

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

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Abstract

This paper estimates the extent to which labor market tightness reduces employer racial preferences, a key prediction of canonical theories of discrimination. Using newly constructed data on 16.8 million historical job advertisements spanning 1900-1970 and 10 million newly digitized WWII draft registration cards, we exploit quasi-experimental variation from World War II draft rates across local labor markets as a shock to White labor supply. Higher draft rates significantly reduced White-preferred job advertisements by 1.1 percentage points per 10 percentage point increase in draft intensity, with effects persisting 15 years post-war. The draft shock enabled Black workers to access better-paying occupations relative to White workers by 1950, primarily through exit from agriculture and educational investment. White workers experienced a 29 percent wage decline while Black workers gained 24 percent despite increased Black labor supply, consistent with durable employer demand shifts rather than labor supply effects alone.

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

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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 (Becker, 1957). While competitive models predict labor shortages should reduce discriminatory barriers, the extent to which exclusionary hiring practices respond to labor supply shocks remains largely unidentified. This study provides quasi-experimental evidence on this relationship using major labor supply shocks during World War II.

The 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 a new dataset we construct of 16.8 million historical job advertisements from thirteen major U.S. newspapers covering the period 1900-1970. We classify explicit racial mentions in these job ads and combine these data with exogenous labor supply shocks at the county-by-occupation level to identify the effect of labor market scarcity on discriminatory preferences. 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 racial preferences.

We develop a computational method to systematically extract racial terminology, occupation codes, and county-level geographic information from historical newspaper job postings, constructing a high-frequency dataset of 16.8 million classified advertisements spanning 1900-1970. The classification algorithm employs a hierarchical context-based approach that identifies candidate racial terms from historically appropriate dictionaries, analyzes surrounding text to determine racial versus non-racial usage (overcoming the methodological challenge of distinguishing racial preferences from non-racial uses of ambiguous terms such as “white” or “black”), and applies exclusion rules based on neighboring occupational and nationality descriptors. We assign Standard Occupational Classification (SOC) codes through a matching classification,

and geographically codify explicit location mentions to Federal Information Processing Standard (FIPS) county-level codes, enabling county-by-occupation market-level analysis with 8.2 million postings that passed reliability tests.

Employers’ racial preferences in job advertisements consistently favored White workers over Black workers throughout the pre-civil rights era, with White preferences appearing in 10-20 percent of postings during the interwar period while Black preferences never exceeded 5 percent. This gap peaked in positions requiring non-routine analytical and interactive skills during the 1920s and 1930s. Administrative support positions maintained White preferences at approximately 9 percent through the 1930s, while transportation and material moving—the sector exhibiting the largest eventual decline—reached 15 percent before converging to near-zero by 1960. Following World War II, the prevalence of racially restrictive job advertisements declined sharply across all occupational categories, though the pace of this decline varied systematically with skill requirements and local labor market conditions.

Motivated by these descriptive patterns, we examine how exogenous reductions in White men’s labor supply arising the World War II draft affected employers’ willingness to maintain racial preferences in hiring. We do so by exploiting variation in military draft rates across local labor markets, defined as county-by-occupation cells. Our estimation sample includes 1,168 local labor markets generating 27,139 market-year observations spanning 1935-1960. The draft reduced White male labor supply by 11-29 percentage points across markets, with intensity determined by pre-war age structures. Our identification strategy leverages predetermined demographic characteristics that determined draft intensity under Selective Service regulations. Specifically, our source of variation is the age structure of the White male workforce aged 21-45 as of 1940, which generated differential exposure to conscription across otherwise similar local labor markets. The key identifying assumption is that, absent draft-induced labor shortages, the evolution of racial preferences in job advertisements would have been similar across markets with different pre-war age structures. This is supported by the nature of Selective Service protocols and validated through within-cell randomization tests showing no selection on worker productivity characteristics and parallel pre-trends in discriminatory advertisements. This shock to the supply of preferred workers provides a direct test of Becker’s prediction that discrimination becomes increasingly costly as the relative price of preferred labor rises.

The difference-in-differences specification yields that a ten percentage point increase in the White male draft rate reduced White-preference job advertisements by 1.1 percentage points.

This effect size implies that markets experiencing a 10 percentage point increase in draft rates—roughly the interquartile range—saw white-preferred job postings decline by 7.5 percent relative to the baseline mean. We complement our difference-in-differences estimates with event studies using the Callaway et al. (2024, 2021) estimator to trace the dynamic effects of draft exposure and account for the staggered timing of initial draft shocks across markets at the start of the war. The estimates reveal these effects emerged immediately upon treatment and persisted through 1960, with markets above the median draft rate (18.7 percent) experiencing 2.5–2.7 percentage point reductions in racial preferences. The continuous treatment event study uncovers diminishing marginal effects at higher draft intensities (for markets above 20 percent draft rates). The persistence of these effects latest fifteen years beyond the war’s end.

We examine how draft-induced labor shortages differentially affected Black and White workers in markets with sufficient representation of both groups using linked Census-enlistment records for males aged 15–65 in 1940. The linked sample yields 2.8 million person-year observations. Our triple-difference-in-differences design exploits variation in draft intensity across markets and over time to identify race-specific responses to labor scarcity while accounting for race-specific time trends. Relative wages converged despite increased Black labor supply, contradicting standard competitive predictions and revealing a demand-side shift toward previously excluded workers. At mean draft exposure (20.9 percent draft rates), relative labor scarcity reduced the Black-White wage gap by 0.14 standard deviations—a 29 percent decline in White wages and an 24 percent gain in Black wages—supporting that convergence operated through employer demand shifts rather than solely labor supply effects. This convergence is consistent with the aggregate 50 log point narrowing of the median Black-White earnings gap during the 1940s documented by Bayer and Charles (2018). Black workers experienced substantial sectoral reallocation: a 20 percent of baseline levels exit from agriculture offset by access to jobs in wholesale (24 percent above baseline), professional services (9 percent) and transportation (17 percent). Despite sectoral advancement, Black workers saw little to no improvement in labor force participation or employment likelihood, and experienced reduced work intensity, with hours, weeks worked, and full-time/full-year employment declining relative to Whites. In contrast, White workers faced downgrading with standardized occupational scores declining 0.09 standard deviations at mean draft exposure, and sustained entrance to government and retail sectors.

To interpret these findings, we develop a framework extending Acemoglu et al. (2004b)’s

effective labor substitution framework with heterogeneous integration costs across firms—costs of workplace reorganization and recruiting infrastructure in historically segregated workplaces. Labor scarcity operates through competing forces: direct production effects predict White wages should rise when their supply contracts, while Black workers’ reallocation into previously high-cost firms creates additional competition. When White labor becomes scarce, rising relative wages make it profitable for high-cost firms to hire Black workers despite integration expenses. This reallocation mechanism provides intuition for how draft-induced scarcity altered occupational segregation, though aggregate wage effects depend fundamentally on the elasticity of substitution between labor types. The framework interprets our findings within the broader wage compression narrative of the 1940s (Goldin and Margo, 1992), showing how labor supply shocks compelled firms to overcome integration costs, eliminating occupational barriers for Black workers’ entry into previously restricted positions.

Finally, we leverage a newly digitized dataset of over 10 million World War II draft registration cards containing employer information to understand the mechanisms driving these effects. These records constitute a near-census of the male workforce given universal registration requirements. Linking these records to Census data allows us to track individual workers and their 1940 employers from 1940 to 1950, providing granular evidence on how employer-level labor reallocation unfolded after the war. Black workers departed their 1940 employers at substantially higher rates than White workers, with exit differentials largest at establishments with the highest baseline Black employment shares—firms concentrated in low-wage services and agriculture. Despite these exits and severe labor shortages, employer-level racial composition remained remarkably stable: regression analysis shows no increase in the probability of Black employment at firms facing severe draft exposure, and all-White firms in 1940 remained predominantly White by 1950. These patterns indicate that labor market integration operated primarily through worker reallocation across firms rather than compositional changes within firms: Black workers exited lower-quality positions to access better opportunities as draft-induced scarcity weakened traditional hiring barriers. The dominant role of between-firm reallocation over within-firm integration aligns with sorting models where employers’ racial preferences restrict sectoral access.

We make contributions to several strands of the literature. Our main contribution is demonstrating that employers’ racial preferences respond to economic incentives, as seminal models in the theory of discrimination predict: discrimination becomes increasingly costly to maintain

as preferred workers grow scarce. The effects reducing employers’ racial preferences persist well beyond demobilization, suggesting that temporary supply shocks can generate permanent equilibrium shifts—a dynamic inconsistent with Becker’s static model (Arrow, 1973). The pre-Civil Rights setting eliminates confounding from anti-discrimination enforcement, isolating the pure price mechanism through which labor scarcity erodes discriminatory practices. These findings validate Becker’s fundamental insight while revealing both the specific conditions required for market discipline to operate and the potential for temporary shocks to permanently reshape discriminatory norms. Our continuous treatment analysis reveals important non-linearities not anticipated in Becker’s framework: markets experiencing the largest supply shocks (above 20 percent draft rates) show diminishing marginal reductions in discrimination. This pattern is consistent with heterogeneous discrimination costs across employers, formalized through a conceptual model.

Our second contribution is to the measurement of employer preferences among workers. 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). 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 (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).

Contemporary 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.

A third contribution is digitizing employer-level data from World War II draft registration cards to analyze the mechanisms underlying the racial wage gap. Recent research demonstrates that firm-specific wage premiums explain approximately 20 percent of overall wage inequality (Card et al., 2018), while workplace segregation by race remains pervasive despite declining occupational segregation (Hellerstein and Neumark, 2008). Our employer-level analysis reveals that wage convergence operated primarily through worker reallocation across a persistently segregated firm structure rather than within-firm racial substitution. This demonstrates that aggregate labor market outcomes can shift substantially even when firm-level segregation persists, highlighting the importance of between-firm sorting mechanisms in understanding how labor market shocks translate into reduced racial inequality.

The fourth contribution is methodological and relates to the literature on analyzing language in job postings using text-as-data (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 classifieds, we train a classification model to identify job advertisements and use Natural Language Processing tools to analyze racial hiring preferences. This approach enables granular quantification of explicit racial preferences by occupation, geography, and year at scale.

The organization of the paper is as follows. Section 2 introduces our measure of racial preferences and describes the computational methodology. Section 3 details the historical context. Section 4 estimates market-level effects of labor shortages on job advertisements. Section 5 develops a theoretical framework formalizing how labor scarcity affects wages. Section 6 analyzes differential effects on Black and White workers, emphasizing the wage gap. Section 7 examines employer-level dynamics, and Section 8 concludes.

2 Measuring Racial Preferences in Job Recruitment, 1900-1970

This section introduces a novel measure of employer discrimination: explicit racial preferences in job advertisements. The use of newspaper data allows constructing a detailed, year-by-year measure of across a broad set of industries and employers who relied on classified advertisements for recruitment throughout the first half of the 20th century. Online Appendix B.1 provides details on the algorithm described in this section and its implementation.

2.1 Computational Method for Identifying Racial Terminology

Historical Newspapers Sources and High-Volume Text Processing. The raw text is sourced from ProQuest’s Historical Newspapers archive.¹ 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 queries that select specific newspapers and time periods. After examining all newspapers available in ProQuest with extended coverage, we selected thirteen newspaper editions covering January 1, 1900, to December 31, 1970, based on three criteria: (1) having the longest uninterrupted temporal coverage, (2) providing the widest geographic representation, and (3) including historically Black newspapers and Southern regional publications to capture different labor market patterns and audiences in their classified sections, though many had limited job advertisement volumes (detailed in Appendix Table A.1). This represents a substantial expansion compared to Atalay et al. (2020), who relied on three newspapers—the New York Times, Wall Street Journal, and Boston Globe—as our thirteen-newspaper dataset provides broader geographic and market coverage across diverse communities.

The analysis faces three primary challenges in extracting job postings from the original newspapers data comprised of approximately 52 million digitized pages: identifying job ads within classifieds, isolating individual advertisements, and analyzing the high-volume content. To address these challenges, we employ a novel hierarchical delimiting approach, leveraging natural language processing and computational linguistics techniques (Online Appendix B.1).

Racial Term Detection Algorithm: A Summary. Prior to the Civil Rights Act of 1964, employers routinely specified racial requirements in job postings, providing an unusually direct

¹The digital archive contains digitized pages from more than 200 publications. Additional information is available at <https://about.proquest.com/en/products-services/pq-hist-news/>.

measure of race-based preferences in recruitment. By January 1965, newspapers largely ceased to publish help-wanted ads that explicitly favored “white” or “colored” applicants, though covert forms of indirect discrimination persisted (Darity and Mason, 1998).

Our classification algorithm addresses a fundamental challenge: distinguishing racial references from non-racial uses of ambiguous terms summarized in Figure 1. The word “White,” for instance, appears in both “White applicants only” (racial) and “white collar position” (non-racial).² We implement a hierarchical context-based classification that: (1) identifies candidate racial terms from a comprehensive and historically appropriate dictionary which includes terms for European descendants and African descent, respectively (Appendix Table B.1), (2) analyzes surrounding text to determine racial versus non-racial usage, and (3) applies exclusion rules based on neighboring occupational, nationality, and personal descriptors.

Samples and Validation We construct two analytical samples from the classified advertisements. The full sample contains all 16.8 job advertisements with racial recognition and valid Standard Occupational Classification (SOC) codes published between 1900 and 1970.³ The estimation sample restricts to 8.2 million postings with both occupation and county-level identifiers that have passed reliability tests, allowing our market-level analysis.⁴ This methodology allows us to move beyond anecdotal evidence of employers’ explicit racial preferences to measurement of how discriminatory preferences shaped occupational sorting in U.S. labor markets (Hellerstein et al., 2008), the lack of workforce diversity (Hsieh et al., 2019), and persistent racial wage gaps (Bayer and Charles, 2018; Blau and Beller, 1992; Charles and Guryan, 2008; Deroncourt and Montialoux, 2020) before their prohibition through civil rights legislation.

To validate the representativeness of our dataset, we conduct three main tests following the approach of Atalay et al. (2020), who used historical newspaper data to track occupational trends. First, the temporal distribution of the dataset aligns with known historical and economic patterns, with job advertisement volumes increasing substantially during both world wars and the post-war economic expansion (Appendix Figure C.1, C.2). Second, we compare the oc-

²Similarly, “Black” encompasses terms for African descent and African Americans. Appendix Table B.3 illustrates these cases with representative examples published in the Boston Globe.

³The newspaper sample includes *The New York Times*, *Chicago Tribune*, *Boston Globe*, *Los Angeles Times*, *Washington Post*, *Atlanta Daily World* (historically Black), *Chicago Defender* (historically Black), and six regional papers. See Appendix Table A.1 for complete coverage details.

⁴We assign SOC codes using a combination of keyword matching and manual classification for ambiguous cases. The geographic identifiers come from explicit location mentions in advertisements, which we geographically codify to Federal Information Processing Standard (FIPS) county-level codes. Appendix B.1.2 details the SOC assignment procedure.

cupational distribution against decennial Census data (1900-1970). We find that occupational distribution correlates at 0.63 with Census employment shares by decade, with expected overrepresentation of white-collar positions that traditionally use newspaper recruitment (Appendix Figure C.3).⁵

Third, the geographic distribution of racial preferences for White workers confirms expected regional patterns. The highest rates of white-preferred job advertisements concentrate in southern counties and parts of the industrial Midwest across the primary decades of our analysis (1940-1950 is shown in Appendix Figure C.13a; and 1950-1960, in Appendix Figure C.13b), with many Southern counties exceeding 7-10 percent of job postings specifying racial preferences. In contrast, Western states and much of the Plains show consistently lower shares of job listings with racial preferences, typically below 3 percent. Across decades, the spatial patterns show remarkable consistency, with a correlation of 0.68 between 1940-1950 and 1950-1960 county-level discrimination rates. Beyond these primary validation tests, Online Appendix C documents additional robustness checks for our classification algorithms, external economic benchmarks, and supplementary representativeness metrics.

2.2 Novel Evidence Job Advertisements

Figure 2 presents the central descriptive fact: employer racial preferences declined sharply during periods of acute labor scarcity. The share of job advertisements explicitly preferring white workers fell from a pre-war average of 14.6 percent to below 5 percent following World War II, with the sharpest declines coinciding with military mobilization periods.

Three features of this aggregate pattern merit emphasis. First, discriminatory preferences were pervasive before federal intervention—one in seven job postings explicitly excluded Black workers. Second, the decline began during World War I (1917-1918) and accelerated during World War II (1942-1945), preceding major civil rights legislation by decades. Third, the changes persisted: discrimination rates remained at their reduced levels through 1970, suggesting permanent rather than temporary effects of the wartime shocks.⁶

The aggregate trends mask substantial heterogeneity across occupations. Appendix Figure A.3 disaggregates racial preferences for the nine largest occupational categories, revealing three distinct patterns. War-sensitive occupations—Production and Transportation—experienced the

⁵The correlation coefficients are similar to the ones reported by [Atalay et al. \(2020\)](#). They increase steadily across decades, from 0.43 in 1910 to 0.85 in 1970, reflecting improved data quality and coverage over time.

⁶Structural break tests identify significant discontinuities in 1909, 1919, 1934, 1945, and 1958. The 1934 break aligns with New Deal labor market interventions, while 1958 corresponds to early civil rights mobilization. The war years show the largest magnitude changes.

largest declines, from 12 percent and 10 percent white preference pre-1940 to 2 percent and 3 percent post-1945, respectively. These occupations faced acute labor shortages due to both military mobilization and defense production demands. White-collar occupations including Office/Administrative and Sales positions showed gradual but substantial integration, declining from 15–18 percent White preference to 3–4 percent by 1960, with timing suggesting both market and regulatory forces. Service occupations such as Personal Care and Food Service maintained shares of job listings with racial preferences of 8–10 percent through 1960, indicating that some sectors could sustain such preferential hiring practices despite broader market pressures.

This occupational heterogeneity provides crucial variation for identification. Production occupations, for example, had 24 percent of workers aged 18-25 in 1940 compared to 14 percent in Personal Services, leading to draft rates of 28 percent versus 16 percent respectively. Appendix Figure A.4 presents the remaining occupational categories, showing similar patterns of wartime convergence in racial preferences.

2.3 Motivating Stylized Facts

Three empirical patterns emerge from our data that motivate our empirical analysis. First, employer racial preferences declined sharply during periods of acute labor scarcity—the share of white-preferred job advertisements fell from 14.6 percent pre-WWII to below 5 percent post-1945, with the steepest declines coinciding with military mobilization. Second, these declines varied systematically across occupations based on their demographic composition. Production and transportation occupations with younger workforces (24 percent aged 18-25 in production) experienced 7-10 percentage point declines in discriminatory advertising, while service occupations with older workforces (14 percent aged 18-25 in personal services) maintained discrimination levels of 8-10 percent through 1960, showing minimal decline. Third, the effects persisted through 1970, twenty-five years after demobilization, suggesting permanent shifts in recruitment practices.

The reduction in explicit racial preferences coincided with substantial racial wage convergence that started in the 1940s (see, for instance, [Bayer and Charles \(2018\)](#)). Figure 3 shows the log median wage gap between White and Black men declined from 0.91 in 1940 to 0.39 by 1980—raising Black workers’ relative wages from 40 percent to 68 percent of White median earnings. This is notable because WWII mobilization substantially increased the relative supply of Black workers in previously segregated labor markets. Standard competitive models would

predict that increased relative supply should reduce relative wages, yet relative wages rose for Black workers. The sharpest convergence occurred between 1940 and 1950—precisely when military mobilization created acute labor scarcity and job advertisements showed the steepest decline in explicit racial preferences. The consistency of this convergence across three age specifications—including draft-eligible men aged 21-45 who faced the most direct mobilization pressures—suggests that demand-side factors, rather than supply-side forces alone, drove the observed wage dynamics.

The combination of declining racial preferences and converging wages raises a critical question: did draft-induced labor scarcity compel employers to reduce discriminatory barriers, and if so, how much did this contribute to the observed improvements in wages and other labor market outcomes for Black workers? We address this question in the following sections.

3 Data and Historical Background

3.1 The Selective Service System in WWII

The Selective Training and Service Act of September 1940 established America’s first peacetime draft, creating a programmatic-implemented conscription system that would mobilize 10 million men through 1945.⁷ This system’s rigid administrative structure—designed to ensure fairness and prevent local manipulation—generates the plausibly exogenous variation central to our identification strategy.

The draft operated through a precise three-tier administrative hierarchy that translated military manpower needs into local conscription requirements. At the federal level, the Director of Selective Service converted military requisitions into state-level quotas using an administratively-implemented formula: each state’s share equaled its proportion of men available for military service (adjusted for deferments and those already serving) multiplied by the military’s monthly requisitions (Jaworski, 2014).⁸ These state quotas generated cross-state variation in mobilization rates from 40 to 55 percent, with variation arising from differences in deferments for dependents,

⁷The 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 also produced permanent losses in the workforce through casualties—the highest in U.S. history, with over 405,000 of those in service killed (U.S. Department of Veterans Affairs, 2020; Defense Casualty Analysis System, 2020). Ferrara (2022) showed 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 inaccessible to them.

⁸These state quotas, mandated by Section 455(b) of the Military Selective Service Act, were “*determined for each State...on the basis of the actual number of men...liable for such training and service but who are not deferred.*”

occupations, and fitness to serve (see Appendix Table D.2; Goldin and Olivetti (2013)). Crucially, these calculations used registration data fixed at specific cutoff dates, preventing states from manipulating their quotas through reclassification or deferment policies.

State directors subdivided their federally-assigned quotas among approximately 4,600 local draft boards based solely on each board’s available men (Class I-A pool) as of predetermined census dates. The National Archives’ RG 147 collection documents this transmission mechanism through 2,730-3,640 standard archival boxes showing the precise flow from federal requisitions to state allocations to local board quotas. Local boards maintained detailed registration rolls but faced binding numerical constraints—they controlled classification decisions about who to draft within their jurisdiction, but the number to be drafted was federally determined and non-negotiable. Online Appendix D provides additional institutional details on the Selective Service System’s implementation and the specific features that prevented local boards from manipulating draft rates.

Military Data Construction: Digitization of Selective Service Draft Cards. We conducted a large-scale digitization effort of the World War II Selective Service System Draft Registration Cards, processing 10 million draft cards from the National Archives digital collection (examples in Appendix Figure A.2; details in Online Appendix B.3). These cards provide comprehensive pre-war demographic and employment information for men subject to conscription between 1940 and 1945. We linked this data with WWII enlistment records through army serial numbers, allowing us to construct precise measures of realized draft rates at the county-occupation level. The records also include employer names and places of employment, which we use in supplementary mechanisms analysis.

Programmatic Draft Assignment Through Age-Based Quotas. A potential concern is that draft rates could be correlated with pre-war economic conditions or racial attitudes that independently affected discrimination trends (we address this formally in Sections 4.1 and 4.5). Four institutional features of the Selective Service System are central to understanding why this is unlikely: (1) draft exposure was predetermined by birth cohorts from 1895-1919, making it orthogonal to 1940s labor market conditions or employer racial attitudes; (2) geographic mobility did not prevent draft evasion, as men were drafted through their original registration boards regardless of relocation; (3) occupational deferments for private employment were unavailable until late 1942, after primary mobilization occurred; and (4) while local boards had discretion

over which individuals to draft within their jurisdiction, they had no control over the total number of men required from each local labor market. These institutional constraints ensured that draft rate variation across county-occupation cells reflected predetermined demographic composition rather than wartime economic conditions.

3.2 Asymmetric Racial Impact of Mobilization

World War II military mobilization had an asymmetric racial impact, removing a disproportionately larger share of White men than Black men from the labor force. Appendix Table [A.2](#) documents that among prime-age workers (21-45), approximately 25 percent of White men served compared to only 3 percent of Black men—a draft rate gap of more than 8-fold. Since White men comprised 81 percent of the county labor force while Black men comprised 9 percent, this differential mobilization created substantial labor shortages that Black workers were positioned to fill.

The disproportionately low mobilization of Black men relative to White men stemmed from institutionalized barriers embedded in War Department policy and operational constraints. Official policy established racial quotas limiting Black representation to approximately 10 percent across all military branches—matching their share of the U.S. population—while requiring complete segregation (Lee, 1966, p. 75).⁹ Despite this mandate, Black military mobilization was constrained by infrastructure requirements and administrative barriers. Black inductees could only be assigned to Black units and mobilization was deliberately delayed until required infrastructure was in place to maintain segregation (Lee, 1966; MacGregor, 1981). Moreover, certain branches categorically excluded Black personnel (e.g., Air Corps), while others faced severe capacity constraints in establishing segregated facilities and training cadres (MacGregor, 1981).

Beyond these policy restrictions, military qualification standards—particularly educational requirements introduced in May 1941—disproportionately screened out Black registrants: by 1943, overall rejection rates reached 53.1 percent for Black men versus 33.2 percent for White men (Lee, 1966; Dalfiume, 1969).¹⁰ Additional details on these institutional barriers appear in Online Appendix [D.3](#).

⁹Appendix Table [D.3](#) documents the systematic restrictions implementing this policy, including assignment to designated Black units only (p. 52), categorical branch exclusions (p. 61), and mandatory delays pending segregated facilities (p. 74). Lee (1966) writes “*The policy of the War Department is not to intermingle colored and white enlisted personnel in the same regimental organizations*” (pp. 75-76).

¹⁰See Appendix Table [D.4](#) for complete rejection and deferral rates by race, 1941-1943. Educational deficiency was the primary cause: between May and September 1941, 12.3 percent of Black registrants were deferred for educational deficiency compared to only 1.1 percent of White registrants (Lee, 1966, p. 240). The literacy requirement (ability to write at fourth-grade level) was labeled “mental deficiency” and historians have documented how this standard was adopted primarily to reduce Black enlistment (Dalfiume, 1969).

3.3 Estimation Samples Definition and Descriptive Statistics

We construct two main samples for analysis: a market-level panel (1935-1960) to analyze market-level effects on employers racial preferences, and a worker-level panel (1940, 1950) to examine the effects on racial gaps. For additional analysis on mechanisms, we construct an Employer-Worker panel matching the employer information extracted from draft cards with the worker-level panel (1940, 1950). Online Appendix B provides details on data sources and construction procedures.

3.3.1 Market-Level Panel

We construct a county-by-occupation panel spanning 1935-1960 (excluding the war years 1942-1945). Our market definition follows a county-2 digit occupation structure, where each market represents a unique combination of geographic location and occupational category (e.g., Queens County-by-Manufacturing). The panel combines three main data sources: (1) newspaper job advertisements with racial preferences and geographic information from 13 major newspapers (including national, regional, and historically Black publications), (2) Selective Service records containing draft rates by county-occupation cells, and (3) 1940 Census data providing pre-war demographic and labor market characteristics.

We impose a temporal coverage requirement detailed in Appendix B.4. The main estimation sample requires markets to appear in at least 25 of the 31 panel years to ensure sufficient pre- and post-treatment observations for testing parallel trends and estimating dynamic treatment effects with precision. Table 1 presents descriptive statistics of the resulting sample. Column (1) reports statistics for all 2,647 local labor markets with available data. Columns (2) through (5) focus on our main estimation sample of 1,168 markets that meet the 25-year requirement, representing 27,139 market-year observations. Excluded markets typically have sporadic newspaper coverage or enter the sample only in later years. Columns (3) and (4) divide the estimation sample by draft intensity above and below the median of 18.7 percent. The similarity in pre-war characteristics across high and low draft markets confirms that requiring near-complete temporal coverage does not meaningfully alter market composition along observable dimensions.

Treatment Intensity Measurement. Figure 4 documents the substantial variation in draft intensity across local labor markets that enables our identification strategy. Figure 4a reveals a near-normal distribution of white male draft rates across county-occupation cells, ranging from near zero to over 60 percent, with a median of 18.7 percent that we use to classify markets

into high and low treatment groups. Figure 4b maps this variation geographically, showing that draft intensity varied both within and across states—not following simple regional patterns that might correlate with economic trends. The highest draft rates (exceeding 28 percent in the top quintile) concentrate in parts of the Plains states and upper Midwest, while draft rates vary considerably within all regions, reflecting differences in pre-war age structures and occupation-specific deferment patterns rather than regional economic conditions.

3.3.2 Worker Level Panel

Table 2 reports descriptive statistics from a linked panel following approximately 2.4 million working-age males (15-65 in 1940) from the 1940 to 1950 censuses. The linking procedure at the individual level, based on exact and probabilistic matching using names, birth dates, and birthplaces following the methodology of Abramitzky et al. (2021), achieves a match rate of 19.3 percent. This rate aligns with contemporary standards for historical record linkage given the challenges of matching across decennial censuses, including name variations, mortality, and geographic mobility. For intensive margin outcomes requiring wage data, we restrict to approximately 260 thousand individuals with complete earnings information reported in both census years.

The sample shows racial disparities that further motivate our analysis. In 1940, the Black-white occupational score gap is 346.4 points in high draft markets versus 340.1 points in low draft markets, a statistically insignificant 2 percent difference. Moreover, high draft markets show similar pre-war characteristics to low draft markets across racial composition, urban residence patterns. The linked sample, with similar match rates across racial groups (19.7 percent for Black versus 19.2 percent for white workers), allows us to observe within-individual changes, addressing concerns about compositional changes or selective migration.

By 1950, the occupational score gap narrowed substantially more in high draft markets compared to low draft markets—a 14 percentage point differential convergence. This convergence reflects both labor supply adjustments and industrial reallocation. Black workers in high draft markets increased manufacturing employment by 8.3 percentage points (31.5 to 39.8 percent) compared to a 3.0 percentage point decline in low draft markets—an 11.3 percentage point differential effect in a historically restricted sector. Government employment moved oppositely, declining for Black workers in high draft markets while increasing in low draft markets, consistent with private sector opportunities drawing workers from public employment.

3.3.3 Employer-Worker Matched Records from 1940-1950

We construct employer-level panels by linking workers from 1940 WWII draft registration records to their reported employers, then tracking these workers to 1950 using Census linkages. The draft cards contain standardized employer names which we match algorithmically, generating a final balanced panel of 34,123 employers observed in both periods covering $N=199,424$ person-year observations.¹¹

4 Effects of Draft-Induced Labor Shortages on Local Labor Markets

4.1 Identification Strategy and Research Design

Our identification strategy uses a quasi-experimental design based on wartime mobilization: the Selective Service System’s draft removed working-age men from civilian labor markets. As documented in Section 3.2, this mobilization had asymmetric racial impacts, removing proportionally more white than Black men and creating differential labor scarcity by race. We identify market-level effects on employers’ hiring practices by exploiting variation in white workers’ relative labor scarcity during World War II due to differential draft intensities across local labor markets. The unit of analysis is the local labor market, m (defined as a county-occupation cell), which allows us to compare draft effects within narrowly defined labor markets.

We measure the relative labor supply shock, s_m , using the observed draft intensity:

$$\tilde{s}_m = \frac{\sum_{a=21}^{45} \pi_{m,a}}{\sum_{a=21}^{45} N_{m,a,1940}}$$

where $N_{m,a,1940}$ is the number of white men of age a in the labor force in market m in 1940, and $\pi_{m,a}$ represents the number of white males of age a in market m drafted between 1940–1945. We consider the age range of 21 to 45 years old, corresponding to the population subject to mandatory draft registration under the 1940 Selective Training and Service Act. The measure captures the fraction of white male workers removed through conscription, providing plausibly exogenous variation in the model’s relative scarcity variable.¹²

¹¹Employer matching uses two complementary algorithms achieving precision above 87% based on manual validation. Combined approach yields 11M matched workers across 3.1M unique employers. See Appendix Section B.2 for matching details.

¹²We exclude voluntary enlistments because they reflect endogenous selection—volunteers likely differed systematically from non-volunteers in ways correlated with labor market outcomes. Voluntary enlistment could correlate with unobserved characteristics like patriotism, economic opportunities, or skill levels that indepen-

Required Identifying Variation. The Selective Service System’s programmatic structure (see Section 3.1) generated quasi-random variation in white male labor supply across local markets. Draft rates were determined through a two-stage process: federal authorities set nationwide conscription requirements based on age quotas, which state and local draft boards then operationalized within their jurisdictions. This structure meant draft rate variation arose from the interaction of nationally-uniform age-based rules with predetermined local demographic composition. Therefore, county-occupation cells with similar economic characteristics but different age structures experienced differential white male labor scarcity. This programmatic assignment—driven by pre-existing demographics rather than wartime economic conditions—generates plausibly exogenous variation in \tilde{s}_m across otherwise comparable local labor markets. Appendix Figure A.1 illustrates with a concrete example: within Manhattan, construction workers (40 percent aged 21-45) experienced a 25 percent draft rate while office administrators (20 percent aged 21-45) faced only 10 percent—variation driven solely by predetermined demographic differences, not occupation characteristics. Since local boards had to meet fixed quotas regardless of whom they selected, market-level draft rates provide exogenous variation even with individual-level selection.

4.2 Empirical Implementation

Building on this identification strategy, we implement a difference-in-differences design that compares changes in racial-based job advertisements across markets experiencing differential draft intensities. We estimate the following baseline specification at the market level:

$$D_{mt} = \beta_0 + \beta_1(\tilde{s}_m \times Post_t) + \beta_2\tilde{s}_m + \beta_3Post_t + \mathbf{X}'_{mt}\beta_4 + \mu_m + \lambda_t + \epsilon_{mt} \quad (1)$$

where D_{mt} is the share of job advertisements with racial preferences in market m at time t , and $Post_t = \mathbf{1}[t > 1941]$ captures the wartime and post-war periods. Market fixed effects μ_m absorb time-invariant local characteristics including baseline discrimination levels, industrial composition, and regional culture. Year fixed effects λ_t control for aggregate shocks including business cycles, federal policies, and national shifts in racial attitudes. The primary specification includes market and year fixed effects only. The vector \mathbf{X}_{mt} includes time-varying controls added progressively across specifications: defense contracts (value and count) and pre-war job

dently affect employer discrimination patterns. By focusing on draftees, we isolate variation driven by age-based quotas rather than individual choice.

advertisement characteristics from 1930-40 (racial composition, gender composition, skill intensity, advertisement length, and volume). The coefficient β_1 identifies the causal effect of draft-induced labor shortages on exclusionary hiring.

Formally, we make two primary identification assumptions:

Assumption 1 (Parallel Trends). $E[\epsilon_{mt}|\tilde{s}_m, X_m, \mu_m, \lambda_t] = E[\epsilon_{mt}|X_m, \mu_m, \lambda_t]$

Assumption 1 requires that conditional on pre-war characteristics X_m , market (μ_m), and time fixed effects (λ_t), draft intensity is uncorrelated with unobserved determinants of discrimination trends. This parallel trends assumption means that absent draft-induced labor shortages, high and low draft markets would have exhibited parallel evolution in discriminatory hiring practices.

Second, we require an exclusion restriction: draft-induced labor scarcity affects discriminatory hiring practices solely through the reduced availability of White male workers, not through other channels such as changes in employers' underlying racial attitudes (e.g., patriotic sentiment making employers more willing to hire Black workers) or structural changes in how firms recruit workers (e.g., developing new screening technologies in response to labor shortages). We test these assumptions in Section 4.5.

4.3 Effects on Racial Preferences on Job Advertisements

4.3.1 Average Market-Level Effects

Table 3 reports the baseline difference-in-differences estimates of β_1 (from Equation 1). Markets experiencing higher draft intensity saw significant reductions in white-preferred job postings for the period analyzed (1935–1960). Column (1) shows a ten percentage point increase in the draft rate—measured as the share of white males aged 21–45 removed from county-occupation labor markets through military drafting—reduced the share of white-preferred job postings by 1.1 percentage points. This precisely estimated effect is equivalent to a 7.6 percent reduction in discriminatory advertising relative to the baseline mean of 14.6 percent.¹³

Columns (4) and (5) show minimal and statistically insignificant effects on Black-preference advertisements (-0.37 and -0.34 percentage points per ten percentage point draft increase, respectively). Columns (6) and (7) demonstrate increases in non-racial job postings of 1.48 percentage points per ten percentage point draft increase. A ten percentage point increase in draft

¹³The average treated market, which experienced draft rates of approximately 20 percent, saw discriminatory advertisements decline by 2.2 percentage points—a 15 percent reduction in explicit racial references in job recruitment.

rates decreases white-preference ads by approximately 1.1 percentage points while increasing race-neutral ads by 1.5 percentage points. The symmetry of these results suggests that employers responded to labor scarcity by broadening their applicant pools rather than substituting between racial preferences.

4.3.2 Dynamic Effects: Persistent Reductions in Racially-Targeted Recruiting

Our annual-level data on discriminatory job advertisements—rare for historical settings—enables us to trace the dynamic effects of draft-induced labor supply shocks. We begin with a binary event study comparing markets above and below median draft intensity:

$$D_{mt} = \sum_{k \neq -1} \beta_k \cdot \mathbf{1}[t - 1942 = k] \cdot HighDraft_m + \alpha_m + \gamma_t + \varepsilon_{mt} \quad (2)$$

where $HighDraft_m$ indicates markets above the median draft rate of 18.7 percent, and β_k captures the differential effect between high and low draft markets k years relative to treatment onset in 1942.

Dynamic Effects on White-Preferred Job Advertising. Figure 5 provides clear evidence supporting the parallel trends assumption underlying our identification strategy. The pre-treatment coefficients are small and jointly insignificant (F-test p-value = 0.146). This confirms that high and low draft intensity markets followed parallel trajectories in racially-driven recruitment practices before the wartime shock, validating our identification strategy.

The dynamic response reveals both persistent and substantial effects in the post-war period. In 1946, high draft markets show a 2.5 percentage point reduction in white-preferred advertisements relative to low draft markets. This differential effect remains remarkably stable throughout the late 1940s and 1950s, ranging between 2.0 and 2.7 percentage points. Even by 1960—fifteen years after the war’s conclusion—high draft markets continue to exhibit approximately 2.0 percentage points fewer discriminatory job advertisements than their low draft counterparts. We provide additional context to interpret the magnitudes of these effects. High draft markets averaged 28.7 percent draft rates versus 11.6 percent in low draft markets. The 2.6-2.7 percentage point reduction in white-preferred job advertisements represent a 18-19 percent decline relative to the pre-treatment mean. This persistence suggests that wartime labor scarcity induced lasting changes in recruitment practices rather than temporary wartime adjustments.

Appendix Figure A.5 shows the evolution of white-preferred job advertisement rates for high and low draft markets separately, revealing whether the differential effect stems from high-draft markets reducing discrimination, low-draft markets increasing it, or both. Both groups begin at similar baseline levels, but following draft exposure, high draft markets show a persistent reduction of approximately 2-3 percentage points in white-preferred job advertisements, while low-draft markets maintain their pre-war trajectory with minimal change. High-draft markets thus actively reduced white racial preferences in recruitment—confirming that labor scarcity induced real behavioral change rather than merely differential trends.

Disaggregated Effects by Advertisement Type. Figure 6 disaggregates these effects across different types of racial preferences in job advertisements. Figure 6a shows no significant differential effects on Black-preferred advertisements, which remain unchanged with point estimates near zero. Figure 6b demonstrates substantial increases in race-neutral job postings of approximately 2-3 percentage points in high draft markets relative to low draft markets. The persistent reduction in white-preferred advertisements, coupled with the shift toward race-neutral rather than Black-targeted recruitment, indicates that the recruitment cost effect dominates the wage gap effect in our setting. As white male workers became scarce, the rising costs of maintaining exclusionary practices outweighed any countervailing wage gap effects. Moreover, the finding aligns with historical evidence that employers during this period were reluctant to explicitly signal openness to Black applicants but were willing to adopt more inclusive language when labor became scarce (Anderson, 1982; Northrup and Rowan, 1970).

4.4 Robustness and Additional Results

4.4.1 Heterogeneous Effects by Treatment Intensity

Our main results estimate average treatment effects, but the impact of labor scarcity on racial preferences may vary across the distribution of treatment intensity. Markets experiencing more severe maximum shortages might show proportionally larger effects if all employers respond similarly to scarcity, or effects might plateau at high intensities if only the least discriminatory employers integrate while the most discriminatory remain exclusionary even under extreme shortages. To test for such heterogeneity, we estimate dose-response functions exploiting variation in markets' maximum wartime draft exposure, which ranged continuously from near-zero to over 40 percent. Markets began experiencing draft shocks at different times (661 in 1940, 597 in 1941, 40 in 1942), providing the staggered timing necessary for identification.

We implement the Callaway et al. (2024, 2021) estimator for continuous treatment with staggered adoption:

$$D_{mt} = \sum_{k \neq -1} \delta_k \cdot \mathbf{1}[t - g_m = k] \cdot d_m + \alpha_m + \gamma_t + \varepsilon_{mt} \quad (3)$$

where d_m is the maximum cumulative draft rate market m reached during 1942-1945, g_m is the first year market m experienced any draft shock, and δ_k captures the average effect per percentage point of maximum draft intensity k years after initial exposure. The specification compares markets with different eventual maximum intensities at the same event time since first treatment. The control group consists of not-yet-treated markets. Intuitively, this specification tests whether markets that eventually experienced more severe shortages show proportionally larger discrimination reductions at each point in time after their first exposure.

Appendix Figure A.6 reveals that the per-unit effect of maximum intensity evolves over time. The effect begins at approximately -1.0 percentage points per percentage point of maximum intensity at onset, deepens to -1.5 to -2.0 within two years, then stabilizes through year 10. This deepening-then-plateau pattern indicates that the marginal impact of higher maximum intensity weakens over time. Markets experiencing 40 percent maximum shortages do not show proportionally larger effects than markets experiencing 20 percent shortages after the initial years. This pattern is consistent with heterogeneous employer responses: the least discriminatory employers integrate under moderate shortages, while highly discriminatory employers remain exclusionary even when facing the most severe labor scarcity.

4.4.2 Alternative Empirical Specifications

We assess whether our main findings are robust to alternative specifications and measurement choices, addressing concerns about confounding factors and classification sensitivity. The stability of our estimates across increasingly demanding specifications provides strong evidence for the exogeneity of our identifying variation. Figure 7 shows that robustness extends to alternative fixed effects structures. Coefficients remain remarkably stable whether we use a parsimonious specification with only market- and time- fixed effects or a saturated model with defense contracts, and occupation-specific controls. This insensitivity to controls reinforces that our identifying variation stems from age-based draft assignment rather than wartime production shocks, occupation-specific trends, or other confounding factors.

4.4.3 Alternative Measurements of Racial Preferences

We examine sensitivity to measurement choices in racial preferences using both event study (Appendix Figure A.7) and difference-in-differences designs (Table 3). Column (2) excludes the term “American” and related nationality indicators from white-preference classifications. During this period, “American” often coded for native-born whites in contrast to recent European immigrants. The coefficient remains virtually unchanged at -1.108 percentage points, ruling out that our results merely capture anti-immigrant sentiment rather than racial discrimination. Column (3) excludes German and Italian nationalities—the Enemy Axis powers—from white-preference classifications. If our results reflected patriotic solidarity with Allied Europeans, removing enemy nationality terms should increase the coefficient magnitude. Instead, it attenuates to -0.683 percentage points, suggesting these enemy-nationality terms were actually used as substitutes for racial categories during wartime. Appendix Figure A.7a and Figure A.7b show these patterns persist in dynamic specifications. The consistency of results across these alternative definitions reinforces confidence that our estimates capture genuine racial discrimination rather than other forms of social preference or wartime sentiment.

4.5 Validation of Research Design

The causal interpretation of our estimates requires validating the assumptions established in Section 4.1.

Age-Based Conscription Binds. If draft rates were truly determined by age-based conscription rules as the historical narrative indicates, then pre-war age composition should strongly predict draft rates. Appendix Figure A.8 confirms this institutional account. County-occupation cells with 10 percentage points more workers aged 21–25 experienced draft rates 8.4 percentage points higher, with effects declining for older age groups and becoming statistically insignificant for workers over 35. This age gradient aligns with Selective Service regulations prioritizing men in their early twenties for conscription. Pre-war age composition explains 38.5 percent of cross-cell variation in draft rates, confirming that conscription intensity reflected predetermined demographic patterns.

Draft Rates at Market Level Unrelated to Economic Conditions. Assumption 1 requires that draft intensity is uncorrelated with unobserved determinants of discrimination trends. A potential violation of this assumption is that draft rates could reflect economic condi-

tions rather than age structure alone, violating the parallel trends assumption. We would ideally want to test parallel trends on annual economic conditions but that data is not available at the time series level. Instead, Appendix Figure A.9a Panel (a) shows age structure strongly predicts draft rates: a 10 percentage point increase in the share of workers aged 18-25 raises draft rates by 5.4 percentage points, with age structure explaining 54 percent of variation across markets. Panel (b) tests whether economic factors independently drive draft rates. After residualizing draft rates on age structure and marital status, we find no correlation with an economic index combining 1940 wages, education, employment rates, and weeks worked (correlation = -0.041, statistically insignificant). This confirms our identifying variation stems from predetermined demographics rather than economic characteristics.

Within-Market Selection Independent of Worker Productivity. Assumption 1 requires that draft intensity is uncorrelated with unobserved determinants of discrimination trends. A potential threat to identification is that draft rates could reflect economic conditions rather than age structure, violating parallel trends. While we cannot directly test parallel trends using annual economic conditions due to data limitations, we test whether cross-sectional variation in draft rates stems from demographics or economic selection using 1940 pre-war data. Appendix Figure A.9a Panel (a) shows age structure strongly predicts draft rates among workers aged 18-25—the cohort facing peak conscription risk during 1940-1945—with age structure explaining 54 percent of variation across markets. Panel (b) tests whether economic factors independently drive draft rates. After residualizing draft rates on age structure and marital status, we find no correlation with an economic index combining 1940 wages, education, employment rates, and weeks worked. The finding supports that our identifying variation stems from predetermined demographics rather than economic characteristics.

Ruling Out Wartime Production Effects. Our exclusion restriction requires that draft exposure affects discrimination solely through reduced White worker availability, not through other wartime channels. We test two potential violations: defense contracts and essential worker deferments. If draft effects operated through federal oversight or spillovers from defense production, counties with defense contracts should show systematically different draft rates. We test this using Jaworski’s (2017) defense contract records for Southern states.¹⁴ Appendix Figure

¹⁴This regional focus provides a particularly stringent test: the South received substantial wartime investment as part of federal efforts to modernize its economy, and it was precisely in these states—with their history of institutionalized discrimination—where federal oversight and defense-related integration pressures would have

[A.11a](#) shows counties with defense contracts average 3.85 percent draft rates versus 4.26 percent without contracts—a statistically insignificant 0.41 percentage point difference ($p = 0.29$). Defense investment explains only 0.2 percent of draft rate variation, ruling out that defense production drives our results. Moreover, if systematic deferments in essential occupations drive our results, excluding these workers should change our findings. Appendix Figure [A.11b](#) compares coefficients from linear probability models of draft status on productivity measures for the full sample versus excluding essential occupations. Coefficient stability confirms our identifying variation captures pure labor scarcity effects rather than systematic deferrals.

5 Conceptual Framework: Labor Scarcity and Wage Dynamics

The preceding analysis shows that labor scarcity substantially altered employer hiring: race-specific job postings declined sharply in high-draft markets, indicating employers opened positions to Black workers previously excluded. This raises questions about wage effects for both groups. Standard theory predicts White wages should rise when White labor becomes scarce. Yet, if Black workers’ reallocation into previously high-cost firms creates sufficient competition for incumbent White workers, this may offset—or reverse—the scarcity premium. Which force dominates and what are the implications for the racial wage gap?

We develop a model with imperfect factor substitution following [Acemoglu et al. \(2004b\)](#)’s labor supply framework, extended to allow for heterogeneous hiring costs of Black workers across firms. The key insight is that labor scarcity operates through two channels. A direct scarcity effect raises wages for the scarce labor, while a reallocation channel intensifies competition as Black workers move into firms that previously employed few of them due to high integration costs. When reallocation dominates, White wages can fall despite reduced supply, narrowing the racial wage gap as it has been vastly documented in the literature ([Goldin and Margo, 1992](#); [Charles and Guryan, 2008](#)). We derive predictions for how draft-induced scarcity affects wages and employment by race, testing them in Section 6. The full model details and derivations are in Online Appendix [E](#).

5.1 Setup

Firms produce using capital (K_j), White labor (W_j), and Black labor (B_j) via nested CES technology with elasticity of substitution $\sigma_{WB} \equiv 1/(1 - \rho)$ between White and Black labor.¹⁵

been most transformative if they mattered.

¹⁵The production function is defined as $Y_j = AK_j^\alpha [(1 - \lambda)(\phi^W W_j)^\rho + \lambda(\phi^B B_j)^\rho]^{(1-\alpha)/\rho}$ where $\alpha \in (0, 1)$ is the capital share parameter, $\rho \leq 1$ determines the substitutability between White and Black labor. The aggregate

Prior to WWII, widespread workplace segregation meant that most firms had organized production around exclusively White workforces.¹⁶ We embed this institutional feature into the model: firms face heterogeneous costs of hiring and integrating Black workers into their workforces. Firm j is characterized by a hiring cost parameter $c_j \sim G(c)$ that captures frictions in recruiting Black workers and workplace reorganization expenses arising from historical exclusion. When hiring Black workers, firm j incurs integration costs $c_j w^B B_j$, representing expenses for workplace reorganization, recruiting infrastructure, and training. The firm's optimization problem is:

$$\max_{W_j, B_j, K_j} Y_j - w^W W_j - w^B B_j - r^K K_j - c_j w^B B_j \quad (4)$$

Firm j pays Black workers the market wage w^B but faces total labor costs of $w^B(1 + c_j)$ per Black worker when integration expenses are included. Labor supplies N_W, N_B are inelastic in the short run. Profit maximization yields firm j 's optimal labor ratio:¹⁷

$$\frac{B_j}{W_j} = \left[\frac{\lambda}{1 - \lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1 + c_j} \right]^{\sigma_{WB}} \quad (5)$$

where $\omega \equiv w^W/w^B$ denotes the White-Black wage ratio, $\lambda \in (0, 1)$ is the distribution parameter governing the relative productivity weight on Black labor, and ϕ^W, ϕ^B are factor-augmenting race-specific productivity parameters. Firms with lower c_j employ relatively more Black workers. Market clearing determines equilibrium wages; existence and uniqueness proven in Appendix E.3.3.

5.2 Model Predictions

We analyze how wages respond to changes in White labor supply N_W , holding N_B constant—the relevant experiment for the WWII draft.

Baseline Direct Effects. With capital fixed at \bar{K} and effective White labor share $s_W = (1 - \lambda)(\phi^W N_W/L)^\rho$, the direct wage elasticities are:¹⁸

effective labor is $L = [(1 - \lambda)(\phi^W N_W)^\rho + \lambda(\phi^B N_B)^\rho]^{1/\rho}$

¹⁶As historians document, Jim Crow customs in the South and de facto segregation elsewhere created separate facilities for schooling, worship, housing, and other aspects of social and economic life (Honey, 2000). Recent research documented the extent of discriminatory public accommodations in the pre-Civil-Rights-Era (Cook et al., 2022). Integrating Black workers into previously White-dominated positions thus required real reorganization costs.

¹⁷The full derivation is in Appendix E.2.

¹⁸Derivations in Appendix E.4.

$$\left. \frac{d \ln w^W}{d \ln N_W} \right|_{\text{direct}} = -s_W \alpha - \frac{1 - s_W}{\sigma_{WB}} < 0, \quad \left. \frac{d \ln w^B}{d \ln N_W} \right|_{\text{direct}} = -s_W \alpha + \frac{s_W}{\sigma_{WB}} \quad (6)$$

Both terms in the White wage expression are negative: reduced White labor raises the capital-labor ratio (capital dilution effect) and makes White workers scarce (substitution effect). Thus White wages should rise when N_W falls. Black wages rise when $\sigma_{WB} > \alpha$ (complementarity dominates capital dilution). The relative wage response is $d \ln(w^W/w^B)/d \ln N_W = -1/\sigma_{WB}$.

The Reallocation Channel. When White labor becomes scarce, ω rises. From equation (5), all firms increase their Black-White ratios. Critically, firms with high c_j that previously employed few Black workers now find it profitable to hire them despite high integration costs. This reallocation of Black workers from low-cost (low- c_j) to high-cost (high- c_j) firms creates additional competition for White workers beyond the direct effect.¹⁹ When many firms lie near the integration threshold—meaning the density $g(c^*)$ is high at the marginal cost level—the extensive margin response is strong. In this case, the increased competition from Black workers reallocating into previously inaccessible firms can dominate the direct scarcity effect, causing White wages to fall despite White labor scarcity. Black wages benefit from both complementarity with scarce White labor and increased employment opportunities at previously inaccessible firms, unambiguously rising.

Testable Predictions. The model generates predictions for high-draft markets (lower N_W) relative to low-draft markets, corresponding to the triple-difference specification in equation (7):

1. White wages ($\pi_1 < 0$) lower when the reallocation channel dominates the direct scarcity effect
2. Black wages ($\pi_1 + \pi_2 > 0$) higher due to complementarity and increased employment opportunities
3. Wage gap ($\pi_2 > 0$) narrows as both effects work toward convergence
4. Black employment higher, especially in previously high-cost occupations

¹⁹The aggregate wage elasticities in equation (6) depend only on production technology parameters (α, σ_{WB}) and factor supplies, not on the distribution of integration costs $G(c)$. The integration costs affect the cross-sectional allocation of Black workers across firms and create the reallocation mechanism described here, but do not independently shift aggregate wage levels. The reallocation channel provides economic intuition for how firms' extensive margin adjustments amplify the wage effects implied by the production structure.

5. Occupational upgrading as Black workers access higher-paying positions

The magnitude of these effects depends on three structural parameters: the elasticity of substitution σ_{WB} , the density of firms near the integration margin $g(c^*)$, and how responsive hiring patterns are to wage changes. Section 6 tests these predictions using individual-level Census data, exploiting variation in draft intensity across local labor markets to provide structural interpretation for the reduced-form findings.

6 Effects on Worker-Level Outcomes

When preferred workers become scarce, how do employment outcomes change across racial groups? This section examines how labor shortages affected individual employment outcomes, comparing how racial gaps evolved differently across high- and low-draft markets before and after the draft removed substantial shares of the white workforce. Given historical barriers to equal treatment in labor markets, we examine whether test whether market pressure alone, via acute labor scarcity, can generate convergent outcomes across Black and White workers.

6.1 Empirical Strategy

6.1.1 Triple-Difference Research Design

The identification strategy leverages within-racial group variation across local labor markets over the 1940-1950 decade, comparing workers in markets that experienced differential exposure to draft-induced White labor scarcity based on their 1940 location. The inclusion of race-by-year fixed effects is crucial for our research design. These absorb aggregate differential time trends between racial groups that might otherwise confound our results, including national differences in migration propensities, convergence in Black-White wage gaps unrelated to local draft exposure, and economy-wide labor market conditions that affect Black and White workers differently. The baseline specification estimates,

$$Y_{it} = \pi_1(\tilde{s}_m \times \text{Post}_t) + \pi_2(\tilde{s}_m \times \text{Post}_t \times B_i) + Z'_{it}\phi + \mu_m + \lambda_t + \nu_{B \times t} + \eta_{it} \quad (7)$$

where Y_{it} denotes outcomes for individual i at time t ; \tilde{s}_m measures the white male draft rate (ages 21-45) in the market m where the individual was at baseline; Post_t indicates the post-war period (1950); B_i is a Black worker indicator; $\nu_{B \times t}$ represents race-specific time trends; μ_m are market fixed effects; and λ_t are year fixed effects. Z'_{it} contains individual-level demographic (age,

age squared, urban) and economic controls (farm status, ownership of house, education levels dichotomized) measured in 1940, and occupation specific time trends. These controls account for observable differences in worker characteristics that might correlate with both market-level draft exposure and employment outcomes, ensuring that our estimates capture employer responses to labor scarcity rather than pre-existing differences in worker quality or characteristics across high- and low-draft markets. Standard errors are two-way clustered by origin market and two-digit occupation. The coefficient π_1 identifies the effect of draft exposure on white workers, while π_2 captures the differential effect for Black workers. The total effect on Black workers is $\pi_1 + \pi_2$.²⁰

6.1.2 Identifying Assumptions

Our identifying assumption requires that, absent draft-induced labor shortages, the evolution of racial gaps would have been similar across markets with different pre-war age structures, conditional on race-specific time trends. For this assumption to be satisfied, draft-induced variation in White male labor supply must be uncorrelated with other market-specific determinants of racial employment gap evolution (which are absorbed by race-by-year fixed effects). Beyond the parallel trends assumption, our identification also requires that draft-induced labor shortages affect racial employment gaps exclusively through labor market competition rather than through changes in discriminatory preferences or federal anti-discriminatory policy interventions. Section 6.4 provides comprehensive empirical tests validating both assumptions.

6.2 Main Results: Employment and Earnings

This section examines how draft-induced labor scarcity affected individual employment outcomes for the same workers observed in both 1940 and 1950, exploiting the panel structure to isolate labor market responses while holding worker identity constant. All estimates follow from the specification in equation (7) and represent effects of a 10 percentage point increase in the local White male draft rate.²¹

6.2.1 Occupational Income, Labor Supply and Migration

Draft-induced scarcity drove Black workers into substantially higher-earning occupations, with more modest gains for White workers. Both groups increased labor force participation,

²⁰This specification absorbs the main effects and two-way interactions from the full parameterization: $Y_{it} = \alpha + \alpha_1 D_m + \alpha_2 \text{Post}_t + \alpha_3 B_i + \pi_1(D_m \times \text{Post}_t) + \pi_2(D_m \times B_i) + \pi_3(\text{Post}_t \times B_i) + \pi_4(D_m \times \text{Post}_t \times B_i) + Z'_{it}\phi + \mu_m + \lambda_t + \nu_{B \times t} + \eta_{it}$ through the separate market and year fixed effects, individual-level controls and occupation and racial group trends, leaving only the variation needed for identification.

²¹Appendix Table A.3 reports complete regression results for all outcomes discussed in this section, including coefficient estimates, standard errors, sample sizes, and pre-treatment means for White and Black workers.

though effects on employment rates were negligible. Figure 8 panel (a) shows that the occupational earnings rank—a percentile measure of the share of occupations with lower median earnings—increased by 6.7 percentile points for Black workers and 3.9 percentile points for White workers per 10 percentage point increase in draft exposure, representing approximately 17 percent and 7 percent of their respective baselines.²² Panel (b) confirms this pattern at the wage level: the median income of occupations held by Black workers rose by 30 dollars (1950 prices), a 1.5 percent increase, while the effect for White workers is not statistically distinguishable from zero.²³

Labor Force and Employment. Labor supply expanded modestly at the participation margin but not through employment (panel c). Black workers increased labor force participation by 0.2 percentage points while White workers increased by 0.1 percentage points, with no detectable employment effects for either group. Given high baseline participation rates exceeding 88 percent and the small magnitude of these effects, draft-induced scarcity primarily enabled existing workers to access higher-quality jobs rather than drawing new entrants into the labor force.

Geographic Mobility. Workers in high-draft markets increased local mobility but sharply reduced long-distance migration, with particularly pronounced reductions among Black workers. Panel (d) reveals this divergent pattern. Out-of-county migration increased modestly—4.3 percentage points for White workers and 1.8 percentage points for Black workers—suggesting some geographic reallocation within regional labor markets. Out-of-state migration shows the opposite: Black workers reduced interstate moves by 2.7 percentage points, a large 43 percent decline, while White workers show a smaller, statistically insignificant decline.

These results indicate that workers adjusted to draft-induced scarcity by accessing opportunities within their existing regional labor markets rather than migrating long distances. High-draft markets—often urban centers with expanding wartime employment—offered sufficient local opportunities to reduce incentives for distant relocation. South-to-North migration shows minimal effects (see Appendix Table A.3), suggesting the broader wartime economic transformation drove large-scale Great Migration flows more than local variation in draft intensity.

²²The occupational earnings rank is the percentile position of an occupation’s standardized median earnings, scaled 0-100.

²³The occupational income score (OCCSCORE) assigns to each occupation the median total income (in hundreds of 1950 dollars) of all persons with that occupation in 1950. The estimated coefficient of 0.302 thus represents an increase of 30.2 dollars.

Having documented substantial occupational upgrading with limited geographic reallocation, we now examine whether these shifts in job quality translated into corresponding wage gains.

6.2.2 Racial Wage Gap

Draft-induced labor shortages narrowed the Black-White wage gap substantially—White workers’ wages fell while Black workers’ wages rose—contradicting standard predictions that labor scarcity should raise wages for scarce workers. Standard competitive models predict draft-induced scarcity should raise White workers’ relative wages as their supply contracts. Instead, relative wages converged precisely when White workers became scarcer, indicating that demand-side forces overweight supply-side adjustments

Figure 9 presents the evidence. White workers experienced wage declines of 0.043 standard deviations per 10 percentage point increase in draft exposure, while Black workers gained 0.025 standard deviations, closing the racial wage gap by 2.1 percentile points. In dollar terms (1999 prices), White workers lost 16 dollars per year while Black workers gained 2 dollars, though the latter effect is not statistically significant. At mean draft exposure (20.9 percent), relative labor scarcity reduced the Black-White wage gap by 0.14 standard deviations—a 29 percent decline in White wages and a 24 percent gain in Black wages.

These estimates align with the aggregate convergence patterns documented by [Bayer and Charles \(2018\)](#), who find the median Black-White earnings gap declined substantially during the 1940s, narrowing from 100 log points in 1940 to approximately 70 log points by 1950. At the 75th percentile of draft exposure (28 percent), our effects scale to 40 percent White wage declines and 33 percent Black wage gains, suggesting draft-induced labor scarcity accounts for a meaningful portion of the 1940s convergence.

This pattern of wage convergence—driven by White wage declines rather than Black wage increases alone—is unsupported by pure supply-side effects and instead suggests shifts in employer demand in response to draft-induced scarcity. The co-movement between the occupational upgrading documented in Section 6.2.1 and wage gains for Black workers, juxtaposed with wage penalties for White workers despite their increased relative scarcity, suggests that employers expanded access for Black workers to previously restricted positions rather than simply bidding up wages for the remaining White workforce. To understand these adjustments more fully, we now examine the specific mechanisms underlying this labor market response: sectoral reallocation, work intensity adjustments, and human capital accumulation.

Interpreting Wage Convergence Through the Conceptual Framework. In the conceptual framework in Section 5, the model predicts that when labor scarcity operates through competing channels—a direct scarcity effect raising wages for scarce workers, and a reallocation channel where Black workers move into previously restricted positions—White wages can fall if reallocation dominates. Our estimates confirm that the reallocation channel dominated the direct scarcity effect, as indicated by the negative White wage coefficient ($\pi_1 < 0$). The positive total effect on Black wages ($\pi_1 + \pi_2 > 0$) reflects complementarity with scarce White labor and reduced hiring frictions. The differential response ($\pi_2 > 0$) captures the wage gap convergence. Combined with the occupational upgrading documented in Section 6.2.1, the evidence validates all five theoretical predictions.²⁴, and the responsiveness of hiring patterns to wage changes. The framework interprets these results as evidence that draft-induced scarcity forced high-cost employers to hire Black workers, creating competition that reduced White wages while enabling Black workers’ occupational upgrading—reconciling the counterintuitive finding that White wages declined precisely when White labor became scarce.

6.3 Mechanisms Analysis

We examine three channels through which draft-induced scarcity may have generated the occupational upgrading and wage convergence documented above: reallocation across industries, adjustments in work intensity along the hours margin, and human capital accumulation through additional schooling.

6.3.1 Sectoral Reallocation

Figure 10 documents how draft exposure affected industrial allocation across racial groups. Consistent with historical accounts of postwar Black economic advancement, draft-induced labor shortages shifted Black employment away from agriculture and personal services, into wholesale trade, transportation, and professional services—sectors experiencing rapid wartime expansion. These sectoral shifts occurred at substantially higher rates for Black workers than White workers, though both groups increased government employment proportionally.

Black workers reduced agricultural employment by 0.6 percentage points per 10 percentage point increase in draft exposure (a 20 percent decline from baseline), while White workers reduced by 0.2 percentage points. This displacement, echoing patterns of the Great Migration’s final phase, occurred as labor scarcity facilitated shifts toward expanding urban sectors. Black

²⁴These magnitudes depend on three structural parameters: the elasticity of substitution σ_{WB} , the density of firms near the integration margin $g(c^*)$

workers moved into wholesale trade, transportation, and professional services at substantially higher rates than White workers—with wholesale trade absorption increasing 24 percent relative to baseline. Both groups increased government employment proportionally, though the estimate for Black workers is less precise. These gains—concentrated in industries experiencing formal anti-discrimination provisions or acute labor needs—align with recent evidence from [Ferrara \(2022\)](#) documenting war casualty-induced integration into semi-skilled and skilled sectors.

White workers largely experienced sectoral stability except for increased access to wholesale trade, retail, and government employment. Notably, retail employment shows statistically significant effects only for White workers, while Black workers experienced no corresponding gains. This asymmetry—White gains without corresponding Black gains—suggests that retail positions either remained segregated or shifted to other demographic groups (potentially women), rather than creating opportunities for Black male advancement. The continued exclusion of Black men from retail expansion aligns with consumer discrimination mechanisms documented in the literature on customer-facing occupations (see, for instance, [Leonard et al. \(2010\)](#); [Sundstrom \(1994\)](#)).

The sectoral shifts directly link to the occupational upgrading documented in [Section 6.2.1](#). Black workers’ reallocation from agriculture into wholesale trade and transportation—sectors with substantially higher average wages—generated a significant portion of the occupational improvements that contributed to wage convergence.

6.3.2 Work Intensity

[Figure 11a](#) documents how draft exposure affected work intensity across racial groups. Both White and Black workers reduced work intensity along multiple dimensions, though reductions were consistently more modest for Black workers. White workers reduced full-time hours employment and full-time, full-year work substantially (by 2.5 percent and 7 percent of baseline, respectively), while Black workers experienced smaller reductions with no statistically significant changes in full-time, full-year work. These reductions indicate differential labor market adjustments across racial groups. White workers experienced demand contractions in their typical occupations, reflected in both reduced hours and wage declines. Black workers’ modest work intensity reductions, despite wage gains, suggest they were transitioning to higher-quality positions rather than facing reduced labor demand.

The asymmetric responses in work intensity connect directly to the wage patterns documented in [Section 6.2.2](#). White workers experienced both wage declines and substantial work

hour reductions as labor demand contracted in their typical occupations. Black workers, by contrast, experienced only modest work intensity reductions alongside wage gains, indicating that their labor market improvements reflected access to better-quality positions. The combination of occupational upgrading (Section 6.2.1), wage convergence, and relatively maintained work intensity for Black workers reveals that expanded access to higher-quality jobs generated net improvements in their labor market position, even as White workers experienced demand contractions in their traditional occupations.

6.3.3 Human Capital

Figure 11b shows that Black workers in high-draft markets increased educational attainment by 0.13 years—a 1.2 percent gain from baseline—while White workers showed no statistically significant change. These educational gains merit careful interpretation. Because our sample consists of working-age adults already established in the labor market in 1940, these increases necessarily reflect completion of additional schooling during the 1940-1950 decade rather than compositional changes or cohort differences.

The coincidence of educational gains with occupational upgrading (Section 6.2.1) and wage convergence (Section 6.2.2) suggests a mutually reinforcing dynamic: improved labor market opportunities during the war years may have increased perceived returns to additional education, while additional schooling in turn enabled access to higher-quality occupations. This pattern aligns with broader historical evidence that the 1940s marked substantial educational expansion for Black Americans, particularly in urban areas outside the South where labor market opportunities were rapidly expanding during and after the war (Bayer and Charles, 2018; Margo, 1986).

6.4 Validity of the Research Design

6.4.1 Parallel Trends: Ruling Out Selection and Pre-Existing Trends

The identification strategy requires that high-draft and low-draft markets would have followed parallel trends in the absence of treatment. Two primary mechanisms could violate this assumption. First, selective migration: more productive white workers might have sorted into low-draft markets before 1940 in anticipation of differential draft exposure, creating systematically different pre-war workforce compositions. Second, selective draft removal: draft boards might have systematically removed white workers from occupations with high Black-white substitutability, making our estimated effects capture selective removal rather than average labor

scarcity.²⁵

Draft Rates Are Uncorrelated with Migration Push and Pull Factors. We test whether draft rates predict pre-war migration patterns or correlate with factors known to drive the Great Migration listed in Boustan (2016). Appendix Table 4 reports bivariate regressions of standardized draft rates on migration measures and push and pull factors from Boustan (2016). Panel A shows small negative correlations with general migration but no relationship with South-to-North migration, the primary channel of the Great Migration. Panel B demonstrates that draft rates are uncorrelated with all six push and pull factors in Southern counties—cotton acreage, agricultural employment, tenant farming, mechanization, New Deal payments, and wartime defense contracts—with all coefficients statistically insignificant and R-squared values near zero. Panel C confirms this null result extends to theoretically-motivated interactions. The joint F-test for all eleven variables yields confirms draft rates were orthogonal to the structural economic forces driving pre-war migration.

Parallel Pre-Trends in the Underlying Mechanism. We directly examine whether high-draft and low-draft markets exhibited differential pre-war trends in discriminatory hiring. Figures 5 and 6 show that discriminatory job advertisement rates followed parallel trends across high and low draft markets before 1942, with divergence beginning precisely when draft-induced labor shortages emerged. This parallel pre-trend in the mechanism—employer demand for specific racial groups—directly addresses both concerns. If productive white workers had sorted into low-draft markets before 1940, or if draft boards had systematically removed whites from substitutable occupations, we would observe differential trends in discriminatory preferences before mobilization began. The evidence shows no such differential trends, confirming our findings reflect genuine responses to labor scarcity rather than pre-existing differences or selective removal patterns.

6.4.2 Testing the Exclusion Restriction

Military Segregation Rules Out Attitude Changes from Interracial Contact. The exclusion restriction is particularly plausible because the U.S. military remained strictly segregated throughout WWII, eliminating the integrated contact mechanism that might have re-

²⁵Market-level selection concerns are addressed in Section 4.5. Appendix Figure A.10 shows that within county-occupation cells, draft selection was based on statutory criteria (age and family status) rather than productivity characteristics. Appendix Figure A.11a demonstrates that defense production was uncorrelated with draft rates, eliminating confounding from wartime industrialization.

duced discriminatory attitudes among white soldiers.²⁶ Moreover, the primary federal anti-discrimination intervention—Executive Order 8802 establishing the Fair Employment Practice Committee (FEPC) in 1941—had severely constrained practical impact. The FEPC could not impose fines, cancel contracts, or compel hiring, and Congress terminated it in 1946.²⁷

Alternative Measures Confirm Labor Scarcity as the Causal Mechanism. Beyond ruling out attitude and policy channels, we test whether our draft rate measure itself captures pure labor scarcity or reflects correlated confounds. To isolate the labor scarcity mechanism, we exploit two alternative measures of wartime disruption: the share of draftees among all enlistees, and combat casualties per enlisted man. These three measures differ critically in their potential correlation with confounding factors. The draft share removes voluntary enlistment patterns that could reflect local economic conditions or racial attitudes. Casualty rates add the essentially random component of combat assignment and survival. If selection patterns drove our results, these measures would produce divergent estimates. Instead, all three yield virtually identical effects—strong evidence that white male labor scarcity, not confounds, drives our results.

Appendix Figure A.12 presents coefficient estimates from the triple-difference specification. For white workers (panels (a)-(b)), estimates remain stable across measures. Educational outcomes cluster near zero across all specifications. Industry access shows consistency: the most variation appears in agriculture (2 to 6 percentage points), while manufacturing, government, retail, and professional services remain within 1 percentage point. Black worker effects show even stronger robustness (panels (c)-(d)). Wage percentile rank improvements converge at approximately 0.55-0.58 standard deviations. Industry access mirrors this stability: point estimates remain within 1-2 percentage points regardless of treatment measure.

This convergence across conceptually distinct measures strengthens our causal interpretation. The draft rate depends on age structure, the draft share reflects local board stringency, and casualty rates incorporate random combat assignment. That all three yield virtually identical racial differentials confirms our findings reflect genuine labor market responses to white

²⁶The military was not integrated until Executive Order 9981 in 1948 (MacGregor, 1981). Schindler and Westcott (2021) finds that segregated African American soldiers reduced prejudice among British civilians where they were stationed. However, this contact-theory mechanism is irrelevant since white soldiers served in segregated units throughout the war.

²⁷The FEPC could only investigate complaints, hold hearings, and issue non-binding recommendations that employers largely ignored (Reed, 1991). Collins (2001) documents modest effects concentrated in Northern defense plants. Delmont (2022) documents that Black workers and civil rights organizations repeatedly protested FEPC’s inability to enforce its rulings.

worker scarcity rather than confounding wartime effects.

6.5 Robustness Tests for Worker-Level Results

6.5.1 Alternative Specifications

Appendix Figure A.13 demonstrates robustness across increasingly stringent specifications. We progressively add race-by-time as well as market-by-race and occupation trends to address differential trends concerns. Panel (a) shows white worker employment outcomes remain stable across all three specifications, with labor force participation, employment status, and occupational income showing consistent point estimates whether we include basic controls or additional controls. Panel (c) confirms this stability extends to industry access: estimates cluster tightly across specifications for most sectors, with manufacturing, government, retail, and professional services showing particularly stable coefficients.

Black worker results in Panels (b) and (d) reveal similar robustness. Employment outcomes—labor force participation, employment status, and occupational income—remain significant across all specifications. Industry access patterns in Panel (d) show consistent effects across sectors, with point estimates maintaining both magnitude and sign under increasingly demanding fixed effect structures. The persistence of core effects under increasingly demanding specifications strengthens our causal interpretation while illuminating mechanisms through which draft-induced scarcity affected different groups.

6.5.2 Robustness to Sample Composition Thresholds

Labor market competition can discipline discrimination only in markets where employers can substitute between racial groups. If our results reflect competitive pressure from labor scarcity, effects should be strongest in markets with sufficient Black workers to enable substitution. Appendix Figure A.14 examines wage effects across samples defined by minimum racial diversity thresholds requiring county-occupation markets to contain at least $T \in \{0, 10, 15\}$ workers of each race in 1940. The pattern strongly supports the competitive mechanism. For white workers, wage effects are small and sometimes negative in the unrestricted sample ($T = 0$), but stabilize at modest positive values in more integrated markets. For Black workers, the evidence is even more striking: total wage effects increase monotonically from approximately 0.03 standard deviations at $T = 0$ to 0.05-0.06 at $T = 15$. This monotonic strengthening as we restrict to racially diverse markets confirms our estimates capture genuine competitive dynamics. The strengthening effects align precisely with the Beckerian prediction that discrimination becomes

costly only in markets with sufficient cross-race substitutability.

6.5.3 Sample Coverage

We test whether results are robust to expanding sample coverage beyond our primary estimation sample. Appendix Table A.4 examines a sample that relaxes the temporal coverage requirement from 25 to 20 years of panel presence, increasing observations from 3.3 to 5.0 million while maintaining individual-level restrictions (males aged 15-65). Panel A coefficients prove remarkably stable: manufacturing employment effects are 0.016 versus 0.015 in the main sample, government effects remain exactly 0.004, and retail effects hold at -0.014 in both specifications. This stability across samples with different geographic coverage indicates our findings reflect systematic labor market responses rather than idiosyncrasies of specific markets.

This stability extends to core labor market outcomes in Panels B and C. Occupational income scores maintain consistent racial differentials across samples. Educational attainment shows similar treatment effects—white workers gain 0.044-0.051 years while Black workers gain 0.54-0.55 years, preserving the roughly ten-fold differential. Even wage and work intensity measures, typically sensitive to sample composition, maintain their qualitative patterns. The preservation of treatment effects across samples with different market compositions demonstrates that our estimates identify a causal parameter—the effect of white labor scarcity on employment outcomes—rather than a sample-specific correlation.

7 Additional Mechanisms: Employer-Level Evidence on Worker Reallocation

The previous section documents substantial wage convergence between Black and White workers in high-draft markets and market-wide mechanisms. This section examines firm-level mechanisms: did convergence operate through within-firm substitution—employers hiring Black workers to replace departing Whites—or through worker reallocation across firms?

We pursue two complementary empirical strategies. First, we use regression analysis to test whether firms facing draft-induced labor shortages increased their Black employment probability, as predicted by within-firm substitution. Second, we examine descriptive patterns in worker retention and firm composition to characterize the nature of worker reallocation across employers. Our analysis links workers' 1940 employers (from WWII draft registration records) to their 1950 Census outcomes, allowing us to track compositional changes at each firm. Our

main limitation is that we observe workers’ employers in 1940 but not in 1950 for those who left their original employer. This means we can identify retention and exit patterns from 1940 firms, but cannot track where workers moved. Despite this limitation, the retention patterns provide clear evidence on whether firms substituted Black for White workers or maintained stable racial compositions as workers sorted across employers.

7.1 Within-Firm Reallocation

Empirical Strategy. Our baseline specification for testing within firm effects exploits variation across firms, markets, and time:

$$B_{iet} = \delta_1(E_e \times \tilde{s}_m \times Post_t) + \delta_2(E_e \times Post_t) + \delta_3(\tilde{s}_m \times Post_t) + \tau_e + \lambda_t + \varepsilon_{iet} \quad (8)$$

where B_{iet} indicates whether worker i at employer e in year t is Black; E_e measures firm-level exposure (share of draft registered males aged 21-45) at firm e according to 1940 draft card records; \tilde{s}_m captures market-level draft intensity as defined in previous sections; and τ_e and λ_t are employer and year fixed effects. Under within-firm substitution, we expect $\delta_1 > 0$ as firms facing severe labor shortages should hire more Black workers to replace departing Whites, increasing the probability that workers at these firms are Black.

Results. Table 5 presents estimates from equation (8). The coefficient on the triple interaction is small and statistically insignificant across all specifications. As a back-of-the-envelope calculation to interpret the magnitude: a firm at the 75th percentile of draft exposure operating in a market at the 75th percentile of draft shock would experience only a 0.3 percentage point increase in the probability of Black employment—economically negligible and opposite in sign to the within-firm substitution prediction.

Even in markets experiencing the most severe labor scarcity, firms did not substitute Black for White workers. Appendix Figure A.15 shows a monotonic pattern in compositional changes: firms experiencing both Low Draft Shock and Low Exposure saw Black shares decline by 7.4 percentage points, rising monotonically to 9.0 percentage points for firms facing both High Shock and High Exposure. While this pattern validates the draft as the mechanism driving worker exits, it rules out within-firm integration as the response. Rather than hiring Black workers to replace departing Whites, the declining Black shares suggest that Black workers disproportionately left firms—particularly those with high baseline Black shares—while firms

maintained stable racial compositions.

Firm Composition Stability. If within-firm substitution drove convergence, firms facing draft-induced labor shortages should have substantially increased their Black employment shares, with all-White firms becoming integrated and integrated firms becoming majority-Black. Figure 12 shows this did not occur. The figure displays firm fixed effects from equation (8), ordering all-White employers in 1940 by their estimated τ_e . The vast majority of firms cluster at fixed effects near zero, indicating they remained predominantly White throughout the period. Among the 20,322 all-White firms in 1940, only a handful hired Black workers by 1950, and these integrated firms show fixed effects in the range of 0.5-0.7—indicating they became moderately integrated, not Black-majority workplaces.

The stability of fixed effects—with most firms remaining at zero rather than converging toward intermediate values—reinforces that firms maintained their baseline racial composition rather than substituting Black for White workers. The handful of all-White firms that integrated did so modestly, with named examples such as C.F. Braun & Co., Pennsylvania Railroad, Hotel Bellevue, and Franklin Ferguson Co. spanning manufacturing, hospitality, retail, and transportation sectors, suggesting the limited integration that occurred was not confined to a single industry. The key insight is that labor market integration remained minimal at the firm level: wage convergence operated through Black workers moving across the existing distribution of employers—from low-quality, high-Black-share firms to better opportunities—rather than through firms themselves becoming more integrated.

7.2 Between-Firm Movements

Having ruled out within-firm substitution, we turn to descriptive evidence on worker reallocation patterns across firms. Descriptive analyses of retention patterns and firm composition characterize how Black and White workers sorted across employers during this period.

Retention Patterns by Baseline Workforce Composition. Figure 13 reveals that White retention rates remain uniformly high (90-97 percent) across all firm types, while Black retention rates vary largely by baseline firm composition. Panel (a) shows Black workers at Token firms (0-5 percent Black in 1940) were actually more likely to stay than White workers. This advantage reversed completely at firms with higher Black shares: at Heavy firms (70-90 percent Black), Black workers left at much higher rates than White workers. Panel (b) plots this retention

differential, showing a steep downward-sloping gradient. The gap swings from a 3.1 percentage point Black retention advantage at Token firms to a 14.1 percentage point deficit at Heavy firms—a 17.2 percentage point total swing across the firm integration distribution.

This gradient contradicts exclusion from integrated firms (which would predict Black exits from Token firms, not Black-majority firms). Instead, the pattern reveals exits from low-quality jobs: Black workers at firms with high Black shares—concentrated in low-wage services and agriculture—left at higher rates when draft-induced scarcity reduced entry barriers elsewhere. Combined with the declining Black shares in Appendix Figure A.15, the evidence points to between-firm reallocation: Black workers moved from lower-quality employers to better opportunities, generating convergence through sorting across firms rather than integration within firms.

Interpretation. The evidence in this section suggests that wage convergence operated through between-firm reallocation rather than within-firm substitution. The regression analysis rules out within-firm substitution: firms did not substitute Black for White workers, as evidenced by the null effect of draft exposure on the probability of Black employment in Table 5 and declining Black shares in Figure A.15. The descriptive evidence on retention patterns and firm composition reveals the reallocation mechanism: Black workers at firms with high baseline Black shares (concentrated in agriculture and low-wage services) left at much higher rates than Whites at those same firms, with retention differentials increasing monotonically with baseline Black share. Draft-induced labor scarcity reduced entry barriers to better jobs, allowing Black workers to climb the job quality distribution by switching employers rather than ascending within firms, generating convergence through market forces with minimal White displacement.

8 Conclusions

We provide the first quasi-experimental evidence that market forces alone, absent regulatory intervention, can discipline racial preferences when the relative price of indulging prejudice becomes sufficiently high. By analyzing 16.8 million job advertisements spanning 1900-1970 and tracking 2.4 million workers across the 1940-1950 censuses, we demonstrate that market forces can reduce discriminatory practices and narrow racial wage gaps, but do so in ways that maintain rather than eliminate racial inequality. The results are consistent with canonical models in the economics of discrimination: as White workers became scarce, the implicit wage

premium required to maintain discriminatory preferences exceeded what employers were willing to pay. This aligns with research establishing labor shortages during the war broke down occupational barriers for Black workers (Maloney, 1994; Ferrara, 2022; Freeman et al., 1973).

Draft-induced white labor shortages generated a 1.1-1.4 percentage point reduction in discriminatory job advertisements per 10 percentage point increase in draft rates—a 7.5 percent decline relative to baseline. These effects persisted for over a decade, suggesting temporary shocks can shift discriminatory equilibria. This reduction in explicit racial preferences translated into meaningful wage convergence: at mean draft exposure, relative labor scarcity reduced the Black-White wage gap by 0.14 standard deviations—a 29 percent decline in White wages and a 24 percent gain in Black wages. This convergence occurred despite increased Black labor supply, contradicting standard competitive predictions and revealing that demand-side shifts toward previously excluded workers dominated supply-side adjustments. Our estimates identify reduced racial preference barriers due to labor scarcity as a key mechanism underlying the 1940s wage convergence documented by Bayer and Charles (2018).

Yet worker-level evidence reveals the limits of this market mechanism: Black workers gained access to better-paying occupations through substantial sectoral reallocation—exiting agriculture while entering wholesale trade, transportation, and professional services—but experienced reduced work intensity and little improvement in overall employment likelihood. Black workers responded through defensive human capital accumulation—increasing education by 0.13 years per 10 percentage point increase in draft rates while White workers showed no significant change. Our employer analysis reveals wage convergence operated through worker reallocation across a persistently segregated firm structure rather than within-firm integration. Despite severe labor shortages, firms maintained stable racial compositions, with Black workers climbing the job quality distribution by switching from low-quality employers to better opportunities rather than ascending within firms.

Theoretically, a narrowing wage gap reflects the interplay of production technology and firm adjustments: the elasticity of substitution between White and Black labor determines the rate of convergence, while Black workers moving into positions at firms with high hiring integration costs—those requiring workplace reorganization and new recruiting infrastructure—created competition that reduced White wages despite their increased relative scarcity, demonstrating that labor market pressure can overcome institutional barriers even when standard production forces predict divergence.

The transformation of discrimination from explicit exclusion to differential returns represents institutional resilience that competitive models fail to capture. Understanding employers' racial preferences and discrimination requires analyzing it as a system rather than a single friction. The wartime labor shortage represents one of history's largest labor supply shocks, yet even this intervention produced adaptation rather than elimination of racial inequality. Racial preferences operate through multiple reinforcing channels that respond dynamically to constraints. Our evidence suggests achieving efficient talent allocation requires sustained intervention across multiple margins rather than relying on market forces alone.

These findings have important implications for contemporary labor markets experiencing similar supply constraints—whether through declining fertility rates or migration restrictions—where demographic forces create labor scarcity comparable to wartime mobilization. Like the WWII draft, these demographic shifts may naturally erode racially-motivated barriers by making exclusion economically costly, even without explicit anti-discrimination policy. However, our results caution that reduced discrimination in hiring does not automatically translate to equal treatment within firms—labor shortages transform discrimination from exclusion to hierarchical integration, with minority workers gaining access but facing systematic disadvantage in job quality and work arrangements.

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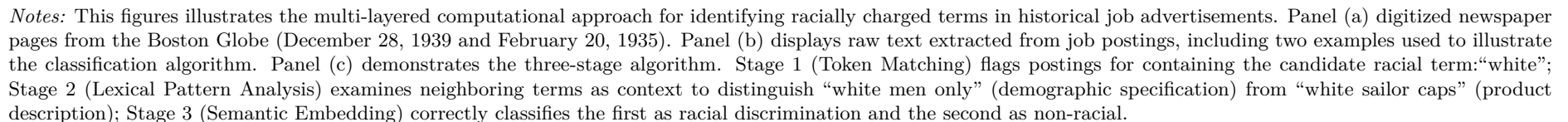
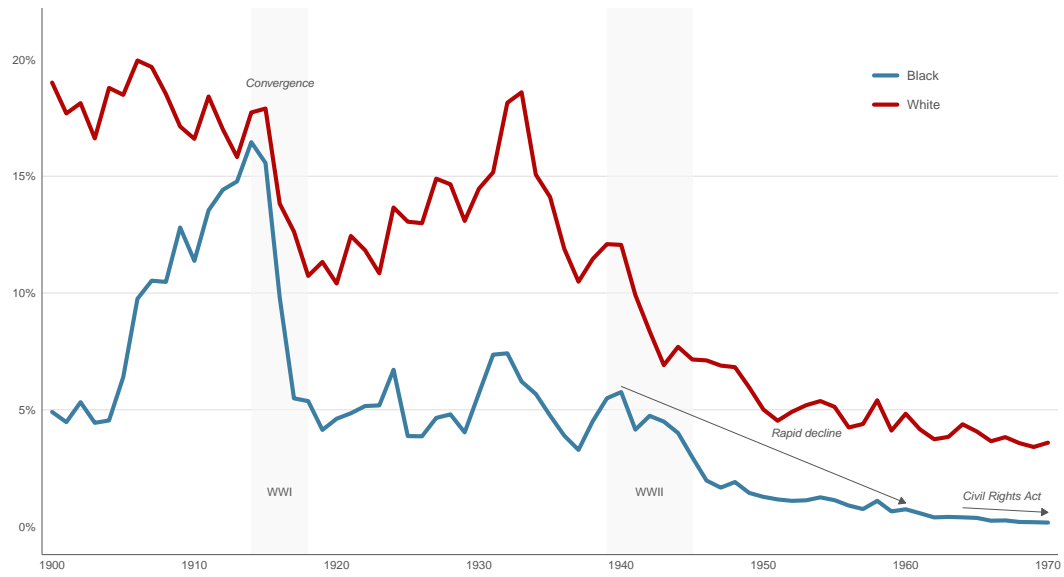
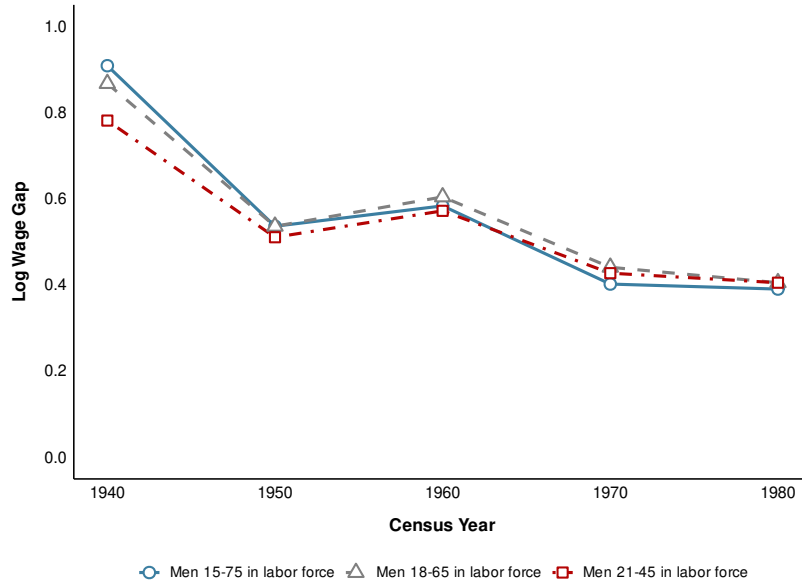


Figure 2: Share of Job Postings With Racial Preferences, 1900-1970



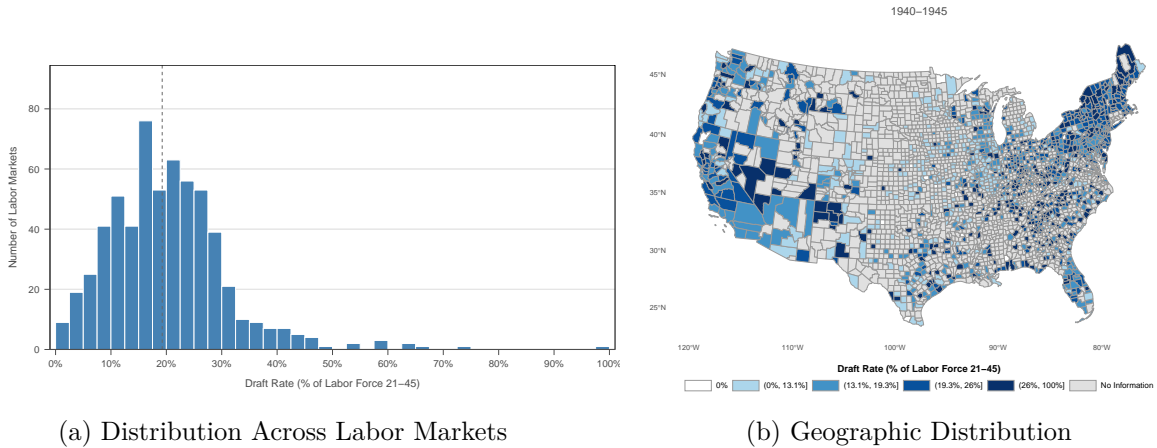
Notes: Annual shares of job advertisements specifying racial preferences from 16.8 million postings across thirteen newspapers. “Black” preferences identified through terms: African, colored, black, and negro. “White” preferences identified through: American, Belgian, British, Canadian, Caucasian, Danish, English, European, French, German, Irish, Italian, Polish, Russian, Scottish, Spanish, and Swedish. Classification employs regex patterns recognizing lowercase singular and plural forms. Shaded regions indicate World War I (1917-1918) and World War II (1942-1945). The series exhibits structural breaks in 1917, 1934, 1945, and 1958 (Chow test $p < 0.01$ for all breaks).

Figure 3: White-Black Log Median Wage Differential, 1940-1980



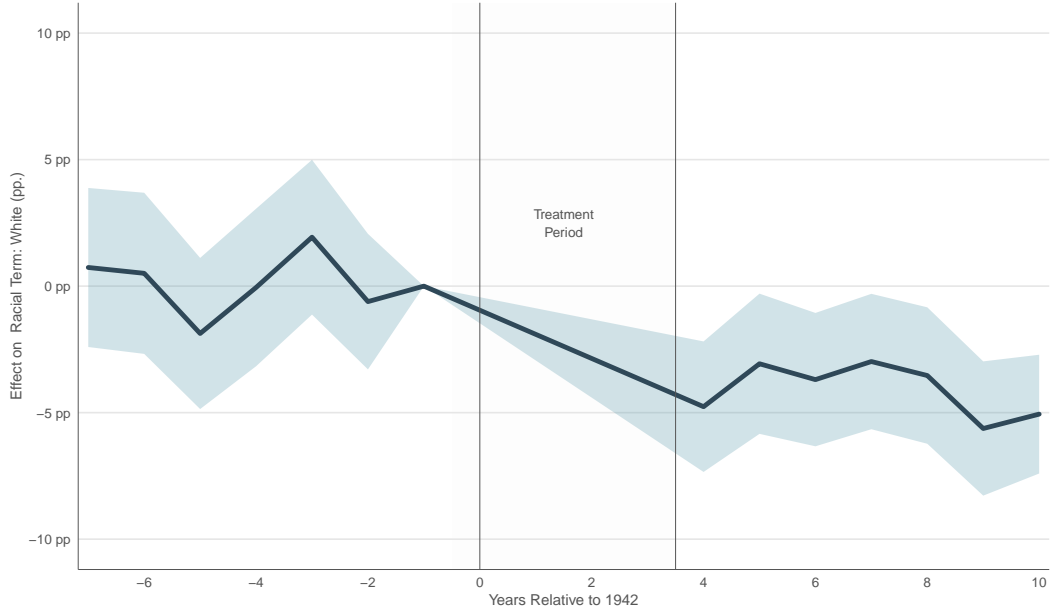
Notes: The figure shows the difference in log median annual wages between White and Black men, calculated as $\text{Log Wage Gap} = \ln(W_{\text{White}}) - \ln(W_{\text{Black}})$. The sample comprises employed men in the labor force from the full-count census. Median wages were weighted and the calculations retain only positive observed wages. Separate estimates computed for three age specifications: 15-75 (solid line), 18-65 (dashed line), and draft-eligible men 21-45 (dot-dash line). Wage information is only available in full-count census data since 1940.

Figure 4: Distribution and Geographic Variation of World War II Draft Intensity



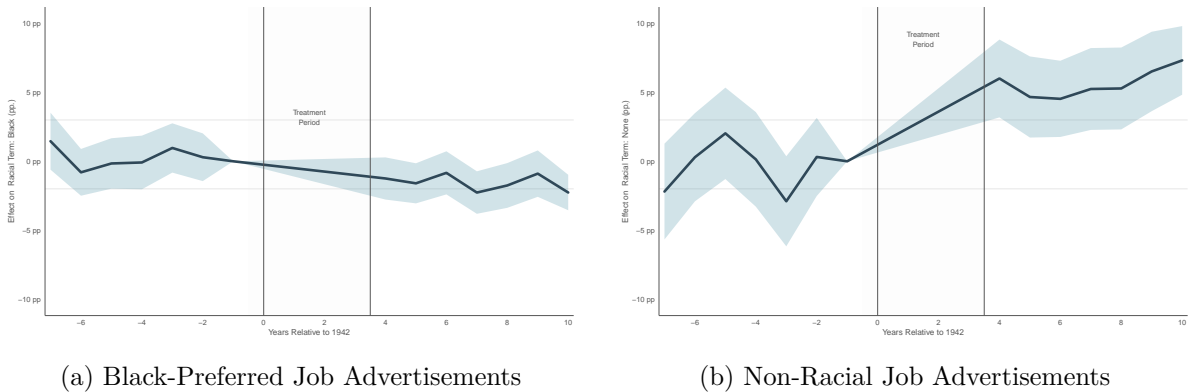
Notes: Panel (a) shows the distribution of draft rates across county-occupation cells, with a median of 18.7 percent dividing high and low draft intensity markets used in our binary treatment specifications. Panel (b) displays the geographic variation in the share of white men aged 21-45 drafted into military service from each county during 1940-1945. Draft rates are computed as the ratio of white men drafted to the 1940 white male workforce. Darker shading indicates higher draft intensity, with categories defined by quintiles of the distribution. The substantial variation across markets (mean = 20.9%, SD = 33.5 percentage points) reflects differences in pre-war age structures rather than endogenous economic factors.

Figure 5: Event Study: Differential Effects of Draft Intensity on White-Preferred Job Advertising



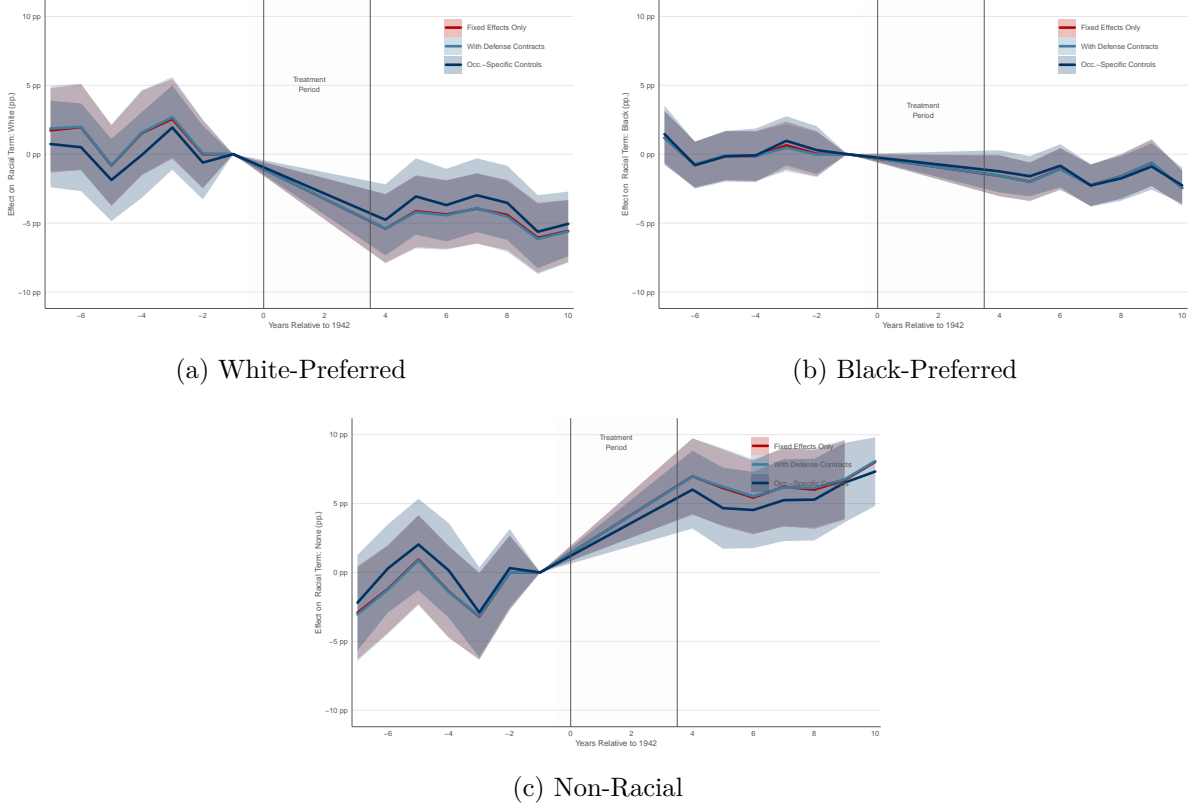
Notes: This figure shows the event study coefficients, β_k , from the estimating Equation (2). The outcome variable, Y_{mt} is the share of job advertisements specifying white racial preferences in market m and year t (pre-treatment mean = 14.6%), $HighDraft_m$ is an indicator for markets above the median shock intensity (measured as county-level draft registrations divided by the 1940 white male working-age population), $t_m^* = 1942$ is the treatment onset indicator, and the omitted reference period is $k = -1$ (year 1941). We report the differential effect between high draft intensity local labor markets (>18.7 percent draft rate, mean = 28.7) and low draft intensity markets (≤ 18.7 percent draft rate, mean 11.6 percent) on white-preferred job advertisement rates in market m . The specification includes market fixed effects (α_m) and year fixed effects (γ_t). The unit of observation is market-year cells (1935-1960, excluding 1942-1945). Pre-treatment coefficients are jointly insignificant (F-test p-value = 0.146). Bands represent 95% confidence intervals based on standard errors clustered at the market level.

Figure 6: Event Study Estimates: Differential Effects of Draft Intensity Effects on Black-Preferred and Non-Racial Job Advertising



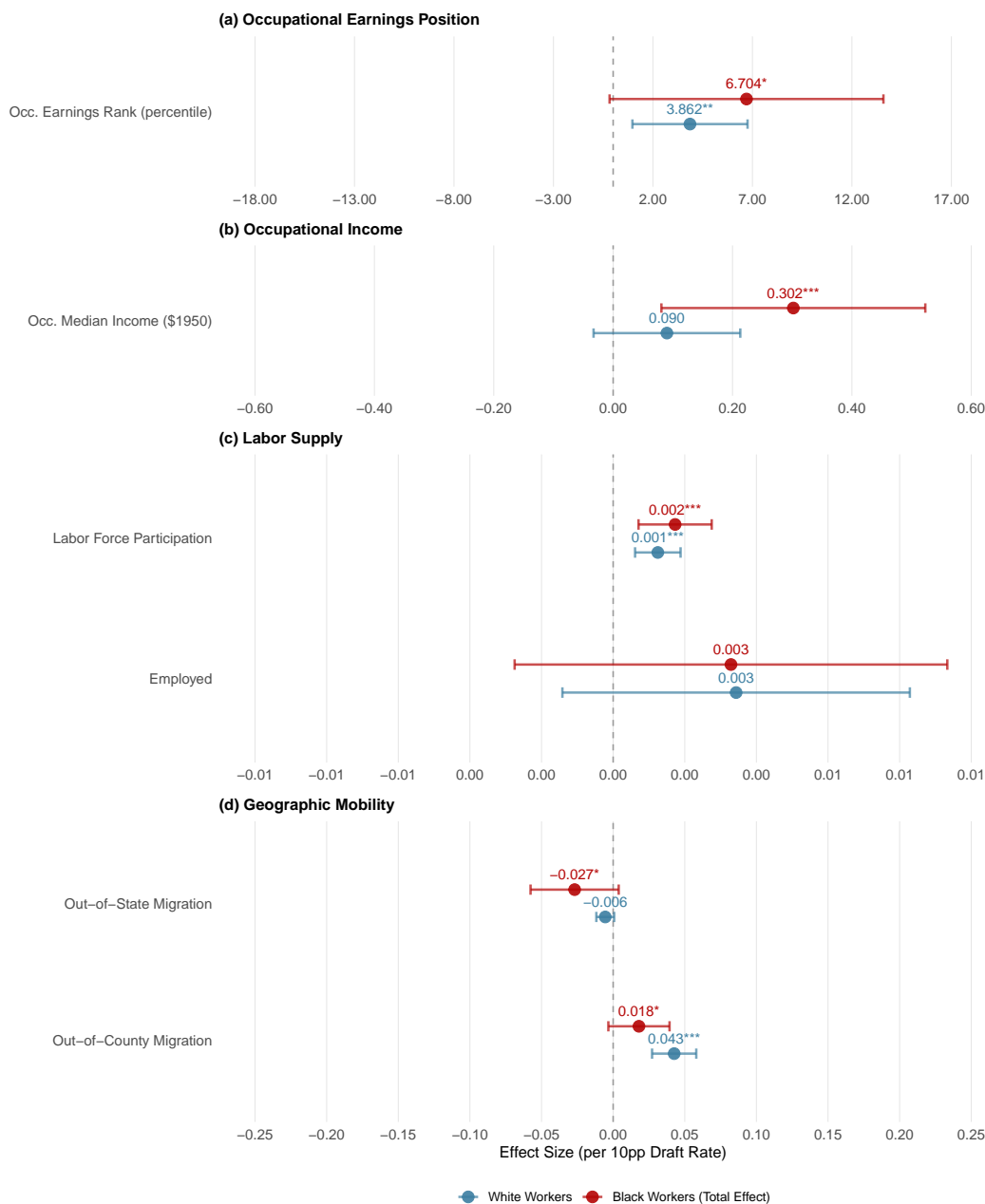
Notes: The figure shows event study coefficients, β_k from Equation (2) for alternative racial preference outcomes. Panel (a): Black-preferred job advertisements (pre-treatment mean = 2.4 percent). Panel (b): Non-racial job advertisements (pre-treatment mean = 83.0 percent). Specification details are the same as in Figure 5. The unit of observation is market-year cells (1935-1960, excluding 1942-1945). Bands represent 95% confidence intervals based on standard errors clustered at the market level.

Figure 7: Robustness of Pre-Treatment Parallel Trends Across Model Specifications



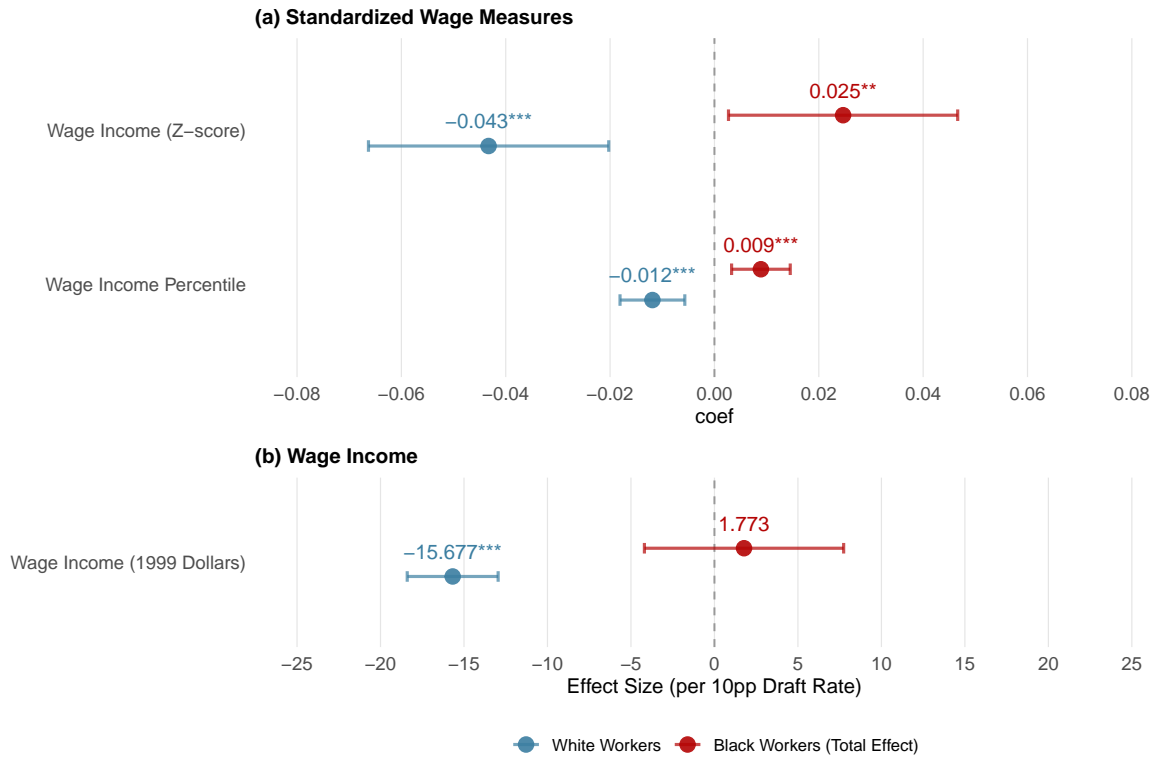
Notes: The figure shows event study coefficients from Equation (2) with varying controls. Coefficients represent the differential job advertisement rate (percentage points) between high and low draft-intensity markets relative to 1941. Unit of observation: market-year (county-occupation, 1935-1960 excluding 1942-1945). Treatment: above-median draft intensity among treated markets ($> 18.7\%$ of white males aged 21-45). (1) *Fixed-effects only*: Market and year fixed effects. (2) *Defense Contracts*: Adds defense procurement variables (contract value and count, minimal within-market variation $< 0.4\%$). (3) *Occupation-Specific Controls*: Adds occupation-specific pre-war (1930-1940) labor market characteristics that control for pre-existing differences in the types of jobs advertised across markets (racial composition, gender composition, skill intensity, advertisement length and volume, and trends in racial terminology usage). These vary by occupation-market cell and capture heterogeneity in which occupations were present and their characteristics before the war. Bands represent 95% confidence intervals based on standard errors clustered at the market level. Pre-trends test for the full specification with all controls: $F = 1.522$, $p = 0.166$.

Figure 8: Total Effects of Draft-Induced Labor Supply Shocks on Occupational Income and Labor Supply



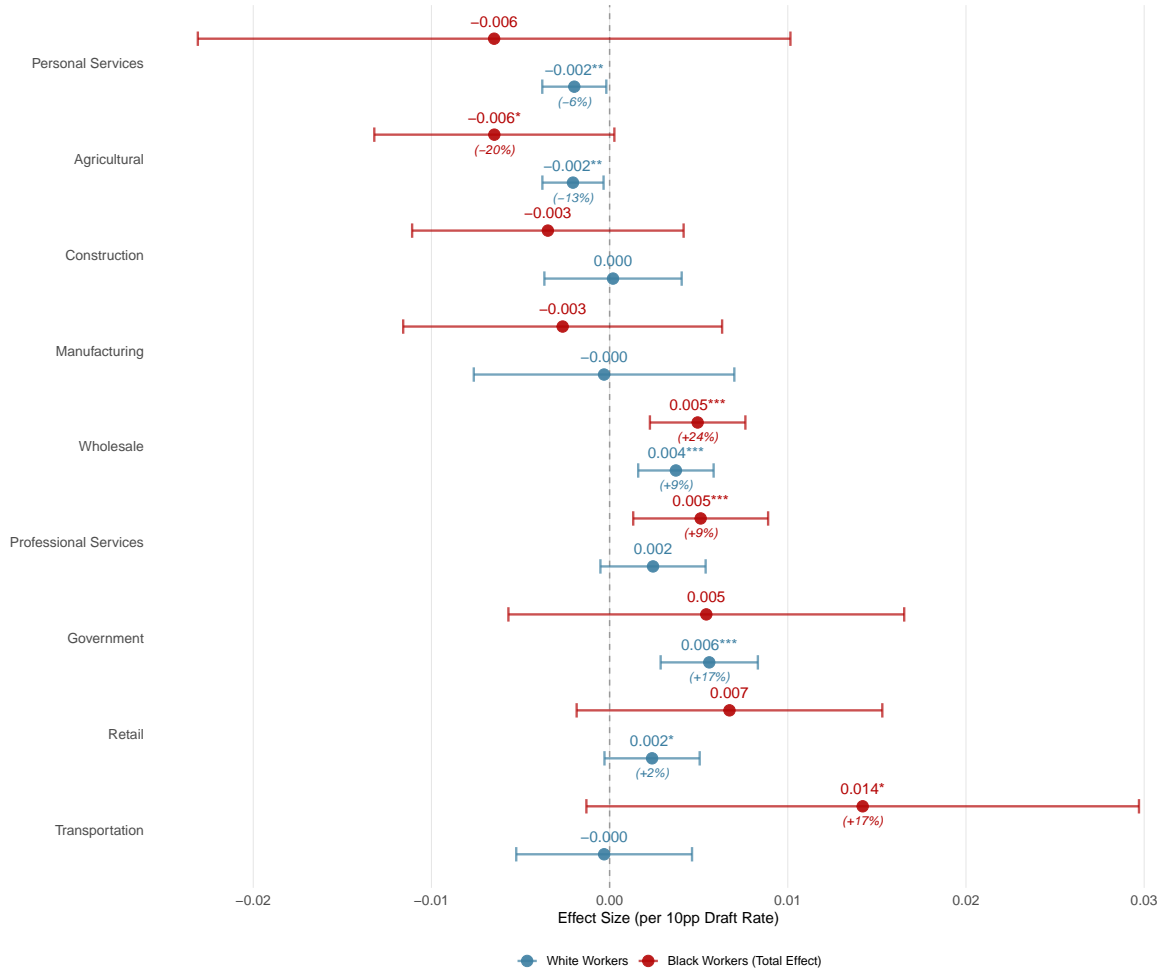
Notes: This figure displays coefficient estimates from triple-difference-in-differences regressions examining the effects of draft-induced labor supply shocks on occupational quality and labor supply outcomes by racial group (Equation 7). The sample consists of linked 1940-1950 census records for males aged 15-65 from county-occupation cells with at least twenty workers of each race in 1940 (person-year observations with non-missing outcome data). Treatment is measured as draft intensity—the share of white males aged 21-45 removed from county-occupation labor markets through military conscription during 1940-1945. Blue bars represent coefficient estimates on π_1 capturing direct effects for white workers; red bars represent total effects for Black workers ($\pi_1 + \pi_2$), where π_2 captures the differential effect. Panel (a) displays the Occupational Income Score to have mean 0 and standard deviation 1; Panel (b) shows the effects on employment status and labor force participation (indicators); Panel (c) reports highest school grade in years. Coefficients are scaled to represent the effect of a ten percentage point increase in local draft rates. The specification includes market, year, race group-by-time fixed effects, and demographic individual-level controls measured at baseline (age, age squared, urban, farmer and home ownership status, and education indicators). Standard errors are two-way clustered by origin market and two-digit occupation. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 9: Total Effects of Draft-Induced Labor Supply Shocks on Wage Income



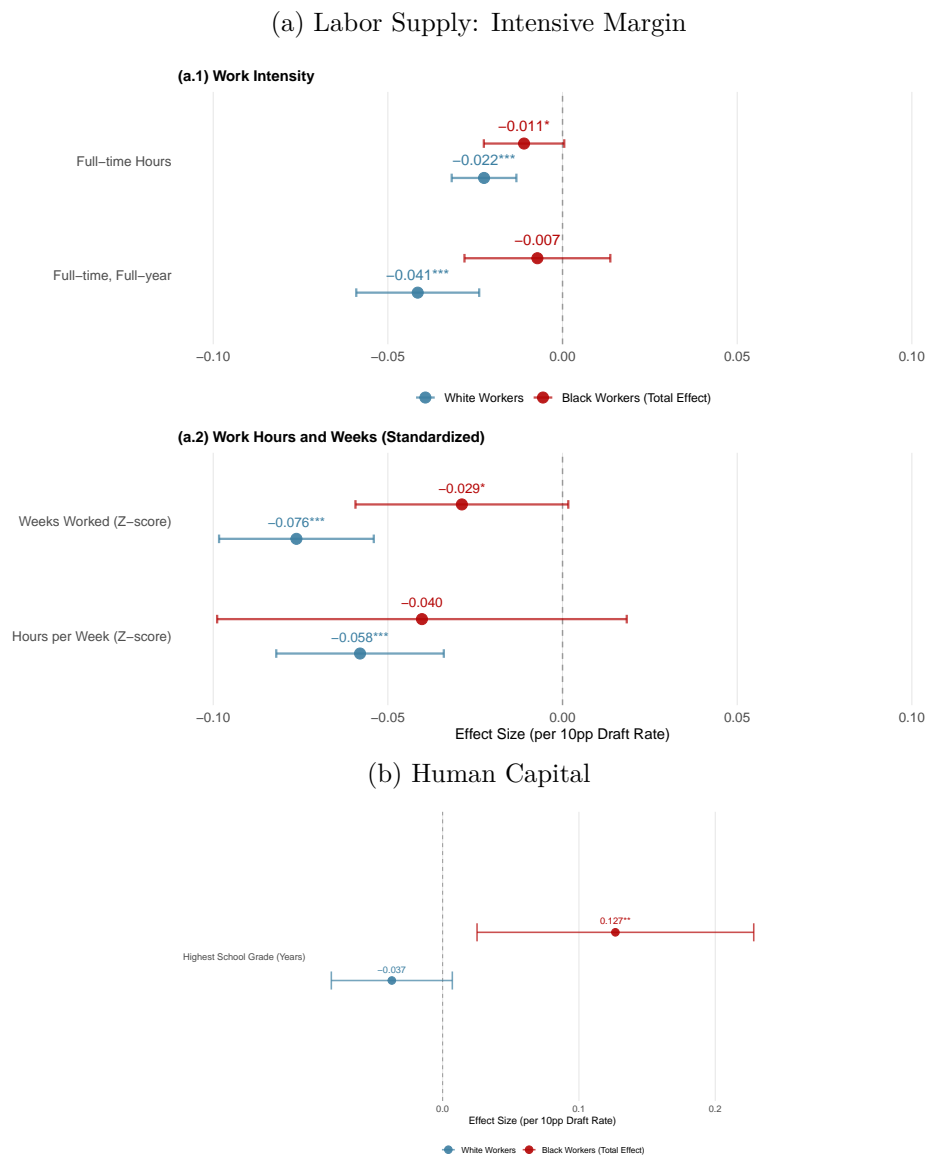
Notes: These figures displays coefficient estimates from triple-difference-in-differences regressions examining the effects of draft-induced labor supply shocks on worker outcomes by race (Equation 7). The sample consists of linked 1940-1950 census records for males aged 15-65 from county-occupation cells with at least twenty workers of each race in 1940 (person-year observations with non-missing outcome data). Treatment, specification, and other details are as in Figure 8. Panel (a) displays wage income percentiles computed within race-year cells and standardized wage scores (z-scores); Panel (b) shows wage income in 1999 US dollars. Coefficients are scaled to represent the effect of a ten percentage point increase in local draft rates. Standard errors are two-way clustered by origin market and two-digit occupation. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 10: Mechanisms: Effects of Draft-Induced Labor Supply Shocks on Industrial Reallocation



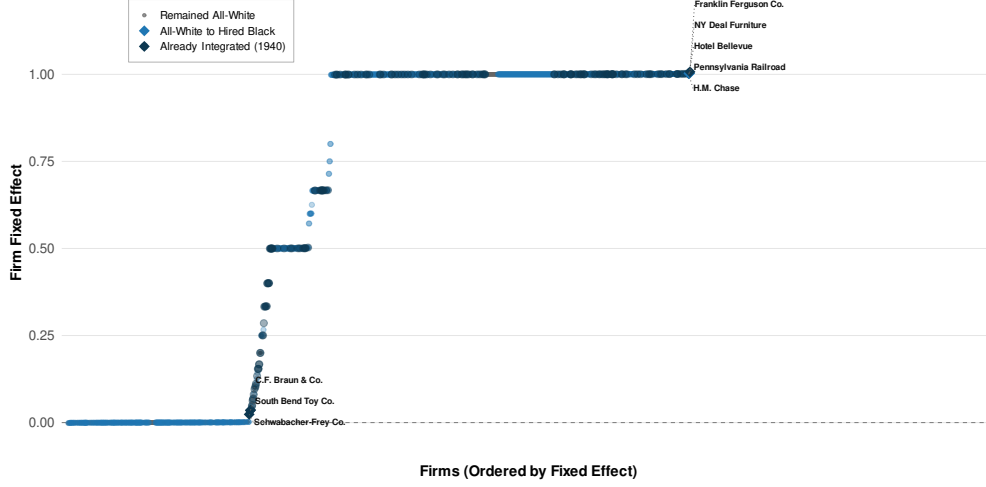
Notes: These figures displays coefficient estimates from triple-difference-in-differences regressions examining the effects of draft-induced labor supply shocks on binary indicators for employment in industries by race (Equation 7). The sample consists of linked 1940-1950 census records for males aged 15-65 from county-occupation cells with at least twenty workers of each race in 1940 (person-year observations with non-missing outcome data). Treatment, specification, and other details are as in Figure 8. Values in parentheses report effect magnitudes as percentages of race-specific baseline means for significant coefficients. Coefficients are scaled to represent the effect of a ten percentage point increase in local draft rates. Standard errors are two-way clustered by origin market and two-digit occupation. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 11: Mechanisms: Effects of Draft-Induced Labor Supply Shocks on Work Intensity and Human Capital



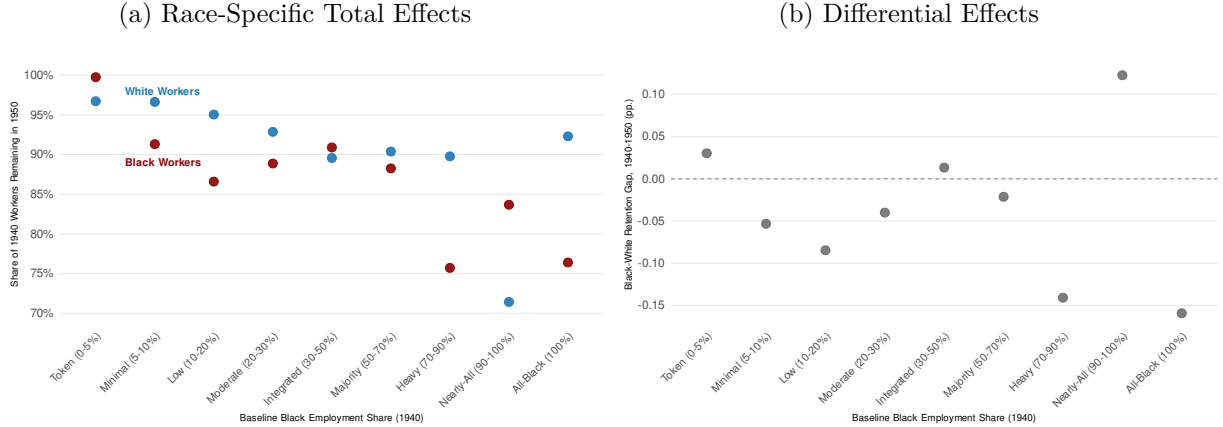
Notes: The figure presents coefficient estimates from triple-difference-in-differences regressions examining the effects of draft-induced labor supply shocks on work intensity and geographic mobility outcomes by race. The sample consists of linked 1940-1950 census records for males aged 15-65 from county-occupation cells with at least twenty workers of each race in 1940 (person-year observations with non-missing outcome data). Treatment, specification, and other details are as in Figure 8. Figure 11a displays work intensity indicators including binary variables for full-time hours and full-time/full-year employment, plus standardized measures of weekly hours and annual weeks worked. Figure 11b shows years of schooling. Coefficients are scaled to represent the effect of a ten percentage point increase in local draft rates. Standard errors are two-way clustered by origin market and two-digit occupation. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 12: Firm Fixed Effects for All-White Employers in 1940



Notes: This figure displays firm fixed effects $\hat{\alpha}_e$ for the subset of employers that were All-White (0% Black workers) in 1940, ranked from lowest to highest. Each point represents one firm ($N = 20,322$), with color indicating whether the firm hired any Black workers by 1950 (blue) or remained All-White (gray). The vertical axis measures the employer fixed effect from equation (8), which captures time-invariant characteristics predicting Black employment probability. The horizontal axis shows firm rank ordered by fixed effect magnitude; axis labels are suppressed for visual clarity. The vast majority of All-White firms (gray points) have near-zero fixed effects and remained segregated. Integration occurred systematically among firms with elevated fixed effects: firms with $\hat{\alpha}_e > 0.20$ (approximately top 5%) disproportionately hired Black workers. Sample: All-White employers in 1940 from the balanced panel tracked to 1950 (20,322 firms from 34,123 total).

Figure 13: Black-White Retention by Baseline Percent of Black Workers at Firm in 1940



Notes: Figure (a) displays 10-year retention rates (1940-1950) separately for Black workers (blue points) and White workers (gray points) across categories of baseline percent Black workers at firms in 1940. The vertical axis measures the share of 1940 workers still present at the same employer in 1950. Retention rates are calculated as $RetentionRate_{r,g} = \frac{\# workers_{1940} \cap workers_{1950}}{\# workers_{1940}}$ for race r in integration category g . Figure (b) displays the retention rate differential (Black minus White) across categories of baseline percent Black workers at firms in 1940. Each point represents one integration category, with the vertical axis measuring the difference in 10-year retention rates (1940-1950) between Black and White workers in percentage points. The retention differential is calculated as $RetentionRate_{Black,g} - RetentionRate_{White,g}$ within each baseline integration category g . Integration categories are defined by the employer's 1940 racial composition. The unit of observation is the individual worker tracked from 1940 to 1950. Sample restricted to employers with ≥ 5 workers in 1940 in the balanced panel ($N = 34,123$ firms, 199,424 person-year observations).

Table 1: Descriptive Statistics of Market-Year Panel

	Full Sample	Estimation Sample			Standardized Difference (5)
	All	All	Above Median Draft	Below Median Draft	
	(1)	(2)	(3)	(4)	
Market Demographics					
Share of White	0.887 (0.136)	0.898 (0.121)	0.899 (0.125)	0.898 (0.117)	0.007
Share of Black	0.064 (0.136)	0.057 (0.121)	0.056 (0.124)	0.058 (0.118)	-0.016
Share of Urban	0.622 (0.289)	0.694 (0.270)	0.678 (0.272)	0.710 (0.266)	-0.117
Share of Female	0.288 (0.222)	0.289 (0.207)	0.315 (0.218)	0.261 (0.190)	0.261
Share Migration	0.513 (0.101)	0.517 (0.091)	0.505 (0.087)	0.530 (0.094)	-0.279
Share Age 18-29	0.303 (0.113)	0.305 (0.103)	0.305 (0.107)	0.304 (0.100)	0.011
Share Age 30-39	0.228 (0.065)	0.232 (0.057)	0.225 (0.058)	0.239 (0.055)	-0.238
Share Age 40-49	0.181 (0.054)	0.188 (0.048)	0.188 (0.048)	0.188 (0.048)	0.010
Share Age 50-65	0.175 (0.078)	0.174 (0.069)	0.180 (0.074)	0.167 (0.062)	0.186
Economic Structure					
Manufacturing Share	0.178 (0.218)	0.196 (0.226)	0.212 (0.249)	0.178 (0.198)	0.150
Agriculture Share	0.043 (0.160)	0.030 (0.129)	0.023 (0.116)	0.037 (0.142)	-0.110
Unemployment Rate	0.064 (0.046)	0.068 (0.042)	0.074 (0.044)	0.062 (0.040)	0.282
Labor Market Characteristics					
Female Labor Force	0.248 (0.055)	0.262 (0.048)	0.264 (0.049)	0.261 (0.047)	0.073
Defense Activity					
Log Defense Value	19.403 (1.894)	19.894 (1.542)	20.069 (1.403)	19.708 (1.657)	0.236
Defense Contracts (count)	549.279 (517.317)	657.312 (541.276)	751.448 (570.342)	557.678 (489.856)	0.364
White Draft Rate	0.210 (0.335)	0.204 (0.125)	0.288 (0.119)	0.115 (0.046)	1.890
Job Ads: Characteristics and Skill Composition					
Avg. Ad Length (words)	64.855 (47.054)	60.260 (27.472)	58.135 (23.089)	62.527 (31.348)	-0.160
Total Ads Count	131.802 (550.192)	258.702 (800.730)	228.454 (551.414)	290.984 (1000.054)	-0.078
Nonroutine Analytic	0.289 (0.169)	0.281 (0.116)	0.271 (0.108)	0.292 (0.123)	-0.179
Nonroutine Interactive	0.545 (0.247)	0.555 (0.221)	0.519 (0.203)	0.592 (0.233)	-0.336
Routine Analytic	0.098 (0.100)	0.093 (0.053)	0.095 (0.053)	0.090 (0.053)	0.085
Routine Manual	0.244 (0.148)	0.239 (0.094)	0.237 (0.086)	0.241 (0.102)	-0.049
Nonroutine Manual	0.218 (0.150)	0.212 (0.101)	0.211 (0.093)	0.213 (0.109)	-0.013
Number of Markets	2,647	1,168	603	565	
Number of Market-Years	83,658	27,139	12,542	11,774	

Notes: This table reports mean values of predetermined characteristics measured in 1940 for county-occupation markets classified by draft intensity above and below the median (18.7 percent). Sample restricted to markets with at least 20 workers per race-year cell to ensure sufficient variation for identification. Standard deviations in parentheses. Each market represents a unique county-occupation cell, with characteristics obtained from the 1940 Census linked with newspaper data and other auxiliary datasets. Column (1) reports information on the full sample of labor markets that can be assigned to county-occupation codes. Columns (2) to (5) correspond to the estimation sample that includes markets a balanced panel with more than 25 years of data. All variables measured at baseline (1940) unless otherwise indicated. Age categories below 17 and above 65 are excluded. Standardized differences calculated as $(\mu_{above} - \mu_{below})/\sigma_{pooled}$. Standard deviations in parentheses.

Table 2: Descriptive Statistics of Worker-Level Estimation Sample

	All Observations	High Draft		Low Draft	
		Black	White	Black	White
	(1)	(2)	(3)	(4)	(5)
Worker characteristics, 1940					
Age (years)	34.7 (10.2)	34.6 (10.1)	34.7 (10.3)	35.1 (9.8)	34.7 (10.1)
Urban status (proportion)	0.844	0.919	0.809	0.942	0.862
Farm status (proportion)	0.023	0.011	0.023	0.009	0.024
Home ownership (proportion)	0.370	0.217	0.369	0.170	0.381
Years of schooling	12.9 (3.2)	11.1 (3.5)	12.9 (3.1)	11.0 (3.4)	13.2 (3.2)
Number of children	1.0 (1.3)	0.9 (1.5)	1.0 (1.4)	0.9 (1.5)	1.0 (1.3)
Education, 1940					
Middle school or less (proportion)	0.405	0.597	0.409	0.643	0.388
High school (proportion)	0.453	0.329	0.469	0.298	0.451
1-4 years college (proportion)	0.122	0.069	0.108	0.052	0.136
5+ years college (proportion)	0.020	0.005	0.014	0.007	0.025
Labor market outcomes, 1950					
Wage income (z-score)	0.2 (1.0)	0.0 (0.8)	0.3 (1.0)	0.0 (0.8)	0.3 (1.0)
Wage income percentile	0.6 (0.3)	0.5 (0.2)	0.6 (0.3)	0.5 (0.2)	0.6 (0.3)
Occ. Median Score (\$1950)	29.6 (9.6)	23.8 (8.5)	29.4 (8.7)	23.7 (8.6)	30.2 (10.0)
Employed (proportion)	0.903	0.938	0.958	0.934	0.963
In labor force (proportion)	0.935	0.984	0.988	0.983	0.988
Out-of-state migration (proportion)	0.167	0.298	0.144	0.341	0.155
Out-of-county migration (proportion)	0.313	0.439	0.300	0.436	0.288
Industry employment, 1950					
Manufacturing (proportion)	0.299	0.228	0.355	0.244	0.320
Agriculture (proportion)	0.029	0.070	0.026	0.080	0.033
Personal services (proportion)	0.023	0.065	0.025	0.054	0.023
Professional services (proportion)	0.077	0.081	0.077	0.075	0.084
Business services (proportion)	0.038	0.040	0.043	0.037	0.041
Transportation (proportion)	0.095	0.122	0.092	0.133	0.112
Construction (proportion)	0.071	0.092	0.097	0.085	0.064
Wholesale trade (proportion)	0.048	0.030	0.043	0.031	0.061
Retail trade (proportion)	0.118	0.102	0.116	0.100	0.142
Government (proportion)	0.057	0.105	0.066	0.088	0.058
Mining (proportion)	0.008	0.010	0.008	0.010	0.008
Other industries (proportion)	0.069	0.052	0.050	0.060	0.052
Sample size					
Number of workers	1,538,825	21,513	516,420	53,899	946,993
Number of observations	2,862,426	39,087	962,019	97,238	1,764,082

Notes: Descriptive statistics for men aged 15-65 (in 1940) successfully linked between 1940 and 1950 U.S. Census. Sample includes workers present in both census years across markets with varying draft intensity. All variables measured at baseline (1940) unless otherwise indicated. Draft shocks represents standardized white casualty/draft intensity by market. Labor market outcomes include employment status, wages, hours worked, and occupational characteristics. Education categories represent highest completed schooling level. Race classifications follow historical U.S. Census categories. Industry employment indicators capture sector-specific work patterns.

Table 3: Effects of Draft-Induced Labor Shortages on Discriminatory Job Advertisements

	White Preferences			Black Preferences		Non-Racial	
	All Terms (1)	Excl. American (2)	Excl. WWII (3)	All Terms (4)	Excl. WWII (5)	All Terms (6)	Excl. WWII (7)
$\tilde{s}_m \cdot Post_t$	-0.111*** (0.037)	-0.111*** (0.035)	-0.068** (0.032)	-0.037 (0.029)	-0.034 (0.026)	0.148*** (0.048)	0.148*** (0.048)
Market FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pre-treatment mean	0.143	0.109	0.118	0.049	0.046	0.808	0.805
R-squared	0.227	0.210	0.221	0.278	0.275	0.276	0.277
Observations	22,943	22,943	22,943	22,943	22,943	22,943	22,943

Notes: The table reports β_1 (from Equation 1) estimates of the effect of draft-induced labor supply shocks on the share of job advertisements specifying racial preferences. Outcome variables are depicted in the column titles; “All Terms” are advertisements with any racial identifier. Excluding American” removes nationality-based restrictions; and “Excluding WWII” excludes defense-related postings, as explained in the main text. The treatment variable is the draft rate for white males aged 21-45, measured as the share removed from county-occupation labor markets through military drafts. All specifications include local labor market and year fixed effects. The sample consists of 22,943 market-year observations from newspaper job advertisements. Standard errors are clustered at the market level and reported in parentheses. Significance levels are: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Relationship Between Draft Rates and Great Migration Push/Pull Factors

Variable	Sample (1)	Coefficient (2)	Std. Error (3)	P-value (4)	R^2 (5)
<i>Panel A: Migration</i>					
Out-of-State Migration	All	−0.116**	(0.053)	0.029	0.013
Out-of-County Migration	All	−0.072**	(0.036)	0.049	0.004
South-to-North Migration	All	−0.066	(0.043)	0.127	0.004
<i>Panel B: Push/Pull Factors</i>					
Cotton Acreage (%)	South	−0.002	(0.119)	0.986	−0.007
Agricultural Employment (%)	South	0.051	(0.092)	0.579	−0.004
Tenant Farmers (%)	South	0.010	(0.120)	0.933	−0.007
Tractors per Acre	South	−0.126	(0.081)	0.126	0.009
AAA Payments (\$ p.c.)	South	−0.012	(0.103)	0.908	−0.007
WWII Contracts (\$ p.c.)	South	0.033	(0.102)	0.745	−0.006
<i>Panel C: Interactions</i>					
AAA × Cotton	South	−0.005	(0.110)	0.963	−0.007
AAA × Agriculture	South	−0.000	(0.100)	0.998	−0.007
Tractors × Cotton	South	−0.039	(0.097)	0.689	−0.006
Tenancy × Cotton	South	0.015	(0.125)	0.906	−0.007
WWII × Agriculture	South	0.040	(0.091)	0.663	−0.006
<i>Joint F-test (Panels B + C)</i>		1.058		0.400	−0.024
<i>N = 141 markets (49 counties)</i>					

Notes: This table tests whether draft rates correlate with pre-war migration patterns and Great Migration push and pull factors from Boustan (2016). Each row reports a bivariate regression: $\text{Draft Rate}_{mc} = \alpha + \beta X_c + \varepsilon_{mc}$, where all variables are standardized (z-scores). The unit of observation is a county-occupation cell (market). Panel A examines migration rates. Panel B examines structural economic factors in Southern counties. Panel C tests interactions between these factors. The joint F-test evaluates whether all eleven variables in Panels B and C jointly predict draft rates; the null of no relationship cannot be rejected ($F = 1.058$, $p = 0.400$). Standard errors clustered at the county level in parentheses. Sample: All = 1,315 markets (243 counties); South = 142 markets (50 Southern counties). Significance levels are: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Employer-Level Effects of Draft Shock on Black Employment Share

	Dependent Variable				
	Black Indicator (1)	Black Indicator (2)	Black Share (3)	N Black Workers (4)	N White Workers (5)
$E_e \cdot \tilde{s}_m \cdot Post_t$	-0.013 (0.011)	0.006 (0.005)	-0.000 (0.004)	7.652 (9.285)	24.689 (33.168)
Observations	199,424	188,316	61,070	61,070	61,070
Firms	34,123	28,506	30,535	30,535	30,535
Sample	All	Min 5	Aggregated	Aggregated	Aggregated
Mean Outcome	0.049	0.051	0.048	1.52	29.34
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates from equation (8), examining employer-level responses to draft-induced labor scarcity. The unit of observation in columns (1)-(2) is the individual worker-year; in columns (3)-(5) it is the employer-year. E_e measures the share of males aged 21-45 at employer e in 1940. Column (1) uses all workers in the balanced panel of employers observed in both years. Column (2) restricts to employers with ≥ 5 workers in both periods. Column (3) aggregates to employer-year observations with Black share as the outcome. Columns (4)-(5) use counts of Black and White workers as outcomes. Standard errors (in parentheses) are clustered at the origin market level (county-occupation cells). Mean outcomes are calculated in 1940. Significance levels are: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix

Market Forces and Employer Racial Preferences: Evidence from Wartime Shortages

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(UC Berkeley)

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November 2025

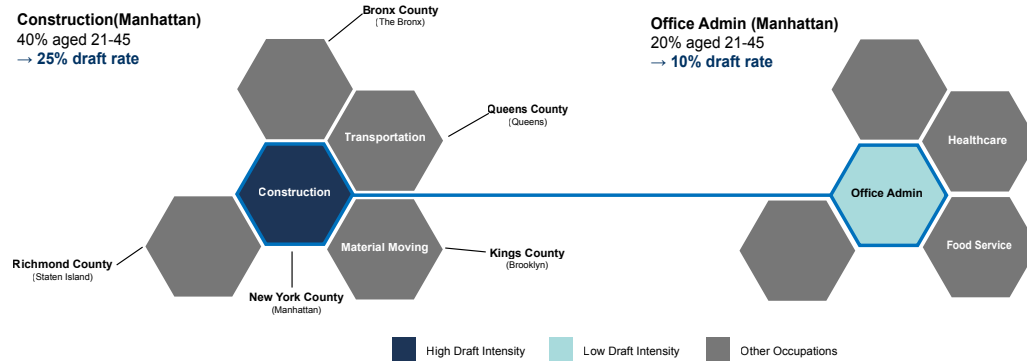
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A Additional Figures and Tables

A.1 Figures

Figure A.1: Draft Intensity Variation Across County-Occupation Cells: New York City Example



Notes: This figure illustrates within-county variation in draft intensity across occupations using New York City as an example. Each hexagon represents a county-occupation cell, with darker shading indicating higher draft intensity. In this example within Manhattan, construction workers faced a 25 percent draft rate while office administrators faced only 10 percent. This variation arose from predetermined differences in occupational age structures, not occupation characteristics. The same occupation could experience different draft intensities across counties due to local demographic differences.

Figure A.2: World War II Draft Registration Cards

SERIAL NUMBER 2172	1. NAME (Print) William Morrison		ORDER NUMBER 1257
2. ADDRESS (Print) Route 6 Chatham Pittsylvania Virginia			
3. TELEPHONE —	4. AGE IN YEARS 24	5. PLACE OF BIRTH Pittsylvania Virginia	6. COUNTRY OF CITIZENSHIP U.S.A.
7. NAME OF PERSON WHO WILL ALWAYS KNOW YOUR ADDRESS Mrs. Ethel Witcher Morrison			
8. ADDRESS OF THAT PERSON Route 6 Chatham Pittsylvania Virginia			
9. EMPLOYER'S NAME J.M. Edmunds Tobacco Company			
10. PLACE OF EMPLOYMENT OR BUSINESS Lynn Street Danville Pittsylvania Virginia			
I AFFIRM THAT I HAVE VERIFIED ABOVE ANSWERS AND THAT THEY ARE TRUE.			
REGISTRATION CARD D. S. S. Form 1 x William Morrison Wit: Vera H. Woods			

(a) Draft Registration Card Example 1

REGISTRAR'S REPORT				
DESCRIPTION OF REGISTRANT				
RACE	HEIGHT (Approx.)	WEIGHT (Approx.)	COMPLEXION	
White			Sallow	
Negro	✓		Light	
Oriental			Ruddy	
Indian			Dark	
Filipino			Freckled	
			Light brown	
			Dark brown	✓
			Black	

Other obvious physical characteristics that will aid in identification.....

I certify that my answers are true; that the person registered has read or has had read to him his own answers; that I have witnessed his signature or mark and that all of his answers of which I have knowledge are true, except as follows:

Registrar for **1** **3** **Vera H. Woods**
(Precinct) (Ward) (Signature of registrar)
Danville, Virginia
(City or county) (State)

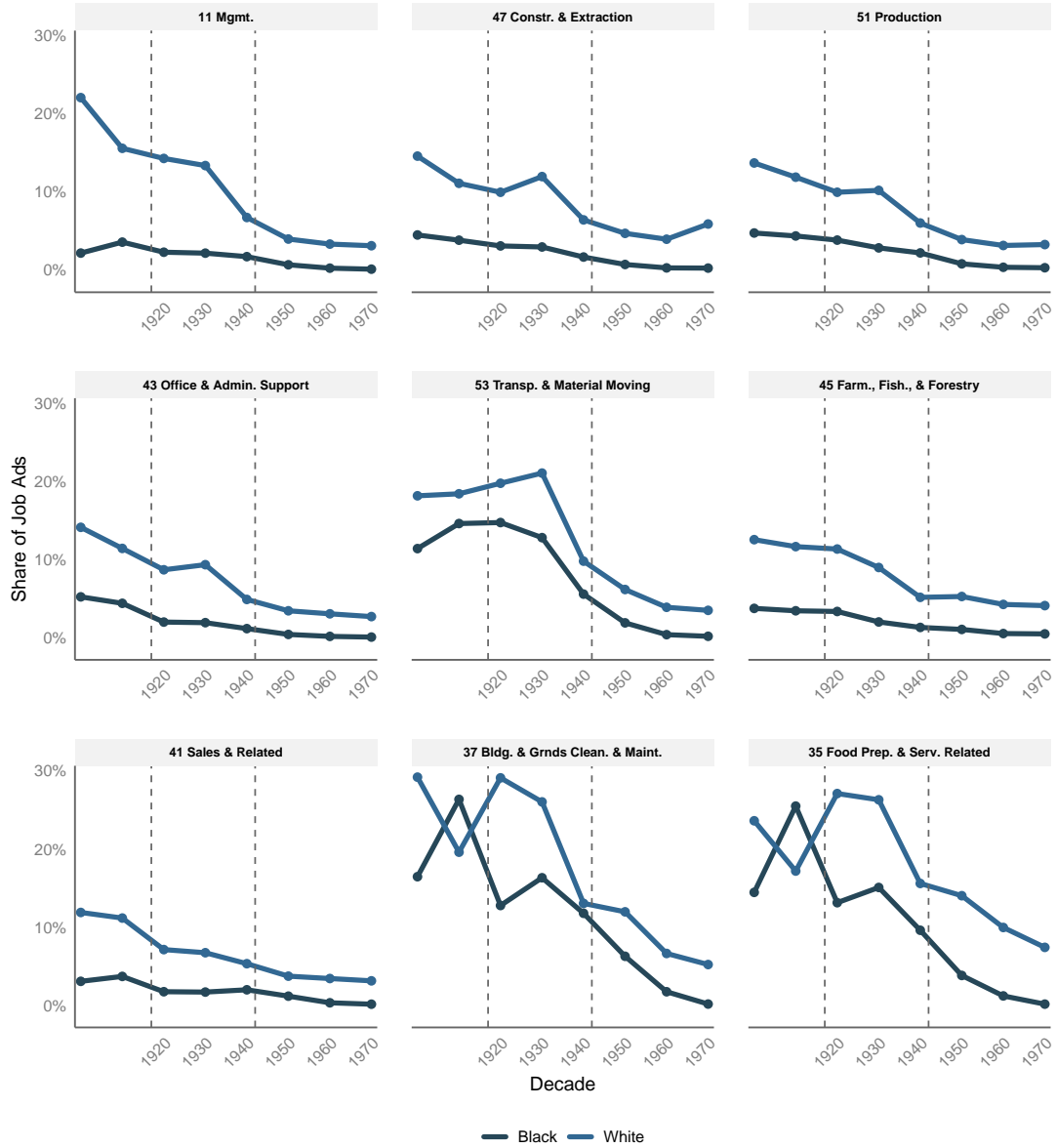
Date of registration **October 16 1940**

LOCAL BOARD NO. 2
PITTSYLVANIA COUNTY
OCT 16 1940
CHATHAM VIRGINIA
(The stamp of the Local Board and the date of registration of the registrant shall be placed in the above space)

(b) Draft Registration Card Example 2

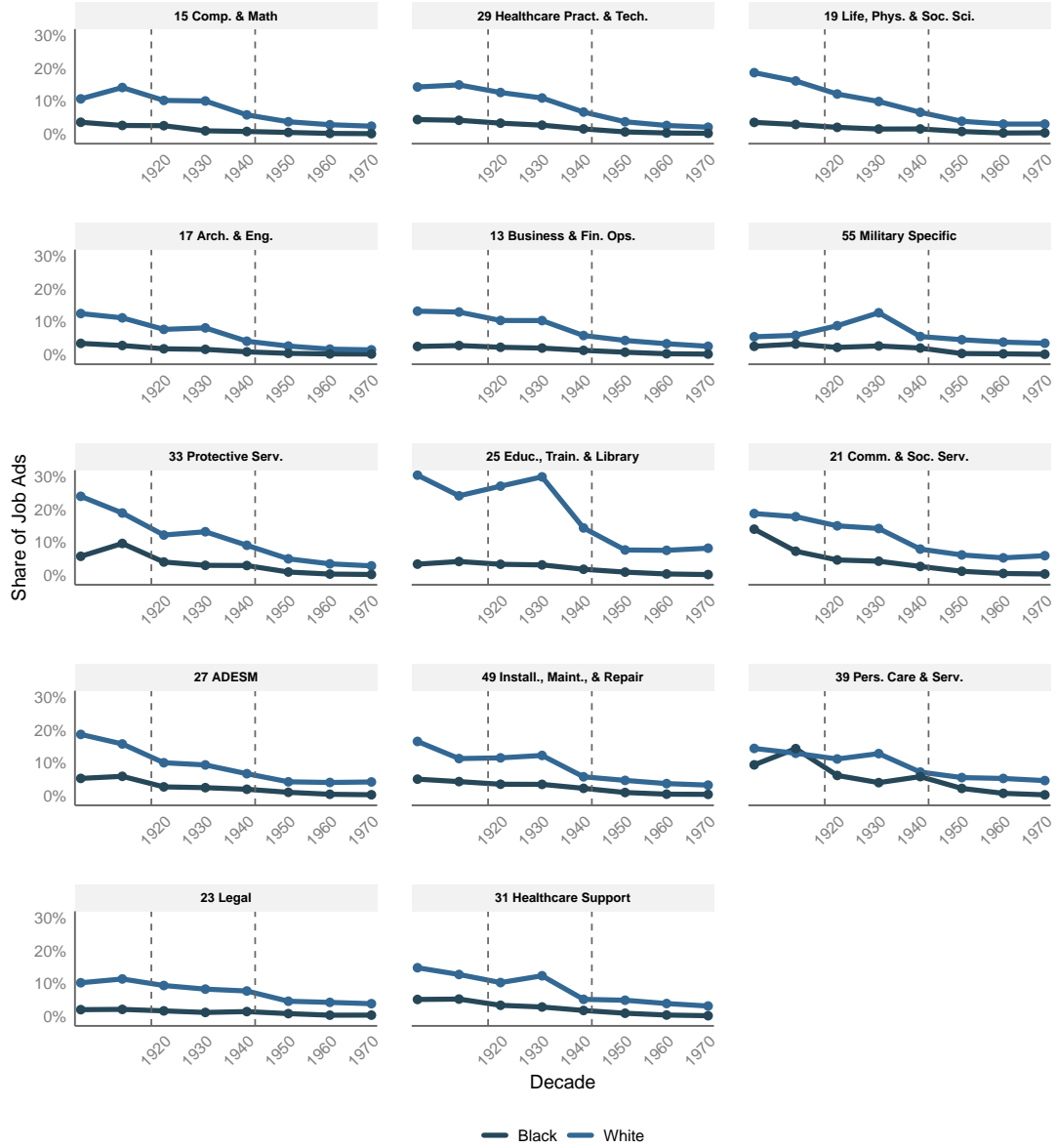
Notes: Examples of World War II Selective Service registration cards from the National Archives. These cards recorded crucial pre-induction information including registrant's name, address, date and place of birth, employer name and address, occupation, and physical characteristics. The occupation and employer information recorded at registration (before military service) allows us to construct draft rates at the county-occupation level, providing the identifying variation for our analysis. Over 44 million registration cards were created between 1940 and 1947, covering virtually all men aged 18-45.

Figure A.3: Racial Preferences by Decade (Panel A)



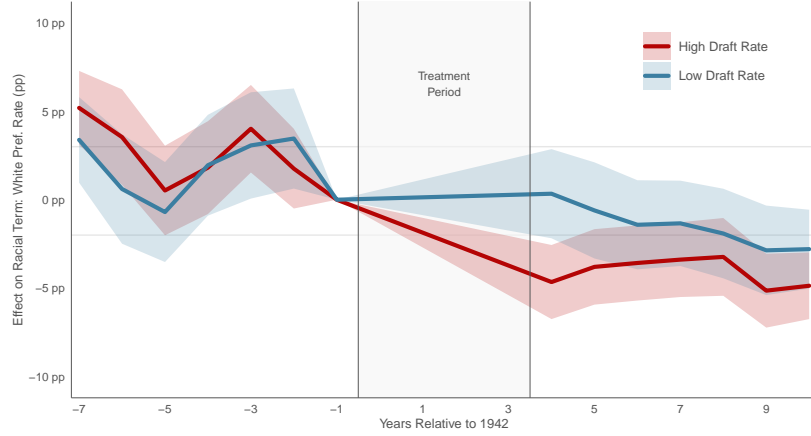
Notes. Decadal shares of job postings specifying racial preferences within each two-digit SOC occupation category. Panels ordered by total job posting volume, with highest-volume occupations appearing first. White preference shares shown in navy bars, Black preference shares in gray bars. Sample includes all job postings with valid occupation codes ($N = 16.8$ million).

Figure A.4: Racial Preferences by Decade (Panel B)



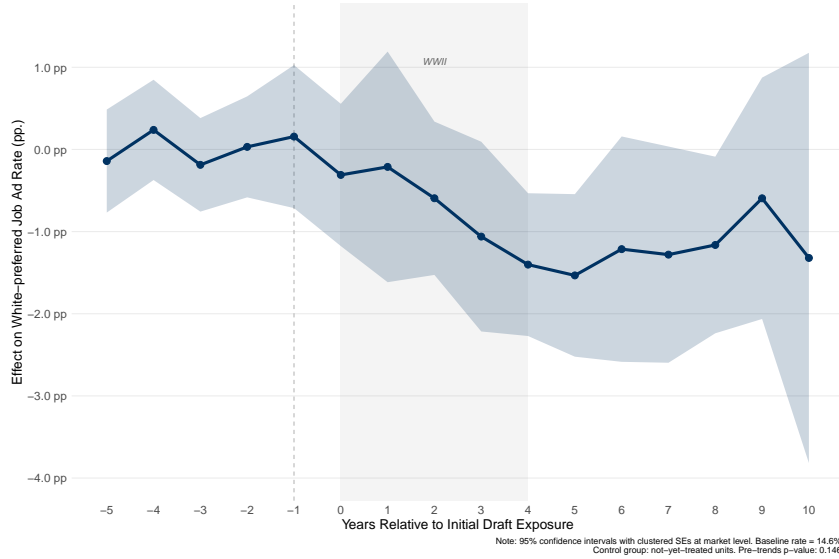
Notes. Continuation of Figure A.3 showing remaining occupational categories. Healthcare Support and Legal occupations exhibit minimal racial preferences throughout the period. Military-specific occupations show elevated discrimination until 1945, then converge to near-zero. Architecture/Engineering and Computer/Math occupations maintain low but persistent gaps. The heterogeneous responses across occupations—with convergence timing correlating with draft exposure—support the labor scarcity mechanism over alternative explanations based on changing social attitudes alone.

Figure A.5: Evolution of White-Preferred Job Advertisement Rates by Draft Intensity Groups



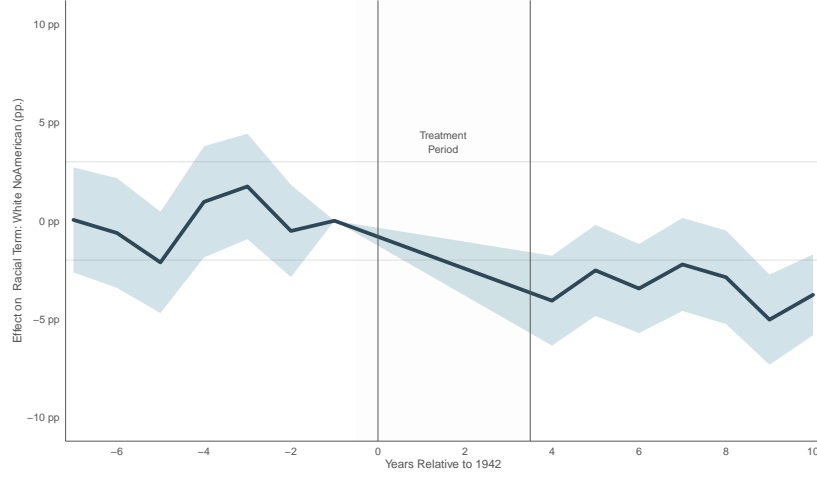
Notes: The figure shows the year-specific coefficients from Equation $D_{mt}^g = \tilde{\kappa}^g + \tilde{\alpha}_m^g + \tilde{\gamma}_t^g + \tilde{\epsilon}_{mt}^g$, for $g \in \{High, Low\}$, tracing different trajectories for markets with above-median and below-median draft intensity. Each trajectory is estimated separately. The coefficients represent the average white-preferred job advertisement rate (in percentage points) for each group (high or low) in each year, after accounting for market fixed effects. The unit of observation is the market-year (county-occupation cells). The gray shaded area indicates the treatment period (1942-1945), which is excluded from the estimation. Bands represent 95% confidence intervals based on standard errors clustered at the market level.

Figure A.6: Dose-Response Effects of Maximum Draft Intensity on White-Preferred Job Advertisements

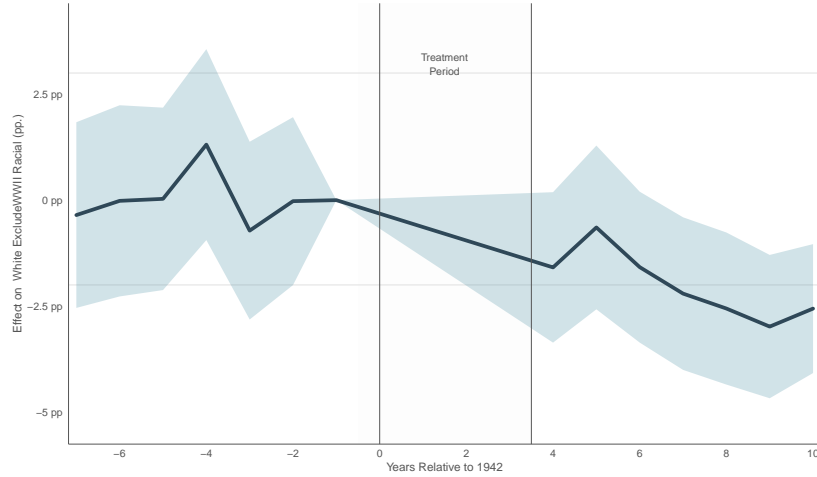


Notes: The figure shows the event study coefficients, γ_k from Equation (3), representing percentage point changes in white-preferred job advertisement rates per percentage point increase in draft intensity (continuous treatment). The outcome variable, Y_{mt} , is the share of job advertisements specifying white racial preferences in market m and year t (pre-treatment mean = 14.6 percent). Draft intensity, d_m , is market m 's maximum cumulative draft rate reached during 1942-1945 (mean = 20.0 percent), measured as the maximum of cumulative draftees divided by the 1940 white male working-age population. Treatment timing g_m indicates when market m first experienced a positive draft shock (cohorts: 1940, 1941, 1942). The specification employs the Callaway et al. (2024, 2021) methodology with outcome regression adjustment and not-yet-treated units as controls. The reference period is $k = -1$. The unit of observation is market-year cells (1935-1960, excluding 1942-1945). Bootstrap standard errors (1,000 iterations) clustered at the market level. Bands represent 95% confidence intervals.

Figure A.7: Robustness to Alternative Definitions of Racial Preference



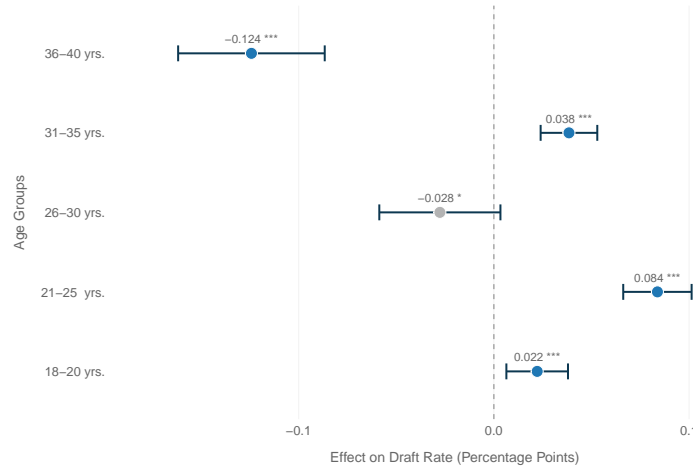
(a) Excluding “American” Terminology



(b) Excluding WWII-Specific Terms

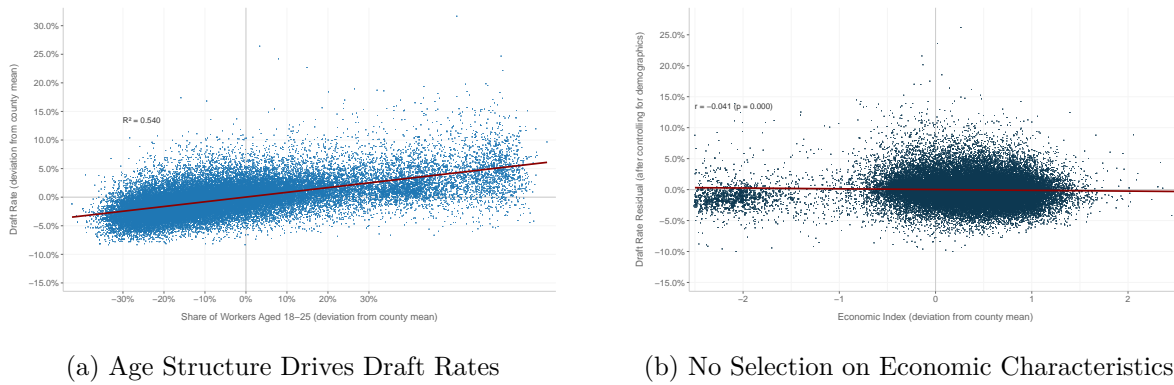
Notes: The figure shows event study coefficients from Equation (2) with alternative outcome variable classifications of racial preferences. The coefficients represent the differential white-preferred job advertisement rate (in percentage points) between high and low draft markets in each year relative to 1941. Panel (a) shows an outcome variable excluding job advertisements using “American” or related terminology from white-preferred category. Panel (b) shows an outcome variable excludes Axis power nationalities (German, Italian, Japanese) from the white-preferred category. The unit of observation is the market-year. High draft markets defined as those exceeding median draft intensity (18.7 percent). Treatment period (1942-1945) excluded from estimation. Pre-treatment coefficients jointly insignificant (Panel a: $p = 0.126$; Panel b: $p = 0.698$). Bands represent 95% confidence intervals based on standard errors clustered at the market level.

Figure A.8: Estimated Effects of Age Composition on Draft Rates Across Local Labor Markets (County-Occupation Cells)



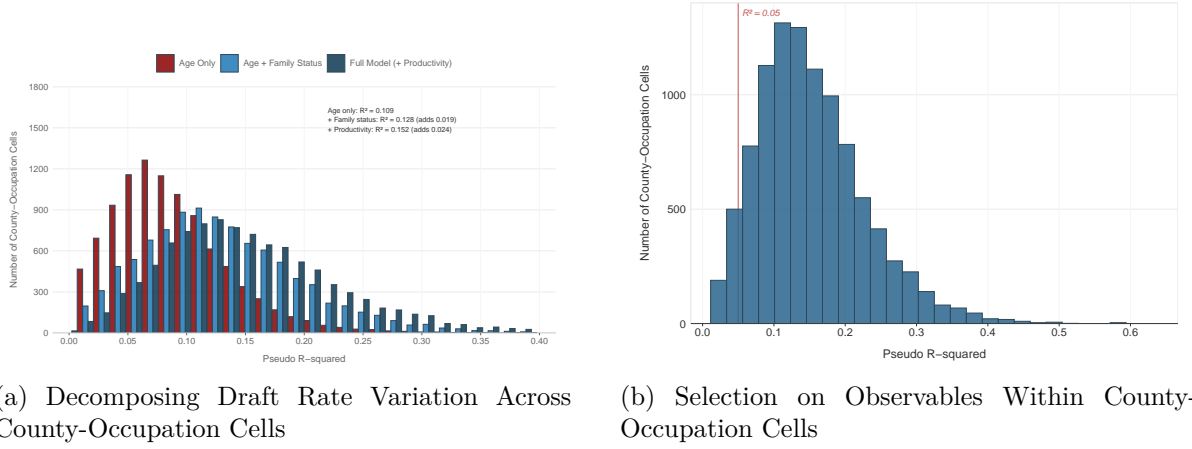
Notes: This figure displays coefficient estimates from a weighted linear regression of draft rates on draft-eligible age group shares using the 1940 Census linked to WWII enlistment records. The unit of observation is the county-occupation cell, restricted to markets with at least 50 white male citizens aged 18-65 in 1940. Each coefficient represents the effect of a one-percentage-point increase in the share of workers in a given age group on the cell's draft rate (in percentage points), relative to workers aged 41-65 (the omitted category). Age groups are mutually exclusive: 18-20, 21-25, 26-30, 31-35, 36-40, and 41-65 years old in 1940. The regression is weighted by cell size (number of men) and standard errors are clustered at the county level ($N = 34,123$ cells, $R^2 = 0.385$). Horizontal bars represent 95% confidence intervals. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A.9: Determinants of Market-Level Draft Rates: Age vs. Economic Characteristics



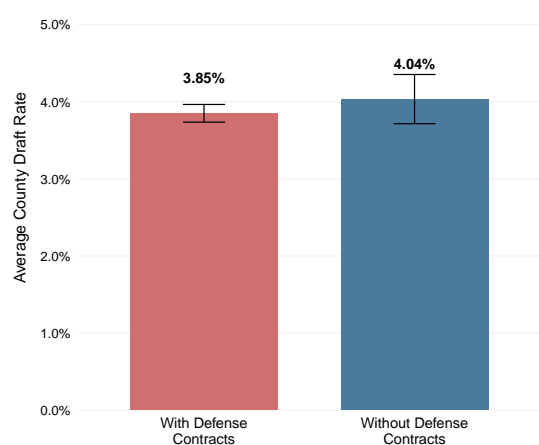
Notes: This figure examines within-county variation in draft rates across occupation cells using the 1940 Census linked to WWII enlistment records. Each point represents a county-occupation cell containing at least 30 male workers aged 18-65 in the 1940 Census. Panel (a) plots the fraction drafted (1940-1945) against the share of workers aged 18-25 in 1940, measured as deviations from county means. Panel (b) plots residualized draft rates against an economic index (expressed as deviations from county means), where the draft rates have been residualized on age structure (share aged 18-25) and marital status using OLS weighted by cell size (number of workers). The economic index combines standardized measures of 1940 log wages, years of education, employment rates, and weeks worked in 1939. The unit of observation is the county-occupation cell. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A.10: Draft Selection Within Markets: Statutory Criteria vs. Productivity

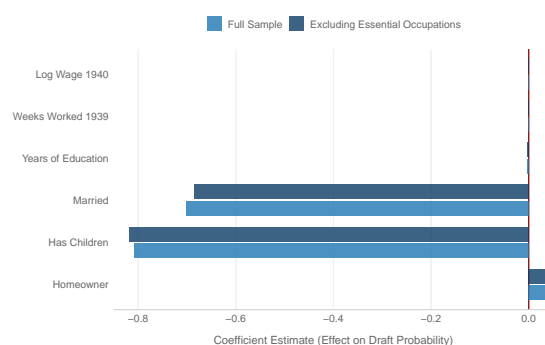


Notes: This figure examines potential individual-level selection into the draft within county-occupation cells using the 1940 Census linked to WWII enlistment records. Panel (a) shows the distribution of pseudo R-squared values from staged logit regressions estimated separately for each county-occupation cell. Three nested models are shown: age variables only, age plus family-based military deferrals (married and has children), and the full model including productivity measures. Panel (b) displays the distribution of pseudo R-squared values from cell-by-cell logit regressions where the dependent variable is individual draft status (*drafted* = 1 if the worker *i* was drafted, 0 otherwise). For each local labor market (county-occupation cell), we regress individual draft outcomes on worker characteristics: education, log wages, marital status, homeownership, children, weeks worked 1939, age, and age squared. These are individual-level regressions estimated separately for each cell, with no fixed effects. The median pseudo R-squared of 0.05 indicates that observable worker characteristics explain approximately 5% of the variation in which individuals were drafted within a given county-occupation cell. Analysis restricted to county-occupation cells with more than 100 workers, more than 10 drafted, more than 10 non-drafted, and draft rates between 1% and 99%. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A.11: Testing for Confounding Effects: Defense Production and Occupational Deferments



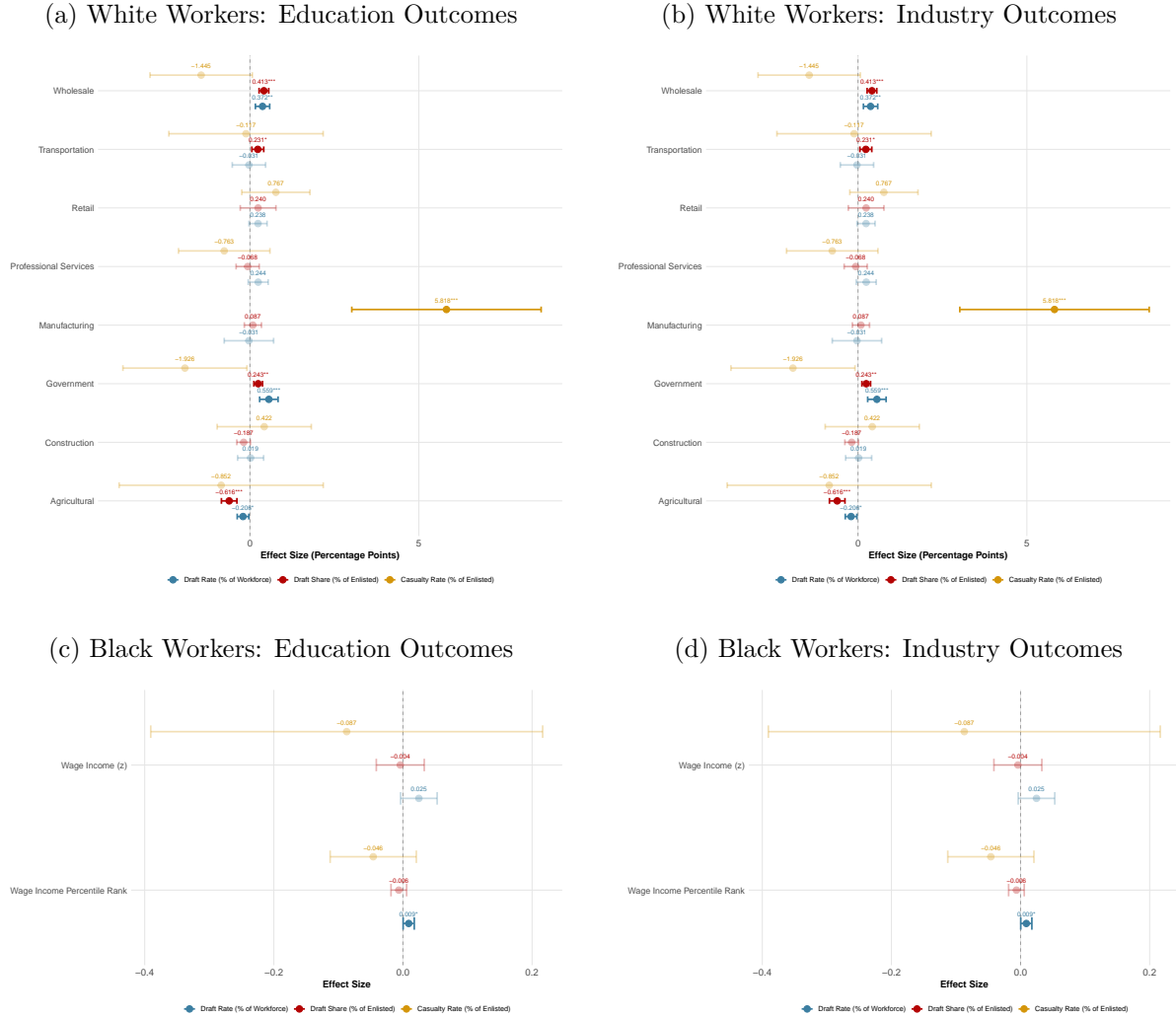
(a) Draft Rates by County Defense Contract Status



(b) Excluding Essential Occupations

Notes: Figure (a) shows the unconditional mean draft rates by county defense contract status. The red bar shows counties with positive wartime defense contracts average 3.85% draft rate (N=249). The blue bar shows counties with zero defense contracts average 4.26% draft rate (N=43). The 0.41 percentage point difference is not statistically significant ($p=0.29$, two-sample t-test). The sample is restricted to counties appearing in the [Jaworski \(2017\)](#)'s defense procurement database; counties with fewer than 100 observations excluded. No controls or fixed effects are included in these calculations. Error bars represent 95% confidence intervals. Figure (b) displays point estimates of the effects of individual characteristics on draft probability from two separate regressions: one using the full sample and one excluding workers in essential occupation. The coefficients are obtained from logit specifications where the outcome variable is a binary indicator for being drafted into military service and the controls are years of education, log wage (1940), married status, homeowner status, presence of children, weeks worked (1939), age, and age squared. Age controls are included but not displayed, as age determined draft priority by statute rather than reflecting discretionary selection. All specifications include county-occupation cell fixed effects. Standard errors are clustered at the county level.

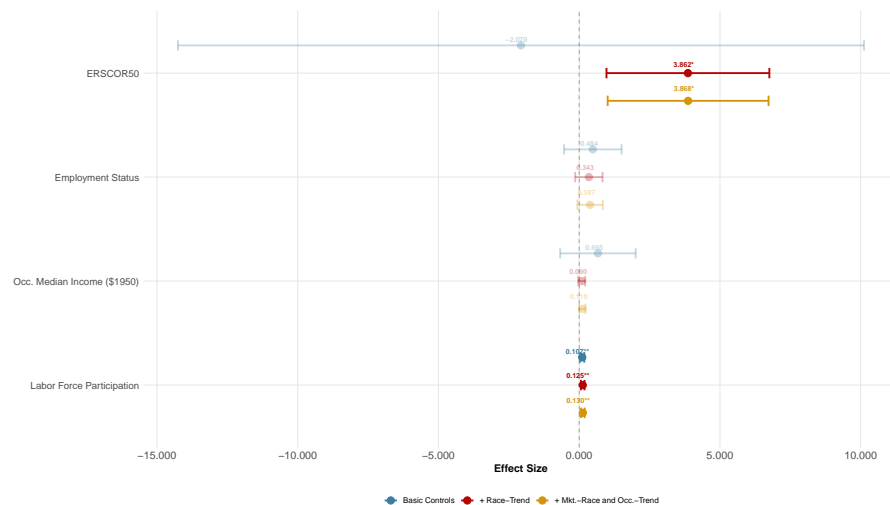
Figure A.12: Sensitivity to Alternative Measures of Wartime Labor Market Disruption



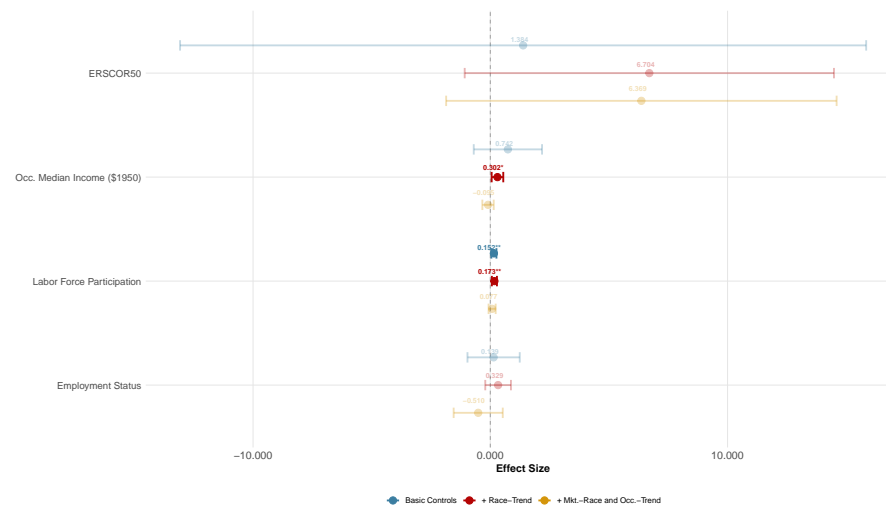
Notes: The figure shows the coefficient estimates from triple-difference regressions (Equation 7) on Black and White workers outcomes using three measures of local military mobilization: Draft Rate measures white men drafted as share of 1940 white male workforce aged 21-45 (blue); Draft Share measures draftees as share of white men enlisted from locality (red); Casualty Rate measures battle deaths as share of white men enlisted from locality (orange). The dependent variable is labor market outcomes for individual workers (education, industry, and socioeconomic measures). All specifications include worker and market-by-time fixed effects. Bands represent 95% confidence intervals based on standard errors clustered at the market level. Significance levels are: $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Figure A.13: Robustness of Treatment Effects Across Model Specifications

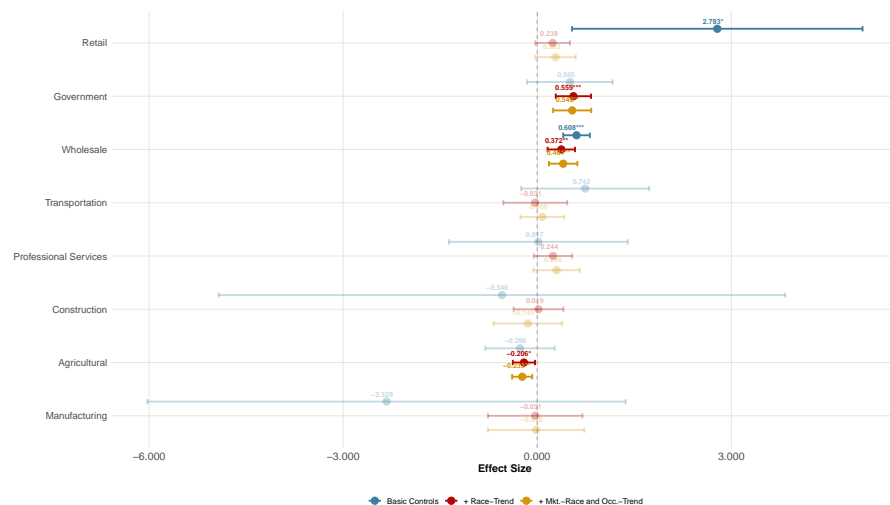
(a) White Workers: Employment



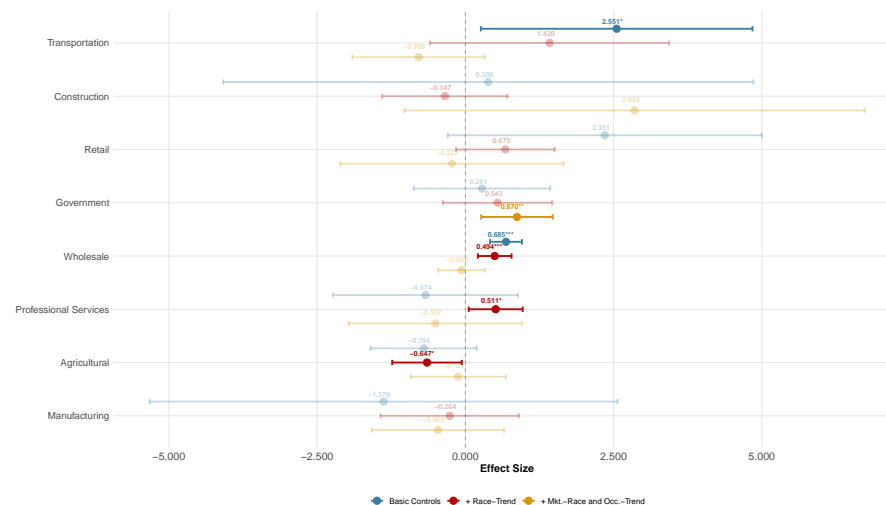
(b) Black Workers: Employment



(c) White Workers: Industry Access

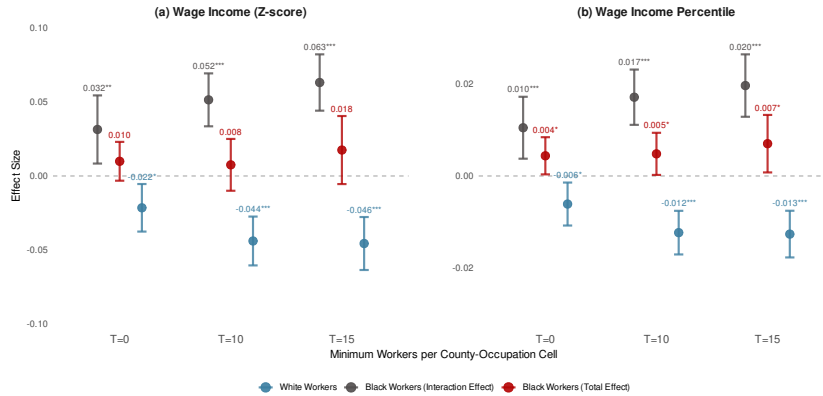


(d) Black Workers: Industry Access



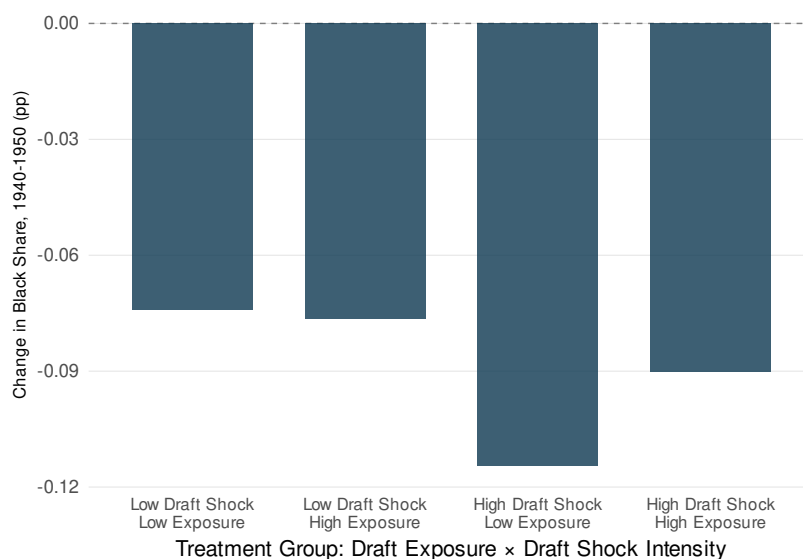
Notes: These figures demonstrate the robustness of draft-induced labor supply shock effects across alternative model specifications using the main individual-level linked estimation sample. Each panel compares coefficient estimates from five specifications: (i) Basic Controls (only year, market and worker fixed effects), (ii) Full Controls (adding individual characteristics), and three robustness checks adding (iii) Market-Race, (iv) Time-Race, and (v) Region-Time interaction fixed effects respectively. Treatment effects are measured using draft rate—the county-occupation specific draft shares during 1940-1945. Transparency indicates statistical significance levels. Standard errors clustered at the market level. Bands represent 95% confidence intervals based on standard errors clustered at the market level. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A.14: Total Effects of Draft-Induced Labor Supply Shocks on Wages with Varying Racial Composition



Notes: This figure displays coefficient estimates from triple-difference-in-differences regressions examining wage effects across samples defined by minimum racial diversity thresholds (Equation 7). Each threshold T requires county-occupation markets to contain at least T workers of each race (Black and White) in 1940, where $T \in \{0, 10, 15\}$. The sample consists of linked 1940-1950 census records for males aged 15-65 from county-occupation cells with at least twenty workers of each race in 1940 (person-year observations with non-missing outcome data). Treatment, specification, and other details are as in Figure 8. Panel (a) displays standardized wage income effects (z-scores); Panel (b) displays wage income percentile rank effects computed within race-year cells. Treatment measures draft intensity—the share of white males aged 21-45 removed from county-occupation labor markets through military conscription during 1940-1945. Blue points show coefficient estimates on π_1 (direct effects for white workers); red points show total effects for Black workers ($\pi_1 + \pi_2$), where π_2 captures the differential effect. Error bars show 95% confidence intervals. Coefficients are scaled to represent the effect of a ten percentage point increase in local draft rates. Standard errors are two-way clustered by origin market and two-digit occupation. Significance levels are: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure A.15: Compositional Changes by Draft Exposure and Market Shock Intensity



Notes: This figure displays changes in percent Black workers among retained workers (1940-1950) for employers with 10-50% Black workers in 1940, partitioned into four treatment groups based on median splits of firm-level draft exposure and market-level draft shock intensity. The vertical axis measures Δ Black Share (percentage points), calculated as $\text{BlackShare}_{1950} - \text{BlackShare}_{1940}$ for workers tracked within each treatment group. The horizontal axis shows four treatment combinations: Low Draft Shock/Low Exposure, Low Draft Shock/High Exposure, High Draft Shock/Low Exposure, and High Draft Shock/High Exposure. Negative values indicate Black workers exited at higher rates than White workers. The largest compositional change (-9.0pp) occurs for firms facing both high firm-level exposure and high market-level shock, demonstrating that effects concentrated where labor scarcity was most severe. The monotonic gradient across treatment intensity validates the draft as the exogenous mechanism driving worker reallocation. Treatment definitions: High/Low Exposure based on median split of share of males aged 21-45 at the firm; High/Low Shock based on median split of share of White males 21-45 drafted in the market. Sample restricted to Integrated employers (10-50% Black in 1940) in the balanced panel ($N = 2,621$ firms). Source: Linked WWII draft registration records to Census.

A.2 Tables

Table A.1: Descriptive Statistics of Job Advertisement Sample, 1900-1970

	Sample period		Variables			Job Postings Sample	
	Start (1)	End (2)	Explicit Racial Terms (3)	Address (4)	Zip Code (5)	Percent (6)	Number (7)
<i>A. National circulation newspapers</i>							
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
<i>B. Non national newspapers</i>							
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
<i>C. Historically Black newspapers</i>							
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 a sample of job advertisements published in thirteen newspapers between January 1900 and 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. Column (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 A.2: County Average Male Proportions of Labor, Employment and Military Service Participation By Demographic Groups, 1940

	Labor Force (1)	Employment (2)	Enlistment (3)	Draftee (4)	Draftee- Enlistment (6)	Casualty (5)
A. Everyone						
Everyone 18-65	0.90 (0.04)	0.84 (0.06)	0.17 (0.32)	0.12 (0.25)	0.71 (0.12)	0.01 (0.01)
Young 18-20	0.72 (0.08)	0.61 (0.11)	0.51 (0.70)	0.33 (0.47)	0.64 (0.14)	0.02 (0.03)
Young adult 21-35	0.93 (0.05)	0.87 (0.06)	0.27 (0.56)	0.20 (0.47)	0.72 (0.13)	0.01 (0.02)
Adult 36-45	0.94 (0.05)	0.90 (0.06)	0.05 (0.11)	0.04 (0.09)	0.77 (0.18)	0.00 (0.00)
Senior 46-65	0.89 (0.05)	0.84 (0.06)	0.00 (0.00)	0.00 (0.00)	0.09 (0.22)	0.00 (0.00)
B. White						
Everyone 18-65	0.81 (0.16)	0.75 (0.14)	0.14 (0.23)	0.10 (0.18)	0.69 (0.12)	0.00 (0.01)
Young 18-20	0.63 (0.15)	0.53 (0.13)	0.45 (0.54)	0.29 (0.33)	0.62 (0.14)	0.02 (0.02)
Young adult 21-35	0.83 (0.17)	0.77 (0.15)	0.24 (0.41)	0.17 (0.33)	0.71 (0.13)	0.01 (0.01)
Adult 36-45	0.85 (0.16)	0.80 (0.15)	0.04 (0.08)	0.04 (0.07)	0.80 (0.18)	0.00 (0.00)
Senior 46-65	0.80 (0.15)	0.76 (0.14)	0.00 (0.00)	0.00 (0.00)	0.10 (0.24)	0.00 (0.00)
C. Black						
Everyone 18-65	0.09 (0.15)	0.09 (0.15)	0.02 (0.09)	0.02 (0.08)	0.84 (0.20)	0.00 (0.00)
Young 18-20	0.09 (0.15)	0.08 (0.14)	0.05 (0.19)	0.04 (0.16)	0.78 (0.25)	0.00 (0.00)
Young adult 21-35	0.10 (0.16)	0.09 (0.16)	0.03 (0.16)	0.03 (0.15)	0.87 (0.20)	0.00 (0.00)
Adult 36-45	0.09 (0.15)	0.09 (0.15)	0.00 (0.02)	0.00 (0.02)	0.94 (0.16)	0.00 (0.00)
Senior 46-65	0.08 (0.14)	0.08 (0.14)	0.00 (0.00)	0.00 (0.00)	0.24 (0.39)	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 parentheses.

Table A.3: Total Effects of Draft-Induced Labor Supply Shocks on Employment Outcomes by Race

	Coefficient Estimates			Pre-treat Mean		N
	$\hat{\pi}_1$	$\hat{\pi}_2$	$\hat{\pi}_1 + \hat{\pi}_2$	White	Black	
	(White)	(B – W)	(Black)			
	(1)	(2)	(3)	(4)	(5)	(6)
A. Wage Convergence						
Wage Income (1999 Dollars)	-15.677*** (1.389)	17.450 (3.346)	1.773 (3.044)	92.154	51.436	862,071
Wage Income (Z-score)	-0.043*** (0.012)	0.068 (0.016)	0.025** (0.011)	0.299	-0.214	862,071
Wage Income Percentile	-0.012*** (0.003)	0.021 (0.004)	0.009*** (0.003)	0.595	0.444	862,071
B. Occupational Upgrading and Labor Supply						
Occ. Median Income (\$1950)	0.090 (0.063)	0.212 (0.129)	0.302*** (0.113)	26.614	20.734	2,862,426
Occ. Earnings Rank (percentile)	3.862** (1.476)	2.841 (3.809)	6.704* (3.511)	56.748	40.155	2,862,426
Labor Force Participation	0.001*** (0.000)	0.000 (0.001)	0.002*** (0.001)	0.886	0.886	2,862,426
Employed	0.003 (0.002)	-0.000 (0.004)	0.003 (0.003)	0.796	0.752	2,862,426
C. Geographic Mobility						
Out-of-State Migration	-0.006 (0.003)	-0.021 (0.016)	-0.027* (0.016)	0.063	0.063	2,862,426
Out-of-County Migration	0.043*** (0.008)	-0.025 (0.013)	0.018* (0.011)	0.625	0.749	2,862,426
South-to-North Migration	-0.000 (0.000)	0.002 (0.003)	0.002 (0.003)	0.012	0.104	2,862,426
D. Industrial Reallocation						
Manufacturing	-0.000 (0.004)	-0.002 (0.006)	-0.003 (0.005)	0.321	0.195	2,862,426
Agricultural	-0.002** (0.001)	-0.004 (0.004)	-0.006* (0.003)	0.015	0.033	2,862,426
Professional Services	0.002 (0.002)	0.003 (0.002)	0.005*** (0.002)	0.060	0.059	2,862,426
Personal Services	-0.002** (0.001)	-0.004 (0.009)	-0.006 (0.008)	0.031	0.100	2,862,426
Transportation	-0.000 (0.003)	0.015 (0.008)	0.014* (0.008)	0.091	0.084	2,862,426
Construction	0.000 (0.002)	-0.004 (0.004)	-0.003 (0.004)	0.097	0.174	2,862,426
Wholesale	0.004*** (0.001)	0.001 (0.002)	0.005*** (0.001)	0.040	0.020	2,862,426
Retail	0.002* (0.001)	0.004 (0.005)	0.007 (0.004)	0.131	0.116	2,862,426
Government	0.006*** (0.001)	-0.000 (0.006)	0.005 (0.006)	0.033	0.031	2,862,426
E. Work Intensity and Human Capital						
Weeks Worked (Z-score)	-0.076*** (0.011)	0.047 (0.019)	-0.029* (0.016)	-0.007	-0.133	862,071
Hours per Week (Z-score)	-0.058*** (0.012)	0.018 (0.032)	-0.040 (0.030)	-0.176	-0.122	862,071
Full-time Hours	-0.022*** (0.005)	0.011 (0.008)	-0.011* (0.006)	0.893	0.850	862,071
Full-time, Full-year	-0.041*** (0.009)	0.034 (0.014)	-0.007 (0.011)	0.587	0.508	862,071
Highest School Grade (Years)	-0.037 (0.023)	0.164 (0.057)	0.127** (0.052)	12.762	10.770	862,071

Notes: The table shows the estimated effects of draft-induced labor supply shocks on worker outcomes (Equation 7) using a sample of linked 1940-1950 census records for males aged 15-65. Treatment measures draft intensity as the share of white males aged 21-45 removed from county-occupation labor markets through military conscription during 1940-1945. All coefficients are scaled to represent the effect of a ten percentage point increase in local draft shocks. Column (1) reports coefficient estimates on π_1 for white workers; column (2) reports π_2 capturing differential effects for Black workers; column (3) reports total effects for Black workers ($\pi_1 + \pi_2$). The specification includes individual, market, year fixed effects, and demographic controls (age, age squared). Sample consists of males aged 15-65 with non-missing outcome data in both census years. Standard errors clustered at market level. Observations are person-year records. Significance levels are *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.4: Robustness Test on Alternative Sample: Effects of Draft-Induced Labor Supply Shocks on Employment Outcomes

	Coefficient Estimates			Pre-treat Mean		
	$\hat{\pi}_1$ (White) (1)	$\hat{\pi}_2$ (B – W) (2)	$\hat{\pi}_1 + \hat{\pi}_2$ (Black) (3)	White (4)	Black (5)	N (6)
A. Wage Convergence						
Wage Income (1999 Dollars)	-15.427*** (1.370)	16.139 (2.858)	0.712 (2.508)	90.483	49.463	945,146
Wage Income (Z-score)	-0.042*** (0.011)	0.060 (0.014)	0.017** (0.008)	0.278	-0.239	945,146
Wage Income Percentile	-0.011*** (0.003)	0.018 (0.004)	0.007*** (0.002)	0.590	0.438	945,146
B. Occupational Upgrading and Labor Supply						
Occ. Median Income (\$1950)	0.085 (0.063)	0.210 (0.110)	0.295*** (0.090)	26.530	20.474	3,291,430
Occ. Earnings Rank (percentile)	7.650*** (1.909)	2.384 (3.267)	10.034*** (2.651)	1805.656	1594.108	3,291,430
Employed	0.003 (0.002)	-0.001 (0.004)	0.002 (0.003)	0.788	0.752	3,291,430
C. Geographic Mobility						
Out-of-State Migration	-0.005 (0.003)	-0.017 (0.014)	-0.021 (0.014)	0.063	0.061	3,291,430
Out-of-County Migration	0.044*** (0.008)	-0.022 (0.013)	0.022** (0.011)	0.622	0.740	3,291,430
South-to-North Migration	-0.000 (0.000)	0.004 (0.003)	0.004 (0.003)	0.014	0.115	3,291,430
D. Industrial Reallocation						
Manufacturing	0.000 (0.003)	-0.004 (0.006)	-0.003 (0.005)	0.321	0.192	3,291,430
Agricultural	-0.002*** (0.001)	-0.004 (0.003)	-0.006** (0.003)	0.019	0.053	3,291,430
Professional Services	0.002 (0.002)	0.001 (0.003)	0.003 (0.002)	0.056	0.059	3,291,430
Personal Services	-0.002** (0.001)	-0.001 (0.007)	-0.003 (0.007)	0.030	0.099	3,291,430
Transportation	-0.001 (0.003)	0.013 (0.007)	0.012* (0.007)	0.092	0.082	3,291,430
Construction	0.001 (0.002)	-0.003 (0.004)	-0.003 (0.004)	0.096	0.166	3,291,430
Wholesale	0.003*** (0.001)	0.002 (0.001)	0.005*** (0.001)	0.039	0.020	3,291,430
Retail	0.003** (0.001)	0.002 (0.004)	0.005 (0.004)	0.126	0.110	3,291,430
Government	0.005*** (0.001)	-0.000 (0.005)	0.004 (0.005)	0.032	0.029	3,291,430
E. Work Intensity and Human Capital						
Weeks Worked (Z-score)	-0.076*** (0.011)	0.039 (0.018)	-0.037*** (0.014)	-0.013	-0.145	945,146
Hours per Week (Z-score)	-0.057*** (0.012)	0.016 (0.027)	-0.041* (0.024)	-0.175	-0.120	945,146
Full-time Hours	-0.022*** (0.005)	0.013 (0.008)	-0.009 (0.006)	0.891	0.843	945,146
Full-time, Full-year	-0.042*** (0.008)	0.034 (0.013)	-0.008 (0.010)	0.583	0.498	945,146
Highest School Grade (Years)	-0.024 (0.019)	0.112 (0.044)	0.088** (0.039)	12.730	10.621	945,146

Notes: The table shows the estimated effects of draft-induced labor supply shocks on worker outcomes (Equation 7) using an alternative sample restriction of linked 1940-1950 census records for males aged 15-65. Treatment measures draft intensity as the share of white males aged 21-45 removed from county-occupation labor markets through military conscription during 1940-1945. All coefficients are scaled to represent the effect of a ten percentage point increase in local draft shocks. Column (1) reports coefficient estimates on π_1 for white workers; column (2) reports π_2 capturing differential effects for Black workers; column (3) reports total effects for Black workers ($\pi_1 + \pi_2$). The specification includes individual, market, year fixed effects, and demographic controls (age, age squared). Sample consists of males aged 15-65 with non-missing outcome data in both census years. Standard errors clustered at market level. Observations are person-year records. Significance levels are *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

B Data Construction and Additional Details

Contents

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B.1 Newspaper Data

This section provides details on the construction of a structured job posting dataset, with identified racial terminology and variables extracted from job advertisement content.

B.1.1 Processing Unstructured Newspaper Pages into Delimited Job Postings

The text data, retrieved from approximately 52 million digitized pages, is highly unstructured and encompasses all newspaper sections (including front pages, news, and Op-Eds) indexed at the page level. We parsed text across all these newspaper sections to identify those belonging to classifieds. Within the classifieds, job postings are embedded in continuous text streams without clear delimiters. We use a heuristic topic modeling approach and train a classification model to distinguish job ads from other listings (real estate, services, vehicle sales).

We begin by processing the raw text data from newspapers for detecting which text corresponds to classifieds pages. We pre-process 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.²⁸

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. The job posting content required extensive cleaning and formatting to correct OCR errors and prepare it for feature extraction (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. The substantial volume of data demands considerable computational optimization and resources — as many processing steps involve detailed word-by-word analysis.

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.

²⁸Using 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.

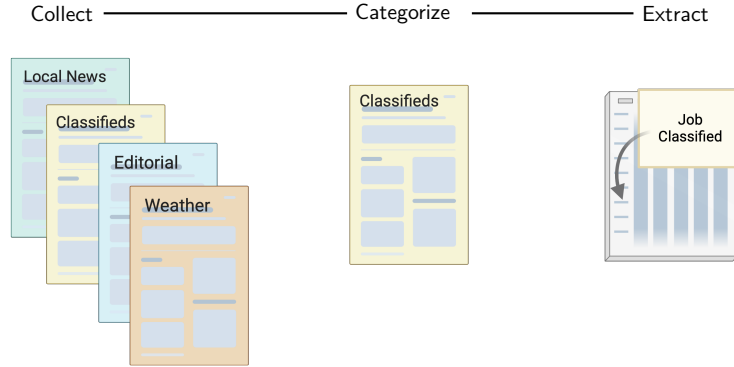
To identify job related content in the job postings, we implement two alternative methods for topic detection. First, we use Latent Dirichlet allocation (LDA) for discovering K topics, where each topic aligning with the contents of the words in the text is modeled as a probability, t_k , over contents. 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.²⁹ 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^*} .

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 B.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.

B.1.2 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 2010.³⁰ Additionally, we calculated

²⁹For 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.

³⁰The SOC classification used is available at <https://www.onetcenter.org/dictionary/22.1/excel/>.

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 performed using the package Word2Vec.³¹ The highest similarity scores direct the assignment of SOC titles to job titles.

B.1.3 Extraction of Racial Terminology

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

Table B.1: Classification of Terms by Racial Categories

<i>Race Category</i>	<i>Terms</i>
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.

B.1.4 County Names: Geographical Location 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 geographical localization verification service application programming interface (API) to verify these addresses against a comprehensive dataset of U.S. locations.³² 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.

B.1.5 Extraction of 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 B.2 using a cosine similarity and string matching techniques.

³¹Word2Vec 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

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

<i>Category</i>	<i>Terms</i>
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, legis, assist, manag, lobbyist, educ, azov, articul, direct, propos, seil, develop, guy, vertislng, advertslag, iobbi, structur, sale, facilit, execut, support, advtsg, administ, negoti, advt, lobbv, execut, explain, odv, inform, advtg, lobbyist, advertsln, adv, brief, coordin, lobb, congression, advert, delight, seli, present, intergovernment, review, advis, communic, soil, advert, arrang, overse, public, grassroot, legis, academ, leach, media, market, advertis, irrever, priorit, teeth, negoti, initi, supervis, nightlif, consult, prepar, present, inform, lobb, coordin, organ, teach, sell, buy, advis, entertain, present, manag, negoti, lobb, 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, egui, 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, epui, 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.2 Full-count U.S. Decennial Censuses (1900-1970) and 1940-1950 Full Count Restricted Census

Data Sources. 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 restricted censuses, which contain detailed employment indicators and nominal information from workers to linked them across time. 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.

for our ads.

³²Geoapify's geographical coding API service is available at <https://www.geoapify.com>.

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 univrsity 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 arlington”
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 glood position for riisl 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.

Individual-Level Census Linkage We linked individual records of 1940 and 1950 full count restricted census for estimating the work-level effects presented in Section 6. The ABE Hierarchical method employs machine learning with exact names, birthplace, and date of birth matching and hierarchical blocking, with internal deduplication already applied. NYSIIS-JW combines New York State Identification and Intelligence System (NYSIIS) phonetic encoding with Jaro-Winkler string distance comparison (using parameters: 2-year tolerance and a conservative 0.1 JW threshold). See Appendix Table B.4 summarizes the linked samples obtained through both methods.

B.3 WWII Military Records and Selective Service Digitized Draft Cards

Data Sources. We use the WWII Army Enlistment Dataset published by UC Berkeley’s CenSoc Project. This is a harmonized version of 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. Our analysis uses an estimation sample restricted to male personnel sourced and 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. Appendix Table B.5 contains descriptive statistics of the estimation sample consisting of 6.8 million enlisted soldiers and 199,778 casualties.

Finally, we also use casualty information from the *World War II Honor List of Dead and Missing Army and Army Air Forces Personnel* digitized by Ferrara (2022).³³ We linked these

³³The 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.

Table B.4: Descriptive Statistics by Record Linkage Algorithm: Pre-Consolidation Comparison

Variable	ABE Hierarchical			NYSIIS JW		
	Mean	SD	N	Mean	SD	N
Demographics						
Age	32.08	11.41	8,594,552	33.66	11.64	1,711,604
Race: Black	0.05	0.21	8,594,552	0.07	0.26	1,711,604
Race: White	0.95	0.22	8,594,552	0.92	0.27	1,711,604
Race: Other	0.00	0.05	8,594,552	0.01	0.09	1,711,604
Education						
Middle School	0.44	0.50	8,434,429	0.52	0.50	1,672,691
High School	0.43	0.50	8,434,429	0.37	0.48	1,672,691
College (1-4 years)	0.11	0.31	8,434,429	0.09	0.29	1,672,691
College (5+ years)	0.02	0.13	8,434,429	0.02	0.13	1,672,691
Geographic & Housing						
Urban Status	0.56	0.50	8,594,552	0.55	0.50	1,711,604
Home Ownership	0.46	0.50	8,342,925	0.45	0.50	1,655,142
Farm Status	0.22	0.41	8,594,552	0.23	0.42	1,711,604
Family Structure						
Mother's Birthplace	116.07	164.59	429,772	138.42	179.98	85,235
Father's Birthplace	124.06	169.73	429,772	147.70	184.29	85,235
Citizenship Status	2.43	0.85	485,992	2.55	0.89	187,713
Children Born	NA	NA	0	NA	NA	0
Relationship to Head	2.56	2.83	8,594,552	2.70	3.08	1,711,604
Migration (5 years)	1.67	0.61	8,395,351	1.68	0.61	1,666,624
1940 Work Outcomes						
Weeks Worked	44.06	12.73	6,911,377	43.97	12.63	1,387,184
Hours per Week	45.48	13.95	6,019,722	45.35	14.08	1,203,279
Weeks Worked Secondary	4.86	1.66	6,911,377	4.85	1.66	1,387,184
Hours Secondary	5.65	1.73	6,019,722	5.64	1.76	1,203,279
Duration Unemployed	920.07	260.94	8,587,730	915.41	267.47	1,710,145
Labor Force Status	1.85	0.36	8,594,552	1.86	0.35	1,711,604
Employment Status	1.37	0.73	8,594,552	1.36	0.72	1,711,604
Full-time Full-year	0.58	0.49	6,607,383	0.57	0.50	1,325,157
Full-time Hours	0.88	0.32	6,019,722	0.88	0.33	1,203,279
Labor Force Participation	0.85	0.36	8,594,552	0.86	0.35	1,711,604
Occupational Score	24.49	10.69	7,242,226	23.94	10.74	1,461,979
Economic Score	2041.38	3522.32	8,594,552	1905.00	3414.51	1,711,604
Education Score	1743.66	3651.44	8,579,518	1609.93	3535.72	1,708,333
Industry Score	405.76	305.27	8,594,552	397.67	302.00	1,711,604
Occupation Score	598.31	309.62	8,594,552	602.73	310.27	1,711,604
Employment Sectors (1940)						
Manufacturing	0.20	0.40	8,594,072	0.20	0.40	1,711,506
Agricultural	0.17	0.37	8,594,072	0.19	0.39	1,711,506
Services	0.09	0.28	8,594,072	0.09	0.28	1,711,506
Retail	0.10	0.30	8,594,072	0.11	0.31	1,711,506
Government	0.04	0.19	8,594,072	0.03	0.17	1,711,506

Notes: This table presents descriptive statistics for men aged 21-45 (who were subject to Selective Service registration) successfully linked between the 1940 and 1950 U.S. Census using two independent record linkage algorithms, prior to the cross-method consolidation procedure detailed in this appendix: the ABE and NYSIIS-JW methods. Each algorithm represents its internally-processed output prior to cross-method consolidation. ABE Hierarchical matches take precedence over NYSIIS JW matches when overlapping HISTID pairs are identified during consolidation. All variables measured in 1940 census year. Education categories represent highest completed schooling level. Race classifications follow historical U.S. Census categories. Labor market variables capture primary and secondary job characteristics, with occupational and industry scores representing standardized IPUMS classifications.

two sources of data using the army serial numbers of the military personnel.

B.4 Sample Construction Criteria

The entire sample of market-year observations requires markets to have observations in both pre-war and post-war periods without mandating a specific number of years. This sample additionally requires successful matching with military service records, newspapers information at

Table B.5: Descriptive Statistics for 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.

the county-occupation level, and 1940 Census data to ensure complete information for treatment and control variables.

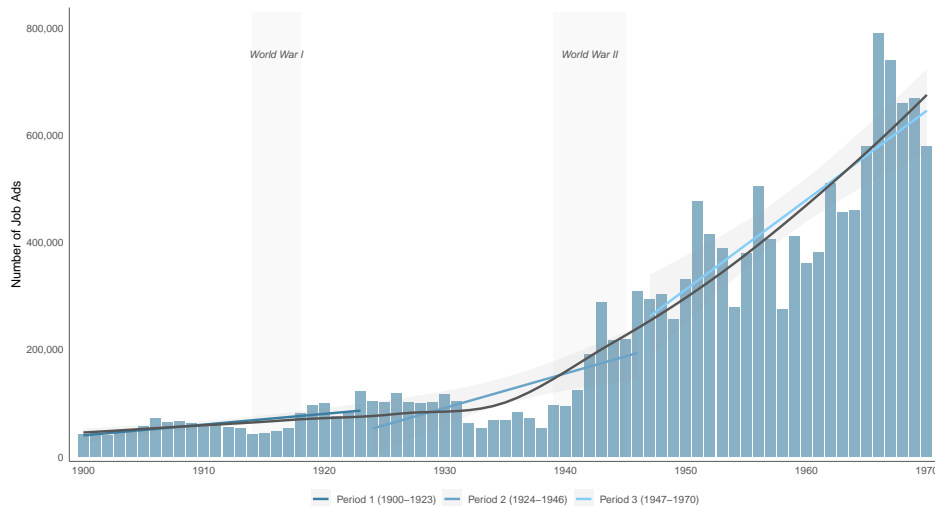
We restrict this universe of local labor markets to construct primary estimation samples with a temporal coverage that balances identification needs with sample size. Our primary specification employs a sample that requires markets to appear in at least 25 of the 31 panel years spanning 1930–1960. War years 1942–1945 are excluded from difference-in-differences estimation while retained for event study specifications.

C Validation of the Historical Newspaper Job Ads Dataset

C.1 Temporal Coverage and Sample Size

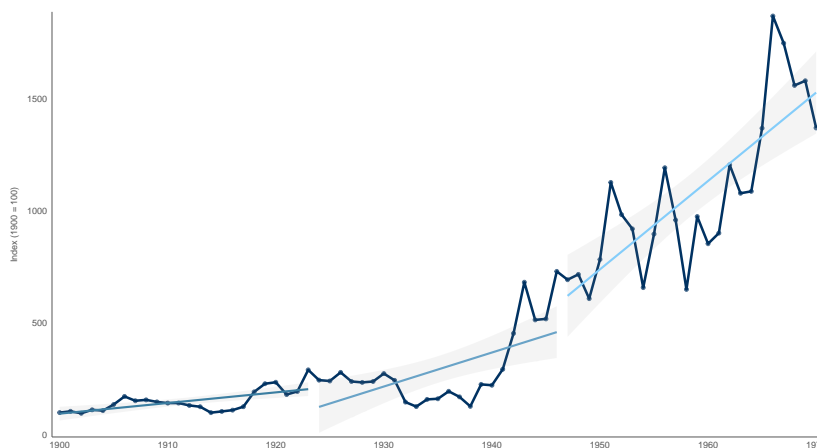
The volume of job advertisements responds strongly to historical economic conditions, validating that our data capture genuine labor market dynamics.

Figure C.1: Evolution of Job Advertisement Volume, 1900-1970



Notes: Annual count of parsed job advertisements from thirteen newspapers. Vertical lines indicate World War I (1917-1918) and World War II (1942-1945). The series shows cyclical patterns corresponding to business cycles, with notable increases during wartime labor mobilization. Post-1940 growth reflects both expanded newspaper coverage and the increasing formalization of hiring practices through classified advertising. The spike in 1942-1945 coincides with defense industry expansion and federal requirements for non-discriminatory hiring in war production, though explicit racial preferences persisted in non-defense sectors.

Figure C.2: Indexed Growth by Historical Period



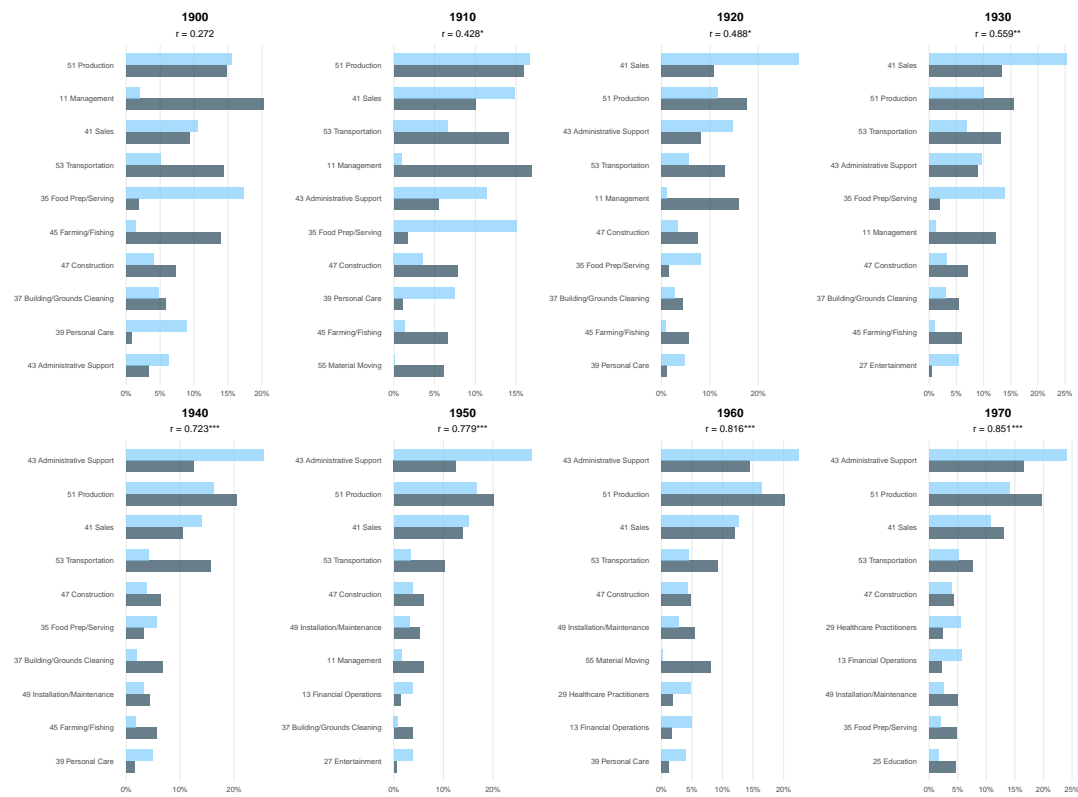
Notes. The figure shows the volume of job advertisements indexed to 100 at period start for five historical intervals: Pre-WWI (1900-1916), WWI (1917-1918), Interwar (1919-1939), WWII (1940-1945), and Post-war (1946-1970). Indexes constructed from annual averages to smooth high-frequency variation.

C.2 Occupational Distribution Validation

We first validate that our newspaper job advertisement sample captures the occupational structure of the U.S. labor market by comparing it with Census employment distributions. The occupational composition of job advertisements shifts across decades, with clerical and sales

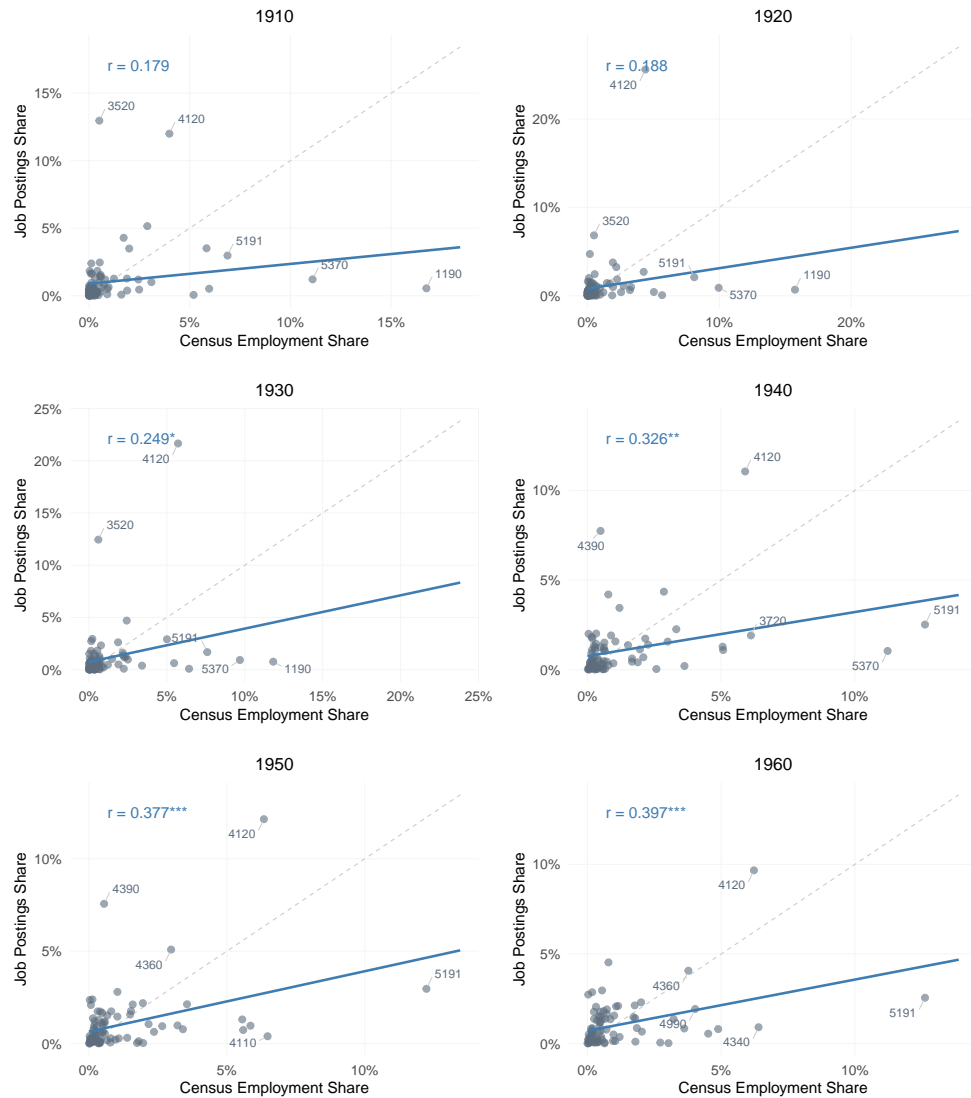
positions dominating early periods before production and service occupations expand during wartime.

Figure C.3: Occupation Shares of Job Postings and Decennial Census, 1910–1970



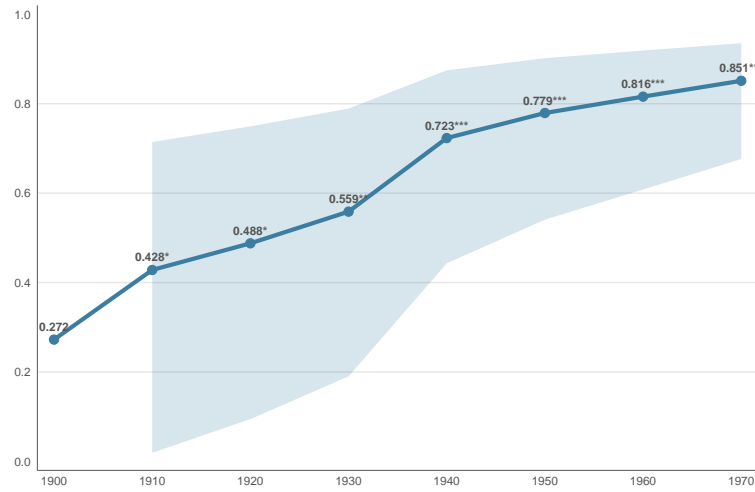
Notes: This graph illustrates the occupation shares for individuals aged 14 to 65 in the labor force according to the Decennial Census and the historical job ads dataset (N = 16.8 million job postings). Categories follow 2-digit SOC classifications: Management, Professional, Technical, Sales, Administrative, Service, Production, Transportation, and Agriculture.

Figure C.4: Correlation Between Job Postings and Census Employment by 4-Digit SOC



Notes. This figure presents the correlation between occupational distributions in the newspaper data of job advertisement and U.S. Census employment data at the 4-digit SOC level for 1900-1970. Each point represents an occupation-decade observation. The overall correlation coefficient is 0.63.

Figure C.5: Temporal Evolution of Occupation-Census Correlation

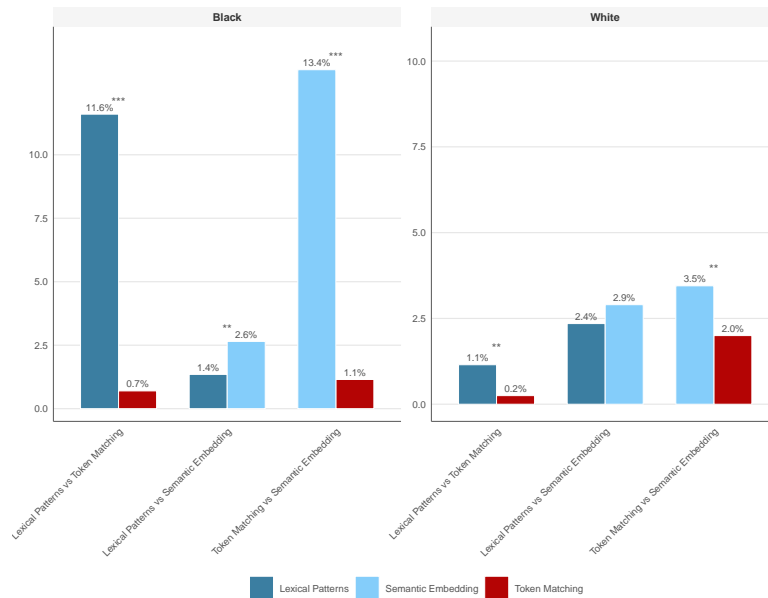


Notes. Annual correlation coefficients between newspaper job posting occupational distributions and Census employment shares, 1900-1970. The upward trend from 0.43 to 0.85 reflects improved OCR quality in later periods and broader adoption of newspaper recruitment across sectors. Correlations calculated at 4-digit SOC level with at least 100 postings per occupation-year. Shaded regions indicate 95% confidence intervals. Major discontinuities align with Census methodology changes in 1940 and 1960.

C.3 Algorithm Validation

Multiple classification methods for identifying racial terminology yield highly consistent results, validating the robustness of our discrimination measures.

Figure C.6: Classification Method Disagreement Analysis

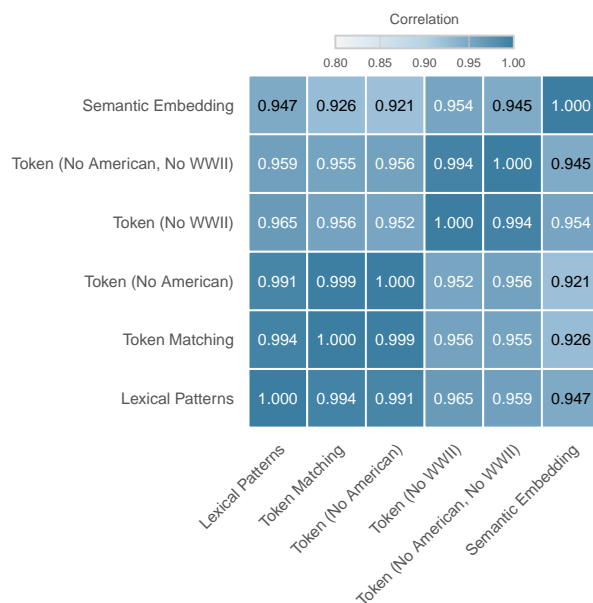


Notes. This figure shows disagreement rates between six methods for identifying racial terminology in job advertisements: Lexical Patterns (regex-based), Token Matching (exact match), Token (No American) excluding “American” as racial term, Token (No WWII) excluding Axis nationalities, Token (No American, No WWII) combining exclusions, and Semantic Embedding using word2vec similarity. Pairwise disagreement rates range from 0.1% to 7.8%. Lower triangle shows disagreement percentages; upper triangle shows agreement counts. Analysis based on random sample of 100,000 job postings with manual validation. Methods converge on 92% of classifications.

The correlation matrix confirms that alternative classification approaches produce nearly

identical measures of racial preferences.

Figure C.7: Method Correlation Heatmap

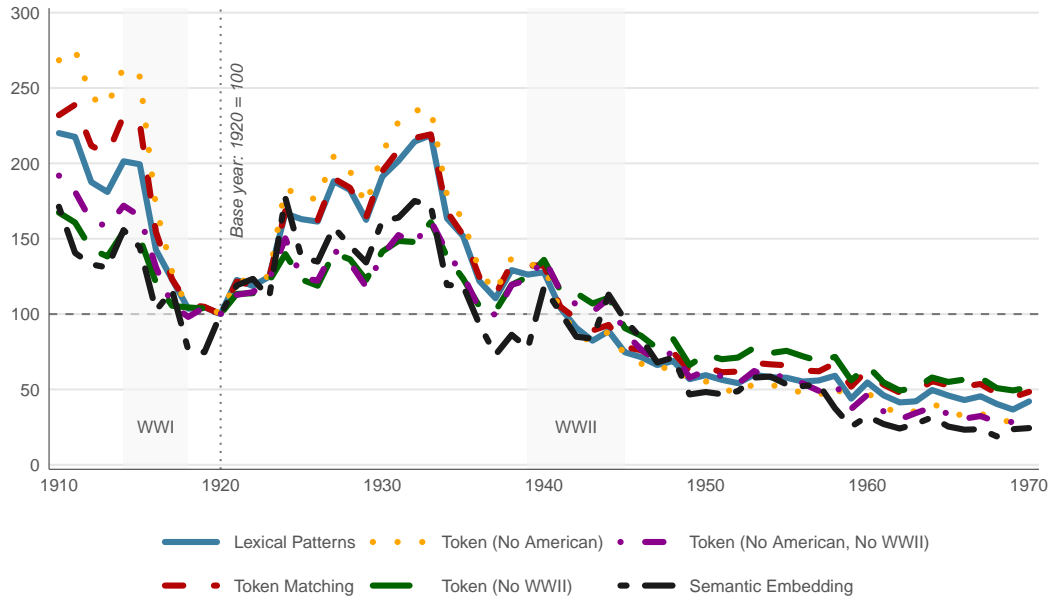


Notes. The figure shows a correlation matrix for racial preference detection across six classification methods. Correlation coefficients range from 0.921 to 0.999, with Token Matching and Token (No American) showing highest agreement ($r = 0.999$). Semantic Embedding shows lowest but still strong correlations ($r > 0.92$) with rule-based approaches. High concordance validates algorithmic robustness to methodological choices. Matrix computed on full sample of 16.8 million postings with methods applied independently.

C.4 Additional Validation of Racial Preferences

All measurement approaches show consistent temporal patterns, with wartime periods driving the largest declines in discriminatory preferences.

Figure C.8: Normalized White Racial Preference Metrics

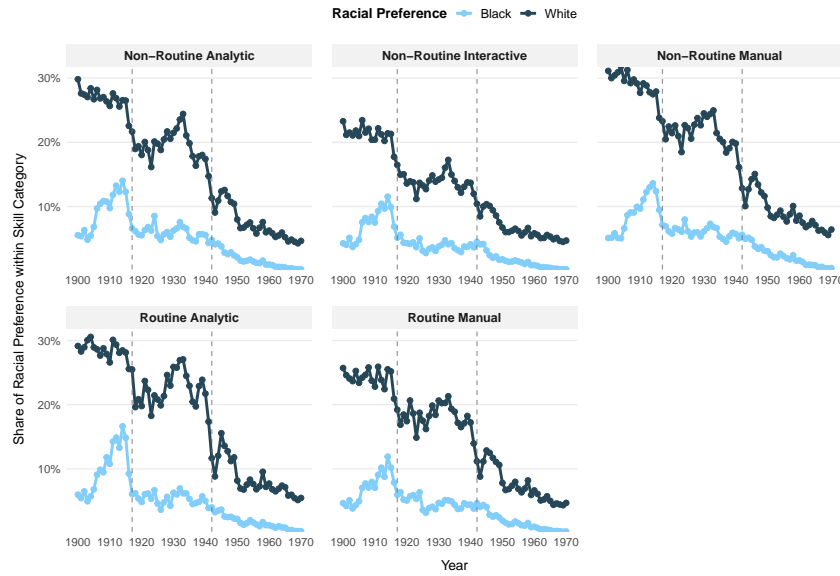


Notes. The figure shows white racial preferences normalized to 1940 baseline across alternative measurement approaches. All methods show consistent temporal patterns: 20-30% decline during WWI, recovery in 1920s, 60-70% decline during WWII, and near-elimination by 1965. Robustness to classification choices supports causal interpretation of wartime effects. Series include: baseline algorithm, excluding ambiguous terms, requiring explicit “only” language, and context-dependent classification using surrounding text.

C.5 Additional Validation Exercises

Discrimination varies systematically by skill requirements, with routine manual occupations showing the highest rates of racial preferences. Within-skill temporal variation exceeds cross-skill differences by 1950, suggesting broad market forces rather than skill-specific technological change.

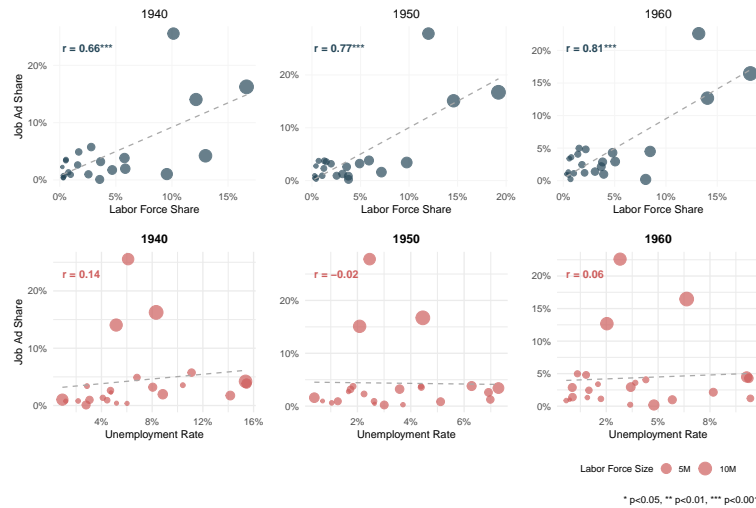
Figure C.9: Racial Preferences by Skill Requirements



Notes. Share of job advertisements with white racial preferences by skill categories following Autor, Levy, and Murnane (2003) task framework. Non-routine cognitive (professional, managerial) shows lowest discrimination (3-5%). Routine manual (production, assembly) shows highest (12-15% pre-war). All categories converge toward zero by 1965. Skill classification based on occupation-task crosswalk with 1,247 occupation codes.

Job posting volumes correlate strongly with multiple external labor market indicators, confirming that our data reflect genuine economic conditions.

Figure C.10: Job Postings and Labor Market Indicators

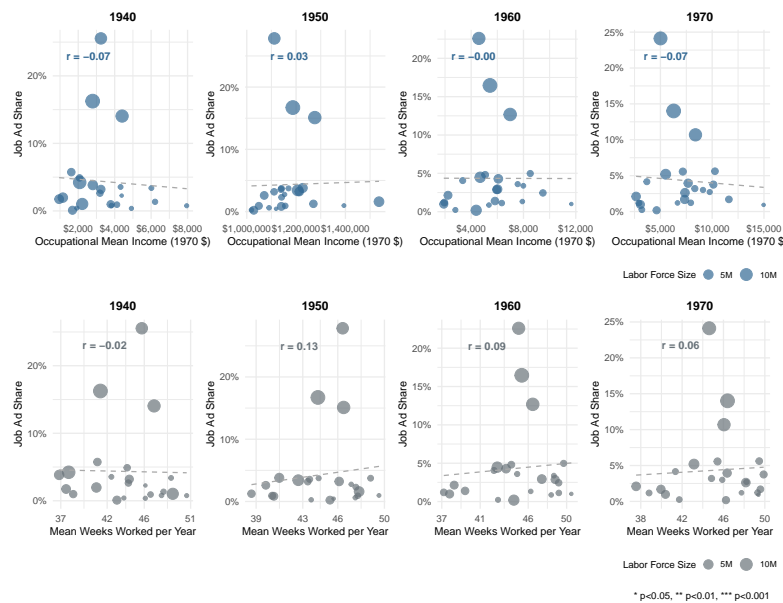


Notes. The figure shows validation exercises of newspaper job advertisement representation against labor market indicators for 1940, 1950, and 1960. Job ad share represents the percentage of all newspaper job advertisements in each occupation. Top panels show the positive correlation between the occupational distribution in our newspaper sample (job ad share) and actual Census employment distribution (labor force share), with correlations strengthening over time ($r = 0.68$ in 1940, $r = 0.77$ in 1950, $r = 0.81$ in 1960). Bottom panels show the negative correlation between job ad representation and unemployment rates by occupation ($r = -0.14$ in 1940, $r = -0.52$ in 1950, $r = -0.06$ in 1960), confirming that occupations with more job postings have lower unemployment. Points are sized by labor force size.

Additional validation exercises confirm data reliability across multiple dimensions including cross-newspaper consistency and temporal stability. The declining correlations over time indicate that newspaper recruitment broadened across all occupation types regardless of income or

employment stability, validating that our sample increasingly represents the full labor market rather than select high-income or stable occupations.

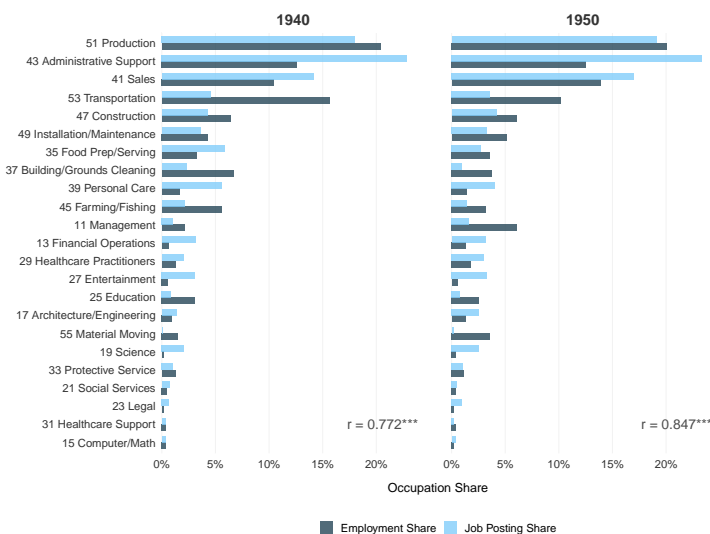
Figure C.11: Supplementary Validation Metrics: Placebo Tests



Notes. The figure shows placebo tests examining whether the occupational distribution of job advertisements correlates with economic characteristics unrelated to newspaper recruitment patterns, 1940-1970. Job ad share represents the percentage of all newspaper job advertisements in each occupation. Top panels test for spurious correlation between occupational representation in newspapers and mean income from the 1970 Census (correlations range from -0.87 to -0.07). Bottom panels test correlation with mean weeks worked per year (ranging from -0.52 to 0.06). Points sized by labor force size.

Direct comparison with Census data for the critical 1940-1950 period shows strong correspondence in occupational distributions.

Figure C.12: Detailed Census Comparison, 1940-1950

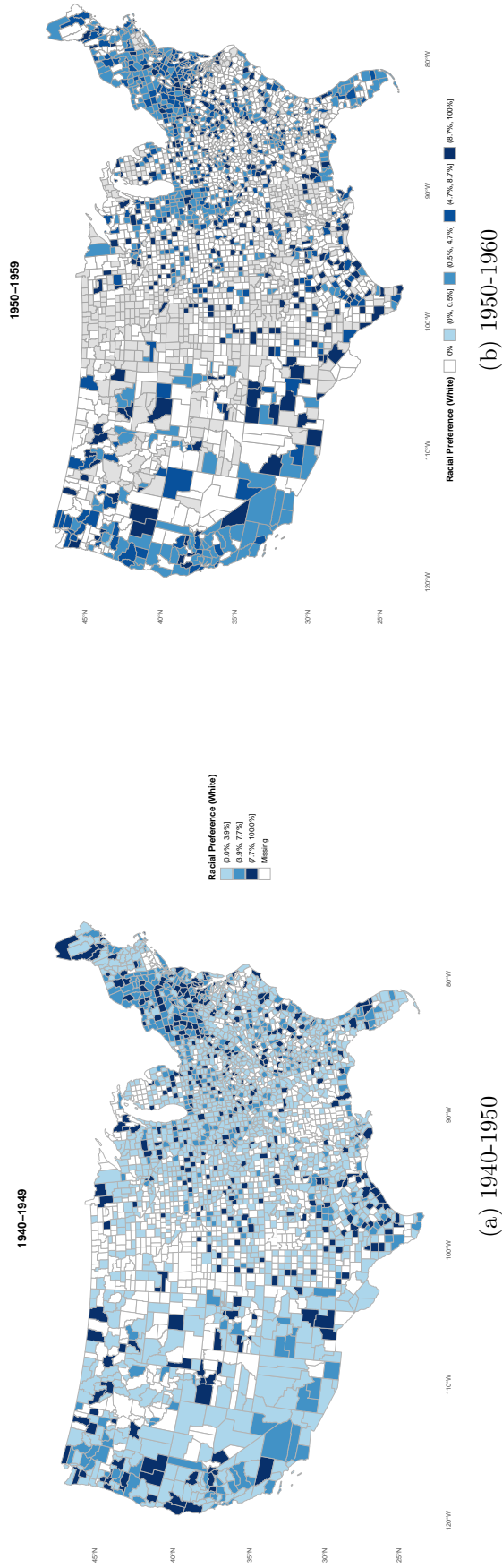


Notes. Additional validation of job advertisement shares against occupational characteristics from 1940-1970. Top panels show the correlation between job ad shares and occupational mean income from the 1970 Census, with correlations ranging from -0.87 (1940) to -0.07 (1970), indicating convergence over time. Bottom panels show the correlation between job ad shares and mean weeks worked per year, with correlations ranging from -0.52 (1940) to 0.06 (1970). The weakening correlations over time suggest broadening use of newspaper recruitment across all occupation types.

C.6 Geographic Validation

Racial preferences in job advertisements exhibit strong geographic concentration, with Southern states showing persistently higher discrimination rates. Geographic patterns of discrimination persist across decades despite overall declines, providing stable spatial variation for identification.

Figure C.13: Geographic Distribution of White-Preferred Job Advertisements, 1940-1960



Notes: County-level shares of job advertisements expressing preference for white workers across two decades. Panel (a) shows 1940-1950 data aggregated from 8.2 million geo-coded job postings, with darker shading indicating higher discrimination rates. Counties with fewer than 50 job postings excluded. Panel (b) shows 1950-1960 patterns.

D Historical Institutional Details

D.1 Draft Board Classification Process

The steps followed by Local Draft boards to register men eligible for drafting are summarized as follows.

Registration. First, universal registration was required for all men aged 18-45 after December 1941, achieving a remarkable 98 percent compliance rate enforced through criminal penalties for evasion.

Order Number Assignment. Second, order numbers were assigned through a national lottery conducted in Washington D.C. and broadcast nationally, ensuring no local influence over the randomization process.

Classification by Local Boards. Third, local draft boards classified registrants through sequential evaluation of all deferment categories based on standardized questionnaires and supporting documentation. The classification Classes are included in Appendix Table D.1. The appeal rights created extensive paper trails that allow us to observe the programmatic nature of this process.

Class I-A Assignment. In the fourth stage, Class I-A assignment occurred only after registrants failed to qualify for all deferments—including occupational, dependency, and other categories. As documented in Selective Service regulations, “no registrant classified in Class I until found ineligible for all other classes” (Selective Service System, 1948). Appendix Table D.2 provides a comprehensive list of essential activities that qualified for occupational deferments during this period.

Physical Examination and other Examinations Final and fifth phase, physical examinations were conducted at Army induction centers (not by local boards), with a standardized 30 percent rejection rate based on uniform medical criteria.

D.2 Federal Enforcement of State Draft Requirements

Age-Based Eligibility Creating Differential Exposure. The six stages of registration during the Selective Service System Act during World War II occurred between October 1940 and December 1942: (1) men aged 21-35 registered on October 16, 1940; (2) men who had reached age 21 since the first registration registered on July 1, 1941; (3) men aged 20-45 who had not previously registered reported on February 16, 1942; (4) men aged 45-65 registered on April 27, 1942, though they were “not eligible for military service” as this “Old Man’s Registration” was intended to inventory manpower resources rather than for military induction; (5) men aged 18-20 registered on June 30, 1942; and (6) those who reached age 18 after November 12, 1942 registered between December 10-31, 1942.³⁴

Preventing Strategic Manipulation in Draft Three institutional features prevented endogenous selection or strategic behavior from contaminating the variation. First, draft boards operated under federal supervision with standardized classification protocols, limiting discretionary deferments. Second, the Selective Service System explicitly prohibited occupational deferments for most private-sector employment until late 1942, after our primary variation had

³⁴National Archives and Records Administration, “World War II Draft Registration Records,” Record Group 147, Records of the Selective Service System, National Personnel Records Center, St. Louis, MO; National Archives and Records Administration, “World War II Selective Service Draft Cards: Fourth Registration, 1942,” RR# 929.

Table D.1: Classification Classes of Registrants Processed by Local Boards

Main Class	Class (Subsection)	Description
Class I: Available for Military Service or Currently Serving	I-A	Available for general military service; not eligible for another class and ready for induction.
	I-A(L)	Subcategory of I-A; fit only for limited service after physical examination.
	I-A*	Designation for men reclassified to I-A (often under lower physical standards) for leaving essential employment without justification.
	I-A-O	Conscientious objector willing to serve in non-combatant roles within the armed forces.
	I-B / I-B-O	Available for limited service (physically). "O" indicated conscientious objector. (Discontinued 18/08/1942).
	I-C	Member of the U.S. armed forces (active, reserve, retired, cadet) or discharged after service.
	I-D / I-E-O	Generally students in military training. (Discontinued 31/08/1941).
	I-G	Member of forces from co-belligerent nations; American Field Service; Merchant Marine (conditions); civilians interned by the enemy; personnel of the U.S. Coast and Geodetic Survey. (Deferred for contributions already made).
	I-H	Initially (08/1941): Registrants in Class I who had reached 28 years of age. (Abolished 19/11/1942).
Class II: Deferred by Occupation	II-A	Man needed in an activity supporting the <i>national interest</i> or <i>war effort</i> .
	II-B	Man needed in an activity essential to "national defense" or <i>war production</i> .
	II-C	Created 18/11/1942: Man needed in agricultural occupation essential to the war effort.
Class III: Deferred by Dependence	III-A	Main class for deferment due to dependence. Progressively restricted. (Discontinued 11/12/1943).
	III-B	Registrant with dependents employed in an activity essential to the war. (Discontinued 12/04/1943).
	III-C	Created 18/11/1942: Agricultural worker deferred also due to dependence. (Discontinued 17/02/1944).
	III-D	Created 12/04/1943: Cases of "extreme hardship and deprivation" for direct family members.
Class IV: Deferred for Other Reasons or Ineligible	IV-A	Original: Completed service under the 1940 Act. Later (11/1942): Reached 45 years of age without induction. Later (10/1944): Reached 38 years of age without induction, or discharged from service.
	IV-B	Officers deferred by law.
	IV-C	Foreigners (initially all, then neutral/enemy nationals unacceptable, later by nationality/ancestry unacceptable for service).
	IV-D	Regular or ordained ministers of religion and theology students.
	IV-E	Conscientious objector opposed to all military service; assigned to work of national importance.
	IV-F	Physically, mentally, or morally unfit for military service.
	IV-H	Created 01/01/1943: Registrants between 38-45 years not inducted, or separated from service. (Discontinued 06/03/1943).

Note: The information presented in this table has been compiled and synthesized from Part III: Classification During Wartime, in United States Selective Service System. (1950). *The Classification Process* (Special Monograph No. 5, Vol. 2). Washington, DC: U.S. Government Printing Office. This monograph is part of the List of Special Monographs published by the Selective Service System.

Table D.2: Essential Activities According to the Selective Service System Deferment Policy

Occupational Bulletin No.	Essential Activity Group	Date Issued
14	Production of Aircraft and Parts	Aug 5, 1942
6	Production of Ships, Boats and Parts	May 5, 1942, amended Dec 15, 1942
25	Production of Ordnance and Accessories	Sep 30, 1942
25	Production of Ammunition	Sep 30, 1942
18	Agricultural Services and Commercial Fishing	Sep 16, 1942, amended Feb 20, 1943
20	Processing of Food	Sep 16, 1942, amended Feb 26, 1943
19	Forestry, Logging, and Lumbering	Sep 16, 1942
33	Construction	Oct 23, 1942
12	Coal Mining	Jul 28, 1942
15	Metal Mining	Aug 5, 1942
12	Nonmetallic Mining and Processing and Quarrying	Jul 28, 1942
16	Smelting, Refining, and Rolling of Metal, Scrap Salvage	Aug 27, 1942
22	Production of Metal Shapes and Forgings	Nov 6, 1942
30	Finishing of Metal Products	Oct 17, 1942
28	Production of Industrial and Agricultural Equipment	Oct 15, 1942
26	Production of Machinery	Oct 6, 1942
24	Production of Chemicals and Allied Products and Essential Derivatives Thereof	Oct 2, 1942
35	Production of Rubber Products	Oct 23, 1942
29	Production of Leather Products	Oct 17, 1942
39	Production of Textiles	Nov 7, 1942
36	Production of Apparel	Oct 23, 1942
34	Production of Stone, Clay, and Glass Products	Oct 23, 1942
15	Production of Petroleum, Natural-Gas and Petroleum and Coal Products	Aug 5, 1942
37	Production of Finished Lumber Products	Oct 30, 1942
38	Production of Transportation Equipment	Nov 4, 1942
<i>Transportation Services:</i>		
21	Air	Nov 20, 1942
3, 7, 21	Water	Nov 20, 1942
5, 21	Railroad	Nov 20, 1942
21	Transit	Nov 20, 1942
21	Truck	Nov 20, 1942
21	Pipe Lines	Nov 20, 1942
21	Storage	Nov 20, 1942
40	Production of Materials for Packing and Shipping Products	Nov 10, 1942
32	Production of Communication Equipment	Oct 23, 1942
27	Communication Services	Oct 13, 1942, amended Jan 23, 1943
9	Heating, Power, Water Supply and Illuminating Services	Jun 5, 1942, amended Jan 19, 1943
42	Repair Services	Nov 23, 1942
41, 44	Health and Welfare Services	Nov 23, 1942
<i>Educational Services:</i>		
23	Production of Technical and Vocational Training Films	Sep 30, 1942, amended Dec 14, 1942
7	United States Maritime Service Training Program	Not specified
8	Civil Aeronautics Administration Civilian Pilot Training Program	Not specified
13	War Department Contract Flying Schools	Aug 1, 1942
23	Instruction and Administration of General and Vocational Institutions	Sep 30, 1942, amended Dec 14, 1942
11, 41	Student Deferment	Amended Mar 1, 1943
<i>Governmental Services:</i>		
31	Civil Aeronautics Administration Aviation Services	Oct 17, 1942
1	Civilian Pilots Employed by the Air Corps Flying Training Command	Apr 3, 1942
1, 7	Air Ferry Pilots	Apr 3, 1942
10, 43	Technical, Scientific, and Management Services	Jun 18, 1942, amended Dec 14, 1942 and Mar 1, 1943

Notes: The first column presents the Occupational Bulletin number, the activities mentioned in each bulletin, and the date issued. Source: 1944 Selective Service System publication "Occupational Bulletins Nos. 1 to 44: and Activity and Occupation Bulletins Nos. 1 to 25.

been realized. Third, interstate migration for draft avoidance was effectively prevented through the requirement that registrants report address changes and the practice of drafting men through their original registration board regardless of current residence.

D.3 Institutional Barriers to Black Military Mobilization

This subsection documents the institutional mechanisms that generated the asymmetric racial impact of World War II military mobilization.

Table D.3: Institutional Barriers to African American Military Participation in WWII

Criterion	For Whites	For African Americans	Source
Unit assignment	Any available unit	Only designated “Negro” units	Lee (1966), p. 52
Available branches	All branches	Only branches with segregated units	Lee (1966), p. 61
Infrastructure	Access to all installations	Only “separate but equal” installations	Lee (1966), p. 74
Officer opportunities	All candidate schools	Specific units only, with restrictions	Lee (1966), p. 76
Technical training	Access based on capability	Limited by racial perceptions	Lee (1966), p. 64
Population quotas	No racial limits	Caps at ~10% (population proportion)	Lee (1966), p. 75
Incorporation timing	No systematic delays	Delays pending segregated facilities	Lee (1966), p. 70
Mobility between units	Transfers as needed	Confined to segregated units	Lee (1966), pp. 75-76
Command	Could command any unit	Restricted to commanding Negro units only	Lee (1966), p. 76

Notes: This table documents the systematic institutional barriers embedded in War Department policy that restricted African American military participation during World War II. All information is drawn from Lee (1966).

Table D.4: Differential Rejection and Deferral Rates by Race, 1941-1943

Indicator	White	Black	Source
<i>Panel A: Educational Deferrals (May 15 - Sep 15, 1941)</i>			
Deferred for educational deficiency	1.1%	12.3%	Lee (1966), p. 240
Number deferred	60,001	83,466	Lee (1966), p. 240
<i>Panel B: Overall Rejection Rates (1943)</i>			
Rejected at induction stations (end of 1943)	30.3%	46.0%	Lee (1966), p. 240
Rejected during calendar year 1943	33.2%	53.1%	Lee (1966), p. 240

Notes: This table presents differential rejection and deferral rates between White and African American registrants during World War II mobilization reported by Lee (1966). Panel A shows educational deferrals during a four-month period in 1941. Panel B shows overall rejection rates at induction stations. The two most frequent causes of rejection were venereal diseases and educational deficiency, with educational deficiency being the more important barrier to mobilization efforts due to slow correction.

Table D.5: War Department Justifications for Segregation Policy

Page	Direct Quote	Main Message
75-76	“The policy of the War Department is not to intermingle colored and white enlisted personnel in the same regimental organizations. This policy has been proven satisfactory over a long period of years, and to make changes now would produce situations destructive to morale and detrimental to the preparation for national defense.”	Segregation necessary for morale and defense
76	“These regular units are going concerns, accustomed through many years to the present system. Their morale is splendid, their rate of reenlistment is exceptionally high, and their field training is well advanced. It is the opinion of the War Department that no experiments should be tried with the organizational set-up of these units at this critical time.”	No experiments with successful units
72-73	“If we should undertake to establish mixed units in the Army, it would be subversive to discipline, subversive to morale, and would not be of benefit either to the colored or to the white race.”	Integration would destroy discipline
63	“It was concluded that ‘the hazards of flying either in peace or war are such that the lack of confidence in any pilot of a combat unit not only creates timidity in the other pilots of the formation, but creates a mental hazard which in reality becomes a material hazard. Thus any such unit whether it is composed of white or negro pilots is useless as a combat unit either in peace or war.’”	Racial distrust makes integrated units useless

Notes: This table presents selected justifications provided by the War Department for maintaining racial segregation in military units during World War II compiled from Lee (1966).

Table D.6: War Department Implementation of 10 percent Racial Quota by Branch

Decision/Branch	Official Expectation	Actual Result	Source
Distribute across all branches proportionally	Each branch absorbs ~10% via Negro units	Persistent imbalances; some branches exempt, others over-saturated	Lee (1966), p. 111
Separate calls to Selective Service	Ensure monthly proportional flow	Questioned legally; Selective Service threatened to abandon	Lee (1966), p. 112
Air Corps (AAF)	Segregated Air Corps units	Quartermaster truck companies assigned to AAF bases instead	Lee (1966), p. 115
Tuskegee program	Segregated pipeline for pilots and technicians	Slow progress; units unfilled for months	Lee (1966), pp. 117, 119
Armored units	Combat role to meet quota	Three tank battalions activated (758th, 761st, 784th)	Lee (1966), pp. 120-121
Infantry divisions	Large quota absorbers (~15,000+ each)	Limited to two in 1942 (92nd, 93rd); rest postponed to 1943	Lee (1966), p. 128
Engineers	High absorption capacity	27 general service regiments by end of 1942	Lee (1966), p. 129
Quartermaster	Convert QM into major quota receiver	Over 1,600 Negro QM companies by war’s end	Lee (1966), p. 129

Notes: This table documents how the War Department attempted to implement its policy of proportional racial representation (~10% African American) across military branches while maintaining segregation (Lee, 1966). The table shows systematic implementation challenges due to infrastructure constraints, training bottlenecks, and branch-level resistance.

E Mathematical Appendix

This appendix provides complete mathematical derivations and proofs for the theoretical model in Section 5.

E.1 Complete Model Setup and Production Technology

E.1.1 Production Function

Consider an economy with a unit mass of firms indexed by $j \in [0, 1]$, each producing a homogeneous final good with price normalized to unity. Firm j operates a nested constant elasticity of substitution (CES) production function:

$$Y_j = AK_j^\alpha \left[(1 - \lambda)(\phi^W W_j)^\rho + \lambda(\phi^B B_j)^\rho \right]^{(1-\alpha)/\rho} \quad (\text{E.1})$$

where Y_j is output of firm j , K_j is capital employed by firm j , W_j is White labor employed by firm j , B_j is Black labor employed by firm j , $A > 0$ is total factor productivity. Also, $\alpha \in (0, 1)$ is the capital share parameter, $\lambda \in (0, 1)$ is the distribution parameter for Black workers in the labor aggregate, $\phi^W, \phi^B > 0$ are factor-augmenting race-specific productivity parameters (factor-augmenting technical change), and $\rho \leq 1$ determines the elasticity of substitution between White and Black labor.

The production function exhibits constant returns to scale in all three factors. The elasticity of substitution between capital and the labor aggregate is unity (Cobb-Douglas), while the elasticity of substitution between White and Black labor is:

$$\sigma_{WB} \equiv \frac{1}{1 - \rho} \quad (\text{E.2})$$

When $\sigma_{WB} > 1$, White and Black workers are gross substitutes; when $\sigma_{WB} < 1$, they are gross complements; when $\sigma_{WB} = 1$, the labor aggregate is Cobb-Douglas in White and Black labor.

E.1.2 Integration Cost Technology

Firms face heterogeneous costs of hiring and integrating Black workers into their workforces. Each firm j is characterized by an integration cost parameter $c_j \geq 0$, which represents the real costs incurred from workplace reorganization, recruiting infrastructure, and training expenses when employing Black workers.

Assumption 2 (Distribution of Integration Costs). *The integration cost parameters $\{c_j\}_{j \in [0, 1]}$ are distributed according to a continuous cumulative distribution function $G(c)$ with support $[0, \bar{c}]$ and strictly positive density $g(c) > 0$ for all $c \in [0, \bar{c}]$.*

When making hiring decisions, firm j with integration cost parameter c_j incurs total costs per Black worker of:

$$\tilde{w}_j^B = w^B(1 + c_j) \quad (\text{E.3})$$

where w^B is the market wage for Black workers. The firm pays Black workers the market wage w^B , and additionally incurs integration costs $c_j w^B$ per Black worker hired. The term $c_j w^B$ represents the firm's real expenses for workplace integration.

E.1.3 Factor Markets and Assumptions

Labor markets are competitive, with workers of each race supplying labor inelastically in the short run:

Assumption 3 (Inelastic Labor Supply). *In the short run, aggregate labor supplies N_W and N_B are exogenously determined and do not respond to wages: $\frac{\partial N_W}{\partial w^W} = \frac{\partial N_B}{\partial w^B} = 0$.*

Assumption 4 (Exogenous Capital Rental Rate). *The rental rate of capital r^K is determined in national or international capital markets and is exogenous to local labor market conditions. This follows from a small open economy assumption or perfectly elastic capital supply in the short run.*

E.1.4 Firm Optimization Problem

Firm j with integration cost parameter c_j solves:

$$\max_{W_j, B_j, K_j} \Pi_j = Y_j - w^W W_j - w^B B_j - r^K K_j - c_j w^B B_j \quad (\text{E.4})$$

The last term $c_j w^B B_j$ represents the real integration costs. This is equivalent to:

$$\max_{W_j, B_j, K_j} Y_j - w^W W_j - w^B (1 + c_j) B_j - r^K K_j \quad (\text{E.5})$$

E.1.5 Marginal Products

From the nested CES production function, define the effective labor aggregate:

$$L_j \equiv \left[(1 - \lambda)(\phi^W W_j)^\rho + \lambda(\phi^B B_j)^\rho \right]^{1/\rho} \quad (\text{E.6})$$

The marginal products are:

$$\begin{aligned} \frac{\partial Y_j}{\partial W_j} &= AK_j^\alpha \cdot \frac{1 - \alpha}{\rho} L_j^{(1-\alpha)/\rho-1} \cdot (1 - \lambda)(\phi^W)^\rho \cdot \rho(\phi^W W_j)^{\rho-1} \cdot \phi^W \\ &= AK_j^\alpha (1 - \alpha)(1 - \lambda)(\phi^W)^\rho L_j^{(1-\alpha-\rho)/\rho} W_j^{\rho-1} \end{aligned} \quad (\text{E.7})$$

$$\frac{\partial Y_j}{\partial B_j} = AK_j^\alpha (1 - \alpha) \lambda (\phi^B)^\rho L_j^{(1-\alpha-\rho)/\rho} B_j^{\rho-1} \quad (\text{E.8})$$

$$\frac{\partial Y_j}{\partial K_j} = \alpha AK_j^{\alpha-1} L_j^{1-\alpha} \quad (\text{E.9})$$

E.2 Firm-Level Factor Demands and Equilibrium

E.2.1 Derivation of Optimal Labor Ratio

Firm j maximizes profits:

$$\max_{W_j, B_j, K_j} Y_j - w^W W_j - w^B (1 + c_j) B_j - r^K K_j \quad (\text{E.10})$$

First-order conditions:

$$\frac{\partial Y_j}{\partial W_j} = w^W \quad (\text{E.11})$$

$$\frac{\partial Y_j}{\partial B_j} = w^B (1 + c_j) \quad (\text{E.12})$$

$$\frac{\partial Y_j}{\partial K_j} = r^K \quad (\text{E.13})$$

Combining equations (E.7), (E.8), (E.11), and (E.12):

$$\frac{AK_j^\alpha(1-\alpha)\lambda(\phi^B)^\rho L_j^{(1-\alpha-\rho)/\rho} B_j^{\rho-1}}{AK_j^\alpha(1-\alpha)(1-\lambda)(\phi^W)^\rho L_j^{(1-\alpha-\rho)/\rho} W_j^{\rho-1}} = \frac{w^B(1+c_j)}{w^W} \quad (\text{E.14})$$

Simplifying:

$$\frac{\lambda(\phi^B)^\rho B_j^{\rho-1}}{(1-\lambda)(\phi^W)^\rho W_j^{\rho-1}} = \frac{w^B(1+c_j)}{w^W} \quad (\text{E.15})$$

$$\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \left(\frac{B_j}{W_j} \right)^{\rho-1} = \frac{w^B(1+c_j)}{w^W} \quad (\text{E.16})$$

Solving for B_j/W_j :

$$\left(\frac{B_j}{W_j} \right)^{\rho-1} = \frac{1-\lambda}{\lambda} \left(\frac{\phi^W}{\phi^B} \right)^\rho \frac{w^B(1+c_j)}{w^W} \quad (\text{E.17})$$

$$\frac{B_j}{W_j} = \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{w^W}{w^B(1+c_j)} \right]^{1/(1-\rho)} \quad (\text{E.18})$$

Since $\sigma_{WB} = \frac{1}{1-\rho}$:

$$\frac{B_j}{W_j} = \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{w^W}{w^B(1+c_j)} \right]^{\sigma_{WB}} \quad (\text{E.19})$$

E.2.2 Optimal Capital

From equation (E.13) and (E.9):

$$\alpha AK_j^{\alpha-1} L_j^{1-\alpha} = r^K \quad (\text{E.20})$$

Solving for K_j :

$$K_j^{\alpha-1} = \frac{r^K}{\alpha A L_j^{1-\alpha}} \quad (\text{E.21})$$

$$K_j = \left[\frac{\alpha A}{r^K} \right]^{1/(1-\alpha)} L_j \quad (\text{E.22})$$

This shows capital-labor ratios are equalized across all firms: $K_j/L_j = \left[\frac{\alpha A}{r^K} \right]^{1/(1-\alpha)}$.

E.2.3 Sorting Proposition (Complete Proof)

Proposition 1 (Sorting by Integration Cost). *The relative employment of Black to White workers is strictly decreasing in the firm's integration cost parameter: $\frac{\partial}{\partial c_j} \left(\frac{B_j}{W_j} \right) < 0$. Firms with lower integration costs employ relatively more Black workers.*

Proof. From equation (E.19):

$$\frac{B_j}{W_j} = \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c_j} \right]^{\sigma_{WB}} \quad (\text{E.23})$$

where $\omega = w^W/w^B$ is the relative wage.

Taking the derivative with respect to c_j :

$$\begin{aligned} \frac{\partial}{\partial c_j} \left(\frac{B_j}{W_j} \right) &= \sigma_{WB} \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c_j} \right]^{\sigma_{WB}-1} \cdot \frac{\partial}{\partial c_j} \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c_j} \right] \\ &= \sigma_{WB} \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c_j} \right]^{\sigma_{WB}-1} \cdot \frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \omega \cdot \frac{-1}{(1+c_j)^2} \end{aligned} \quad (\text{E.24})$$

Since $\sigma_{WB} > 0$ (elasticity of substitution is positive), $\lambda \in (0, 1)$, so $\frac{\lambda}{1-\lambda} > 0$, $\phi^W, \phi^B > 0$, $\omega > 0$ (positive wages), $1 + c_j > 1$ for all $c_j > 0$, and the term $\frac{-1}{(1+c_j)^2} < 0$.

All terms in equation (E.24) are positive except $\frac{-1}{(1+c_j)^2}$. Therefore:

$$\frac{\partial}{\partial c_j} \left(\frac{B_j}{W_j} \right) < 0 \quad (\text{E.25})$$

□

E.3 Equilibrium Characterization and Market Clearing

E.3.1 Competitive Equilibrium Definition

Definition 1 (Competitive Equilibrium). *A competitive equilibrium consists of wages (w^W, w^B) , firm-level allocations $\{W_j, B_j, K_j\}_{j \in [0,1]}$, and aggregate allocations such that:*

1. *Firms maximize profits: first-order conditions hold for all j*
2. *White labor market clears: $\int_0^1 W_j dj = N_W$*
3. *Black labor market clears: $\int_0^1 B_j dj = N_B$*
4. *Capital markets clear (satisfied by exogenous r^K)*

E.3.2 Equilibrium Wage Ratio

Define the relative wage ratio $\omega \equiv w^W/w^B$. Dividing the Black labor market clearing condition by the White labor market clearing condition:

$$\frac{N_B}{N_W} = \frac{\int_0^1 B_j dj}{\int_0^1 W_j dj} \quad (\text{E.26})$$

Using the optimal labor ratio from equation (E.19) and changing variables from firm index j to integration cost parameter c using the distribution $G(c)$:

$$\frac{N_B}{N_W} = \int_0^{\bar{c}} \frac{B(c)}{W(c)} g(c) dc = \int_0^{\bar{c}} \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c} \right]^{\sigma_{WB}} g(c) dc \quad (\text{E.27})$$

Since capital-labor ratios are equalized across firms, we can write:

$$\frac{N_B}{N_W} = \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \omega^* \right]^{\sigma_{WB}} \cdot \mathbb{E}_{c \sim G} [(1+c)^{-\sigma_{WB}}] \quad (\text{E.28})$$

where $\mathbb{E}_{c \sim G}[\cdot]$ denotes the expectation over the distribution of integration costs, and ω^* is the equilibrium relative wage.

This equation implicitly defines the equilibrium wage ratio as a function of labor supplies, technology parameters, and the distribution of integration costs.

E.3.3 Existence and Uniqueness of Equilibrium

Proposition 2 (Existence and Uniqueness of Equilibrium). *There exists a unique competitive equilibrium as defined in Definition 1.*

Proof. We prove existence and uniqueness of the competitive equilibrium.

Step 1: Firm optimization is well-defined.

Given any positive wages $(w^W, w^B) \in \mathbb{R}_{++}^2$ and rental rate $r^K > 0$, the firm's profit maximization problem has a unique solution because:

- The production function (E.1) is strictly concave in (W_j, B_j, K_j) when $\rho < 1$
- The production function exhibits constant returns to scale
- Factor prices are strictly positive

The first-order conditions (E.11)–(E.13) are necessary and sufficient for a global maximum.

Step 2: Relative factor demands are well-defined.

From equation (E.19), for any firm j with integration cost parameter $c_j \geq 0$:

$$\frac{B_j}{W_j} = \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{w^W}{w^B(1+c_j)} \right]^{\sigma_{WB}} \quad (\text{E.29})$$

Since $\sigma_{WB} = \frac{1}{1-\rho} > 0$ (because $\rho \leq 1$), $\lambda \in (0, 1)$, $\phi^W, \phi^B > 0$, and $w^W, w^B > 0$, the right-hand side is strictly positive and finite for all $c_j < \infty$.

Step 3: Aggregate market clearing defines a fixed-point problem.

Let $\omega = \frac{w^W}{w^B}$ denote the relative wage. From the market-clearing conditions, we need:

$$\int_0^1 W_j dj = N_W \quad (\text{E.30})$$

$$\int_0^1 B_j dj = N_B \quad (\text{E.31})$$

Dividing (E.31) by (E.30):

$$\frac{N_B}{N_W} = \frac{\int_0^1 B_j dj}{\int_0^1 W_j dj} \quad (\text{E.32})$$

Using equation (E.29) and changing variables from firm index j to integration cost c using the distribution $G(c)$:

$$\frac{N_B}{N_W} = \int_0^{\bar{c}} \frac{B(c)}{W(c)} \cdot \frac{W(c)}{\int_0^{\bar{c}} W(c') g(c') dc'} g(c) dc \quad (\text{E.33})$$

Since capital-labor ratios are equalized across firms (from equation (E.22)), all firms have the same scale after normalizing by capital. Therefore, $W(c)$ is proportional across c , and we can write:

$$\frac{N_B}{N_W} = \int_0^{\bar{c}} \frac{B(c)}{W(c)} g(c) dc = \int_0^{\bar{c}} \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c} \right]^{\sigma_{WB}} g(c) dc \quad (\text{E.34})$$

Define the function:

$$\Psi(\omega) \equiv \int_0^{\bar{c}} \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c} \right]^{\sigma_{WB}} g(c) dc \quad (\text{E.35})$$

Equilibrium requires: $\Psi(\omega) = \frac{N_B}{N_W}$.

Step 4: Properties of $\Psi(\omega)$.

(a) **Continuity:** $\Psi(\omega)$ is continuous in ω for $\omega > 0$ because it is an integral of continuous functions over a compact support $[0, \bar{c}]$.

(b) **Monotonicity:**

$$\frac{\partial \Psi(\omega)}{\partial \omega} = \sigma_{WB} \int_0^{\bar{c}} \left[\frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{\omega}{1+c} \right]^{\sigma_{WB}-1} \cdot \frac{\lambda}{1-\lambda} \left(\frac{\phi^B}{\phi^W} \right)^\rho \frac{1}{1+c} \cdot \frac{g(c)}{\omega} dc > 0 \quad (\text{E.36})$$

Therefore, $\Psi(\omega)$ is strictly increasing in ω .

(c) **Boundary behavior:**

- As $\omega \rightarrow 0^+$: $\Psi(\omega) \rightarrow 0$
- As $\omega \rightarrow +\infty$: $\Psi(\omega) \rightarrow +\infty$

Step 5: Existence and uniqueness.

By the Intermediate Value Theorem, since $\Psi(\omega)$ is continuous and strictly increasing with $\Psi(0) = 0$ and $\lim_{\omega \rightarrow \infty} \Psi(\omega) = \infty$, there exists a unique $\omega^* > 0$ such that:

$$\Psi(\omega^*) = \frac{N_B}{N_W} \quad (\text{E.37})$$

Given $\omega^* = \frac{w^W}{w^B}$, we can normalize one wage (say $w^B = 1$) and obtain $w^W = \omega^*$. The absolute wage levels are then determined by the first-order conditions (E.11)–(E.13) and market clearing.

Step 6: Strictly positive wages.

From the first-order conditions and the fact that $N_W, N_B > 0$, marginal products are strictly positive, implying $w^W, w^B > 0$.

Therefore, there exists a unique competitive equilibrium with strictly positive wages. \square

E.4 Derivation of Wage Elasticities

E.4.1 White Wage Elasticity (Detailed)

From the aggregate production function with fixed capital:

$$Y = A \bar{K}^\alpha L^{1-\alpha} \quad (\text{E.38})$$

where the effective labor aggregate is:

$$L = \left[(1-\lambda)(\phi^W N_W)^\rho + \lambda(\phi^B N_B)^\rho \right]^{1/\rho} \quad (\text{E.39})$$

From equation (E.39):

$$\frac{\partial L}{\partial N_W} = \frac{1}{\rho} L^{1-\rho} \cdot (1-\lambda)(\phi^W)^\rho \cdot \rho(\phi^W N_W)^{\rho-1} \cdot \phi^W = L^{1-\rho} (1-\lambda)(\phi^W)^{2\rho} N_W^{\rho-1} \quad (\text{E.40})$$

Therefore, the White wage is:

$$w^W = A \bar{K}^\alpha (1-\alpha) L^{1-\alpha-\rho} (1-\lambda)(\phi^W)^{2\rho} N_W^{\rho-1} \quad (\text{E.41})$$

Taking logarithms:

$$\ln w^W = \ln A + \alpha \ln \bar{K} + \ln(1-\alpha) + \ln(1-\lambda) + 2\rho \ln \phi^W + (1-\alpha-\rho) \ln L + (\rho-1) \ln N_W \quad (\text{E.42})$$

Differentiating with respect to $\ln N_W$:

$$\frac{d \ln w^W}{d \ln N_W} = (\rho - 1) + (1 - \alpha - \rho) \frac{d \ln L}{d \ln N_W} \quad (\text{E.43})$$

Now, from equation (E.39):

$$\ln L = \frac{1}{\rho} \ln \left[(1 - \lambda)(\phi^W N_W)^\rho + \lambda(\phi^B N_B)^\rho \right] \quad (\text{E.44})$$

Differentiating:

$$\begin{aligned} \frac{d \ln L}{d \ln N_W} &= \frac{1}{\rho} \cdot \frac{(1 - \lambda)(\phi^W)^\rho \cdot \rho(\phi^W N_W)^{\rho-1} \phi^W N_W}{(1 - \lambda)(\phi^W N_W)^\rho + \lambda(\phi^B N_B)^\rho} \\ &= \frac{(1 - \lambda)(\phi^W N_W)^\rho}{(1 - \lambda)(\phi^W N_W)^\rho + \lambda(\phi^B N_B)^\rho} \\ &= (1 - \lambda) \left(\frac{\phi^W N_W}{L} \right)^\rho \equiv s_W \end{aligned} \quad (\text{E.45})$$

where s_W is the effective share of White labor in the labor aggregate. Substituting into equation (E.43):

$$\begin{aligned} \frac{d \ln w^W}{d \ln N_W} &= (\rho - 1) + (1 - \alpha - \rho)s_W \\ &= \rho - 1 + s_W - \alpha s_W - \rho s_W \\ &= \rho(1 - s_W) - 1 + s_W - \alpha s_W \\ &= -\alpha s_W + \rho(1 - s_W) + s_W - 1 \\ &= -\alpha s_W + s_W - 1 + \rho - \rho s_W \\ &= -\alpha s_W - 1 + \rho + s_W(1 - \rho) \\ &= -\alpha s_W - (1 - \rho)(1 - s_W) \end{aligned} \quad (\text{E.46})$$

Since $\sigma_{WB} = \frac{1}{1-\rho}$, we have $1 - \rho = \frac{1}{\sigma_{WB}}$:

$$\frac{d \ln w^W}{d \ln N_W} = -\alpha s_W - \frac{1 - s_W}{\sigma_{WB}} \quad (\text{E.47})$$

Remark 1 (Interpretation of White Wage Elasticity). *The White wage elasticity consists of two negative terms:*

- $-\alpha s_W$: *The capital dilution effect. When White labor supply falls, the capital-labor ratio rises, reducing the marginal product of White labor.*
- $-\frac{1-s_W}{\sigma_{WB}}$: *The substitution effect. When White labor becomes scarce, firms substitute toward Black labor. The strength of this effect depends inversely on the elasticity of substitution σ_{WB} .*

Both effects imply that White wages should rise when White labor supply falls (i.e., $\frac{d \ln w^W}{d \ln N_W} < 0$).

E.4.2 Black Wage Elasticity (Detailed)

Similarly, the Black wage is:

$$w^B = A\bar{K}^\alpha(1 - \alpha)L^{1-\alpha-\rho}\lambda(\phi^B)^{2\rho}N_B^{\rho-1} \quad (\text{E.48})$$

Taking logarithms and differentiating with respect to $\ln N_W$ (holding N_B constant):

$$\begin{aligned}
\frac{d \ln w^B}{d \ln N_W} &= (1 - \alpha - \rho) \frac{d \ln L}{d \ln N_W} \\
&= (1 - \alpha - \rho) s_W \\
&= s_W - \alpha s_W - \rho s_W \\
&= s_W(1 - \alpha - \rho)
\end{aligned} \tag{E.49}$$

Expanding:

$$\begin{aligned}
\frac{d \ln w^B}{d \ln N_W} &= s_W - \alpha s_W - \rho s_W \\
&= s_W(1 - \rho) - \alpha s_W \\
&= -\alpha s_W + \frac{s_W}{\sigma_{WB}}
\end{aligned} \tag{E.50}$$

Remark 2 (Interpretation of Black Wage Elasticity). *The Black wage response depends on the relative strength of two opposing forces:*

- $-\alpha s_W < 0$: *The capital dilution effect reduces Black wages when White labor falls (negative effect).*
- $+\frac{s_W}{\sigma_{WB}} > 0$: *The complementarity effect raises Black wages when White labor becomes scarce (positive effect).*

Black wages rise when $\sigma_{WB} > \alpha$, meaning complementarity dominates capital dilution. The sign depends on production technology parameters, not on the distribution of integration costs.

E.4.3 Relative Wage Elasticity

The relative wage elasticity is:

$$\begin{aligned}
\frac{d \ln(w^W/w^B)}{d \ln N_W} &= \frac{d \ln w^W}{d \ln N_W} - \frac{d \ln w^B}{d \ln N_W} \\
&= \left[-\alpha s_W - \frac{1 - s_W}{\sigma_{WB}} \right] - \left[-\alpha s_W + \frac{s_W}{\sigma_{WB}} \right] \\
&= -\frac{1 - s_W}{\sigma_{WB}} - \frac{s_W}{\sigma_{WB}} \\
&= -\frac{1}{\sigma_{WB}}
\end{aligned} \tag{E.51}$$

Remark 3 (Key Result on Relative Wages). *The relative wage elasticity depends only on the elasticity of substitution σ_{WB} , independent of:*

- *The capital share α*
- *The labor share parameter λ*
- *The effective labor shares s_W, s_B*
- *The distribution of integration costs $G(c)$*

This is a fundamental property of CES production functions: the percentage change in the relative wage depends solely on the ease of substitution between the two labor types.

E.5 The Role of Integration Costs in Cross-Sectional Allocation

E.5.1 Integration Costs and Sorting

The integration cost parameter c_j plays a critical role in determining the cross-sectional allocation of Black workers across firms, but does not independently affect the aggregate wage elasticities derived in Section E.4.

Remark 4 (What Integration Costs Determine). *The distribution of integration costs $G(c)$ affects:*

1. **Cross-sectional sorting:** Which firms employ Black workers (Proposition 1)
2. **Extensive margin responses:** How many firms integrate Black workers when relative wages change
3. **Occupational patterns:** The distribution of Black workers across occupations/industries with different integration cost structures

Remark 5 (What Integration Costs Do Not Determine). *The distribution of integration costs $G(c)$ does not affect:*

1. **Aggregate wage levels:** Market wages w^W, w^B are determined by aggregate marginal products
2. **Wage elasticities:** The elasticities in equations (E.47)–(E.51) depend only on $(\alpha, \sigma_{WB}, s_W)$
3. **Total factor payments:** Aggregate payments to White and Black workers depend on total supplies N_W, N_B

E.5.2 Reallocation Channel: Economic Intuition

When White labor supply falls (due to the draft), relative wages $\omega = w^W/w^B$ rise. From equation (E.19), all firms respond by increasing their Black-White ratios B_j/W_j .

The *reallocation channel* describes the extensive margin response: firms with high integration costs c_j that previously found it unprofitable to hire Black workers now find it worthwhile despite the costs. This reallocation creates additional competition for White workers in previously segregated occupations.

Remark 6 (Reallocation as Mechanism, Not Independent Effect). *The reallocation channel provides economic intuition for how firms adjust to the labor supply shock through extensive margin hiring decisions. However, the aggregate wage effects are fully captured by the production technology parameters in equations (E.47)–(E.51). The reallocation mechanism explains the microeconomic process underlying these aggregate results, but does not constitute an independent structural force affecting wages beyond what is implied by the CES production structure.*

E.5.3 Density of Firms at the Integration Margin

The density of firms near the integration threshold—measured by $g(c^*)$ where c^* is the marginal integration cost—determines the strength of the extensive margin response.

Remark 7 (Interpretation of $g(c^*)$). *When $g(c^*)$ is high:*

- Many firms lie near the threshold of finding integration profitable
- Small changes in relative wages induce large extensive margin responses
- The reallocation of Black workers across firms is more pronounced
- The microeconomic adjustment process is more active

However, this affects the composition of where Black workers are employed, not the aggregate wage levels, which are pinned down by aggregate marginal products.

E.6 Formal Propositions

E.6.1 Wage Convergence

Proposition 3 (Racial Wage Gap Convergence). *The Black-White wage gap narrows when White labor supply falls (draft shock):*

$$\frac{d \ln(w^B/w^W)}{d \ln N_W} = \frac{1}{\sigma_{WB}} > 0 \quad (\text{E.52})$$

The magnitude of convergence depends solely on the elasticity of substitution σ_{WB} between White and Black labor.

Proof. From equation (E.51):

$$\frac{d \ln(w^W/w^B)}{d \ln N_W} = -\frac{1}{\sigma_{WB}} \quad (\text{E.53})$$

Therefore:

$$\frac{d \ln(w^B/w^W)}{d \ln N_W} = -\frac{d \ln(w^W/w^B)}{d \ln N_W} = \frac{1}{\sigma_{WB}} > 0 \quad (\text{E.54})$$

Since $\sigma_{WB} > 0$, the wage gap narrows when White labor supply falls. Higher substitutability (σ_{WB} large) implies faster convergence, while lower substitutability (σ_{WB} small) implies slower convergence. \square

E.6.2 Conditions for White Wage Decline

Proposition 4 (White Wage Response to Labor Scarcity). *White wages can fall when White labor supply falls if and only if the direct effect of equation (E.47) is dominated by additional competitive pressures. Given the production structure, White wages are predicted to rise ($\frac{d \ln w^W}{d \ln N_W} < 0$) since both the capital dilution and substitution effects work in the same direction.*

For White wages to actually fall requires the empirical wage response to differ from the prediction of equation (E.47). This can occur if:

1. *Labor supply shocks generate general equilibrium effects not captured by the partial equilibrium analysis*
2. *Migration or other labor market adjustments amplify competitive pressures*
3. *The extensive margin reallocation creates localized competition effects beyond aggregate marginal products*

Remark 8. *The model predicts that White wages should rise when White labor becomes scarce. If empirical evidence shows White wages falling, this indicates that the reallocation mechanism creates competitive effects beyond what is captured by the aggregate production function. This motivates the empirical analysis in Section 6 to test whether observed wage patterns match theoretical predictions or reveal additional economic forces.*