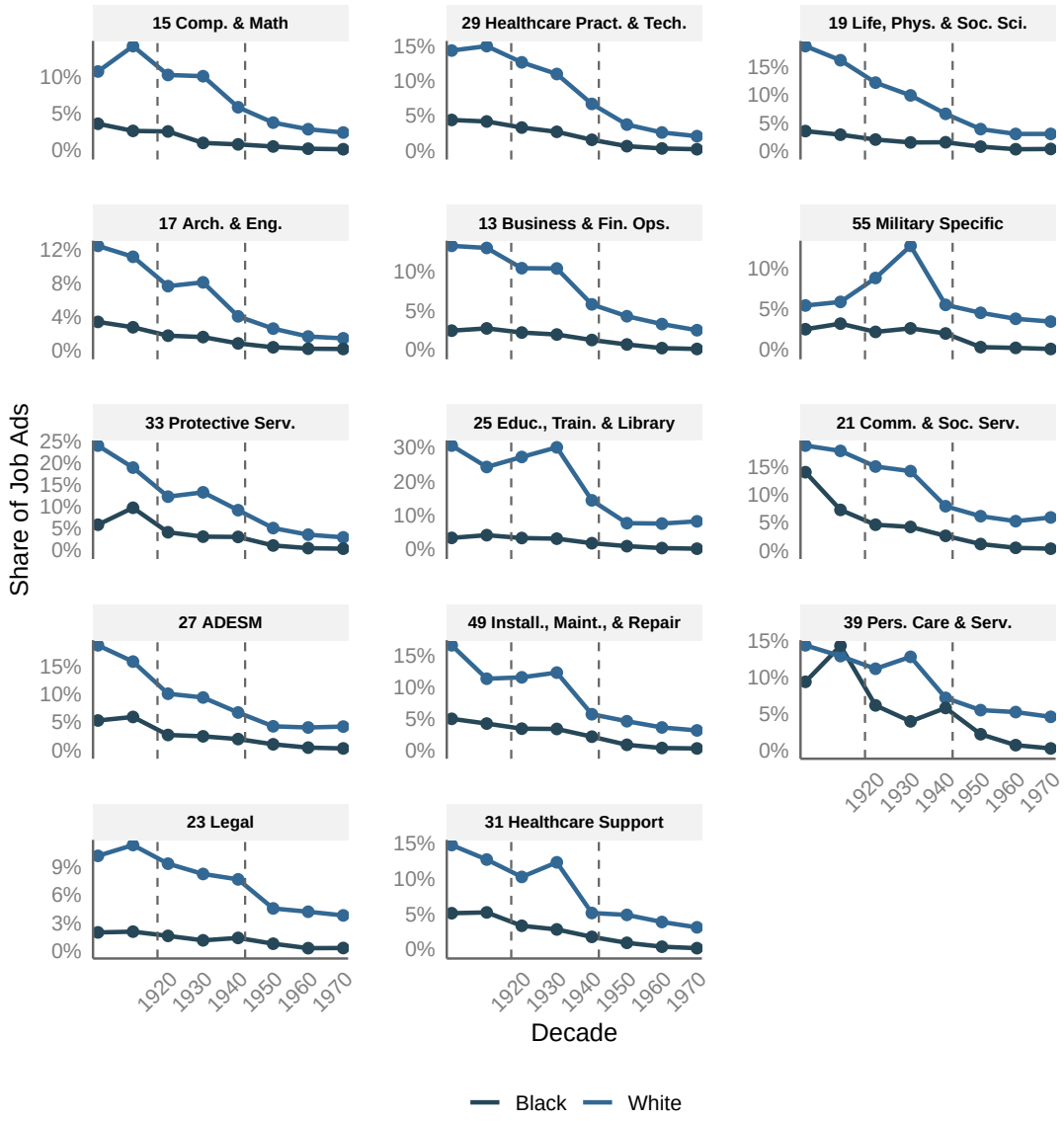
Notes: This graph illustrates the occupation shares for individuals aged 14 to 65 in the labor force according to the Decennial Census and the newspaper dataset constructed in Section 3. The occupational categories used for this comparison are 2010 Standard Occupation Codes (SOC) with two digits.

Figure B.3: Occupational Shares from Job Postings and Decennial Census: Analysis of 4-Digit SOC Codes, 1910–1960



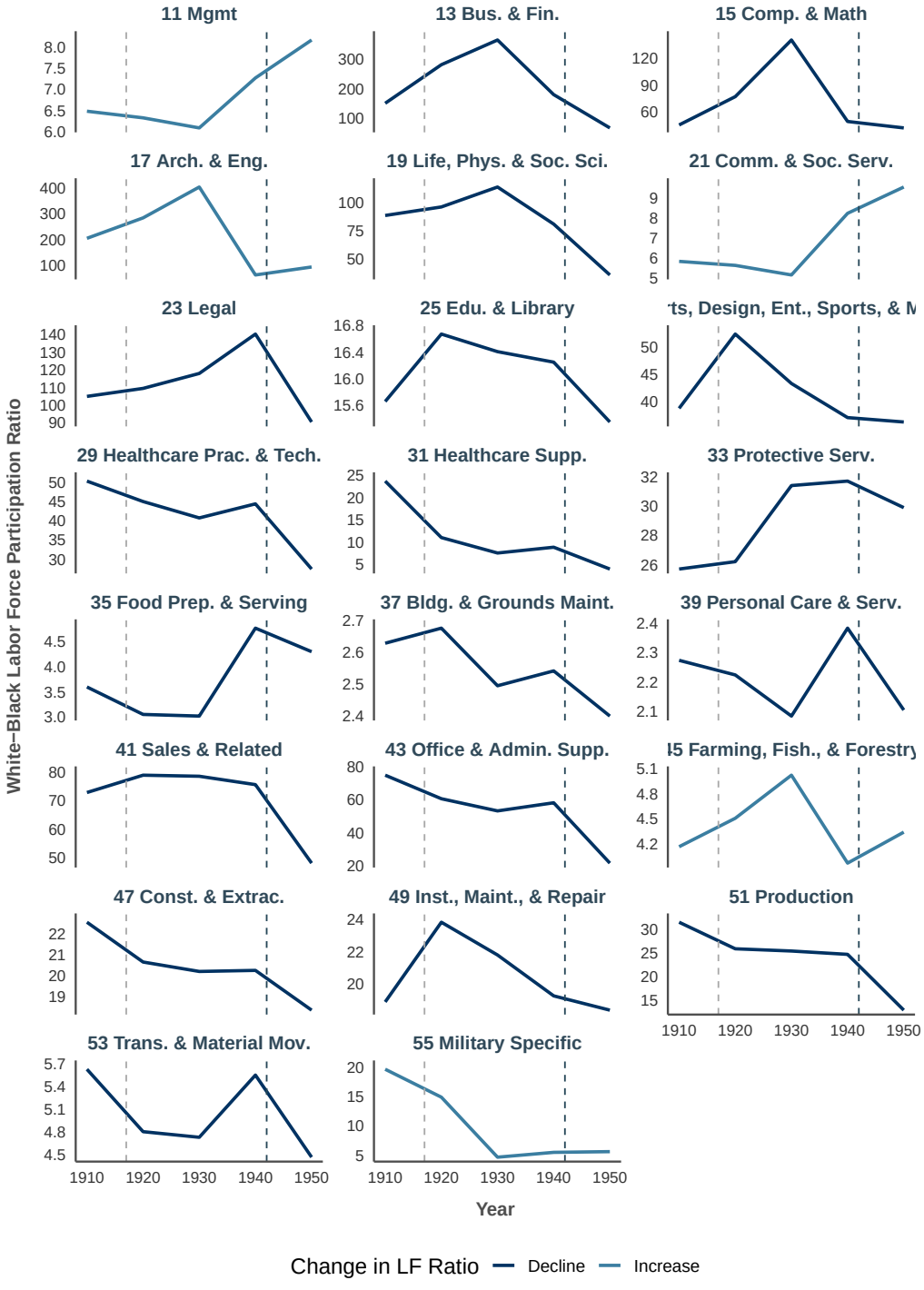
Notes: This graph illustrates the occupation shares for individuals aged 14 to 65 in the labor force according to the Decennial Census and the newspaper dataset constructed in Section 3. The occupational categories used for this comparison are 2010 Standard Occupation Codes (SOC) with four digits.

Figure B.4: Share of Job Postings With Race Preferences by Occupation



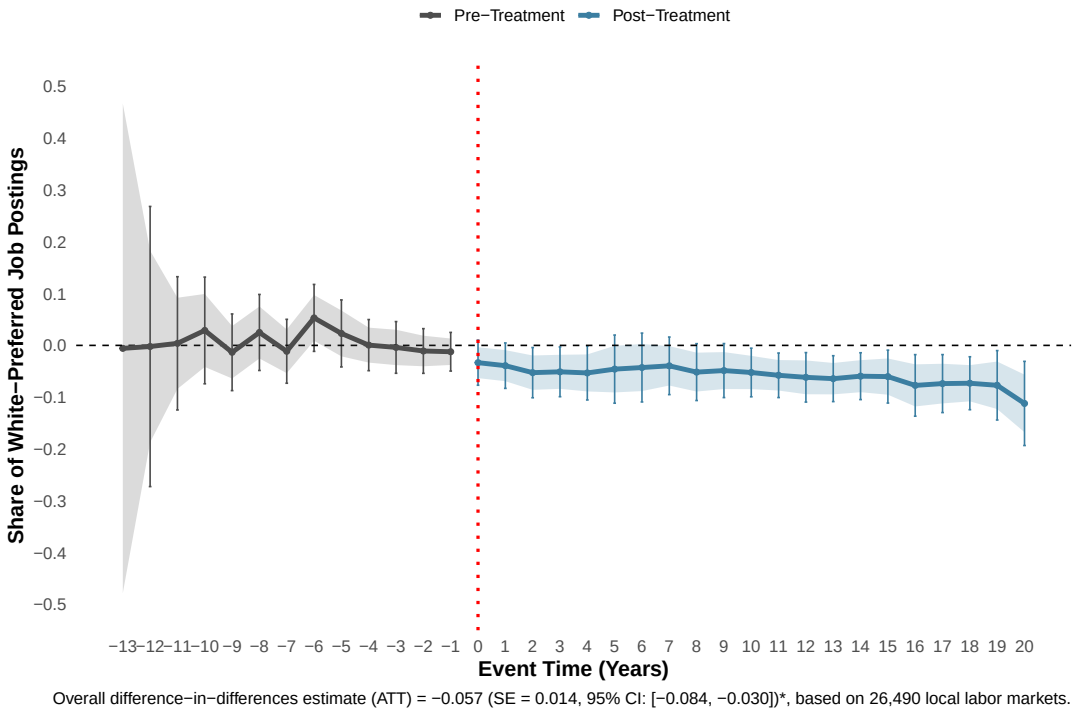
Notes: The graph displays the proportion of job postings within each occupation category (categorized by two-digit SOC codes) that specify a racial preference. The graphs are ordered by the occupations with the highest participation rates in job postings, with occupations appearing first if they have a greater share of total job postings.

Figure B.5: Labor Force Participation Ratio Evolution by Occupational Category, 1920–1950



Notes: The figure shows the evolution of labor force participation ratios across occupational categories between 1910 and 1950. Each panel represents a distinct occupational group. Light blue lines indicate an increase in the white-black labor force participation ratio, while dark blue line denote declines. The data are derived from the full-count Decennial Census 1910–1950. The dashed gray vertical lines represent the years 1917 and 1942.

Figure B.6: Robustness Exercise: Placebo of Dynamics of White Casualties over Local Labor Market Casualties



Notes. This figure presents a robustness check using an alternative treatment specification. The outcome variable remains the share of job postings with white racial preferences, but treatment intensity is measured as the ratio of white casualties to total casualties within each local labor market. Estimation follows the same Callaway and Sant'Anna (2021) methodology. The average treatment effect is -0.057 (SE=0.014, 95% CI: [-0.084, -0.030]) across 26,490 local labor markets. This alternative specification tests whether the observed effects reflect white-specific labor supply constraints or general wartime disruption. The specification includes the same controls and fixed effects as in Figure 5, with standard errors clustered at the local labor market level.