After the Burning:
The Economic Effects of the 1921 Tulsa Race Massacre*

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23 July 2025

ABSTRACT: The 1921 Tulsa Race Massacre resulted in the looting, burning, and leveling of thirty-five square blocks of a once-thriving Black neighborhood. We examine the economic consequences of the Massacre for Black Tulsans. We find that in the years and decades that followed, the Massacre led to declines in Black home ownership, occupational status, and child education. The adverse effects of the Massacre on the home ownership of Black Tulsans persisted and actually widened in the second half of the 20th century. Consistent with historical accounts, we also see that, in the years following the Massacre, Black skilled workers were more likely to leave Tulsa. While the compositional effects due to selective migration are too small to explain the direct effects of the Massacre, dynamic growth effects from the loss of entrepreneurial talent may explain part of the longer-term adverse effects of the Massacre. Outside of Tulsa, we find that the Massacre also had detrimental effects on Black communities that were connected to Tulsa through family and kinship networks.

Key words: race, violence, wealth.

JEL classification: J62; J69; N31; N41; N91.

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1. Introduction

Between May 31 and June 1 of 1921, Tulsa experienced one of the largest and worst incidents of racial violence, murder, and destruction in postbellum U.S. history. During the course of the Massacre, 35 square blocks of the once-thriving Black community of Greenwood, which was once hailed as "Black Wall Street," were burned to the ground. Over one thousand houses were burned while thousands of Black people were held in internment centers at gunpoint. While there are official death certificates for thirty-nine victims, estimates of the true death toll are as high as 300. The Greenwood area of Tulsa was known for its affluence. Prior to the Massacre, the area had 191 businesses (including solo-practice lawyers and doctors), a library, two schools, and a hospital.[1] Figure 1, which shows photographs of Greenwood prior to, during, and after the Massacre, provides a visual representation of the damage and loss from the event. Our calculations, which as detailed in Appendix A1 are based on data from insurance claims and Red Cross reports, conservatively estimate the loss to be between \$32.6 and \$47.4 million in 2020 USD (\$2.2 and \$3.2 million in 1921 USD).

The Tulsa Massacre was unique for both the level of property damage and the affluence of the targeted Black community. A common narrative is that the event had long-term and widespread effects on Black people, both within and outside of Tulsa. If the Massacre had not occurred, "Black Wall Street" would have been an example of the achievement and economic success possible for Black communities across the country. Instead, the Massacre sounded a warning of what would happen if other Black communities became too successful. The view that the Massacre had lasting effects was described by State Senator Maxine Horner in the 2001 Report on the Massacre: those who had been through the Massacre "emerged haunted as a result of that experience...If a people have been terrorized to the degree that North Tulsa survivors and descendants were, it could be expected that they would not make themselves noticed or be noticed by the group that terrorized them in the first place." (Horner, 2001, p. 177).

While many other instances of racial violence are worth investigating for the sake of under-standing their consequences, the Tulsa Massacre was exceptional and marked a turning point in expectations and beliefs about racial violence in the United States. As Lisa Cook (2014, p.

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[1]In the past, the Tulsa Race Massacre was commonly called a "Race Riot." The 1921 Centennial Commission changed the official designation to "Massacre" in 2018 (Krehbiel, 2018). In this paper, we use the term "Massacre" throughout.

Figure 1: Images from the Tulsa Race Massacre of 1921

(a) Greenwood Neighborhood of Tulsa Prior to the Massacre

(b) Greenwood Burning During the Massacre

(c) Internment of Black Tulsans During the Massacre

(d) Greenwood After the Massacre

235) puts it, "...before 1921 potential victims implicitly believed that, if implored, the federal government would act. The response to the Tulsa riot was considered a major policy shift in favor of nonintervention by federal and state governments. Accounts of the Tulsa riot suggest that many at the time believed that government failed at all levels, and that this was a turning point in federal policy and national practice related to property-rights protection, and that the country was likely headed towards racial warfare." The aftermath also made clear that insurance companies could easily ignore policies held by Black people seeking redress after racial violence (Luckerson, 2023). Tulsa was also, as we will document, a story that commanded media coverage across the country, dominating newspaper front pages even beyond past events of racial violence like the Red Summer of 1919.

Despite the importance of this event, we have a limited understanding of its effects in either the short- or long-run. The Greenwood neighborhood of Tulsa, which was looted and destroyed,

was economically vibrant, dynamic, and affluent. It was one of the finest examples of Black entrepreneurship and success in the early 20th century. The 1921 Massacre put an abrupt end to this, destroying nearly all of the community's wealth and assets. In addition to the potential direct impacts on those who experienced the Massacre, other Black communities in the state, region, or country may have also been affected; the destruction of Black Tulsa may have changed the choices, particularly the investment decisions, of Black people throughout the country.

We first show the devastation in data drawn from Tulsa city directories, a source rarely used in quantitative analysis. We digitize directories from 1916 to 1925 (the last year race was reported) to track the economic evolution of Black and non-Black businesses and residents in Tulsa. Before the Massacre, Black-owned businesses showed remarkable growth that outpaced white-owned establishments. However, following the Massacre, we find sharp declines in both the number of Black-owned businesses and the occupational status of Black workers.[2] Based on the directories, evidence suggests that the Massacre's immediate economic impacts on Tulsa's Black community were sharp and severe.

We then examine the short- and medium-run effects of the Massacre in individual-level Census data, focusing on its effects on the home ownership and occupational status of Black Tulsans. We analyze a panel that has three dimensions: a racial group (white, Black, and other), a location (either cities or counties), and a Census year. The sample begins in 1910, the year of the first Census that includes Tulsa. It also includes 1920, 1930, and 1940 for the baseline analysis and is extended to 2000 for the long-run analysis. We estimate effects using a triple-difference design, where we control for location-race, location-year, and race-year fixed effects in a specification where the coefficient of interest is the interaction between a post-Massacre indicator, an indicator for the racial group being Black individuals, and an indicator for Tulsa being the location of residence. Thus, the analysis effectively compares Black people to people from other races, within Tulsa versus elsewhere, before versus after the 1921 Massacre.

In our main analysis, we restrict the sample to individuals living in Tulsa and a set of comparison cities. Because there is no ideal set of cities to compare to Tulsa, we make use of several different strategies for selecting the comparison set. In all of the strategies we employ, we find that the Massacre is associated with a sizeable decline in home ownership and occupational

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[2]We also see that the share of Black Tulsans in white-collar occupations fell substantially relative to white residents, but increases in the number of teachers and clergymen, who might have emerged as part of community rebuilding efforts, complicate these share results.

status of adults and a decline in the educational enrollment of their children. The estimates are large in magnitude, statistically significant, and robust to alternative methods of measuring the outcomes of interest. Our first comparison choice is a set of 59 cities that are comparable to Tulsa in terms of racial distribution and size; namely, cities that had a total population between 50,000 and 150,000 people and had a Black population of at least 1,000 individuals in 1920.[3] We consider a second set of boom cities as a comparison. A notable feature of Tulsa is that it was a boom city that first appeared in the U.S. Census in 1910. Thus, we also consider as a set of comparison cities the 93 cities that also appear in the Census for the first time in 1910. We also use a smaller set that further restricts the boom city group to only include cities that have a total population of at least 5,000 and a Black population of at least 250; 44 cities satisfy these criteria in addition to Tulsa. The third strategy that we undertake starts with a much broader set of cities: all cities that are between the 5th and 95th percentiles in terms of total population in 1920 (11,695 to 237,505 people) and are at least at the 25th percentile of Black share (0.48%). There are 374 such cities. We then randomly draw samples of 50 cities from this set to use as our control cities and then estimate our equations of interest. We repeat this procedure 1,000 times, obtaining a distribution of estimates.

We then examine selective migration using linked Census data from 1920 to 1930. Consistent with historical accounts, we find that the Massacre led to the outmigration of Black Tulsans. According to the estimates, the Massacre resulted in about a 10 percentage point increase in the rate of outmigration among Black individuals living in Tulsa in 1920. But not all Black Tulsans were equally likely to leave. Consistent with historical accounts, we find that Black Tulsans who, in 1920, had higher-status occupations were more likely to leave Tulsa after the Massacre, although evidence for the selection of homeowners is less clear.

We then turn to the question of whether the selective migration can explain the estimated effects of the Massacre. We find that the compositional changes implied by the selective migration estimates are small relative to the impact we estimate. For example, selective migration is predicted to have reduced the share of Black Tulsans with white collar occupations by 0.2 to 0.3 percentage points, dwarfed by the total estimated effect of the Massacre, which was about ten times larger. Although the compositional effects due to selective migration are too small to explain the direct effects of the Massacre, it is possible that dynamic growth effects, which

[3]In 1920, Tulsa's total population was 72,203, and its Black population was 8,901.

arise from the loss of entrepreneurial talent, explain part of the longer-term adverse effects of the Massacre. We view this as plausible, consistent with historical accounts, and likely an important factor in the overall effects of the Massacre on the economic well-being of Black Tulsans.

Finally, we move our analysis to the county level and consider the entire U.S. This has four benefits. First, we can replicate our main city-level results using an analogous triple-difference specification at the race, county, and Census decade level using weighted least squares (WLS). This specification also finds evidence that the Massacre resulted in lower rates of home ownership, lower occupational status, and less education of children.

The county-level specification also allows us to consider other important race massacres in this era, namely, the cities hit by racial violence during the Red Summer of 1919. While very few of the Red Summer cities were comparable to Tulsa – and so do not enter our various city-level specifications in the control group – our nationwide county-level analysis includes all documented Red Summer locations. We find that our estimates are robust to the inclusion of these other acts of violence. We also find that these episodes, in general, had detrimental effects along lines similar to the Tulsa Massacre. In Red Summer counties, Black home ownership, white-collar occupations, and schooling all declined among Black people after 1919.

Given the shocking and widespread knowledge of the Massacre at the time, it is possible that the event affected the expectations, aspirations, and economic decisions of Black entrepreneurs, business owners, and homeowners in other parts of the country. If one believed there was a chance of a similar race riot occurring in one's community, the incentives to purchase a home, invest in a business, or accumulate wealth may have been significantly reduced. As we document using wire data from Silcock, Arora, D'Amico-Wong and Dell (2024), news coverage about the Massacre saturated the country. However, the salience and memory of the Massacre would have been stronger if one had family or extended family living in Tulsa at the time. In counties with stronger ties to Tulsa, information about the Massacre circulated through informal channels where personal narratives of violence, destruction, and dislocation were shared. To measure extended family networks, we use surname-based methods applied to complete-count census data, identifying families probabilistically.[4] Kinship network connections are measured by the

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[4]For examples of the use of surnames to capture family connections, see Ager, Boustan and Eriksson (2021), Ghosh, Hwang and Squires (2023), Althoff and Reichardt (2024), Posch, Schulz and Henrich (2024). Jaworski, Kimbrough and Saito (2024) use first name similarity to construct proxies of cultural similarity in the 19th century. Thus, our strategy follows Jaworski et al. (2024) but uses surnames to measure family connections rather than first names to measure cultural similarity.

cosine similarity of the distribution of surnames between Tulsa and other counties in 1920. The measure ranges from 0 (no overlap in surnames) to 1 (every last name in Tulsa is in the comparison county and the same proportion). Looking across counties, using either a measure of cosine similarity for the Black or the full population, we find evidence of large spillover effects. Counties with stronger connections to Tulsa have reduced Black home ownership rates and school enrollment after the Massacre.

Our final exercise examines the longer-run dynamic effects of the Massacre. For home ownership, we are able to extend the period of analysis to 2000 using county-level data. We find that the direct effects of the Massacre on Black Tulsans persisted and actually worsened over time. The estimated effect of the Massacre on the home ownership of Black Tulsans in 1980, 1990, and 2000 is found to be over twice the magnitude of the effects in 1930 and 1940.

Our findings add to the rich existing literature on the history of race, coercion, violence, and unrest in the United States. Cook (2014) studies the effects of race riots and lynchings between 1870 and 1940, and finds that these forms of violence and insecurity reduced patenting by Black people by more than 15% annually from 1882–1940. Williams (2022) estimates the county-level relationship between lynchings from 1882–1930 and lower rates of voter registration among Black people today. Acharya, Blackwell and Sen (2016) study the lasting consequences of slavery on racial and political attitudes of white people today: Counties with more slavery in the past are more racist today, have strong support for the Republican Party, and are more likely to oppose policies that provide support for Black people, such as affirmative action. Logan (2023) documents a relationship between violence against Black politicians and declines in tax revenues between 1870 and 1880. Collins and Margo (2004, 2007) study the effects of the race riots of the late 1960s. The authors find that the riots had a negative and persistent effect on Black incomes, employment, and property values. Williams (2021) documents a striking micro-spatial relationship between Confederate street names and the worse labor market outcomes of their Black residents. Additional research, some outside the U.S. context, speaks to the detrimental effects of exposure to coercion, violence, or exploitation (Nunn and Wantchekon, 2011, Bautista, 2015, Alsan and Wanamaker, 2018, Archibong and Obikili, 2020, Archibong and Annan, 2021, Bautista, González, Martínez, Muñoz and Prem, 2023).

Our findings also contribute to the existing literature within economics that studies the historical determinants, be they political, social, economic, or institutional, of the economic

success of Black people during the late 19th and 20th centuries (e.g., Naidu, 2012, Hornbeck and Naidu, 2014, Logan and Parman, 2018, Clarke, 2019, Derenoncourt and Montialoux, 2021, Derenoncourt, 2022, Derenoncourt, Kim, Kuhn and Schularick, 2024, Aneja and Xu, 2022, Darity Jr., 2022, Chelwa, Hamilton and Stewart, 2022). Lastly, our work also adds to descriptive accounts of the Tulsa Massacre and its consequences (e.g., Halliburton, 1972, Horner, 2001, Messer, 2011, Messer, Shriver and Adams, 2018). Our analysis builds on these accounts and provides estimates of the general effects of the Massacre in the short, medium, and long runs.

The paper proceeds as follows. In section 2, we first provide a quantitative and qualitative description of Tulsa, the Massacre, and its aftermath. This is followed, in section 3, by an examination of the patterns in the raw Census data and our digitized Tulsa city and business directory. We then turn, in section 4, to our DDD estimates, which provide estimates of the short- and medium-run effects (until 1940) of the Massacre for Black Tulsans. In section 5, we then compare our effects to the effects of Red Summer and examine spillover effects and the persistence of home ownership effects (until 2000) for all counties in the United States. Lastly, section 6 concludes.

2. Historical Background

A. *Tulsa Prior to the Massacre*

The origins of Tulsa, Oklahoma, can be traced to an oil boom in the 1910s that was due to an oil field called Glenn Pool, which was viewed as the "richest small oil field in the world" at the time. By 1921, Tulsa was home to more than 400 oil and gas companies, four railroads, and a commercial airport (Ellsworth, 2001). Excitement about the prospects of oil and broader economic opportunity meant that Tulsa's population boomed between 1910 and 1920. According to the U.S. Census data, Tulsa County more than tripled in total population from around 35,000 in 1910 to 109,000 residents in 1920. Among all counties in the U.S. at the time, Tulsa's population growth was the ninth highest.

When Oklahoma achieved statehood in 1907, the area was seen as an opportunity for Black people seeking freedom from Southern oppression. In fact, of the approximately 50 "all-Black towns" (i.e., municipalities established for or by a predominantly Black population), more than 20 were located in Oklahoma (Ross, 2001). Despite the promising setting, the first bill that

was passed after Oklahoma's statehood was "Senate Bill One," which segregated the state. The Greenwood neighborhood in Tulsa and its vastly different racial makeup from the rest of Tulsa was a direct consequence of these strict Jim Crow laws.

Since Black people were legally barred from oil industry jobs and most manufacturing facilities, Black Tulsans were largely unable to take up many of the professions that their white counterparts could during the county's oil boom. A consequence was that, while some of Greenwood's Black population were business owners, the vast majority worked for white employers (Ellsworth, 2001, Luckerson, 2023). About a third of the Greenwood population lived in servants' quarters of white Tulsa. The city's tight segregation laws meant that money earned in the white downtown area was spent in the neighborhood of Greenwood (Madigan, 2003). There were doctors, dentists, and lawyers, as well as two newspaper offices. Residents had access to a public library, two schools, and, after 1917, a hospital. The economic success of several Black entrepreneurs such as Loula and John Williams (owners of the 750-seat Dreamland Theater), O.W. Gurley (owner of the Gurley Hotel), and J.B. Stradford (owner of the 65-room Stradford Hotel) added to the view of Tulsa as the "Black Wall Street" (Messer, 2021).

Although the Black community of Tulsa was economically successful, an examination of the aggregate data shows that it was not a dramatic outlier. Figure 2 reports a histogram showing the distribution of four county-level measures for Black populations across the country: the share of household heads that own their home of residence, the share of individuals who live in a home owned by a family member, the average occupation score among people in the labor force, and the share of people in the labor force who are employed in white-collar occupations.[5] (Full details of each measure are provided in Section A3 of the Appendix.) In each of these dimensions, Tulsa, illustrated with the orange dotted line, appears fairly typical.[6] The one exception is the proportion of individuals who are in white-collar occupations. Though still low, at approximately 3.4%, the share of Tulsa's Black population with white-collar occupations was higher than most other counties. This may be an important factor behind the perception of Tulsa as the "Black Wall Street," and is consistent with the prominence of several high-profile entrepreneurs from

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[5]The comparison is restricted to counties that, in 1920, had a population of at least 50,000 individuals and a Black population of at least 1,000 individuals. This is a similar restriction to the one we make when selecting comparison cities for the analysis of Section 3. The conclusions reported here are the same if we look at all counties, even those that are sparsely populated or with few Black residents.

[6]If one restricts the comparison to other counties that are also in the segregated U.S. South, the same picture emerges (Appendix Figure A5).

Figure 2: Black Economic Status, Tulsa County Compared to the National Distributions in 1920
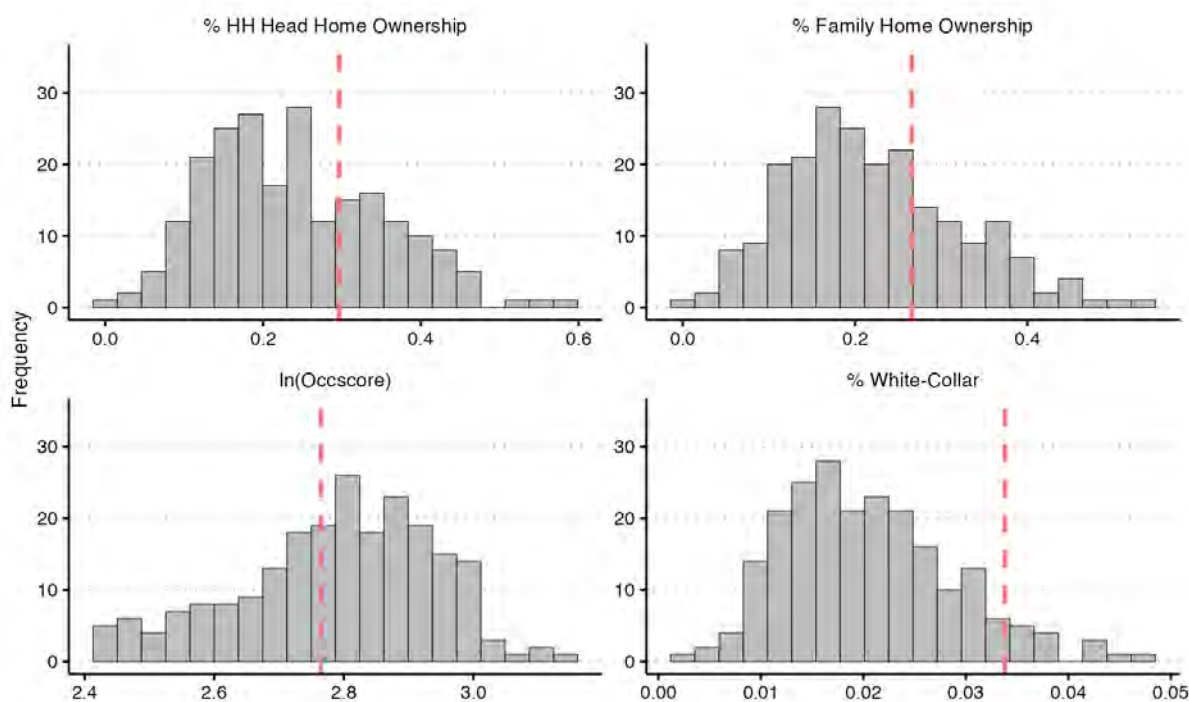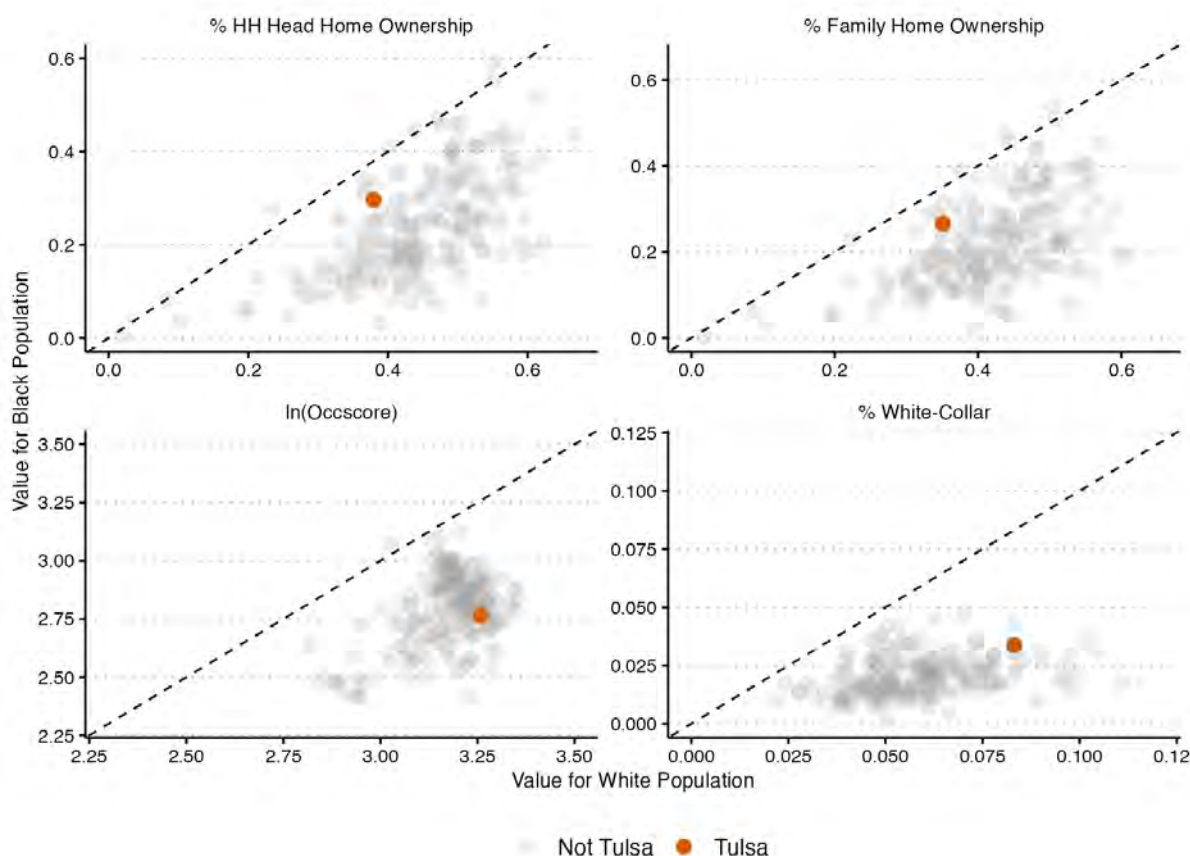

Notes: This figure shows the distributions of descriptive statistics of interest across all counties in 1920 with a population of at least 50,000 individuals and a Black population of at least 1,000 individuals. The orange dashed line shows where Tulsa County falls in the distribution. The variables examined are: the share of household heads who own their home of residence, the share of individuals who live in a home owned by a family member, the average occupation score among people in the labor force, and the share of people in the labor force who are employed in white-collar occupations. See Section A3 of the Appendix for the details of each variable.

Greenwood.

We probe the racial differences within Tulsa further by examining the differences between the white and Black populations across the country. Figure 3 reports a series of graphs that have the value of the characteristic of the white population on the x-axis and the value of the characteristic of the Black population on the y-axis.[7] Each graph also reports the 45-degree line, which indicates Black-white equality for the dimension of interest. Tulsa is denoted by a solid orange circle, while all other counties are denoted by light gray circles. The figures show clearly that, within a county, the Black population tended to have a lower likelihood of home ownership, lower average occupational status, and lower white-collar employment than the white population. From the figures, particularly the distance of the Tulsa dot to the 45-degree line, it is clear that Tulsa was not an extreme outlier on most Black-white differences. However, Black Tulsa's position relative to the white population was more equal with respect to home ownership than in many

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[7]We also observe a similar pattern when the set of comparison counties is restricted to the segregated U.S. South (Appendix Figure A6).

Figure 3: Black and White Economic Status, Tulsa County Relative to Other U.S. Counties in 1920

Notes: We restrict to counties in 1920 with a population of at least 50,000 individuals and a Black population of at least 1,000 individuals. The black dashed line shows the 45-degree line where rates are equal for the Black and white populations. The orange dots represent Tulsa County, while the gray dots are other counties. The variables examined are: the share of household heads who own their home of residence, the share of individuals who live in a home owned by a family member, the average occupation score among people in the labor force, and the share of people in the labor force who are employed in white-collar occupations. See Section A3 of the Appendix for the details of each variable.

other counties.

The data confirm that Black Tulsa (i.e., Greenwood) was economically successful in a few dimensions. Black wealth, as measured by the likelihood of home ownership, was closer to white wealth than in many other counties. The home ownership measures for Black Tulsa were within 10 percentage points of the measures for white Tulsa (Figure 3). Tulsa also had a relatively high proportion of the Black population engaged in white-collar jobs compared to other counties in 1920 (Figure 2). However, the data also suggest that many other counties in the U.S., and even in the segregated South, were similarly successful (see Appendix Figures A5 and A6). The existence of other prosperous Black communities is relevant for potential spillover effects since Black economic success was commonly perceived to have been a key determinant of the Massacre.

For example, a 1921 NAACP report wrote that "[t]he negro in Oklahoma has shared in the sudden prosperity that has come to many of his white brothers, and there are some colored men there who are wealthy. This fact has caused a bitter resentment on the part of the lower order of white people, who feel that these colored men [...] are exceedingly presumptuous in achieving greater economic prosperity than they who are members of a divinely superior race." Thus, Black communities across the country, many of which had the potential to achieve prosperity similar to Tulsa's, would have been acutely aware that they too could face a similar massacre. This fear likely influenced their economic decisions. These effects were likely more pronounced in communities with stronger social ties to Tulsa, particularly ties through extended families that might share vivid accounts of the Massacre.

B. *The 1921 Race Massacre*

On May 31, 1921, Dick Rowland, a Black man, was accused of assaulting a white woman named Sarah Page. Mr. Rowland was a shoe-shiner who had taken an elevator, operated by Ms. Page, to use a restroom in a nearby building since the shine parlor where he worked had no restrooms for Black people. There is no record of what Sarah Page initially said to the police who interviewed her (Ellsworth, 2001).

Following the accusation, Mr. Rowland was brought to the local courthouse, where crowds of white people soon gathered. Members of the Black community grew concerned that the white mob might try to lynch Rowland. People were skeptical of law enforcement's ability to keep defendants safe, as a mob had successfully taken a man from the courthouse and lynched him a year prior (Ellsworth, 2001, p. 55). A confrontation in the crowd between Black and white Tulsans led to mob violence against the Black community. Armed white people broke into Black homes and businesses, which they looted before setting them on fire with oil rags and torches.[8] As many as five hundred white men and boys were sworn in by police officers as "special deputies" during the riot and then participated in burning homes (Ellsworth, 2001).

Thousands of Black Tulsans were taken to internment centers at gunpoint. They were detained in makeshift centers at the Convention Hall, the fairgrounds, and a baseball park (Goble, 2001, Ellsworth, 2001). Even after the restoration of order, it was official policy to only release a Black

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[8]Some accounts also mention the dropping of incendiaries from airplanes (Luckerson, 2023, p. 98). Luckerson (2023) describes the systematic way fires were set by teams of white arsonists, including those deputized by the police.

detainee upon the request of a white person, typically their employer (Goble, 2001). The Frissell Memorial Hospital, the only hospital that served Black people, was burned down. As a result, Black victims with injuries went untreated in internment centers or were eventually treated in a converted basement of a white hospital called the Morningside Hospital. The Red Cross also converted the local Black high school "into the equivalent of a wartime field hospital" as it was "one of the only large buildings left standing" in Greenwood (Luckerson, 2023, p. 108). While official death certificates exist for 39 victims, the Red Cross estimates there were as many as 300 deaths (Snow, 2001, Brooks and Witten, 2001). One hundred years later, the city of Tulsa is still searching for mass graves.

In terms of property damage, 1,256 homes were burned down, leaving thousands homeless (Goble, 2001). In all, 35 square blocks of the Black community were completely destroyed. About $25 million (in 2020 dollars) of property damage was estimated using Tulsa Real Estate Exchange Commission records, claims from Tulsa City Commission meetings, and court cases (O'Dell, 2001). This is surely an underestimate of actual losses since not all residents took insurance companies or the city to court. Professor Alicia Odewale estimates financial losses at $50–100 million (Chang, 2019). Black residents who filed insurance claims were never compensated since companies, as it was standard in their contracts, were not liable for loss caused by "riot." The cases against insurance companies were inert for years before eventually being dismissed in 1937 (Brophy, 2001).

The Red Cross remained in Tulsa for months to provide relief. Ellsworth (2001) writes that, despite the Red Cross's enormous relief efforts, "thousands of black Tulsans were forced to spend the winter of 1921–22 living in tents. Others simply left. They had had enough of Tulsa, Oklahoma" (pp. 88–89). For example, the two most prominent Black businessmen in Tulsa, J.B. Stradford, owner of the Stradford Hotel, and O.W. Gurley, owner of the Gurley Hotel, both left Tulsa after the Massacre. Both started businesses in their new locations, Stradford in Chicago and Gurley in Los Angeles (Ross, 2001, Wills, 2019). Another prominent example is A.J. Smitherman, who had founded the Tulsa Star. After the Massacre, he left for Springfield, MA, eventually founding the Buffalo Star newspaper in Buffalo, N.Y. (Magliulo, 2006).

In the autumn of 1921, Dick Rowland's case was dismissed because Sarah Page failed to appear in court (Brophy, 2001). During this same time, the *Tulsa World* ran an article saying "Grand Jury Blames Negroes for Inciting Race Rioting: Whites Clearly Exonerated" (Brophy, 2001). In

the decades after 1921, Tulsa and Oklahoma practiced "historical amnesia" when it came to the Massacre, leaving it out of textbooks and newspapers. Even the *Tulsa Tribune*'s "Fifteen Years Ago" feature in 1936 failed to mention the Massacre on its 15th anniversary. It was "as if the greatest catastrophe in the city's history simply had not happened at all" (Franklin and Ellsworth, 2001, p. 26). The words of James B.A. Robertson, who was the Governor of Oklahoma from 1919–1923, illustrates the manner in which the Massacre was approached: "riots are unfortunate affairs at all times and the less said about them the better for all concerned."[9]

While our analysis estimates the average effects of the Massacre, each person behind the aggregate numbers has their own story and experience. Concrete accounts of experiences during the Massacre were collected in January and February 1999 by the *Tulsa World* and the *Oklahoma Eagle* newspapers, which put out calls requesting information on the 1921 Massacre from its readers. More than 150 people called in with family stories, eyewitness accounts, and more. These accounts were then converted to draft write-ups of telephone conversations. Images of the text from four conversations (from the Oklahoma Historical Society's Tulsa Race Riot Commission Collection) are shown in Appendix Figure A2. The accounts, although brief, provide rich first-hand context to the experiences of those who experienced the Massacre. They describe a man who, after hearing of the riot, "tore down the stairs" to his family's apartment and "stationed himself with a shotgun at the top" (no. 25); firemen in Greenwood who were forced to "let it burn by armed white civilians" and who witnessed "two flat bed trucks with bodies" (no. 71); a private trash hauler who was forced to transport "six bodies to a hole… in Oaklawn Cemetery" (no. 76); and a man "who had been in the riot and shot many Blacks… He said hundreds of them were buried under the railroad. He was proud of this and said he would do it again." (no. 37).

C. *The Magnitude of the Massacre*

The Tulsa Race Massacre was not the only instance of mass racial violence in the early 20th century. However, the sheer scale of concentrated destruction and violence in the Massacre was unique. We demonstrate the striking nature of the Tulsa Massacre by using historical data from news coverage during this period, leveraging archival data on newswires from Silcock et al. (2024). Since local papers in the U.S. sourced much of their content from newswires, like the A.P., newswire data provide a rich picture of news coverage. We find that over 300 local

[9]See Appendix Figure A1 for the full letter from which the quotation is taken.

newspapers used newswires mentioning 'Tulsa' at the peak of the Massacre's coverage, and 2/3 of all 1921 newswires mentioning the term 'race riot' pertain to Tulsa. The most frequently featured newswire about Tulsa was in the top 1% of all articles in 1921 in terms of newspaper use.

A way to contextualize the scale of the Tulsa Massacre is to compare it to other instances of racial violence in the same period. Of particular interest is the 1919 Red Summer Riots, which occurred in 25 cities and rural areas over many months. To compare the magnitudes of news coverage of Tulsa and the Red Summer, we use Silcock et al.'s (2024) newswire data to show how many papers used newswires that mentioned 'race riot[s]' over time from 1918 to 1923. This is shown in Figure 4. The largest spike aligns exactly with the dates of the Tulsa Massacre. The second largest spike takes place during the Red Summer of 1919. The fact that no single month during the 1919 Red Summer had more 'race riot' coverage than June 1921 aligns with historical evidence of Tulsa's unique level of concentrated violence and national significance. Because the Red Summer of 1919 was also a striking period of racial violence against Black people in America, we account for this in our analysis and compare our estimates for the Tulsa Massacre to those for the 1919 Red Summer events. In this way, we can speak to whether our results are specific to one event or reflect more generalizable effects of race riots during this period.

D. *Consequences of the Massacre*

Within Tulsa

Our analysis examines several consequences of the Massacre. The most obvious is home ownership. Nearly every Black-owned business or home was looted and then burned. Despite years of litigation, no compensation, either from insurance companies or the government, was received by any of the victims. The locations of the destroyed buildings are shown in Figures 5a for Tulsa as a whole and Figure 5b for the neighborhood of Greenwood. The locations shown on the figures are georeferenced using the addresses of destroyed buildings obtained from three archival sources: a database compiled by the Oklahoma Historical Society of cases filed by Tulsa residents against Insurance Companies and the City of Tulsa; a list of property losses reported in Parrish (1998); a document from the Oklahoma Historical Society that lists churches in Tulsa that received structural damage. It is clear that the destruction was concentrated within the Black

Figure 4: News Coverage of Racial Violence, 1918–1922
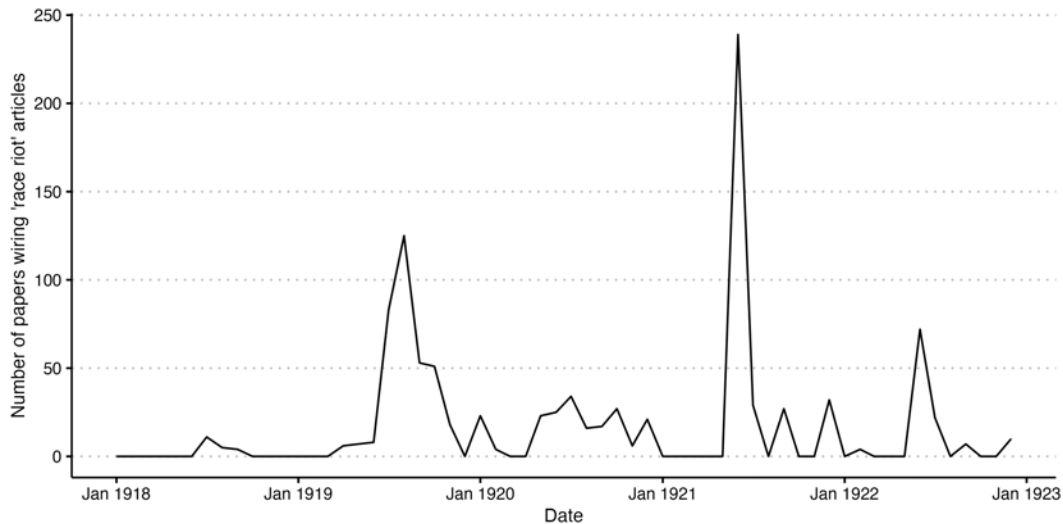
Notes: The figure reports the number of local newspaper articles that use a newswire with the term 'race riot' over time. The data are binned by month and covers months between January 1918 and December 1922. The newswire data are from Silcock et al. (2024).

neighborhood of Greenwood and that it was extensive, with full city blocks being burned to the ground.

We also expect that the Massacre may have resulted in occupational downgrading. There are numerous accounts of individuals losing not only their home but also their businesses. Because compensation was not received, they were unable to rebuild and instead had to take less skilled employment to survive. A typical case can be seen in the example of Pressley and Mable Little. Before the Massacre, Mabel owned a beauty salon, while Pressley ran a cafe. The couple also owned their own home, two rental properties, and a Model T Ford. All were destroyed during the Massacre. The couple fled their home after the first night of looting and destruction. After fleeing North, they were intercepted by the National Guard and brought back against their will to Tulsa. After the Massacre, the couple, with fifty dollars to their name, built a three-room shack without electricity, running water, or gas. To survive, Pressley, the once entrepreneur and landlord, did manual labor and carpentry until his death three years later (Hirsch, 2002, pp. 145–147). This example illustrates how the Massacre may have caused significant occupational downgrading.

The Massacre had additional effects on the Black children of Tulsa. Due to the Massacre, the two colored elementary schools in Tulsa were destroyed. Dunbar Grade School and Washington School are listed in the 1920 and 1921 City Directory, but disappeared after 1922. Figure 6a shows

Figure 5: Locations of Damaged Property in Tulsa and Greenwood.

(a) The Broader City of Tulsa
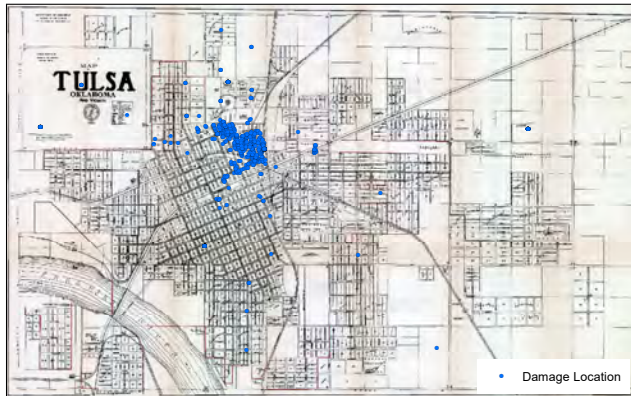
(b) Zooming in to the Greenwood neighborhood

Figure 6: Effects of the Massacre on Education Infrastructure

(a) The Destruction of Dunbar School

(b) Booker T. Washington High School After the Massacre

the remains of Dunbar School, located on Hartford Avenue between Easton and Cameron Streets, after the Massacre. While the one colored high school in Tulsa, the Booker T. Washington High School, located on the edge of Greenwood, survived the destruction of the Massacre, the building was converted to a Red Cross headquarters and medical facility, leaving the Black community without any schools in the year following the Massacre. Figure 6b shows the school used as a relief headquarters following the Massacre.

Testifying before Congress in 2021, Viola Fletcher, a survivor of the Massacre who was seven at the time, recounted the impact that the Massacre had on her own life, noting the personal consequences on her educational attainment: "I have lived through the Massacre every day. Our country may forget this history, but I cannot...I lost my chance at an education. I never finished

school past the fourth grade. I have never made much money in my country."

Beyond Tulsa

Beyond the direct effect of the Massacre for those who experienced it, we also expect that the event may have had effects on Black communities outside of Tulsa. In the aftermath of the Massacre, it became clear that such an event could easily occur again. The narrative that emerged from those in positions of power was that the blame for the Massacre fell squarely on the shoulders of the Black community. There was no regret or remorse for the events that had occurred. The mayor of Tulsa, T.D. Evans, in a statement to city commissioners on June 14, 1921, made obvious his view that the Black community was to blame: "Let the blame for the Negro uprising lie right where it belongs – on those who armed negroes and their followers who started this trouble and who instigated it...Any person who seeks to put half the blame on the white people are wrong and should be told so in no uncertain terms." He continued, arguing that "it was good generalship to let the destruction come to that section where the trouble hatched up...All regret the wrongs that fell upon the innocent Negroes [but] the fortunes of war fall upon the innocent as well as the guilty." (Hirsch, 2002, pp. 126–127).

To the Black population outside of Tulsa, the message was unmistakable. Rather than regretting the destruction of Greenwood, authorities and the white population, in general, lamented that the neighborhood existed in the first place and felt that the Massacre resulted in a better city. This sent a strong message to Black populations across the country that an event like the Tulsa Massacre was easily possible in their community. The failures of the legal system to either hold the perpetrators accountable or to deliver any compensation from insurance companies underscored the precarity of African Americans' situation in Jim Crow America. As Luckerson (2023, p. 128) describes, "[F]or a long time, black people had thought of the law as a final refuge from the daily vagaries of racism ...But the execution of justice in the aftermath of the massacre would shake this belief to its very core."

While the initial coverage of the Massacre in newsprint was extensive, the lingering effects of the Massacre would have been strongest in localities that were more strongly connected to the Massacre. In these locations, the pain of rebuilding would have been indirectly felt long after the Massacre disappeared from the news. Thus, if the events of Tulsa affected people's decisions in other parts of the U.S., we expect the effects to be most pronounced in places more connected to

Tulsa, especially if the connections are through (extended) family (Frazier, 1949). Our analysis tests for spillover effects in counties with stronger connections to Tulsa.

3. Effects of the Massacre: Evidence from Raw Data

A. *Immediate Effects of the Massacre Within Tulsa, 1916–1925*

We begin our analysis by examining the Tulsa City Directory. City directories in the early 20th century were comprehensive annual publications compiled for various cities, including Tulsa, that provided an alphabetical list of both 'business firms' and 'private citizens.' For citizens, the directories typically report a person's occupation (in addition to their name, address, and the name of their spouse). See Appendix Figures A3 and A4 for sample extracts. Until 1925, the Tulsa Directory also noted whether the business owner or citizen was 'colored' or not. We have digitized all volumes of the Tulsa City Directory from 1916 until 1925 (the last year for which race is reported). With this, we examine how businesses and occupations evolved before and after the Massacre for Black and non-Black individuals living in Tulsa.

The counts of businesses each year for both Black and non-Black owners are reported in Figure 7a.[10] Because the 1921 directory was published before the Massacre, 1922 is the first publication after the event. In the graphs, we mark 1921 with a vertical dashed line and normalize each series so that its value in 1921 is zero. The other years are reported as deviations (in cumulative percentage difference) from 1921. This allows us to report both the Black and non-Black series on the same axis despite their very different means, which provides an easy visualization of changes before and after the Massacre. We see that the number of Black-owned businesses declined significantly immediately following the Massacre and, as of 1925, the last year that race-specific counts are available, much of the reduction remained. Consistent with the historical narrative that Greenwood was a prosperous and vibrant neighborhood before the Massacre, the data show a rapid rise in Black-owned businesses that outpaces the growth of white-owned businesses. We also see that the exceptional performance of Black Tulsa did not continue after the Massacre, at least until 1925. It is possible that after 1925, there was a convergence back to the longer-run trend. The increase between 1924 and 1925 suggests this, but it is unclear if this was sustained.

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[10]Because the directory is not a Census of all individuals – e.g., other residents of each household are not listed, except the spouse who is only sometimes reported – we do not have annual population figures and cannot calculate reliable annual per capita measures.

This highlights the importance of looking at medium and longer-run consequences, which is the focus of our analysis that uses the U.S. Census data.

A similar pattern emerges when we look at the average occupation score of all individuals in the City Directory who report an occupation (Figure 7b).[11] In contrast to the number of establishments, we see stability in the mean occupation score for both Black and white Tulsans before the Massacre. After this, we see significant occupational downgrading for Black Tulsans while occupation scores hold steady or increase slightly for white Tulsans.

A second slightly coarser way to cut the data is to examine the share of occupations that are defined as "white collar" (defined as IPUMS occupation codes less than 100), which is reported in Figure 7c. Because the occurrence of white-collar occupations is infrequent and the Black population in Tulsa is not large, the average share for Black individuals exhibits more year-to-year variation. But taking this into account, the share before the Massacre seems to be on a similar trajectory to that of white Tulsans. In the year following the Massacre, there was a decline in the white-collar share for Black Tulsans, but by 1923, the emerging gap seems to have disappeared. However, it turns out that this is entirely explained by an increase in the number of individuals reporting their occupation as 'teacher' or 'reverend,' both white-collar occupations, in 1923 and after. The increase in the number of teachers is understandable. Following the Massacre, and the destruction of all Black schools in Tulsa, decentralized, make-shift efforts emerged to attempt to educate children. These took place in churches, tents, basements, and homes. This decentralized education would have required more teachers, many of whom were recently unemployed and now volunteering. These individuals could have listed 'teacher' as their occupation in the City Directory.

The increase in reverends can be similarly explained by a combination of unemployment and volunteer efforts to rebuild the community through the church, along with a demand for religious services. During this time, it was common for ordained individuals to also have other paid employment. For Black Tulsans who became unemployed, they could have listed reverend as their occupation. 'Unemployed' was not listed in the City Directory. After the Massacre, Black religious leaders also came to Tulsa to help rebuild the community. Those who stayed for an

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[11]We code the occupation strings from the directories into the usual IPUMS occ1950 codes manually after generating candidate codes with Dahl, Johansen and Vedel (2024).

Figure 7: Tulsa Trends by Race and Year from the City Directory

(a) Number of Businesses by Race of Owner

(b) Average Occupation Score by Race

(c) Share of Occupations that are White-Collar by Race

(d) Share of Occupations that are White-Collar by Race (Dropping Reverends and Teachers)

Notes: The figures show the reported statistics, from the Tulsa City Directory, for each Black and non-Black individual in Tulsa for each year from 1916–1925. The axis reports the cumulative percentage change of the value for a series in a year relative to its value in 1921 (the last volume before the Massacre), which has been normalized to equal 0.

extended duration would appear in the Tulsa City Directory with reverend as their occupation.[12]

Given that after the Massacre, an increase in teachers and reverends may not be a sign of economic success, we reproduce the same figure but remove these two occupations for all years in the Black and white series. (That is, they do not appear in either the numerator or denominator of the white-collar share.) We see that the gap in white-collar share that emerged between Black and white Tulsans immediately following the Massacre persisted until 1925 (Figure 7d).

B. *Short and Medium-Term Effects of the Massacre, 1910–1940*

Data from the City Directory provides evidence of the effects of the Massacre on Black Tulsans. A DD comparison of the difference in Black business ownership before and after the Massacre to the

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[12]As we report in Section 5.B, the Massacre was associated with a shift towards more portable occupations, and 'clergymen' and 'teachers' are the third and fourth most geographically portable among all 253 occupations coded by IPUMS. Thus, this may also explain part of the observed increase in the two occupations.

white business difference is informative, but concerns about the comparison remain. First, since race information was not reported in the Tulsa City Directory after 1925, we have no evidence about the medium and longer-run effects. Second, although unlikely, we cannot be certain that no other events around this time caused the same difference in outcomes of Black and white individuals in the 1920s. Thus, we would also like to compare the pattern found in Figure 7a to the pattern observed in comparable cities. To do this, we turn to U.S. Census microdata from 1910, 1920, 1930, and 1940, which allow us to examine a range of outcomes, including home ownership (direct and by one's family), occupational status (of adults), and education (of children).

We first examine home ownership using Census information on whether the home in which the enumeration took place was owned or rented by its inhabitants. The first measure we consider examines all household heads and creates an indicator variable that equals one if the household head lives in a house that is owned rather than rented. Assuming that the homeowner is the household head, this measure captures direct home ownership. We also create a second broader measure, which is intended to measure family home ownership and, therefore, does not depend on a respondent's status as the household head. It is an indicator variable that equals one if a respondent lives in an owned home and is a family member of the household head. We measure occupational status using the natural log of the occupation score[13] and an indicator variable that equals one if an individual is employed in an occupation that is "professional" or "technical," which we refer to as a "white-collar" occupation.[14] We measure education by examining children who are of school-attending age (7–18 years old), an indicator variable that equals one if they were reported in the Census as being enrolled in school. Given the potential importance of gender, we report estimates separately for boys only, girls only, and both.

As shown in Figure 8a, Greenwood (i.e., Black Tulsa) appears to have had exceptional performance before the Massacre. Following the Massacre, there was a decline in home ownership, which did not occur among the white Tulsan population. Between 1930 and 1940, home ownership increased, but at a rate slower than the white Tulsan population. We see a similar pattern for family home ownership (Appendix Figure A7a) and for education (Appendix Figures

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[13]Because the Census does not record income directly before 1940, it must be proxied by an individual's reported occupation. Occupations have been assigned income values based on "the median total income (in hundreds of 1950 dollars) of all persons with that particular occupation in 1950." We take the natural log of the income measure since this makes the variable less skewed (and more normally distributed) than the raw income measure.

[14]This corresponds to all 1950 IPUMS occupation codes from 000 to 099. It includes occupations such as accountants, engineers, lawyers, judges, nurses, doctors, etc. Further details on the occupation variables can be found in Section A3 of the Appendix. The top 10 white-collar occupations for men and women are reported in Appendix Table A3.

A10a–A12a).

We next compare the patterns from Tulsa to those in a set of comparison cities with similar populations to Tulsa. In 1920, Tulsa had a total population of 72,203, with 8,901 Black residents. The comparison cities that we consider are those that, in 1920, had a population between 50,000 and 150,000 and had a Black population of at least 1,000 individuals. In total, 59 cities satisfy these criteria. These cities are reported in Appendix Table A4. Figure 8b and Appendix Figures A7b–A12b report the same figures as Tulsa but for the control cities. The figures show that, consistent with the historical narrative, the prosperity and growth of the Black population of Tulsa appear exceptional. Outside of Tulsa, we do not observe growth in home ownership being faster among the Black population than the white population. Further, after 1920, the rate of change in home ownership of the Black population (relative to the white population) appears to increase and not decrease, as was the case for Tulsa, which experienced the Massacre. We also see similar patterns for education (Appendix Figures A10b–A12b).

Given the assumption that the control cities provide a helpful counterfactual, it is useful to examine the difference between Tulsa and the control cities. One way to do this is to look at how the gap between Black and white home ownership in Tulsa and in the control cities changes before and after the Massacre. This is shown in Figure 8c and Appendix Figures A7c–A12c. Before the Massacre, the rise in the Black-white home ownership difference was greater for Tulsa than for the control cities. Following the Massacre, this is reversed. Tulsa experienced a fall in the Black-white home ownership difference between 1920 and 1940. There was also a fall in the control cities, but it was more modest than Tulsa's decline. A decade later, between 1930 and 1940, unlike Tulsa, the control cities saw an increase in the Black-white difference.

Another way to visualize this same pattern is to plot the difference in home ownership between Tulsa and the control cities by race over time, which is reported in Figure 8d and Appendix Figures A7d–A12d. Prior to the Massacre, relative to the control cities, the increase in home ownership of Black Tulsans was greater than it was for white Tulsans. After the Massacre, this is reversed. The increase (relative to control cities) for Black Tulsans is lower than for white Tulsans.

The same general patterns are observed for the family home ownership measure and for educational enrollment, whether we look at boys, girls, or all children. For occupational earnings and white-collar share, while we see a widening Black-white gap between Tulsa and other counties after the Massacre, we also see significant pre-trends driven by a dramatic decline in

Figure 8: Household Head Home Ownership

(a) Tulsa

(b) Control Cities

(c) Black–White Difference by City

(d) Tulsa–Control City Difference by Race
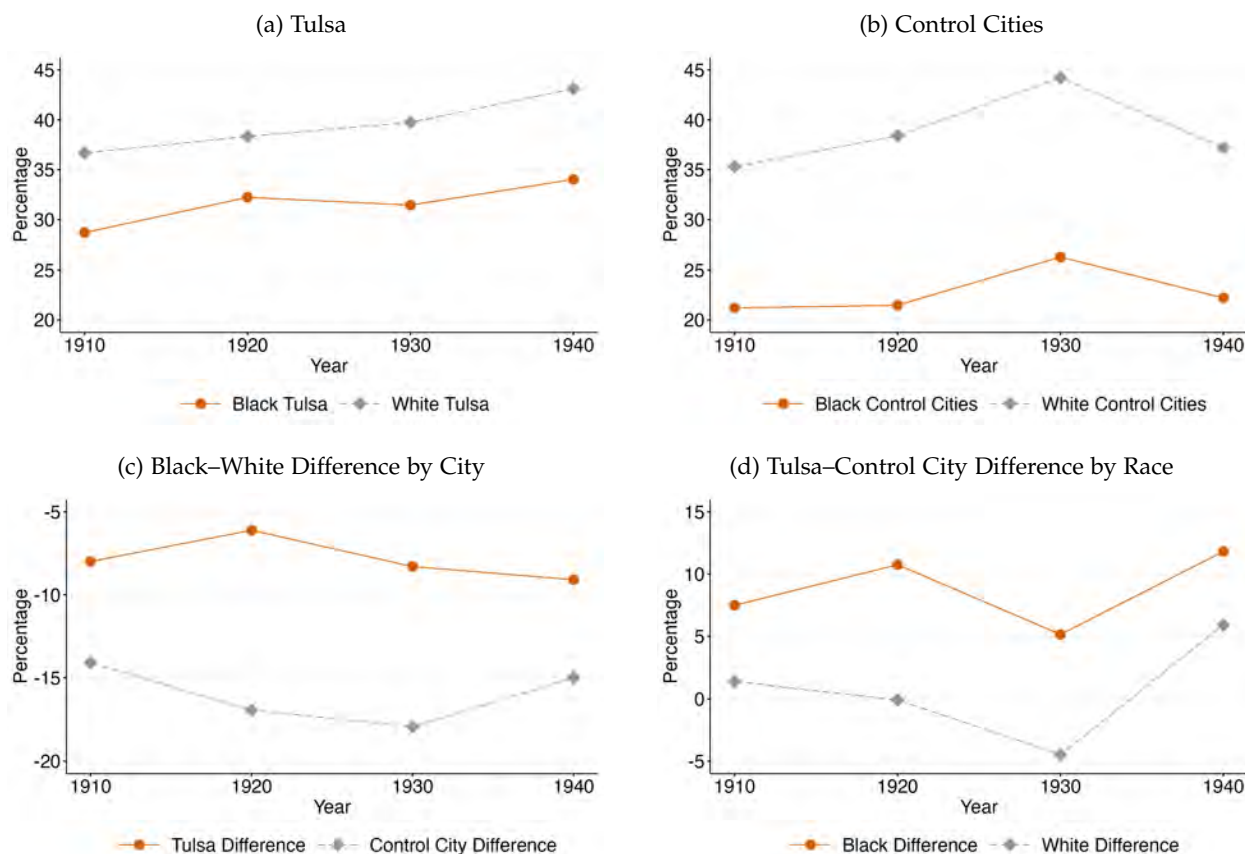
Notes: The figures show the percentage of household heads in each Census who are homeowners by race and city. Figures 8a and 8b show home ownership by race for Tulsa and the control cities, respectively. Figure 8c shows the Black-white difference in home ownership percentage among household heads separately in Tulsa and the control cities. Figure 8d shows the difference in home ownership percentage between Tulsa and the control cities separately for Black and white household heads.

the occupation score and white-collar share for Black Tulsans from 1910 to 1920 (see Appendix Figures A8 and A9). An examination of the raw data reveals that this is very likely due to a significant problem with the occupation information for Black Tulsans in the 1910 Census, where over 40 percent of Black Tulsan men have missing occupational information. This is very different from the rate of 8% missing for white men in Tulsa in 1910 or of 4.3% or 5.7% for Black and white men nationally in 1910. While the exact reason is unclear, it may be because the city was so new and many newly arrived individuals, particularly those who were Black, did not yet have an established occupation. From Figures A8 and A9, it is clear that the irregularities in the trends arise because the values for Black Tulsans in 1910 are anomalous.[15] In the following section, we discuss this limitation further and the various strategies we take to address it, including using

occupation data from the Tulsa City directory.

4. Effects of the Massacre: DDD Estimates

We now turn to formal regression estimates. We estimate a difference-in-difference-in-differences specification, where we compare outcomes of Black Tulsans with control groups for which the Massacre should have no direct effect: white Tulsans and Black and white individuals in comparison cities. The identifying assumption of our DDD approach is that there were no changes, contemporaneous to the effects of the Massacre, to black-white trends between Tulsa and the other cities.

Our estimating equation is given by:

$$y_{ijrt} = \psi_{rt} + \theta_{jt} + \tau_{jr} + \alpha_1 \left(I_j^{Tulsa} \times I_r^{Black} \times I_t^{Post} \right) + \mathbf{X}'_{it}\mathbf{\Gamma} + \varepsilon_{ijrt}, \tag{1}$$

where i denotes individuals, j cities (Tulsa and comparison cities), r race (Black, white, and other), and t Census years (1910, 1920, 1930, and 1940).[16] y_{ijrt} is an outcome of interest measured for individual i living in city j who reports being of race r in Census year t. I_j^{Tulsa} is an indicator that equals one if individual i lives in Tulsa, I_r^{Black} is an indicator that equals one if they report their race as being Black, and I_t^{Post} is an indicator that equals one if the Census decade t is after 1920. $\mathbf{X}'_{it}$ denotes a vector of individual-level covariates that includes age, age squared, an indicator for being married, an indicator for having children, and a gender indicator (for specifications that include men and women). We cluster all standard errors at the city level.

Our interest is in the coefficients on the interaction term α_1, which captures the difference in the outcome of interest for Black Tulsans (relative to other races) after (relative to before) the 1921 Massacre. The double interactions of the triple interaction are absorbed by the fixed effects that are included in the specification, which are race-year fixed effects ψ_{rt}, city-year fixed effects θ_{jt}, and city-race fixed effects τ_{jr}.

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[15]In contrast to the patterns observed in Appendix Figures A8 and A9, the historical record only reports rising Black prosperity in Tulsa from 1910 to 1920. Thus, the decline during this period shown in the figures is likely erroneous and driven by missing 1910 data rather than a real trend.

[16]In 1920, among the residents of Tulsa county, 89% were white, 10% were Black, and 1% belonged to another racial category, which primarily comprised indigenous populations.

Home ownership

Estimates of equation (1) examining our two measures of home ownership are reported in columns 1 and 2 of Table 1. Because men were the primary homeowners and income earners at the time, our baseline specification examines men, although for completeness, we also report the same estimates for a sample of men and women (see Appendix Table A6). In general, we find that the estimates are similar in either case. Column 1 reports estimates where the sample is all household heads and the dependent variable is an indicator that equals one if the household head reports owning their home. Column 2 reports estimates where the dependent variable is an indicator that equals one if the home in which the individual lives is owned by someone in their family. For both specifications, we find evidence that the Massacre resulted in a statistically significant decrease in home ownership. The magnitude of the estimates suggests that, for the sample of male household heads (column 1 of Table 1), the Massacre is associated with a decline in the likelihood of home ownership of 1.3 percentage points. This can be compared to the home ownership rate of Black men in Tulsa in 1920, which was 32.2 percent. The Massacre reduced the rate of men living in a home owned by a family member by 2.9 percentage points relative to a baseline rate of 27.9 percent for Black men in Tulsa in 1920 (column 2 of Table 1).

Occupation

Columns 3 and 4 of Table 1 (for men) and Appendix Table A6 (for men and women) report estimates of the effect of the Massacre on occupational status. In both specifications, the sample comprises individuals in the labor force who report a valid occupation code. In column 3, the outcome of interest is the natural log of the occupation score, and in column 4, it is an indicator variable that equals one if an individual is employed in an occupation that is "professional" or "technical," which we refer to as a "white-collar" occupation. The estimates indicate that the Massacre led to a decline in occupational status – i.e., occupational downgrading – for Black Tulsans. This decline is consistent with historical accounts of professionals who, after losing their businesses during the Massacre, had to enter into manual occupations to survive.[17]

Within the Census, Black individuals living in Tulsa in 1910 had a disproportionately high incidence of missing occupation codes. For males aged 16 or older, 40.7% of Black Tulsans have

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[17]The movement out of white-collar occupations is robust to alternative definitions of white collar. This is not surprising since quantile regression estimates reveal that the occupational downgrading occurred in approximately similar magnitudes throughout the occscore distribution.

Table 1: Effects of the Tulsa Massacre, 1910–1940

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1	In School 0/1	In School 0/1	In School 0/1
				Dependent Variable:			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tulsa × Black × Post	−0.013**	−0.029***	−0.050***	−0.026***	−0.038***	−0.013***	−0.025***
	(0.006)	(0.007)	(0.007)	(0.001)	(0.008)	(0.005)	(0.006)
Year-City FEs	Y	Y	Y	Y	Y	Y	Y
Race-City FEs	Y	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y	Y
Sample	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force	Males Ages 7-18	Females Ages 7-18	Full Ages 7-18
Dep. Var. Avg. for Black Tulsans, 1920	0.322	0.279	2.928	0.034	0.817	0.791	0.803
Observations	4,661,386	10,608,649	6,873,651	6,873,651	2,211,763	2,287,317	4,499,083

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual, living in a city, and observed in a census year. The sample includes individuals living in Tulsa or one of the 59 comparison cities. The dependent variables are reported at the top of the table. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). Home ownership and occupation specifications include controls for age, age squared, marriage, and children, year-race fixed effects, year-city fixed effects, and city-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

missing occupation codes compared with 8.1% of white Tulsans and 4.2% of Black males in our comparison cities. By contrast, in 1920, only 4.4% of Black Tulsans had missing occupation codes.[18] Given the concern that differential reporting by race, location, and period might drive some of our findings, we undertake sensitivity checks for the occupation estimates. We have digitized the City Directory for Tulsa for 1910. Since the directories, in addition to reporting name, race, and address, report the occupations of most individuals (e.g. 69% for Black Tulsans in 1910), we can use these to check the sensitivity of our baseline estimates to either filling in missing occupation data in the 1910 Census for Black Tulsans or using the City Directory data when data from both sources are available.[19] As reported in Appendix Table A10, the estimates are robust to these sensitivity checks. Thus, the higher incidence of missing data in the 1910 Census for Black respondents does not seem to drive our estimates.

We use the City Directory in a second way to fill in missing data. We replace all missing occupation values for Black Tulsans in 1910 in our sample with the average occupation score for Black men aged 16 and older (the population of the Census sample) in the Tulsa City Directory. The estimates after this imputation are reported in column 1 of Appendix Table A11. Our final check is to omit 1910 completely from our analysis, leaving one pre-period (1920) and two post-periods (1930 and 1940). These estimates are reported in columns 2 and 3 of Appendix Table A11. The estimates show that our findings of a decline in the occupational score of Black Tulsans after the Massacre are present in all cases.[20]

Children's education

We next examine whether children's education was affected. This is motivated by the well-documented importance of income for child schooling (Edmonds, Pavcnik and Topalova, 2010), as well as the destruction of all schools in Greenwood, which would suggest that the Massacre may have reduced school attendance. Although natural to expect adverse effects, the recent findings of Becker, Grosfeld, Grosjean, Voigtlaender and Zhuravskaya (2020) raise the possibility that, due to the uncertainty about the safety of investments in physical capital, there may be

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[18]See Appendix Table A9 for a full characterization of missing occupation codes in the Census.

[19]Because the sample is relatively small and the names in the city directory are not fully transcribed, we link from 1910 to the directory by hand.

[20]**In our City-Directory analysis, we found that occupational downgrading was even more stark if one omits teachers and reverends, two white collar occupations that increased noticeably following the Massacre. The estimates here are very similar if we omit teachers and reverends.**

increased investment in human capital, which cannot be expropriated. Thus, the effect of the Massacre on education is an empirical question.

To examine this, we estimate a version of equation (1) where the sample is children who are of school-attending age (7–18 years old), and the dependent variable is an indicator variable that equals one if they were reported in the Census as being enrolled in school. The estimates, reported in columns 5–7 of Table 1, show that the Massacre is associated with reduced school attendance. In this setting, the importance of the income effect seems to outweigh the potential Becker et al. (2020) effect greatly. The magnitudes of the estimated effects are also sizeable. Relative to a baseline school enrollment rate of about 80% among Black children in Tulsa before the Massacre, we estimate an average decline for boys and girls of 2.5 percentage points.

Sensitivity to race categories

We check the robustness of our findings to our inclusion of an "other" racial category. In the early 19th century, the U.S. government forcibly removed many indigenous peoples from the eastern United States to the land that is today part of Oklahoma (including Tulsa). Eventually known as Indian Territory, more than thirty Native American nations and tribes were living in Oklahoma by the late 19th century. To be thorough, we investigate the sensitivity of our findings to the exclusion of this racial category, which, by construction, is fairly heterogeneous across the treatment and control cities. As reported in Appendix Table A8, we obtain virtually identical estimates when we do this.

A. *Other newly created cities as comparisons*

Throughout our analysis, we are restricted to using a panel that begins in 1910, the first Census for which Tulsa is present. Though Tulsa was incorporated in 1898, the population was tiny until oil was discovered at the Glenn Pool Oil Reserve, 15 miles south of Tulsa, in 1905 and more so when drilling began in earnest after 1907. In addition, Oklahoma did not receive statehood until 1907. Tulsa's history provides a unique setting for thinking about parallel trends in our empirical setup. It presents challenges but also helps guide the selection of appropriate comparison cities. When thinking about treatment and control groups, there is a potential concern that the youth of Tulsa, and its growth from infancy, might invalidate the parallel trends assumption. Given this, we restrict our analysis to a set of cities that, like Tulsa, were not present in the 1900 Census

and appeared for the first time in the 1910 Census. This sample comprises 94 cities in total, including Tulsa. Given the concern that many of these might not be comparable to Tulsa in terms of initial (1910) size and racial composition, we restrict the sample to only include cities with a total population of 5,000 and a Black population of 250 individuals. This sample comprises 45 cities, including Tulsa, which can also be viewed as 'boom towns' that sprang up in 1910 with a sizeable Black population.[21] A benefit of this strategy is that it exploits the 'natural experiment' nature of the fact that all cities in the sample did not exist before 1910. In this sense, parallel trends are satisfied before this period.

Whether these alternative samples represent a compelling set of comparison cities is informed by comparing the balance of characteristics between the cities and Tulsa prior to the Massacre, in 1910 and 1920. These statistics, which are reported in Appendix Tables A12 and A13, show that these comparison cities tend to show more balance on the outcomes of interest before the Massacre, particularly for Black home ownership and the white-collar share.

Using the two samples, we then re-estimate equation (1). The estimates of effects on the male population using the 94-city sample are reported in Panel A of Table 2, and the estimates using the 45-city sample are reported in Panel B of Table 2. We find that the estimates closely mirror our findings using the baseline sample of cities. The estimated effects on home ownership are negative and highly significant (columns 1 and 2). We also see that the Massacre caused significant occupational downgrading, measured using either the occupational score or participation in a white-collar occupation (columns 3 and 4). Estimates examining both men and women, which are reported in Appendix Table A7, are very similar.

B. *Sensitivity to comparison cities*

We further examine the sensitivity of our estimates to our choice of comparison cities. The first exercise that we undertake is to test the sensitivity of our estimates to the presence of cities that may be outliers with significant leverage. We do this by re-estimating equation (1) after removing each city from our sample. Appendix Figure A15 summarizes the estimates of this procedure for our baseline 60-city sample. Removing potentially influential cities does not affect our findings.

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[21]The cities in both samples are reported in Appendix Table A5 and their locations in Appendix Figures A13 and A14.

Table 2: Effects of the Tulsa Massacre, 1910–1940, Sample from Cities that are in 1910 Census but not in 1900 Census

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1	In School 0/1	In School 0/1	In School 0/1
	Dependent Variable:						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Cities in 1910 Census but not in 1900 Census (n=94)							
Tulsa × Black × Post	−0.037***	−0.062***	−0.046***	−0.024***	−0.048***	−0.033***	−0.041***
	(0.009)	(0.009)	(0.010)	(0.002)	(0.008)	(0.006)	(0.006)
Panel B: Cities in 1910 Census but not in 1900 Census with total population ≥5,000 and Black population ≥250 (n=45)							
Tulsa × Black × Post	−0.047***	−0.068***	−0.050***	−0.024***	−0.051***	−0.033***	−0.042***
	(0.008)	(0.008)	(0.011)	(0.003)	(0.008)	(0.006)	(0.006)
Year-City FEs	Y	Y	Y	Y	Y	Y	Y
Race-City FEs	Y	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y	Y
Sample	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force	Males Ages 7-18	Females Ages 7-18	Full Ages 7-18
Dep. Var. Avg. for Black Tulsans, 1920	0.322	0.279	2.928	0.034	0.817	0.791	0.803
Observations (Panel A)	1,563,321	3,449,091	2,177,692	2,177,692	744,143	775,477	1,519,642
Observations (Panel B)	818,227	1,814,732	1,151,666	1,151,666	399,207	423,034	822,252

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual, living in a city, and observed in a census year. The sample for Panel A includes individuals living in Tulsa or one of the 93 comparison cities. The sample for Panel B includes individuals living in Tulsa or one of the 44 comparison cities. The dependent variables are reported at the top of the table. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). Home ownership and occupation specifications include controls for age, age squared, marriage, and children, year-race fixed effects, year-city fixed effects, and city-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

The estimates are very similar to the baseline estimates reported here.[22]

We also implement a second complementary strategy where we rely on a large number of alternative cities for the control group. For each iteration of the simulation, we randomly draw 50 cities without replacement from a pool of 374 cities that satisfy two broad criteria. We limit the potential pool to cities with a 1920 population between the 5th percentile (11,695) and 95th percentile (237,505). We also limit the pool to cities with a Black population share above the 25th percentile (0.48%). Figure 9 plots the 1920 city population and percentage Black for the pool of 374 cities and the city of Tulsa.

In each iteration, we re-estimate equation (1) for our outcomes of interest. Figure 10 displays the distribution of the estimated effects from the simulation with 1,000 iterations. For each outcome of interest, the mass of the estimated effects are negative and similar in magnitude to the baseline estimates reported in Tables 1 and 2.

These results show that while the constructed control groups used in Tables 1 and 2 are our preferred comparisons based on the demographic and historical context, the estimated effects are not substantively sensitive to our selection of cities. The simulations demonstrate that regardless of the composition of cities, the Massacre had measurable deleterious effects on home ownership, occupation, and children's education.[23]

C. *Effects of the Massacre on Migration*

We now consider the effects that the Massacre had on migration. An important part of the effects of the Massacre on Black individuals living in Tulsa may be due to selective migration, which depleted Tulsa of Black entrepreneurs and business owners, leading to detrimental effects on the longer-run economic growth of the community. There are many accounts of individuals leaving Tulsa and enriching and strengthening other communities (Ross, 2001, Wills, 2019).

To examine migration, we use linked Census data from two sources from 1920 to 1930 that allow us to study whether men remained in their 1920 city of residence in 1930 or whether they

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[22]While not reported here due to lack of space, we find that this is also true when we use the sample of cities that did not exist in 1900 (45- and 94-city samples).

[23]In situations with one treated unit and many untreated units available for comparison, a synthetic control is often used as a counterfactual. Unfortunately, this method is not feasible in our setting since it requires a large number of pre-treatment periods (Abadie, 2021). Since the city of Tulsa is not recorded in the decennial Censuses before 1910, we only have the two pre-treatment periods, 1910 and 1920.

Figure 9: Cities in Simulation by Total Population and Percentage Black
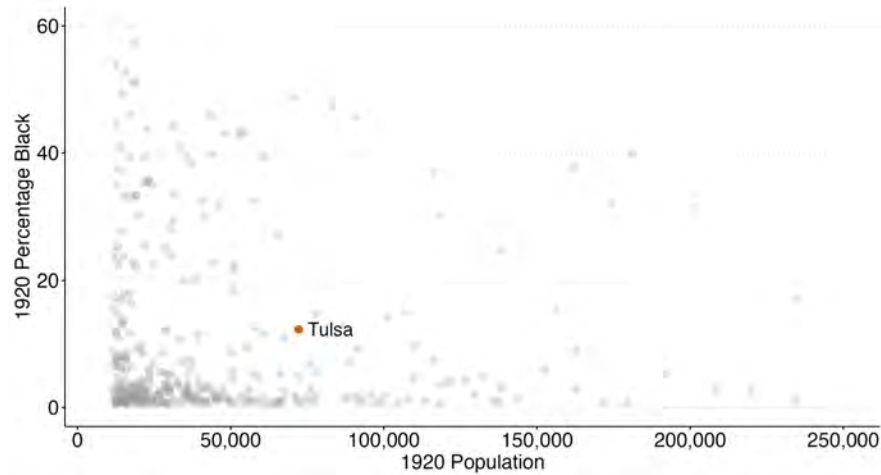
Notes: The figure includes cities between the 5th percentile and 95th percentile of 1920 city population and above the 25th percentile of the Black percentage of city population.

moved away.[24] The first is the Census Linking Project (CLP), which comprises a dataset of links between each pair of complete count U.S. Censuses from 1850 to 1940 (Abramitzky, Boustan, Collins, Eriksson, Feigenbaum, Ferrie, Helgertz, Perez, Price and Rashid, 2021a). We use the first set of links from the project for 1920 to 1930, which are generated via the "ABE algorithm," described in detail in Abramitzky, Boustan, Eriksson, Feigenbaum and Perez (2021b).[25] The second is the IPUMS Multigenerational Longitudinal Panel, version 1.2 (MLP), which comprises a new set of crosswalks between pairs of adjacent Censuses from 1900 to 1940 (Helgertz, Ozder, Ruggles, Warren, Fitch, Hacker, Nelson, Price, Roberts and Sobek, 2024, Ruggles, Nelson, Sobek, Fitch, Goeken, Hacker, Roberts and Warren, 2024).[26]

We combine the linked data in the following way: Of the 1920-1930 links identified by either source, 33% were identified in both the CLP and MLP crosswalks; 60% were in MLP only, and 6% were in CLP only. For 0.8% of the links, the MLP and CLP links were different. In these cases, we used the MLP link.[27] Since women tended to change their last name upon marriage, linking them from Census to Census is much more difficult. Thus, our analysis only considers men.

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[24]Our analysis follows in the footsteps of other studies that link Black and white individuals during this era e.g., Collins and Wanamaker (2014), Ward (2023), and Aneja and Xu (2022).

[25]Links are identified according to matches on first name, last name, state of birth, and year of birth across two Censuses. To minimize false-positive linkages, we use only the "exact conservative" links, which require first and last names to match exactly and require potential matches to be unique within a five-year age band around the year of birth (within $\pm$ 2 years of the birth year implied by age as recorded in the Census).

[26]For further details, including a detailed discussion of how the linking differ from those produced by the ABE algorithm, see Section A3 of the Appendix.

[27]The findings we report here are robust to using the CLP link over the MLP link or to removing these observations.

Figure 10: Distribution of Estimated Effects for Alternative Control Groups

(a) HH Head Home Ownership

(b) Family Home Ownership

(c) ln(Occscore)

(d) White-Collar

(e) Education of Boys

(f) Education of Girls

(g) Education of All Children
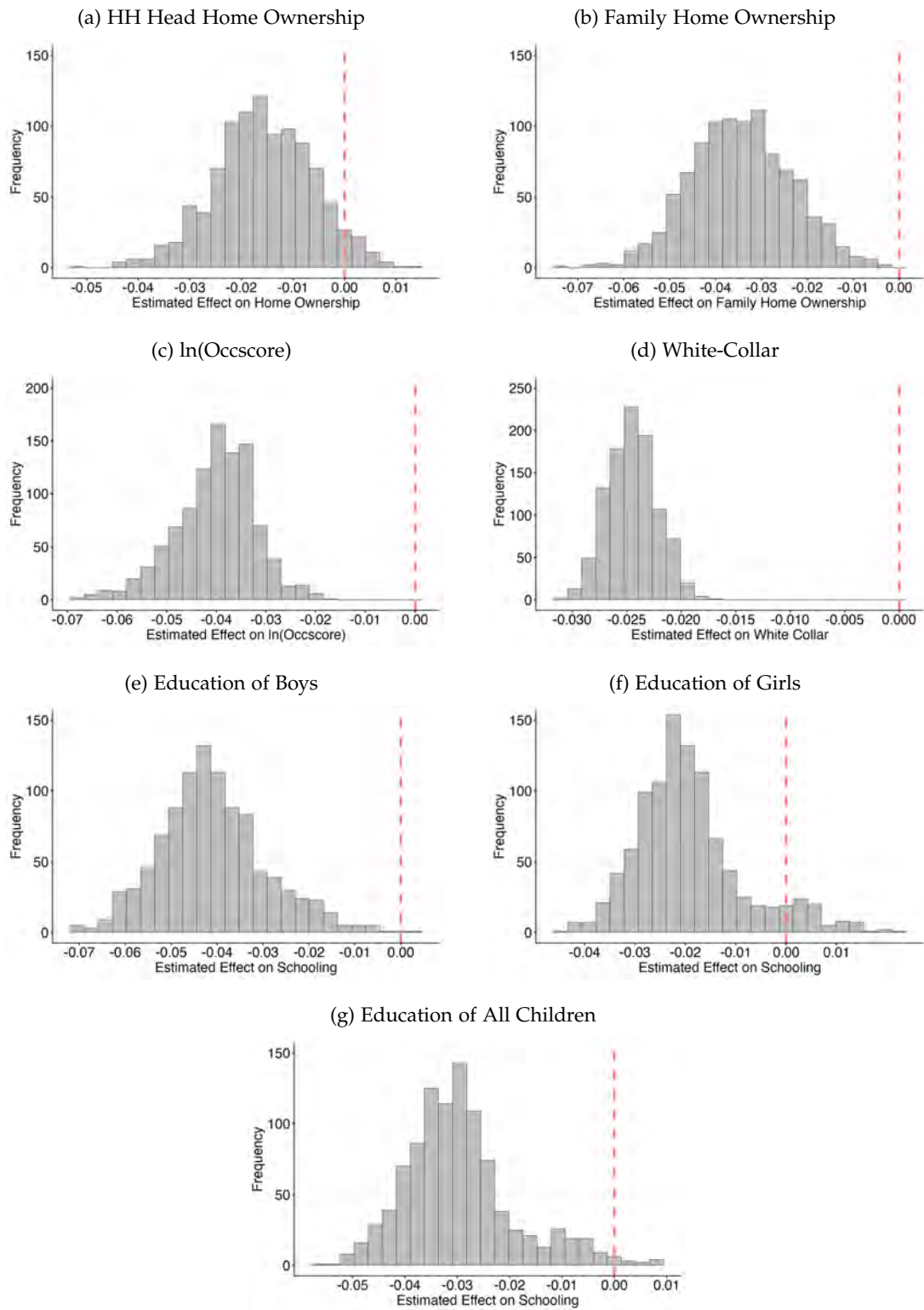
Notes: The figures show, for each outcome, the distribution of estimated effects from 1,000 iterations of randomly selected control city groups. Fifty cities are drawn from a pool of 374 cities that have a 1920 population between the 5th percentile (11,695) and 95th percentile (237,505) and a Black population share above the 25th percentile (0.48%).

We examine the nature of migration of Black people out of Tulsa with the following equations:

$$I_{icr}^{Migrate} = \alpha_c + \alpha_r + \beta(I_c^{Tulsa\,1920} \times I_r^{Black}) + \mathbf{X}'_{icr}\mathbf{\Gamma} + \varepsilon_{icr} \tag{2}$$

$$\begin{aligned}
I_{icr}^{Migrate} = &\; \alpha_c + \alpha_r + \alpha_c y_i^{1920} + \alpha_r y_i^{1920} + \beta_1(I_c^{Tulsa\,1920} \times I_r^{Black}) \\
&+ \beta_2(I_c^{Tulsa\,1920} \times I_r^{Black} \times y_i^{1920}) + \mathbf{X}'_{icr}\mathbf{\Gamma} + \nu_{icr},
\end{aligned} \tag{3}$$

where i denotes an individual, c their city of residence in 1920, and r their race. The sample comprises men who were residents of Tulsa or one of our Tulsa-comparison cities in 1920. The dependent variable $I_{icr}^{Migrate}$ equals one if individual i, with race r, who was living in city c in 1920 changed their city of residence between then and 1930 and zero otherwise. y_i^{1920} denotes a pre-Massacre characteristic of individual i, either occupational status or home ownership. $\mathbf{X}'_{crt}$ is a vector of individual-level covariates, measured in 1920: fixed effects for year-of-birth, marital status, and number of children. α_c denotes 1920 city-of-residence fixed effects and α_r denotes race fixed effects. Equation (3) also includes the interaction of y_i^{1920} with the race and city fixed effects.

Equation (2) examines whether outmigration was different for Black Tulsans after the Massacre relative to individuals living in other cities. This is given by the estimate of β. Equation (3) examines whether outmigration was selective. The primary coefficients of interest are β_1 and β_2. If we take the case where y_i^{1920} measures home ownership, then β_1 captures whether Black Tulsans who did not own a home in 1920 were more likely to leave after the Massacre relative to Black individuals living in other cities. β_2 informs us about the nature of selection and whether home ownership increased or decreased the incidence of Black Tulsans moving away after the Massacre.

The estimates of equations (2) and (3) are reported in Table 3 for each of the three samples of comparison cities. Panel A matches the set of cities from Table 1 (60-city sample), while Panel B and C match the samples used in Table 2 (94-city and 45-city samples). The results are generally stable across the three panels. Column 1 reports estimates of equation (2), which show that Black Tulsans were about 10 points more likely to migrate out of their location after 1920. This is not surprising given the accounts of victims leaving Tulsa after the Massacre. Turning to the question of whether the outmigration was selective, columns 2 and 3 report estimates of equation (3), where y_i^{1920} is 1920 home ownership, either measured for household heads or the full male

Table 3: Estimates for Migration Out of Tulsa, 1920–1930, Sample of Linked Men

	No Selection	HH Head Home Ownership 0/1 Selection	Family Home Ownership 0/1 Selection	ln(Occscore) Selection	White-Collar 0/1 Selection
	Dependent Variable: Migration 0/1				
	(1)	(2)	(3)	(4)	(5)
Panel A: 60-City Sample of Comparison Cities (from Table 1)					
Tulsa × Black	0.100***	0.134***	0.112***	−0.534***	0.089***
	(0.011)	(0.014)	(0.012)	(0.081)	(0.011)
Tulsa × Black × Selection		−0.018	0.022*	0.213***	0.247***
		(0.013)	(0.012)	(0.026)	(0.037)
Sample	All Males	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force
Dep. Var. Mean	0.32	0.30	0.32	0.32	0.32
Observations	757,833	494,293	757,833	674,805	706,007
Panel B: 94-City Sample of Comparison Cities (from Panel A of Table 2)					
Tulsa × Black	0.107***	0.156***	0.115***	−0.827***	0.100***
	(0.013)	(0.020)	(0.018)	(0.090)	(0.014)
Tulsa × Black × Selection		0.012	0.018	0.310***	0.216***
		(0.024)	(0.027)	(0.029)	(0.042)
Sample	All Males	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force
Dep. Var. Mean	0.38	0.35	0.38	0.38	0.38
Observations	232,456	157,349	232,456	204,437	213,346
Panel C: 45-City Sample of Comparison Cities (from Panel B of Table 2)					
Tulsa × Black	0.115***	0.161***	0.125***	−0.863***	0.106***
	(0.013)	(0.020)	(0.019)	(0.117)	(0.015)
Tulsa × Black × Selection		0.004	0.010	0.323***	0.232***
		(0.023)	(0.029)	(0.038)	(0.043)
Sample	All Males	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force
Dep. Var. Mean	0.41	0.38	0.41	0.41	0.41
Observations	105,046	71,119	105,046	92,857	96,660

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual. Following Bailey, Cole, Henderson and Massey (2020b), we use inverse propensity weights to adjust for observable differences between matched and unmatched people in our census-linked sample. The dependent variable is an indicator for migration, defined by an individual changing their city or county or state of residence between 1920 and 1930. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and have a valid occupational code (see the Appendix for further explanation). All specifications include fixed effects for age, marital status, number of children (if any), as well as race and city fixed effects. In columns 2–5, we include interactions between the specific 1920 variable of heterogeneity focus and both race and city fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

population. We see only weak evidence of selective outmigration. The coefficient on β_2 is positive in five of six cases but only marginally significant once. Thus, it does not appear that Black homeowners were particularly likely to flee Tulsa.

We do find evidence of positive selective outmigration when examining 1920 (log) occupation

score (column 4), which ranges from 1.38 to 4.39 and has a mean of 3.36 (and a median of 3.25). Focusing on the results in Panel A, we see that for Black Tulsans with the lowest occupation score (e.g., newsboys, farm laborers, etc.), the Massacre is associated with a 24.0 percentage point decrease in the likelihood of leaving Tulsa ($-0.534 + 0.213 \times 1.38 = -0.240$). For individuals with average occupational earnings (e.g., postmasters, brick masons, meat cutters, etc.), the Massacre is associated with a 18.2 percentage points increase in outmigration ($-0.534 + 0.213 \times 3.36 = 0.182$) and for those in the most skilled occupations (e.g., physicians, dentists, lawyers, etc.), this figure is 40.1 percentage points ($-0.534 + 0.213 \times 4.39 = 0.401$). Thus, following the Massacre, Black Tulsans in more skilled occupations were more likely to leave Tulsa, while those in less skilled occupations were more likely to stay. We come to the same conclusion when examining differential migration depending on whether a person had a white-collar occupation in 1920 (column 5). The estimated effect of the Massacre on migration is 8.9 percentage points for those not in white-collar occupations, compared to 33.6 percentage points for those in white-collar occupations.

We can more formally calculate the share of our estimated effects that could be due to selective migration. Consider the estimates for home ownership by household heads (column 2) reported in Panel B, which provide the strongest evidence of selection. (The sign of the estimates from column 2 of Panel A implies that selection explains no part of the effects found in Table 1.) They imply that Black Tulsan household heads who owned a home had a migration rate of 16.9% relative to 15.6% for those without a home. In 1920 Tulsa, the share of Black household heads who owned a home was 32.22%. Thus, ignoring the potential for selective in-migration, in the first decade, out-migration is predicted to have decreased the home ownership rate by about 0.3 percentage points to 31.9%.[28] Thus, selective migration only explains 8.7% of the estimated decline in this measure of home ownership due to the Massacre (column 1 of Panel A of Table 2). The same calculations for the estimates for white-collar status (column 5) show that selective outmigration accounts for at 36.2% of the estimated white-collar effect. Even here, we find that the majority of the adverse effects of the Massacre cannot be explained by selective outmigration and simple accounting.

It is possible that selective migration may have had other effects that resulted in Tulsa's economic decline beyond reducing the composition of homeownership or workforce occupations.

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[28]That is: $\frac{0.3222(1-0.169)}{0.3222(1-0.169)+(1-0.3222)(1-0.156)} = 31.9$.

For example, in auxiliary regressions reported in Table A16, we show that Black Tulsans who were employers (identified by the `classwkr` variable from IPUMS) were much more likely to leave Tulsa between 1920 and 1930. Losing much of Greenwood's best entrepreneurial talent and most-skilled business people likely had persistent, dynamic adverse effects on the economic prosperity of Tulsa's Black community.

5. Nationwide county-level estimates

A. *Baseline specification*

The next part of our analysis examines variation across all counties in the United States. There are four benefits to doing so. First, we can replicate our main results at a different geographic level (county rather than city). Second, national data allows us to account for another widespread event of racial violence at about this time, 1919's Red Summer. Red Summer was a series of racial riots, led by white individuals, that occurred in dozens of cities across the United States. While our city-level analysis, in general,[29] did not comprise control cities that experienced the Red Summer, a sample with all counties does. The third benefit of moving to the county level is that we can account for spillovers from Tulsa to other locations via informal information channels that might operate within kin networks, a feature we proxy for with surname similarity between counties. The fourth and final benefit of the county-level data is to extend our analysis by looking at longer-run outcomes for one of the home ownership measures, which is available at the county level in more recent Censuses.

We begin by estimating a standard difference-in-difference-in-differences regression where, for computational efficiency, we aggregate the data and perform the analysis at the county, race, and Census year level using a weighted least squares estimate. The estimating equation is as follows:

$$y_{crt} = \psi_{rt} + \theta_{ct} + \tau_{cr} + \beta_1 \left(I_c^{Tulsa} \times I_r^{Black} \times I_t^{Post} \right) + \mathbf{X}'_{crt} \mathbf{\Gamma} + \varepsilon_{crt}, \tag{4}$$

where c denotes U.S. counties, r race (Black, white, or other), and t Census years (1910–1940).[30] The dependent variable, y_{crt}, is the group mean of one of our outcomes of interest discussed

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[29]The 45- and 94-city samples included one Red Summer city (Gary, IN). The 60-city sample includes seven (Charleston, SC, Gary IN, Jacksonville, FL, Knoxville, TN, Macon, GA, Norfolk, VA, and Wilmington, DE. The estimates are nearly identical to what we reported in Section 4 if Red Summer cities are either omitted or an indicator (interacted with Post 1919 and a person being Black) is controlled for.

[30]Observations from Alaska and Hawaii exist for 1910 but no other years in our time period of interest (neither were admitted as statatets until 1959). We exclude the 1910 observations for those two states in our analysis.

above. I_c^{Tulsa} is an indicator that equals one if county c is Tulsa, I_r^{Black} is an indicator that equals one if the racial category r is for Black individuals, and I_t^{Post} is an indicator that equals one if decade t is after 1920. Our interest is in the coefficient on the interaction term β_1, which captures the difference in the outcome of interest for Black Tulsans after the 1921 Massacre. The relevant double interactions are absorbed by the fixed effects included in the specification: decade-race fixed effects ψ_{rt}, decade-county fixed effects θ_{ct}, and county-race fixed effects τ_{cr}. The equation also includes a set of covariates, denoted by $\mathbf{X}'_{crt}$, that are intended to account for the 1919 (Red Summer) race riots; namely, a triple interaction comprised of an indicator for the presence of a riot in the county, a post-1919 indicator, and an indicator for the race being Black individuals. We estimate equation (4) using weighted least squares (WLS) with weights given by the population of each observation. All standard errors are clustered at the county level.

Estimates of equation (4) without the Red Summer covariates are reported in Panel A of Table 4.[31] In columns 1 and 2, we report estimates examining home ownership as the dependent variable. The dependent variable in column 1 is the fraction of household heads who report owning their home. In column 2, the dependent variable is the fraction of individuals who live in a home owned by a family member. For both measures, we find a significant negative effect. The Massacre is associated with a decline in the share of male household heads who own their home by 4.1 percentage points and a decline in the share of men who live in a home owned by a family member by 4.5 percentage points. These estimates are qualitatively identical and quantitatively similar to the estimates from the individual-level regressions, where the comparison locations were restricted to a set of control cities.

We next turn to an examination of income as proxied by the natural log of the occupation score of those in the labor force. We find that the Massacre had an adverse effect on the occupational score (column 3), being associated with a decline of 2.4% for men. We also find a statistically significant decline in employment in white-collar occupations (column 4). For men, the Massacre resulted in a decline of white-collar employment by 2.2 percentage points, which is substantial given that the baseline share for Black male Tulsans was only 3.2 percent in 1920.

The estimates examining the effects on education are reported in columns 5–7 of Table 4 for boys, girls, and then all children, respectively. Consistent with the city-level estimates, we find evidence that the Massacre resulted in a sizeable decline in school enrollment for both boys and

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[31]In Appendix Table A14, we show the ownership and occupation results for men and women combined.

Table 4: Economic Effects of the Tulsa Massacre, All Counties 1910–1940

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1	In School 0/1	In School 0/1	In School 0/1
	Dependent Variable:						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Base Model							
Tulsa × Black × Post	−0.0414***	−0.0454***	−0.0239***	−0.0220***	−0.0512***	−0.0409***	−0.0465***
	(0.0070)	(0.0089)	(0.0056)	(0.0010)	(0.0075)	(0.0069)	(0.0071)
Panel B: Red Summer Model							
Tulsa × Black × Post	−0.0422***	−0.0468***	−0.0226***	−0.0223***	−0.0519***	−0.0415***	−0.0472***
	(0.0067)	(0.0084)	(0.0054)	(0.0009)	(0.0074)	(0.0069)	(0.0071)
Red Summer × Black × Post	−0.0445**	−0.0599***	0.0655***	−0.0123***	−0.0387***	−0.0292***	−0.0337***
	(0.0204)	(0.0219)	(0.0136)	(0.0029)	(0.0107)	(0.0071)	(0.0084)
Year-County FEs	Y	Y	Y	Y	Y	Y	Y
Race-County FEs	Y	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y	Y
Sample	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force	Males Ages 7-18	Females Ages 7-18	Full Ages 7-18
Dep. Var. Avg. for Black Tulsans, 1920	0.298	0.255	2.971	0.032	0.79	0.774	0.782
Observations	28,653	29,814	29,003	29,003	25,651	25,314	26,442

Notes: The table reports WLS estimates. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. The dependent variables, reported at the top of the table, are averages for each observation. Regressions are weighted by the relevant population in each county, racial group, and year. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). All specifications include year-race fixed effects, year-county fixed effects, and county-race fixed effects. Statistical significance is denoted by: $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

girls. The estimates suggest that the Massacre resulted in a decline of 4.7 percentage points (in the pooled sample), a sizeable effect relative to the pre-Massacre mean of 78.2 percent among Black children in Tulsa (i.e., a 6% decline).

In Panel B of Table 4, we include an indicator for the Red Summer counties, which we interact with a post indicator and a Black indicator. For all outcomes other than occupation score, we find evidence of negative effects of the Red Summer race riots of 1919. While the table permits a direct comparison of the magnitude of the effects of the two episodes of violence, such a comparison is difficult to interpret because of their timing relative to the decennial census years. The Red Summer riots occurred only a year before the next census (1920), while the Tulsa Massacre occurred 9 years before the next census (1930). Thus, the effects of the Massacre (in each subsequent period) are measured approximately 8 years later than for the Red Summer. Thus, we might expect the estimated Tulsa effects to be muted relative to the Red Summer effects, given the longer lag. With this caveat in mind, we find the magnitude of the Tulsa effects to be fairly similar for home ownership but more pronounced for the occupation and education outcomes compared to the Red Summer effects.

B. *Accounting for Potential Spillover Effects*

As State Senator Maxine Horner wrote in 2001, the survivors of the Massacre "emerged haunted." But the horrors of June 1921 echoed far beyond Tulsa. Carried first by national newswire coverage and then burned into the minds and imaginations of communities nationwide by accounts from survivors to their relatives and others in their networks, the Massacre was, potentially, a signal to Black communities across the United States about the potential risks of racial violence in locations where they prospered. Thus, it may have discouraged displays of economic success and even efforts made to achieve it – e.g., home ownership, occupational success, or educational investments. The response to the Massacre (or lack thereof) from federal officials demonstrated that in future massacres, the government was not going to intervene. The refusal of insurance companies to compensate Black policyholders for property destroyed during a "race riot" sent a similarly blunt message. With this motivation, we now turn to the possibility that knowledge of the Massacre may have affected outcomes for Black communities in other parts of the United States. We can also examine whether our within-Tulsa effects are affected by our accounting for potential spillovers.

We expect that locations with greater knowledge of the Massacre would have experienced a stronger warning and a more salient signal to Black people of what was possible in their community. There are many ways that news of the Massacre would have spread. We have already shown that Tulsa was front-page news across the country. But beyond the often sanitized or slanted newspaper articles, there were other ways the details of the horror were communicated: word of mouth, written letters, and even the dissemination of "real photo postcards," which were created using personal photos taken of the Massacre. The most famous of these featured the body of a Black man who was burned to death. The images shown in Figures 1b-1d were from the front of three real photo postcards. Images of the front and back of two others are provided in Appendix Figure A16. The postcards' theme of death and destruction is evident in their imagery, and the message conveyed by the *memento mori* cards was unambiguous: this could happen to any Black community in the United States.

Our strategy is to create a proxy measure of the intensity of family connections to Tulsa using the cosine similarity of last names between the county and Tulsa. This builds on the now-widely used strategy of using surnames to probabilistically identify extended families at the individual level (Ager et al., 2021, Ghosh et al., 2023, Althoff and Reichardt, 2024) or within county (Posch et al., 2024) to link kinship networks across counties. Counties with many of the same surnames as Tulsa (and in the same proportion) are likely to be more connected to Tulsa via family networks. We expect information about the Massacre, including details too painful to recount to a newspaper reporter, to have been communicated through these networks.

Using surname data from the 1920 Census, we count the number of people with each surname in each county c, creating a high-dimensional vector n_c where the sth dimension is the share of people in a given county c with a surname s. n_{Tulsa} are the surname shares in Tulsa. The cosine similarity measures the angle between vectors, and we focus on the cosine similarities between the vector for Tulsa and vector for each other county c:[32]

$$Similarity_c = \frac{\sum_{i=1}^{S} n_i \cdot n_{Tulsa}}{\sqrt{\sum_{i=1}^{S} n_i^2} \cdot \sqrt{\sum_{i=1}^{S} n_{Tulsa}^2}}.$$

The measure can take on potential values from zero to one, where a county with zero has a distribution of last names totally unlike Tulsa's, and a county with a one has a distribution of last names identical to Tulsa's. We create two measures of name similarity. The first limits

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[32]The connectivity formula is the same as Jaworski et al. (2024), who use cosine similarity of first names to measure cultural proximity between counties in the 19th-Century United States.

the surname sets to only Black individuals, capturing the connections between Tulsa and county c among the Black community. The second measure uses all individuals, regardless of race, capturing all potential connections between Tulsa and county c.

Ex-ante, it is unclear whether connections among Black individuals or connections among all individuals are what may matter. While it is natural to think that connections among Black people are all that was relevant, consider the example of the real photo postcards. These are likely to be sent and received by white individuals from Tulsa to people they know (including their extended family) elsewhere in the country. Thus, places more connected to Tulsa would be more likely to receive repeated exposure to the details of Tulsa through this source. This may then affect Black behavior if the postcards are posted publicly, discussed, or circulated. In short, connections and information transmission could also have occurred through individuals who are not Black.

Before estimating spillover effects, we first check the validity of the measure.[33] Given the role we know kinship networks played in migration during this era, particularly for Black people, we check whether we find evidence for a relationship between our measure of surname similarity and migration to or from Tulsa from 1910–1920 and 1920–1930. Using our linked samples, we estimate a gravity-model-inspired Poisson pseudo-maximum likelihood model with the number of migrants to or from Tulsa as the dependent variable. We control for bilateral geographic distance and state fixed effects. As we report in Appendix Table A18, we find that counties with a higher cosine similarity to Tulsa, which we interpret as having more family connections, have significantly more migration to and from Tulsa.

With the similarity spillover measure, we estimate the following equation:

$$
\begin{aligned}
y_{crt} \;=\; & \psi_{rt} + \theta_{ct} + \tau_{cr} + \kappa_1 \left(I_c^{Tulsa} \times I_r^{Black} \times I_t^{Post} \right) + \kappa_2 \left(Similarity_c \times I_r^{Black} \times I_t^{Post} \right) \\
& + \mathbf{X}'_{crt}\mathbf{\Omega} + \varepsilon_{crt},
\end{aligned}
\tag{5}
$$

where c continues to denote counties, t Census years, and r a racial group (either Black, white, or other). All variables are as defined above. As noted, $Similarity_c$ is our county-level measure of a county's connection to Tulsa County based on surname cosine similarity in 1920. For Tulsa, we assign $Similarity_c$ a value of zero so that κ_1 captures the total (direct) effect of the Massacre on Black inhabitants of Tulsa, and κ_2 captures the effect of the Massacre on locations other than Tulsa.

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[33]Finer details are provided in Appendix A3.

Estimates of equation (5) are reported in Table 5 (Panel A uses the similarity among Black individuals only and Panel B uses the similarity among all individuals). We find spillover effects that mirror the direct effects of the Massacre on Black Tulsans. For example, we find that counties similar or connected to Tulsa experience a decline in Black home ownership rates following the Massacre (columns 1 and 2). Scaling by the standard deviation of the cosine similarity measure (0.27 for Panel A and 0.18 for Panel B), it appears the home ownership effects of the Tulsa Massacre are about four to five times larger in Tulsa directly than in counties a standard deviation more connected to Tulsa.

Importantly, we find that our estimated direct effect of the Massacre, κ_1, not only remains robust but increases in magnitude. This is expected given the direction of the spillover effects: our baseline DDD estimates do not account for the adverse consequences to Black populations outside of Tulsa from the Massacre, which reduces the difference between the treatment and control countries (because control counties are also affected). We find that the estimated direct effect of the Massacre is roughly two to three times higher once spillovers are accounted for. These patterns are present for all outcomes except for the occupation score (column 3), possibly complicated by the missing information on occupations for Black Tulsans in the 1910 Census (see the discussion in Section 4).

We also undertake an alternative strategy that measures a county's familial connection to Tulsa via census linking. We link Tulsa residents from 1920 to earlier censuses (1850–1910) and then iteratively identify and link family and household members, identifying up to three degrees of connection to Tulsa in 1920.[34] We consider counties with more family links to Tulsa (across first, second, and third degrees) to be more connected. Using this census-linking-based measure, rather than our surname similarity measure, yields similar spillover effects (Appendix Table A17).

Another dimension of occupational choice

Historians have argued that one strategy employed by Black Americans was to select into occupations that had portable skills, which provided increased outside options in case they needed to move. This occupational adjustment was a strategic response to the threat of racial violence, as geographically concentrated occupations would severely limit relocation options if flight became

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[34]To study the consequences of slave trade wealth in 19th Century Britain, Heblich, Redding and Voth (2022) reconstruct family trees in a related way.

Table 5: Economic Effects of the Tulsa Massacre with Surname Similarity Spillovers, 1910–1940

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1	In School 0/1	In School 0/1	In School 0/1
			Dependent Variable:				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Panel A: Cosine Similarity (Black)				
Tulsa × Black × Post	−0.1240***	−0.1514***	0.0790***	−0.0349***	−0.0879***	−0.0813***	−0.0858***
	(0.0112)	(0.0121)	(0.0084)	(0.0019)	(0.0084)	(0.0079)	(0.0079)
Cosine Similarity (Black) × Black × Post	−0.1145***	−0.1480***	0.1419***	−0.0177***	−0.0529***	−0.0578***	−0.0564***
	(0.0179)	(0.0197)	(0.0129)	(0.0031)	(0.0126)	(0.0117)	(0.0118)
			Panel B: Cosine Similarity (All)				
Tulsa × Black × Post	−0.1343***	−0.1684***	0.0810***	−0.0325***	−0.0988***	−0.0964***	−0.0992***
	(0.0145)	(0.0163)	(0.0140)	(0.0032)	(0.0113)	(0.0104)	(0.0105)
Cosine Similarity (All) × Black × Post	−0.1232***	−0.1641***	0.1390***	−0.0139**	−0.0648***	−0.0752***	−0.0716***
	(0.0212)	(0.0238)	(0.0184)	(0.0043)	(0.0159)	(0.0144)	(0.0147)
Year-County FEs	Y	Y	Y	Y	Y	Y	Y
Race-County FEs	Y	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y	Y
Sample	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force	Males Ages 7-18	Females Ages 7-18	Full Ages 7-18
Dep. Var. Avg. for Black Tulsans, 1920	0.298	0.255	2.971	0.032	0.79	0.774	0.782
Observations (Panel A)	27,138	28,129	27,403	27,403	24,311	23,993	25,046
Observations (Panel B)	28,642	29,802	28,991	28,991	25,641	25,304	26,432

Notes: The table reports WLS estimates. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. The dependent variables, reported at the top of the table, are averages for each observation. Regressions are weighted by the relevant population in each county, racial group, and year. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). All specifications include year-race fixed effects, year-county fixed effects, and county-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

necessary. The post-Massacre increase in Black reverands and teachers (both portable occupations) observed in the City Directory data is consistent with historical accounts. We now more formally test whether there was a systematic shift to more portable occupations due to the Tulsa Massacre. Unlike our baseline outcomes of interest – e.g., homeownership, occupational quality, or education – specialization in portable occupations is not directly associated with economic or social well-being. However, given the prominence of historical narrative, we check for it here.

We measure a portable occupation (one that provides outside options) using the Herfindahl-Hirschman Index (HHI) of occupational concentration across counties. The lower the HHI of a given occupation, the more geographically dispersed it was and, thus, the more portable it might have been. Since occupations were highly race-dependent at the time, we calculate a race-specific HHI measure that captures the concentration of occupations in 1920, just before the Tulsa Massacre. According to the race-specific measure, among the 253 occupations, teacher is the third most portable and clergymen the fourth. We estimate equation (4), with either the population's average HHI or share of the population with occupations within the top 5th, 10th, 25th, or 50th percentile of concentrated occupations. The estimates, reported in Appendix Table A19, show that the Massacre caused Black Tulsans to specialize in occupations that were less geographically concentrated – i.e., more geographically dispersed and, thus, more portable (columns 1–5). We also test whether the Massacre had similar effects on counties more connected to Tulsa. Estimates for occupational concentration allowing for spillovers using equation (5) are reported in Appendix Table A20. We find evidence for spillover effects. The Black community in counties more connected to Tulsa, after the Massacre, specialized in less concentrated, more portable occupations (columns 1–3).

The findings might also help explain the somewhat puzzling results in Table 5, column 3, which suggest that after Tulsa, African Americans had higher occupation scores. Given the challenges of measuring occupation scores across time and space (and race), the occupation results may be affected by the sorting of Black people into portable occupations. Across occupations, the status measure is positively related to how portable an occupation is. Thus, it is possible that while the Massacre led to occupational downgrading, it also created incentives to move into portable occupations, which tended to be of slightly higher status.[35]

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[35]This mirrors our findings within Tulsa using the City Directory data. We found occupational downgrading, but also a strong increase in reverends and teachers, two occupations that were highly portable and also white collar. The movement to these occupations masked the occupational downgrading that occurred.

We examine this further by estimating the effects of the Massacre on having a portable and non-white-collar occupation. The estimates, reported in column 6 of Appendix Tables A19 and column 4–6 of Appendix Table A20, show that after the Massacre, there was a significant increase in the share of Black people with non-white collar but portable occupations in both Tulsa and counties more connected to Tulsa. The magnitude of the direct effect implies a 5% increase relative to the baseline share in 1920 for Black Tulsans.

C. *Long-Term Effects of the Massacre on Home Ownership, 1910–2000*

To this point, we have focused on the effects of the Massacre until 1940. The last exercise that we undertake is to examine the longer-term effects of the Massacre on home ownership. For the post-1940 census years, we do not have access to the micro-Census. However, we can use county-level data by race from the NHGIS, which are available for 1980, 1990, and 2000. The NHGIS includes data on the number of household heads living in owned housing units and the number living in rented housing units, broken down by county and race. We use these data to construct a measure of the home ownership rate (owners divided by the sum of owners and renters).[36] While there are some slight differences between the post- and pre-1940 Census measures, the full series provides measures that are comparable for 1910, 1920, 1930, 1940, 1980, 1990, and 2000, allowing us to examine longer-term effects.

We begin the analysis by extending our panel to include 1980, 1990, and 2000. The post-1940 data do not allow us to focus specifically on the sample of men. Therefore, to maintain consistent definitions across years, we report estimates for the full sample, where the dependent variable is the share of household heads who are homeowners. Intuitively, this should be nearly identical to the results if we restrict our sample to men, since most household heads are men in this period. We show this is the case for the 1910–1940 data (where we can observe gender) in Appendix Table A15. The results are identical if we restrict the sample to men only, which is not surprising since 99.3% of the household heads are men.

To obtain a sense of the persistence of the effects until 1940, we estimate a dynamic equation that allows the post-treatment effects of the Massacre to differ in the shorter-run (1930 and 1940)

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[36]For details, including the differences between the pre- and post-1940 variable construction, see the Appendix.

Table 6: Estimates for HH Head Home Ownership, 1910–2000

	Dependent Variable: Average of HH Head Home Ownership			
	All Counties	60-City Counties	94-City Counties	45-City Counties
	(1)	(2)	(3)	(4)
Tulsa × Black × I[1930-1940]	−0.040***	−0.001	−0.020**	−0.038***
	(0.007)	(0.009)	(0.010)	(0.006)
Tulsa × Black × I[1980-2000]	−0.130***	−0.053***	−0.065**	−0.071**
	(0.014)	(0.012)	(0.026)	(0.029)
Red Summer × Black × I[1920-1940]	−0.035	−0.020	−0.056***	−0.108***
	(0.024)	(0.038)	(0.020)	(0.020)
Red Summer × Black × I[1980-2000]	−0.011	0.031	−0.019	−0.039
	(0.031)	(0.035)	(0.033)	(0.051)
Year-County FEs	Y	Y	Y	Y
Race-County FEs	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y
Sample	HH Heads	HH Heads	HH Heads	HH Heads
Dep. Var. Avg. for Black Tulsans, 1920	0.296	0.296	0.296	0.296
Observations	54,756	1,214	1,828	884

Notes: The table reports WLS estimates for the sample of household heads. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. The dependent variable is the average household head home ownership for each group. Regressions are weighted by the relevant population in each county, racial group, and year group. All specifications include year-race fixed effects, year-county fixed effects, and county-race fixed effects. We show the medium-run results (for years 1930-1940) separated by the long-run results (for years 1980-2000). We also show results across different sample options, as denoted by the different columns. Column (1) includes all counties in the sample, column (2) limits to the counties that correspond to the baseline 60-city sample, column (3) limits to the subset of counties that correspond to 94-city sample, and column (4) limits to the subset of counties that correspond to the 45-city sample. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

and longer-run (1980, 1990, and 2000):

$$y_{crt} = \psi_{rt} + \theta_{ct} + \tau_{cr} + \kappa^{MR}(I_c^{Tulsa} \times I_r^{Black} \times I_t^{Post\,MR}) + \kappa^{LR}(I_c^{Tulsa} \times I_r^{Black} \times I_t^{Post\,LR})$$

$$+ \mathbf{X}'_{crt}\mathbf{\Omega} + \varepsilon_{crt}, \tag{6}$$

where all variables are as defined prior, except now t denotes the larger set of Census years: 1910, 1920, 1930, 1940, 1980, 1990, and 2000, and $I_t^{Post\,SR}$ is an indicator that equals one if year t is 1930 or 1940 and $I_t^{Post\,LR}$ is an indicator that equals one if year t is 1980, 1990, or 2000.

The estimates of equation (6) are reported in Table 6. We find that home ownership for Black individuals living in Tulsa declines following the Massacre in both the shorter-run (1930–40) and the longer-run (1980–2000). This effect does not attenuate over time and, in all specifications, actually increases. We also estimate negative effects of the Red Summer riots, although the estimates appear to be less robust, often underpowered, and to die out in the longer run. In

terms of magnitude, the estimated effect of a Red Summer event is usually smaller than for the Tulsa Massacre, consistent with the Tulsa Massacre being one of the most devastating and consequential acts of racial violence in U.S. history.

We also examine the fully dynamic version of equation (6), where we estimate the effect of the Massacre in each period rather than a medium and long-run average. We do the same for the Red Summer riots as well. The estimates are summarized in Appendix Figure A17, which reports the estimated coefficients and 95% confidence intervals. A benefit of the strategy is that we can check for pre-trends, which do not appear to be present. Consistent with the estimates from Table 6, we see an immediate short-run effect that is large in 1930 and then grows slightly in 1940. The longer-run effect appears to grow between 1980 and 2000, the last period in the sample.[37]

6. Conclusions

We have studied the effects of the 1921 Tulsa Massacre, an event that leveled the prosperous Black community of Greenwood. The Massacre was uniquely devastating in both scale and national significance. Using newswire data, we demonstrated the widespread coverage of the Massacre, with over 300 local newspapers picking up the Tulsa story. The most frequently featured newswire about Tulsa ranked in the top percentile of all coverage in 1921. Further, no single month during the 1919 Red Summer had more race riot coverage than June 1921, underscoring Tulsa's dark and exceptional place in American history. The destruction of thirty-five square blocks of Black wealth – combined with the failure of insurance companies to compensate victims and the government's refusal to intervene – sent a clear signal to Black communities nationwide about the precarity of their economic achievements under Jim Crow.

We began our analysis with the digitization of Tulsa's annual city directories from 1916 to 1925, which list businesses and residents along with their race and occupations. Using OCR to digitize thousands of directory entries, we find that, consistent with historical accounts, Black-owned businesses in Tulsa experienced rapid growth before 1921, outpacing white-owned establishments. However, following the Massacre, we observe sharp declines in both the number of Black-owned businesses and the occupational status of Black workers – patterns not observed for white businesses or workers. The directory findings offer short-run evidence of how racial violence immediately disrupted economic progress in Tulsa's Black community.

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[37]Estimates using the more restricted set of control counties are similar (Appendix Figures A18–A20).

Our main analysis uses a place-based triple-differences approach to estimate the effects of the Massacre on the Black population of Tulsa. The identification strategy compares Black individuals to those of other races, within Tulsa versus elsewhere, before versus after the Massacre. We find that the Massacre is associated with a decline in home ownership, lower occupational status, and reduced school enrollment. The effects are robust across a range of alternative strategies for selecting comparable control cities and to the inclusion of other racially violent episodes during the same period, namely, the Red Summer riots of 1919, which we also find had adverse economic effects for Black Americans. Extending the analysis past 1940 and through 2000, we find that the effects on home ownership persist and intensify over time.

Consistent with historical accounts, we also find evidence of selective outmigration following the Massacre, with Black Tulsans in white-collar professions more likely to leave. While these compositional changes are quantitatively modest relative to our triple-difference estimates, the loss of skilled and entrepreneurial individuals may have contributed to longer-run adverse effects through local dynamic spillovers – particularly in home ownership, where the estimated effects grow over time.

Although the primary effects of the Massacre were concentrated in Tulsa, we also find evidence of spillover effects felt by Black communities elsewhere in the United States. In counties with stronger kinship ties to Tulsa, home ownership and educational outcomes among African Americans declined after the Massacre, effects consistent with the Massacre serving as a cautionary signal about the vulnerability of Black prosperity under systemic racial threat.

Our results contribute to a deeper understanding of the long-run effects of racial violence and economic insecurity. The persistence of these effects is especially relevant in light of the reparations initiative recently announced by the City of Tulsa, which aims to support long-term recovery for the Black community through investments in housing, education, and community infrastructure. The initiative targets precisely the economic domains our study identifies as most adversely affected, and, thus, has the potential to help mitigate the enduring consequences of the episode of racial violence.

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Online Appendix

"After the Burning: The Economic Effects of the 1921 Tulsa Race Massacre"

(Not for Publication)

A1. Archival Data for Background Descriptives

To supplement our complete count census data, we also use archival data on Massacre property loss and casualties.

Loss of Property

Insurance data are from from the Oklahoma Historical Society's Tulsa Race Riot Commission Collection. The claims for damages to residential buildings generally range from $22,074 to $29,432 ($1,500 to $2,000 in 1921 USD), and the Red Cross reports 1,256 destroyed homes. We multiply the damage amount by the number of houses to arrive at $27,724,944 to $36,966,592 in residential damage ($1,884,000 to $2,512,000 in 1921 USD). Following the same procedure, there were 529 looted homes with personal property claims generally ranging from $5,886 to $8,830 ($400 to $600 in 1921 USD), giving $3,113,694 to $4,671,070 in property damages ($211,600 to $317,400 in 1921 USD). There were 39 destroyed businesses with damage claims ranging from $44,148 to $147,160 ($3,000 to $10,000 in 1921 USD), giving $1,721,772 to $5,739,240 in business damages ($117,000 to $390,000 in 1921 USD).

The total amount of claims reported in the Oklahoma Historical Society's records is $21,643,064 ($1,470,712 in 1921 USD). This amount is lower than our estimate since we take into account the total number of buildings damaged, as reported by the Red Cross, even when a claim was not filed. Additionally, these are estimates of insurance claims, not necessarily the worth of the property. There are several instances where the property's worth is listed along with the claim amount. In these instances, the claim amount is usually about half of the original worth of the property.

Deaths

We compiled our list of those killed from four sources, all of which we digitized from the Oklahoma Historical Society's Tulsa Race Riot Commission Collection. The first is the table of 39 confirmed causalities (killed) according to death certificates, which is referenced as "Table 1: Tulsa Race Riot Deaths" in the Oklahoma Commission Report. The second is "Race Riot Dead" by Dick Warner, which is a listing of people proven dead by cemetery burial records or funeral home records. The third is "Computations as to the Deaths from the 1921 Tulsa Race Riot," also

written by Dick Warner, which lists individuals who were issued death certificates or were listed as dead in funeral home records, legal claims, or newspapers or were mentioned dead by family or neighbors. Lastly, we use the "A working list of the confirmed victims of the riot compiled by Dick Warner, Dr. Scott Ellsworth, and Dr. Clyde Snow," which includes names from death certificates, funeral home records, newspapers, court case petitions, and interviews.

These four sources identify deaths based on the following distinct kinds of primary sources: death certificates (issued by the City of Tulsa), funeral records (from Stanley & McCune and Mitchell-Flaming), cemetery burial records, legal claims, newspaper articles,[38] and interviews.[39] The list of those killed and the source of information is provided in Appendix Table A1.

Injuries

Since no comparable listing of individuals injured during the Massacre has been made available by the Oklahoma Historical Society, we relied on listings by the June 1, June 2, and June 3, 1921 editions of Tulsa World, the June 1 and June 2, 1921 editions of the Tulsa Tribune and the 1921 Red Cross report to assemble a list of individuals admitted to hospitals due to Massacre-induced wounds.[40] The final list, which contains 98 injured individuals, is reported in Appendix Table A2.

Property Losses

We compiled our list of those who lost property from three sources. First, we used the "Database of damage claims filed through the City of Tulsa by Blacks and Whites after the riot," which we digitized from the Oklahoma Historical Society's Tulsa Race Riot Commission Collection. This source includes names and amounts of losses in dollars. Second, we use a partial list of financial and property losses in the Massacre from the book "Race Riot 1921" by Mary E. Jones Parrish

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[38] The main newspapers reporting on mortalities were the June 1, June 2, and June 3, 1921 editions of Tulsa World, the June 1 and June 2, 1921, editions of the Tulsa Tribune, the June 1, 1921 edition of the Guthrie Daily Leader, and the June 1, 1921 edition of the Muskogee Phoenix.

[39] We cross-validated these listings, which have been compiled by the Oklahoma Historical Society, against a listing of Tulsa Race Riot victims compiled by I. Marc Carlson, a librarian at the University of Tulsa. All names in our listing were also in his listing.

[40] The 1921 Red Cross Disaster Relief Report summarizes the impact of the Tulsa Massacre on the health and economic well-being of the local population, and includes the names, ages, and biographical details of 10 patients who were in hospital on December 30th, 1921 due to riot-induced wounds. Although the American Red Cross paid for the hospitalization of 183 (48 black and 153 white) individuals who suffered riot-induced wounds, it does not provide the names of those who were discharged before the publication of the report. As a result, our count necessarily represents a lower bound on the true number of individuals injured by the Massacre.

(we digitized pages 115–126). The list includes losses in dollar amounts by addresses, businesses, and people. Third, and largest, we use the "Cases Filed Database" as compiled by OHS during the preparation of the 2001 report on the Massacre.[41] This source includes the plaintiff's names, addresses, defendants, property loss details, and an amount in dollars.

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[41]Larry O'Dell shared a digitized version of this database with us.

A2. Data: Analyses with the Tulsa City Directory

Digitizing the Directory

For the city directory analysis, we construct two novel datasets by digitizing City Directories for Tulsa from 1916 to 1925, published annually by Polk-Hoffine Directory Co. For additional analysis, we also digitize the City Directory for 1910. From each year's City Directory, we use two sections: 1. List of "Business Firms" and "Private Citizens", indexed in the city directory as "Alphabetical List of Names" and 2. "The Classified Business Directory". The primary difference between the two is that the latter only contains the names of businesses.

For this digitization, we primarily rely on Optical Character Recognition (OCR), which is a technique that converts text in images into machine-readable (and parsable) text. Each scanned image is a page of a year's city directory. We OCR the text from all the images from a city directory and compile them, which gives us a dataset with all the information from that year's city directory. This process is then repeated across all years from 1916 to 1925.

Before these images are fed into the OCR engine to be processed, they first need to be formatted uniformly to ensure consistency across all pages and all directories, so that the quality of text captured from them is the same. A typical page in the sections we use has advertisements on all four borders, with information about individuals and/or businesses in the center. These advertisements can potentially add an element of randomness to the OCR process, since they are not consistent throughout the directory, and can therefore interfere with the digitization of the list of individuals and businesses. Therefore, in order to only retain the center and remove the advertisements, we automate the cropping of each image based on some of the page features, like the presence of horizontal and vertical lines.

To construct the individual-year-level dataset, each page in the 'Alphabetical List of Names' section for each year is then fed into Tesseract, the OCR engine of our choice. Each of these images contains a partition along the middle of the page, with lines corresponding to individuals and businesses on both sides. We split the page along this vertical line, and then OCR the words on either side. When we compile this output from every page from a year's city directory, we get a dataset of parsable text, where each entry or line in the dataset corresponds to an individual or business in a year in Tulsa. A typical entry of text from the City Directory takes the following form: 'Aaronson David M lab b 316 E 20th'.

To create the dataset we use for our analyses, we further parse these entries using certain features in the text like capitalization and punctuation. From each entry, we extract an individual's name, partner's name, race, occupation, and place of stay. Name, partner's name, race, occupation, and place of stay is the order of the columns in our dataset, which matches the order of these variables in every city directory entry. We start by extracting an individual's name. A name typically contains two or three words – a last name, a first name, and often a middle name – the first letter for all of which is capital. We use this capitalization criterion to create a regular expression and extract the name from an entry, like 'Aaronson David M' or 'Abrams Joseph'. For some city directories, the names in all entries end with a comma, which combined with the capitalization criterion, makes the extraction of names more convenient. For instance, 'Minson Till,' in the 1921 City Directory. Since we'd like the dataset to be at an individual-level, we're also able to use this criteria for names to separate individuals and businesses. This is because business names are usually longer than three words and/or are capitalized differently, like 'NORTH SIDE FURNITURE CO' or 'NORTHEASTERN OKLAHOMA Chamber of Commerce' in the 1922 city directory.

If an individual is married, the partner's name would appear alongside the husband's in a bracket, like so: Abrams James W (Minnie) r 1527 S Cincinnati av. Here, to extract the partner's name, we simply look if there is text after an individual's name in brackets. We process the race of an individual next. The indicator for race is only present for colored individuals, as a (c) after their name in their entry. An entry for a colored individual takes the following form: 'Abrams Joseph (c) porter rms 536 N Elgin av'. Since OCR is occasionally prone to errors, a lot of sanity checks were implemented to ensure the accuracy of the race of individuals. For colored individuals who are married, the indicator for race and partner's name appears in one of these two formats: (c) (Partner's Name) or (c; Partner's Name). For instance, 'Bagby Wm (c) (Mamie)' in the 1922 city directory or 'Bruce James (c; Ester)' in the 1923 city directory.

We process the occupations next, which consistently occur in all lowercase letters, as one or two words after an individual's race. Occupations also often appear as abbreviations in case of longer titles, like 'steno' for stenographer, or 'tel opr' for telegraph operator. These abbreviations are listed at the beginning of every city directory under an "Abbreviations" list. We used these lists from every city directory to create a dictionary that maps these abbreviations to occupations. The dictionary also contains occupations that appear as complete words. This completed dictionary

of occupations that appear in the City Directory was then manually matched to corresponding HISCO Codes, OCC Codes, and OCC Scores from 1950. This is what is used to calculate the Mean OCC Scores and our definition of White-Collar occupations (Occupation Codes < 100). Finally, to process the places of stay, a similar dictionary is created but with abbreviations like 'b' for boards, or 'rms' for rooms.

The city directories underwent another format change in 1920, which reappeared in 1923, 1924, and 1925. With this change, if two consecutive entries in the city directory have the same last name like Doe Jane and Doe John, they'll show up as Doe Jane and " John. This " (double quotation mark) indicates that the last name in this entry is the same as that of the previous entry. Therefore, when we process these particular city directories, we include a function in the code that carries the last names forwards. As another sanity check, we had two RAs manually work through a sample of entries from the 1920 and the 1923 City Directory, to ensure the accuracy of the OCR.

Lastly, to create the business-level dataset, largely the same process as described above was followed with the Classified Business Directory. The primary difference in the individual directory and the business directory is that the latter contains an additional sub-header for the category of business. This includes categories like Barbers, Insurance Agents, Vulcanizers, and everything in between. When processing the business directories, we created an indicator variable based on certain text characteristics to exclude these business categories from our list of businesses. In order to do this, we exploited the fact that these business categories were always centrally aligned, completely uppercase, and often beginning with an asterisk (*). With the business directories, we have a race indicator exactly as that in the individual directories, using the (c), but with no wife's name, occupation, or place of stay variables.

A3. Data: Analyses with the U.S. Census

Outcomes of Interest

We use complete count U.S. census microdata from 1910, 1920, 1930, and 1940 (Minnesota Population Center, 2019). These datasets include detailed information at the person-level. We describe below the outcome variables of interest in this draft.[42]

HH Head Home Ownership

For household head home ownership, we require that a respondent report living in an owned home and also report being the household head. We assume household heads of owned homes are the people who own the homes. For the household head home ownership measure, we restrict the sample to household heads, so that the variable is missing for all non-household heads.

Family Home Ownership

We want to capture whether someone in a person's family owns their home. In its raw form, the ownership variable sometimes only shows whether someone in the household head's family owns the home, meaning a servant can have an "owned" value for her home even though it is really her employer who owns the home.

The family home ownership measure we construct excludes these non-primary-family members by only counting individuals living in an owned home if the home is owned by someone living there, and that owner is a family member. On a technical level, under our definition, a person owns a home if and only if they are marked as living in an "owned home" in the census and they are in the primary family unit.

Our slight alteration to this variable makes it consistent over time.[43] The way the home ownership variable was assigned to non-family household members differs based on census year. For instance, in 1930, the questionnaire instructions differentiated between family units in the same household. In 1940, they did not.

As such, we make the variable equivalent of the question "does someone in your family own the house you live in?" to get at a *person-level* measure of "home ownership" rather than a

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[42]Highest grade of schooling and educational attainment are also variables of interest but are only available in 1940.

[43]See the questionnaire text at: `https://usa.ipums.org/usa-action/variables/OWNERSHP`

household-level measure of home ownership. Our home ownership variable is a binary variable for each person that is the same at the family level.

Home Ownership, 1980, 1990, 2000

In addition to the micro-census data, we use county-level data on home ownership from the NHGIS to examine longer-run impacts in the years 1980, 1990, and 2000. We use the following NHGIS data files on tenure: nhgis0011_ds104_1980_county, nhgis0011_ds104_1990_county, and nhgis0011_ds104_2000_county. These data and corresponding codebooks can be downloaded from `https://data2.nhgis.org/main`, with additional documentation and source information at `https://www.nhgis.org/documentation/tabular-data`.

To construct a measure of county-level household head ownership by race, we rely on the counts of householders who live in an owner-occupied housing unit and householders who live in a renter-occupied housing unit (for example, variables CY001 through CY010 in the 1980 data). A "householder" is 'The person, or one of the people, in whose name the home is owned, being bought, or rented. If no such person is present, any household member 15 years old and over can serve as the householder. Two types of householders are distinguished: a family householder and a nonfamily householder. A family householder is a householder living with one or more people related to them by birth, marriage, or adoption. The householder and all people in the household related to him are family members. A nonfamily householder is a householder living alone or with nonrelatives only.

The variables draw from the universe of occupied housing units and are available for 1980, 1990, and 2000. We take the number of owner-occupied housing units in the county as the numerator and the number of owner-occupied housing units plus the number of renter-occupied housing units as the denominator. To create the ownership measure for Black individuals in 1980, our calculation is C7Y002 / (C7Y002 + C7Y007). For white individuals, it is C7Y001 / (C7Y001 + C7Y006). The NHGIS describes these count variables as the number of units, which we take to be the same as the number of householders.

As with the complete-count measures, we combine other races into one category so that the races we analyze are Black, white, and other. For example, in the 1980 data, we take the sum of American Indian, Eskimo, and Aleut owners (C7Y003), Asian and Pacific Islander owners (C7Y004), and Other owners (C7Y005) to create the other category.

The ownership share for the other category is calculated as (C7Y003+C7Y004+C7Y005) / (C7Y003+C7Y004+C7Y005+C7Y008+C7Y009+C7Y010).

We use the population of householders as weights in the regressions. As with the complete count data, weights vary by census year, county, and racial group.

Our measure of home ownership in the NHGIS corresponds closely with the household head ownership measure in the complete count census (described above). Both samples restrict the analysis to householders (in the NHGIS) or household heads (in the complete count census), and calculate home ownership rates at the year, race, and county level. Since the NHGIS does not include a gender breakdown, we append the NHGIS data to the complete count data and report estimates using this dataset.

Occupation-Based Income Proxy

We use a measure of income constructed based on occupation responses, called the occupational income score, `occscore`. The variable "assigns each occupation in all years a value representing the median total income (in hundreds of 1950 dollars) of all persons with that particular occupation in 1950." The measure converts occupational responses in the census to median income values. IPUMS documentation explains that "[f]or years prior to 1940, information on occupation was collected for persons who had not permanently retired," but, in 1940, "only persons in the labor force responded to the occupation inquiry." Therefore, to "construct a fully compatible universe," we follow IPUMS recommendations and restrict the sample to persons currently in the labor force with valid occupational responses. For further details, see the data description located at: `https://usa.ipums.org/usa-action/variables/OCCSCORE`.

White-Collar Occupations

We also capture if someone reports a professional or technical job in the census, which we call white-collar jobs. Specifically, these are the occupations for which the occ1950 variable in IPUMS has a value less than 100. For reference, the ten most common white-collar occupations in Tulsa in the 1920 census, broken down by race, are reported in Appendix Table A3. We restrict all regressions using the white-collar variables to those individuals who report being in the labor force, are 16 and older, and have a valid occupational score.

Labor Force Participation

We also measure labor market participation and sometimes restrict our sample to individuals in the labor force. The 1910–1930 and 1940 labor force definitions are different within the census.[44] From 1910 to 1930, "participation is defined as reporting any gainful occupation."[45] In 1940, "participation follows the modern labor force definition," meaning "within a specific reference week, having a job from which one is temporarily absent (e.g., on vacation), working, or seeking work." As such, in the census data, people can be in the labor force, but have an invalid occupational response. By invalid, we mean that their `occ1950` value is one of the following: not classified, non-occupational response, occupation missing/unknown, or N/A (blank). Non-occupational responses include: Keeps house/housekeeping at home/housewife, Imputed keeping house (1850–1900), Helping at home/helps parents/housework, At school/student, Retired, Unemployed/without occupation, Invalid/disabled w/ no occupation reported, Inmate, New Worker, Gentleman/lady/at leisure, Other non-occupational response. A respondent can also have a valid occupational response, but not be coded as being in the labor force. To create a consistent definition across all years in our sample, we measure labor force participation using a variable that equals one if an individual is in the labor force and has a valid occupational response.

In our analysis, we restrict the sample to individuals who are 16 years or older. This is aimed at removing mechanical effects due to children not being in the labor force.[46]

Using Linked Census Data to Examine Selective Migration

In Section 4.C, we use linked Census data to study selective migration between 1920 and 1930. Two sources are used. The first is the Census Linking Project (CLP), which comprises a dataset of links between each pair of complete count U.S. Censuses from 1850 to 1940 (Abramitzky et al., 2021a). We use the first set of links from the project for 1920 to 1930, which are generated via the "ABE algorithm," described in detail in Abramitzky et al. (2021b). Links are identified according to matches on first name, last name, state of birth, and year of birth across two Censuses. To minimize false-positive linkages, we use only the "exact conservative" links, which require first

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[44]See the discussion about comparability at: https://usa.ipums.org/usa-action/variables/LABFORCE

[45]On a technical level, this means you have a valid occupation response for `OCC1950`, which must be from 0 to 970.

[46]In 1910-1930, the universe of the labor force question was those 16+. In 1940 the universe was 14+. As such, restricting to the 16+ sample also provides better consistency in the sample of interest over time.

and last names to match exactly and require potential matches to be unique within a five-year age band around the year of birth (within $\pm$ 2 years of the birth year implied by age as recorded in the Census).

The second source is the IPUMS Multigenerational Longitudinal Panel, version 1.2 (MLP), which comprises a new set of crosswalks between pairs of adjacent Censuses from 1900 to 1940 (Helgertz et al., 2024, Ruggles et al., 2024). The links differ from those produced by the ABE algorithm in several respects. Most importantly, they are probabilistically generated via a machine-learning regression model calibrated with hand-linked training data. Also, unlike most historical record linkage approaches, the model augments time-invariant individual-specific characteristics (name and birth information) with household and extended individual characteristics. Linked women are included in the MLP dataset, but only insofar as they are matched with a linked man in both Censuses. They do not, therefore, represent unique household links across Censuses. For a complete description of the approach, see Helgertz, Price, Wellington, Thompson, Ruggles and Fitch (2022). To mitigate bias that could arise in our empirical analysis from linkage error (Bailey et al., 2020b), we follow Bailey, Cole and Massey (2020a) and create custom weights for our linked samples. The weights come from a probit model predicting whether or not we link a given record from 1920 to 1930 as a function of the following 1920 characteristics: first and last name length, first and last name commonness, age, race, family size, number of children in the household, marital status, birthplace, size of place, farm status, urban status, nativity, state, and city, following Feigenbaum and Tan (2020).

Tulsa Effect Spillovers

As we show in Section 5.B, the counties most "connected" to Tulsa via surname similarity appear to also be affected by the aftermath of the racial Massacre. In this appendix section, we provide validation of our surname similarity measure using migration data, and we show robustness to an alternative measure of social connection constructed with census linking.

Validating the Surname Similarity Measure

If the measure we construct of surname similarity represents familial connections between Tulsa and other counties, we should expect that the measure is correlated with other measures of social connection. Following Jaworski et al. (2024), we test to see if surname similarity predicts migration

to or from Tulsa between 1910 and 1920 or 1920 and 1930.[47] We do this by regressing the number of people who moved from Tulsa to other counties or from other counties to Tulsa on surname similarity, controlling for the log of the distance between Tulsa and the other county and state fixed effects. We use a pseudo-Poisson regression because the dependent variable is a count of people moving.

As we show in Appendix Table A18, whether we are predicting total migration, Black migration, or white migration, we find that surname similarity is a strong predictor: the larger the cosine similarity in surnames between Tulsa and the other county, the more migration. This is true both for migration from Tulsa (Panel A) and to Tulsa (Panel B). We do this both for 1910 to 1920 (before the Massacre; columns 1 to 5 in both panels) and for 1920 to 1930 (after the Massacre; columns 6 to 10 in both panels). The point estimates are statistically significant in 19 of the 20 specifications (the one exception is predicting Black migration out of Tulsa between 1910 and 1920 using the overall cosine similarity).

Social Connection via Linking

An alternative way to measure social connection (or expected spillovers) from Tulsa to other counties is to use census linking to reconstruct extended family networks directly. To do this, we link all Tulsa 1920 residents (Black and white) to the censuses from 1850 to 1910.[48] We then collect all the family (household) members of each linked Tulsan in these past censuses and link those family members forward and backward to all other censuses from 1850 to 1920. We repeat this step an additional time, collecting another set of family (household) members and linking them forward and backward to all other censuses from 1850 to 1920.

To make this more precise, consider a 30-year-old man who lives in Tulsa in 1920. We might link him back to his 10-year-old self in 1900. When we do so, we likely see his father, mother, and siblings in 1900. Focusing just on his father, we might then be able to link the father back to his younger self in the 1880 census. In that census, we might see his brother (the uncle of the original Tulsan). Linking him forward, suppose we find him again in the 1920 census as an older

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[47]Jaworski et al. (2024) use first name cosine similarity between counties to measure cultural similarity (rather than extended kin connections) and find that it predicts migration from census to census.

[48]Of course, the farther back in time we link, the fewer matches we expect to make because less and less of our sample was even alive in each earlier census. In addition, much of the Black population (if they were born yet) would have been enslaved and thus not enumerated in 1850 and 1860.

man. With that link, we should see where our original Tulsan's uncle (and perhaps cousins) lived in 1920.

After all of this linking, we observe the counties that are one (the original link), two (the second link), or three (the third link) degrees away from Tulsa via family links. Counting up the number of links (over all degrees), we consider this a measure of social connection to Tulsa via family networks. Counties with many first, second, and third degree links to Tulsa are more likely to hear more detailed and personal stories about what happened in Tulsa during the race Massacre.[49]

When we replicate our analysis from Table 5 but instead interact Black x Post with this linking-based measure of connection (either in logs as in Panel A or in 1000s of links as in Panel B), we find that the results are similar to those when using the surname-based measure of similarity (see Appendix Table A17).

Effects on Occupational Choices

Our findings suggest that after the Tulsa Massacre, there were spillovers to Black Americans nationwide. The estimated spillover effects of the Tulsa Massacre on reduced homeownership and occupational downgrading are consistent with a heightened fear of expropriation or destruction at the hands of a white mob, particularly if a Black community became too prosperous. In thinking about occupational choice, historical accounts also point to another logic that was followed. Black populations fearing violence often chose to select into occupations that were more mobile and portable if they had to move to other locations. For example, if one had accumulated experience in an occupation that was geographically dispersed, then this would offer greater potential mobility in the event of future displacement. Someone with a geographically concentrated occupation would have far fewer options unless they chose to change (likely downgrade) their occupation.

We explore whether the data are consistent with these accounts. To measure occupational dispersion, we construct measures of geographic concentration for each occupation using the Herfindahl-Hirschman Index (HHI). For every occupation coded by IPUMS, we calculate the

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[49]In this analysis, we focus on links of both Black and white Tulsans. When we restrict to just measures based on Black Tulsans, we find similar point estimates but statistically insignificant results. This is likely because it is so much more challenging to link Black records in this period and the match rates, especially on second and third degree connections, are so much lower; these low link rates are driven by several factors including low numeracy and literacy, high numbers of common names, and because any Black families who were enslaved were not enumerated in the 1850 and 1860 censuses.

geographic concentration using HHI in 1920, before the Tulsa Massacre, doing this separately for each racial group. We do this separately by racial groups because of the large-scale segregation of the labor market in the early 20th-century U.S.: an African American lawyer, for example, would be unlikely to find employment as a lawyer in a county where every incumbent lawyer was white. After calculating these race-occupation-specific HHI values, we assign them to individuals in the complete count data and compute the mean HHI for each county-race-year observation, representing the average geographic concentration of occupations held by each racial group in each county over time. We also calculate the share of individuals in each county-race-year cell with an occupation in the top 5, 10, or 25th percentile by HHI as an alternative outcome.

Our findings, presented in Appendix Tables A19 and A20, reveal a significant decline in the geographic concentration of occupations held by Black Americans both in Tulsa and in the spillover counties following the 1921 Massacre. In column 1, our outcome is the county-race-year mean of HHI. We see that the triple-interaction coefficient that represents the Tulsa effect is negative and statistically significant, indicating that Black Tulsans shifted toward more geographically dispersed occupations after the violence. In columns 2–5, we see that the share of individuals in geographically concentrated occupations – whether we define these as the top 5, 10, or 25th percentile of occupation-level HHI – falls among African Americans in Tulsa after the Massacre. In column 6, we calculate the share of people with a portable (occupation-level HHI below the median) and non-white collar job. This adds suggestive evidence that after the Massacre, African Americans in Tulsa moved into more portable occupations that were less likely to draw the attention of white mobs.

In Appendix Table A20, we include our spillover measures (the surname similarity score based on either Black names or all names). We see that the occupational adjustments were not limited to Tulsa. Instead, counties more likely to be treated with news and stories of Tulsa also see a shift into these more geographically dispersed (and thus more portable) occupations (columns 1-3). These effects are robust across both of our measures of surname similarity. We also see suggestive evidence for a shift into occupations that are both portable (below median HHI) and not white collar (columns 4–6). Overall, we see this shift toward more portable occupations as a significant adjustment in labor market strategies among Black Americans in response to the threat of racial violence.

A4. Appendix Figures

Figure A1: Letter from Oklahoma Governor (via OHS)

Mr. D. P. Bailey,
Care Bailey & Collier,
Insurance Managers,
Dallas, Texas.

Dear Mr. Bailey:

      I thank you for your letter, written from New York, relative to the Tulsa riot. I concur in your observations and conclusions. These riots are unfortunate affairs at all times and the less said about them the better for all concerned.

      I have no sympathy with the so-called friends of the negro who live in the North and are always so anxious to give us advice on this and kindred subjects.

      I appreciate what you have to say with reference to "Dr." Du Bois. He is an agitator of the worst type and I have directed the Attorney General, who has charge of the investigation now under way at Tulsa, to inquire about his activities and if he is in any way responsible for this outrage, I am going to have him indicted and tried as any other criminal should be.

      Again thanking you for the interest manifested, I remain

               Respectfully,

                   Governor.

Figure A2: Images of the Text of Stories of the 1921 Tulsa Massacre from the Oklahoma Historical Society Archives

25. (wouldn't give her name)
    A woman who was born in 1927 said her grandparents owned a grocery store at th and South   . They lived upstairs and their apartment was reached by an outside wooden stairway. When her grandfather heard of the riot, he took his family to the upstairs apartment, tore down the stairs, and stationed himself with a shotgun at the top.

71. Paul W
    His father was a fireman at the time of the riot and was stationed at Station #2 on North Main. He told him that when the fire alarm rang they drove to Archer and Greenwood to fight a fire, but were told to let it burn by armed white civilians and they returned to the station. He said that he had seen two flat bed trucks with bodies heading towards Sapulpa.

76. Virginia
    Her great grandfather   started a trash hauling service in Tulsa before the riot. Her father   was a private trash hauler at the time of the riot. He had a team and wagon. His father was forced to haul six bodies to a hole in a low place in Oaklawn Cemetery. He didn't want to do it, but a deputy sheriff rode along with him.

37. Carol W
    When she was a nurse intern at St. Francis Hospital in about 1978 she sat with a man who was about 70 years old. He was dying and he told her that he had been in the riot and had shot many Blacks. He said hundreds of them were buried under the railroad. He mentioned the RR station. He was proud of this and said he would do it again.

Figure A3: Excerpt from 1921 Tulsa Business Directory
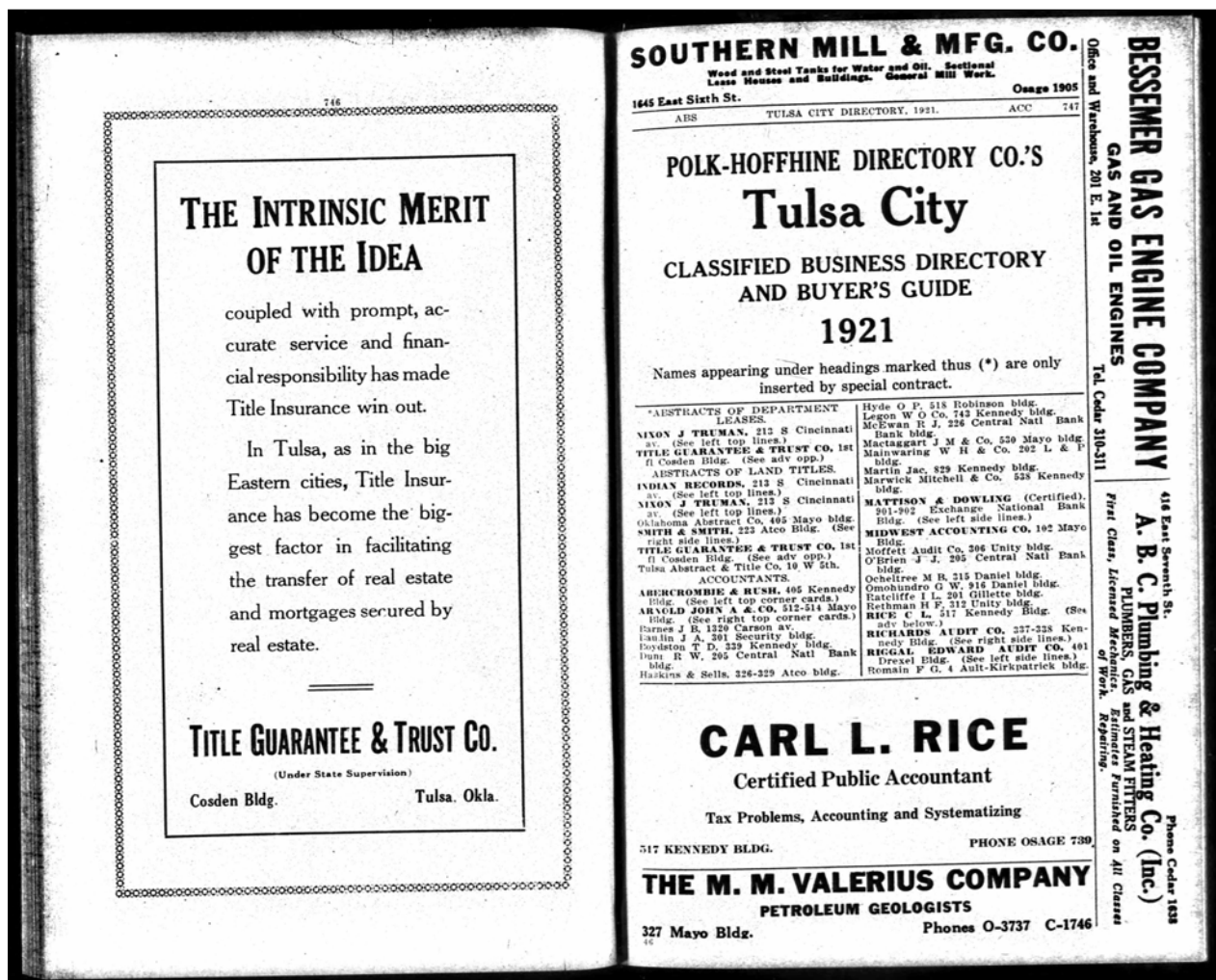
Figure A4: Excerpt from 1921 Tulsa City Directory

Figure A5: Black Economic Status, Tulsa County Compared to the Jim Crow South Distribution in 1920
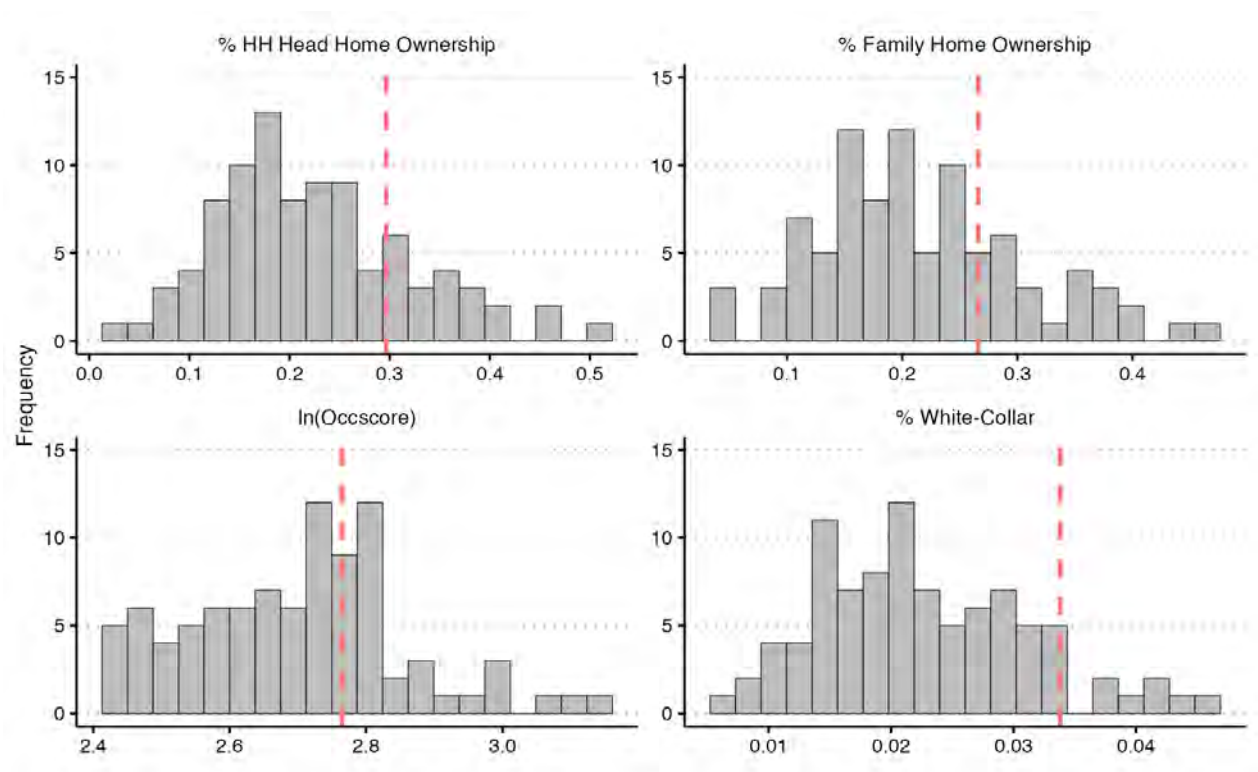
Notes: This figure shows the distributions of descriptive statistics of interest across all Jim Crow state counties in 1920 that had a population of at least 50,000 individuals and a Black population of at least 1,000 individuals. The orange dashed line shows where Tulsa County falls in the distribution.

Figure A6: Black and White Economic Status, Tulsa County Relative to Other Counties in the Segregated U.S. South in 1920
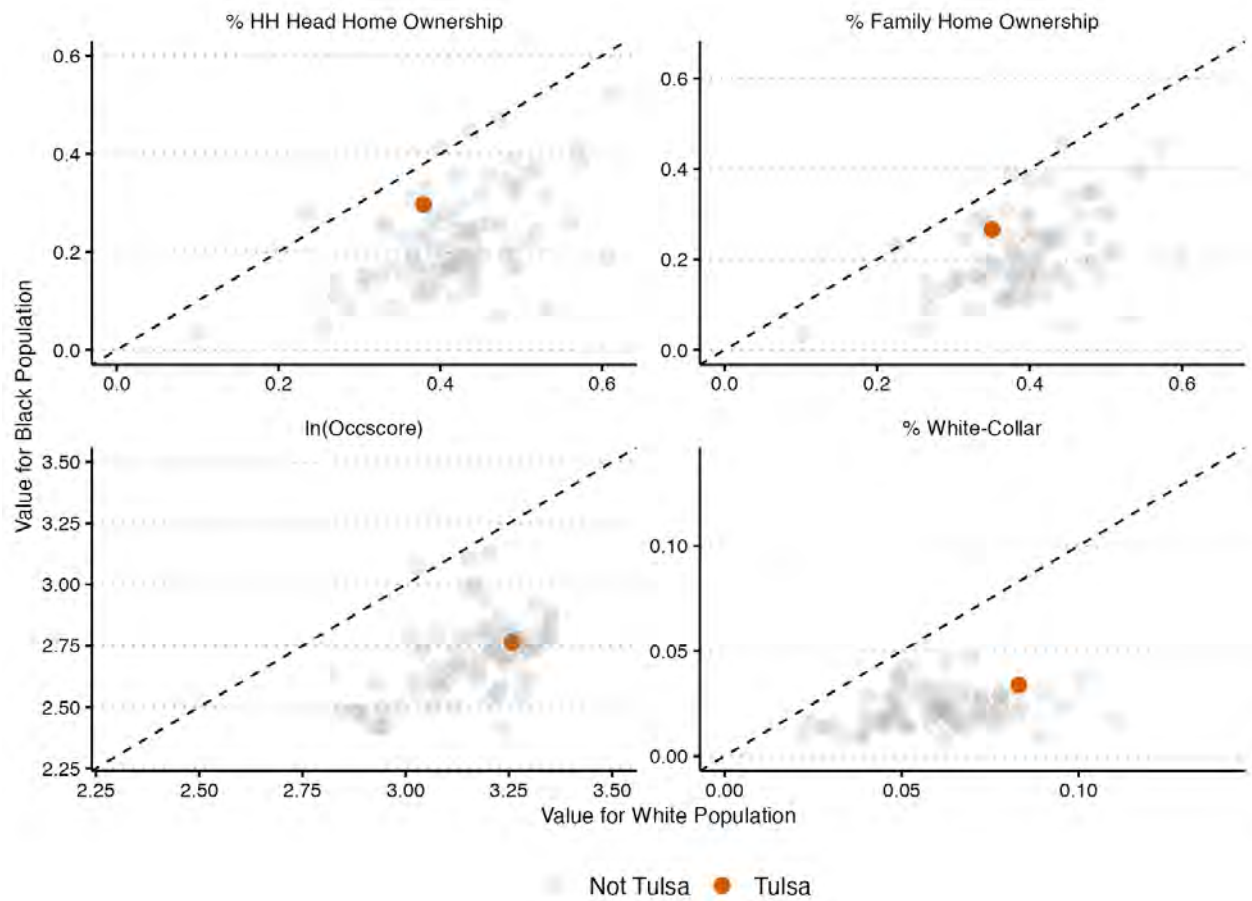
Notes: We restrict to Jim Crow state counties that, in 1920, had a population of at least 50,000 individuals and a Black population of at least 1,000 individuals. The black dashed line shows the 45-degree line where rates are equal for the Black and white populations. The orange dots represent Tulsa County, while the gray dots are other counties.

Figure A7: Family Home Ownership

(a) Tulsa

(b) Control Cities

(c) Black–White Difference by City

(d) Tulsa–Control City Difference by Race

Figure A8: ln(Occscore)

(a) Tulsa

(b) Control Cities

(c) Black–White Difference by City

(d) Tulsa–Control City Difference by Race

Figure A9: White-Collar

(a) Tulsa

(b) Control Cities

(c) Black–White Difference by City

(d) Tulsa–Control City Difference by Race
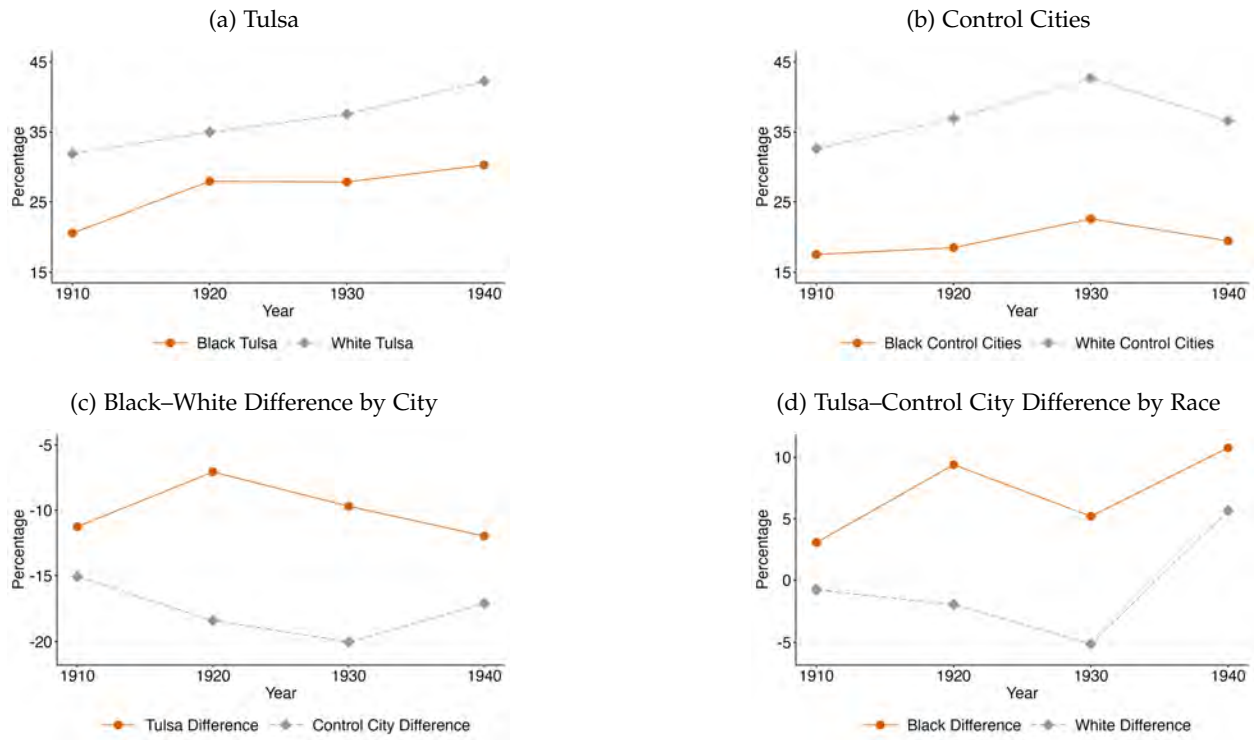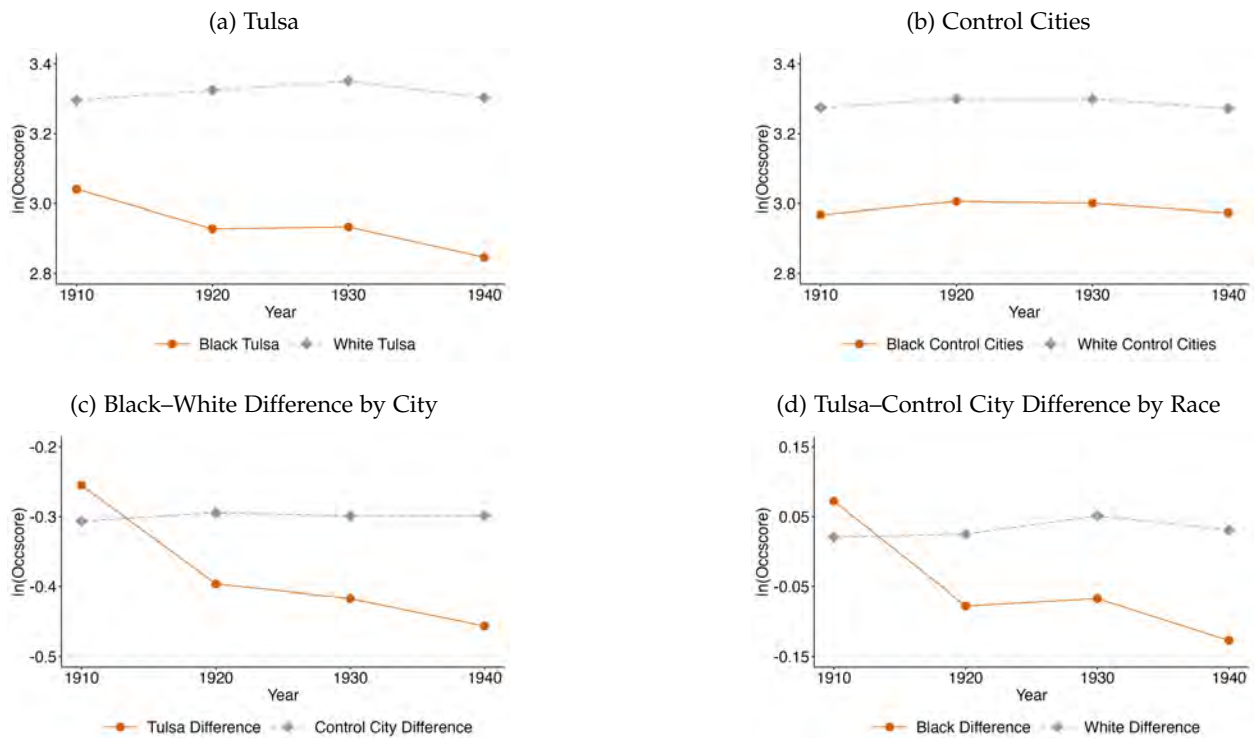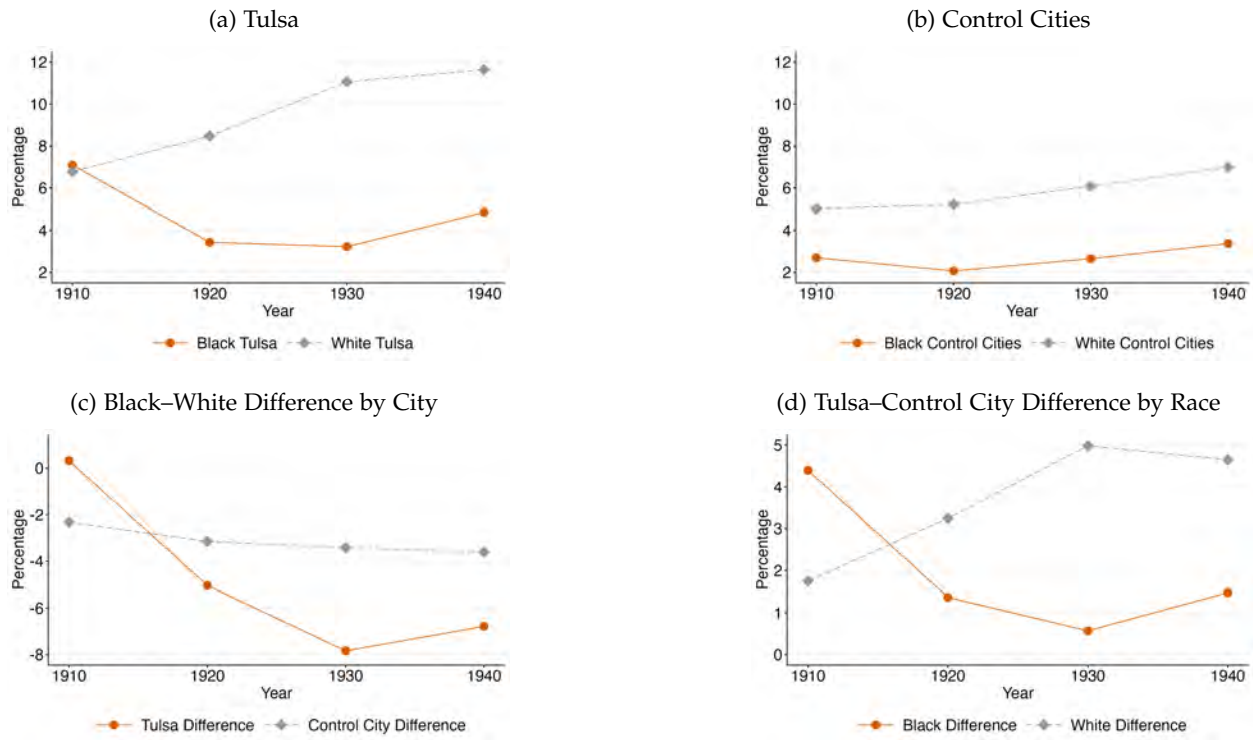
Figure A10: Schooling - Boys

(a) Tulsa

(b) Control Cities

(c) Black–White Difference by City

(d) Tulsa–Control City Difference by Race

A22
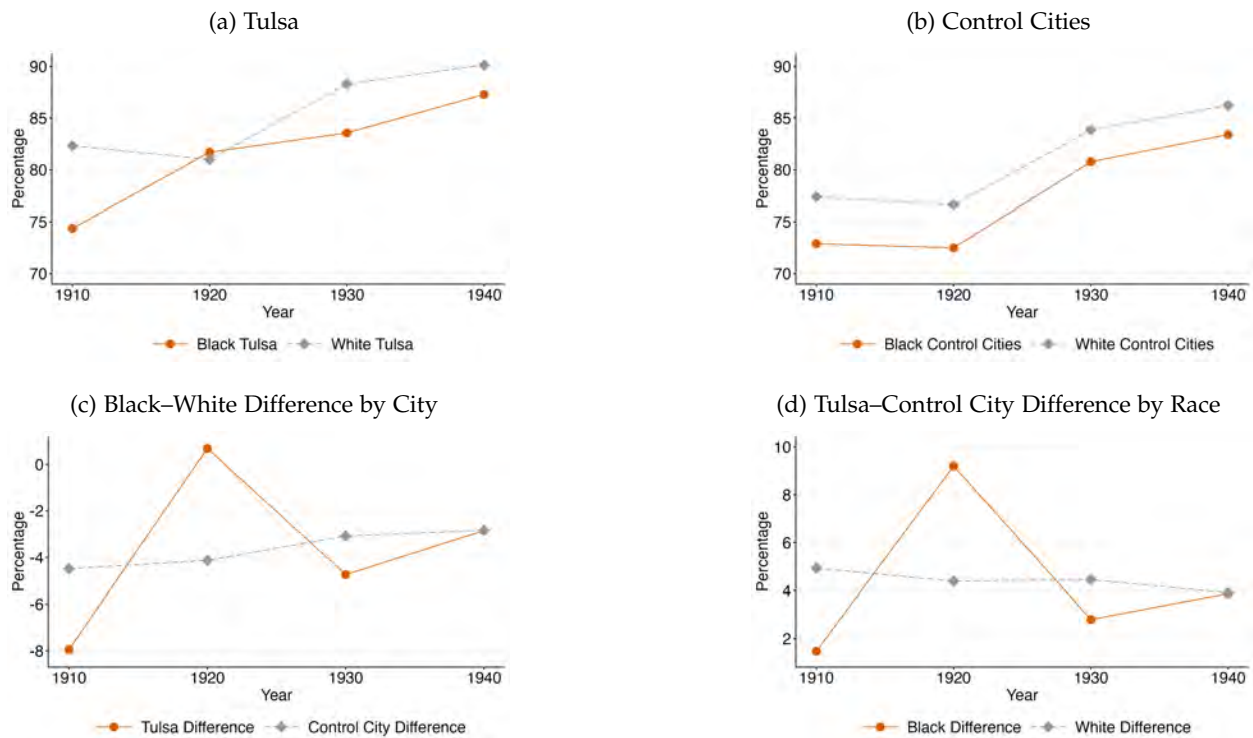
Figure A11: Schooling - Girls

(a) Tulsa

(b) Control Cities

(c) Black–White Difference by City

(d) Tulsa–Control City Difference by Race
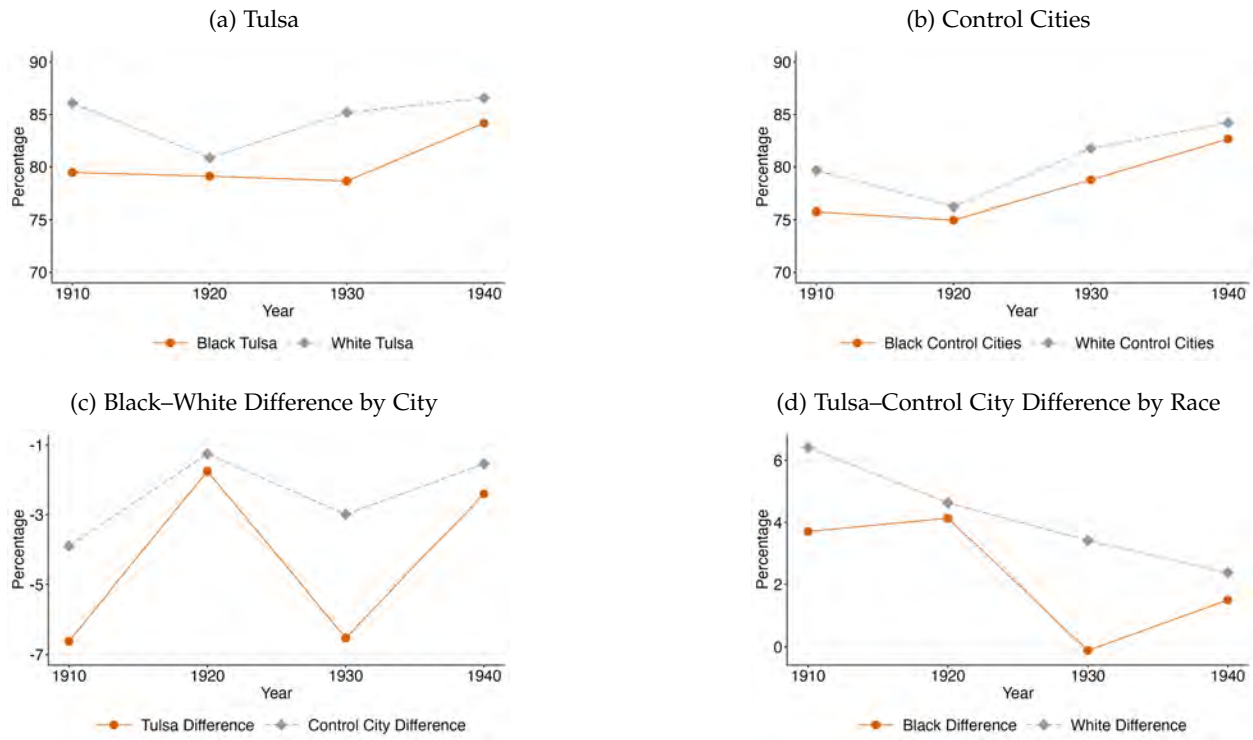
Figure A12: Schooling - Boys and Girls

(a) Tulsa

(b) Control Cities

(c) Black–White Difference by City

(d) Tulsa–Control City Difference by Race
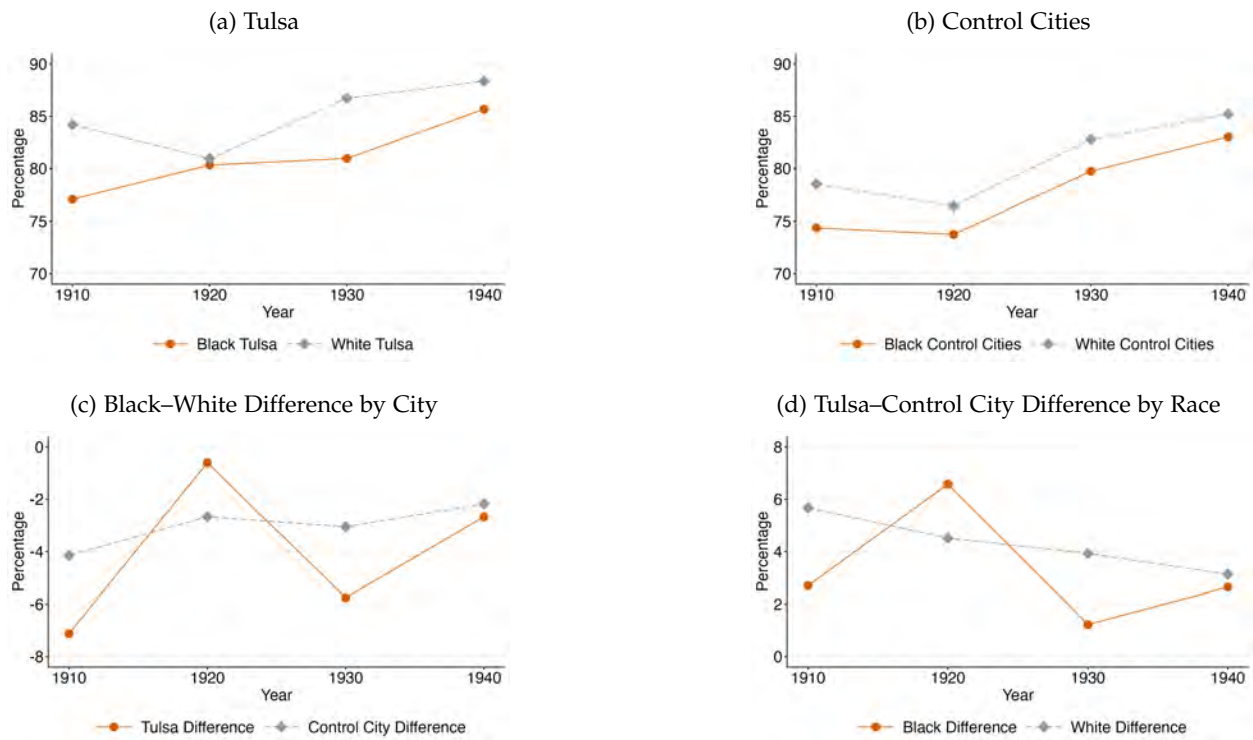
Figure A13: Comparison cities: Boom cities
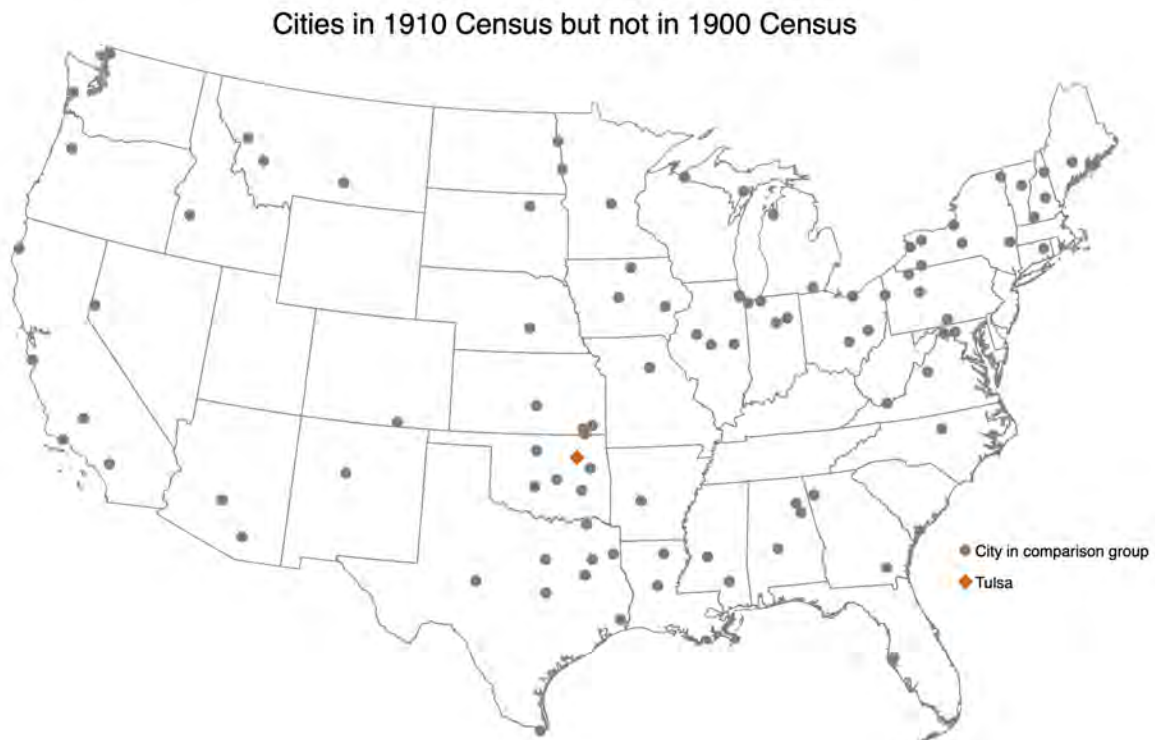
Cities in 1910 Census but not in 1900 Census

Notes: The map shows the location of comparison cities used as a control group. All cities shown appear in the U.S. Census for the first time in 1910.

Figure A14: Comparison cities: Boom cities with population restrictions
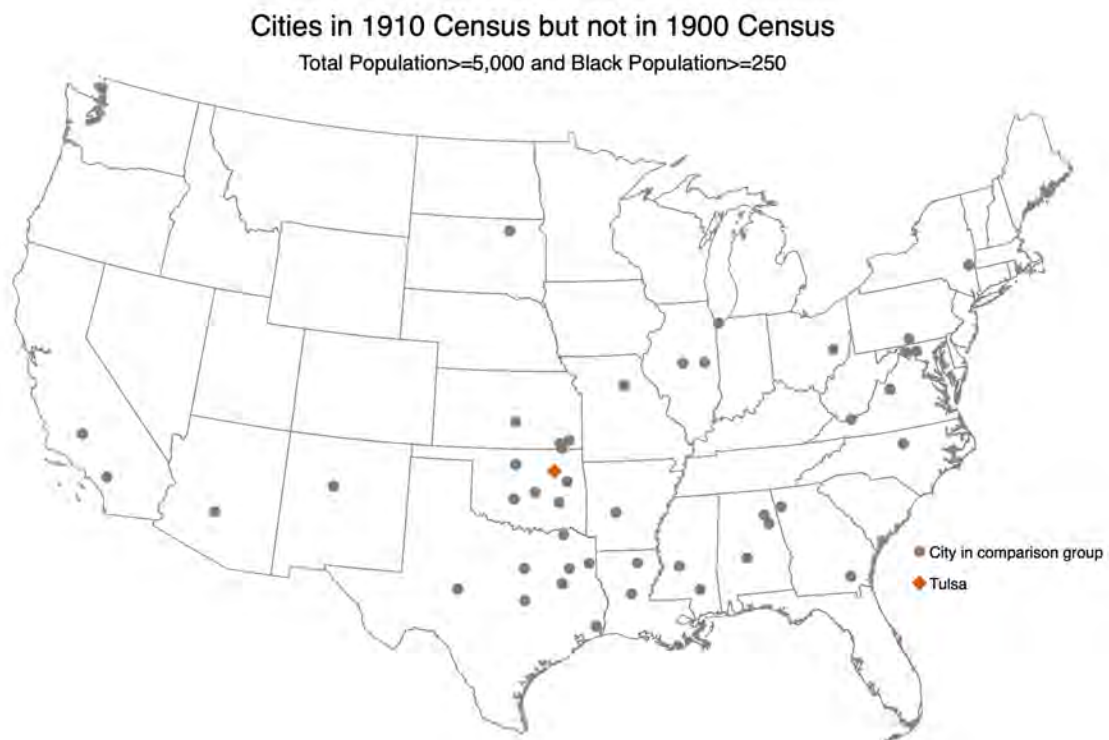
Cities in 1910 Census but not in 1900 Census
Total Population>=5,000 and Black Population>=250

Notes: The map shows the location of comparison cities used as a control group. All cities shown appear in the U.S. Census for the first time in 1910 and have a total population of at least 1,000 people and 250 Black people in 1910.

Figure A15: Influence Histograms – Sample of 60 Cities

(a) HH Head Home Ownership

(b) Family Home Ownership

(c) ln(Occscore)

(d) White-Collar

(e) Education of Boys

(f) Education of Girls

(g) Education of All Children
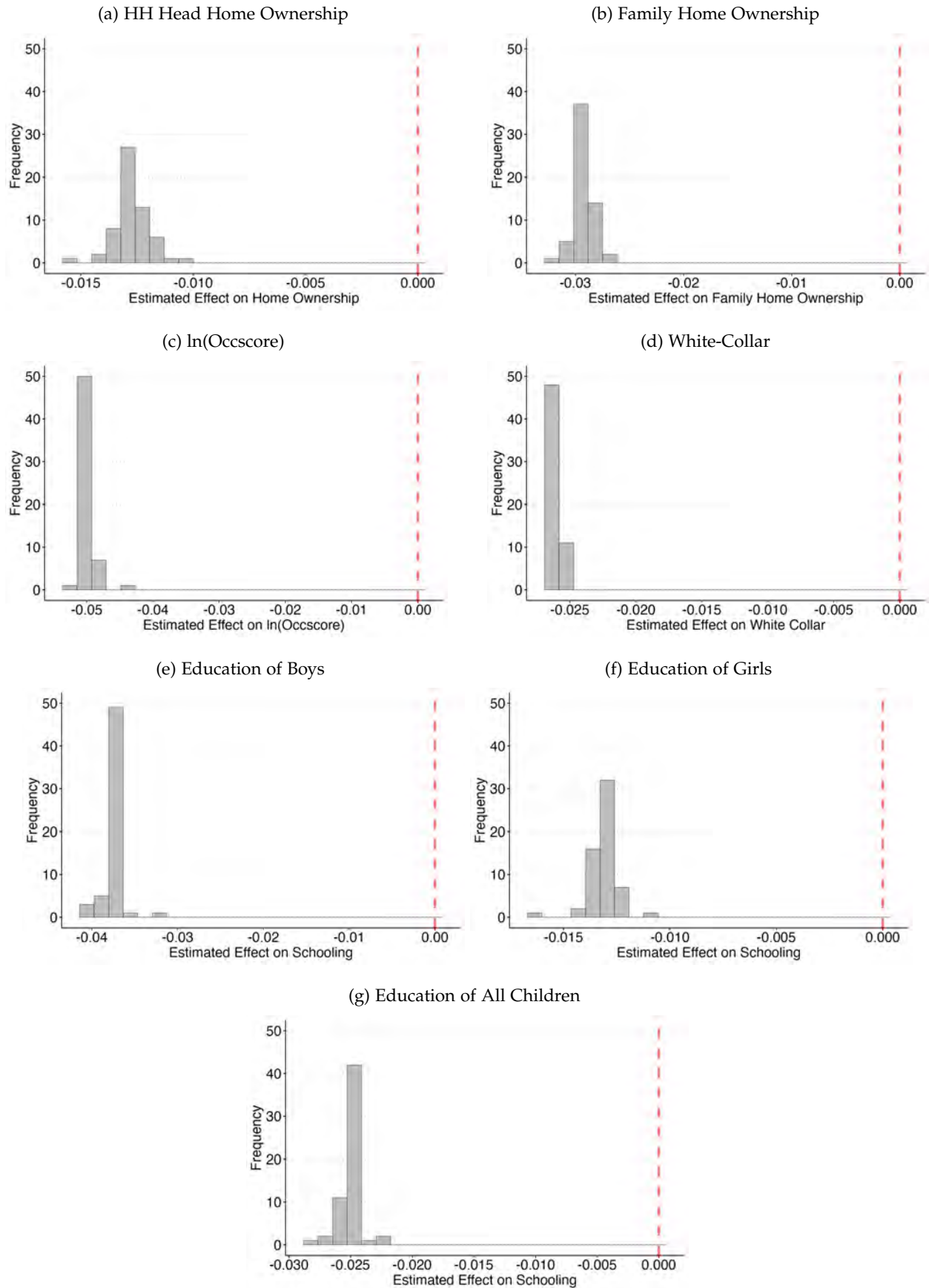
Figure A16: Two real photo post cards (front and back)

Figure A17: Dynamic DD Estimates, 1910–2000: Direct Tulsa Effects on Home Ownership
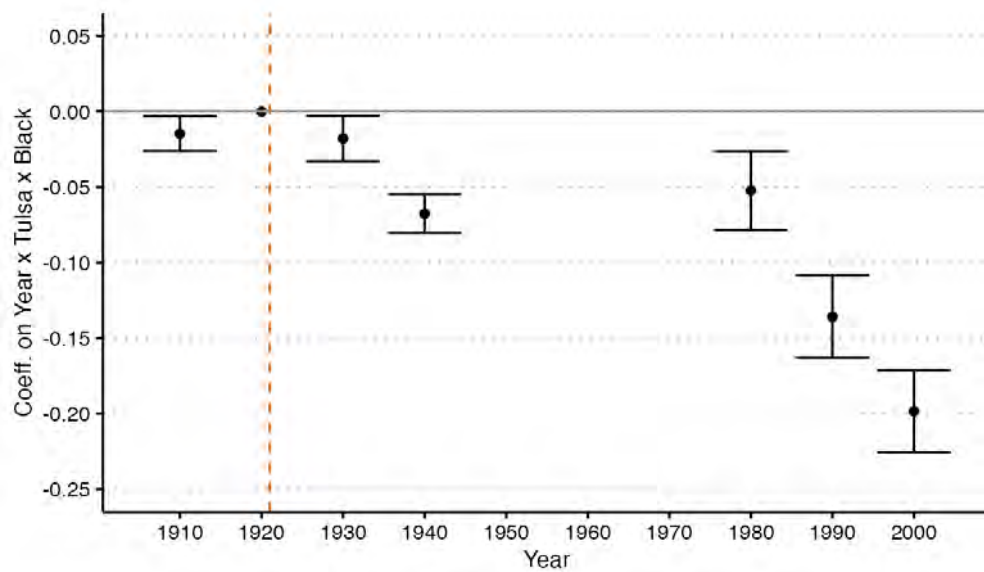
Notes: The reported estimates are for the sample of all household heads in all counties. Point estimates are displayed as dots, 95% confidence intervals are displayed as bars. The gray horizontal line shows a 0 point estimate, while the vertical orange dashed line shows the year of the Tulsa Massacre.

Figure A18: Dynamic DD Estimates, 1910–2000: Direct Tulsa Effects on Home Ownership (45 city sample)
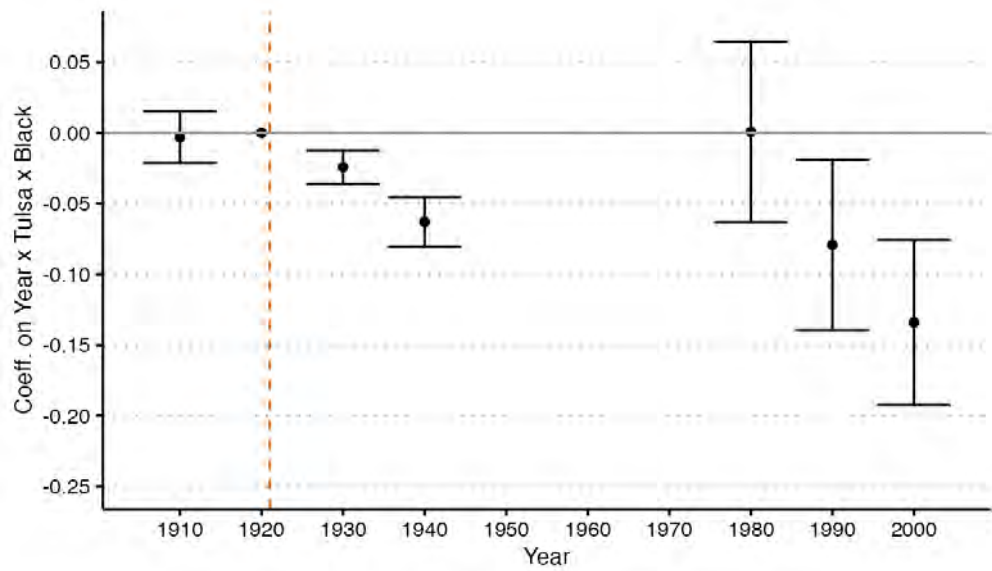
Notes: The reported estimates are for the sample of all household heads in counties that align with the 45-city sample. Point estimates are displayed as dots, 95% confidence intervals are displayed as bars. The gray horizontal line shows a 0 point estimate, while the vertical orange dashed line shows the year of the Tulsa Massacre.

Figure A19: Dynamic DD Estimates, 1910–2000: Direct Tulsa Effects on Home Ownership (60 city sample)
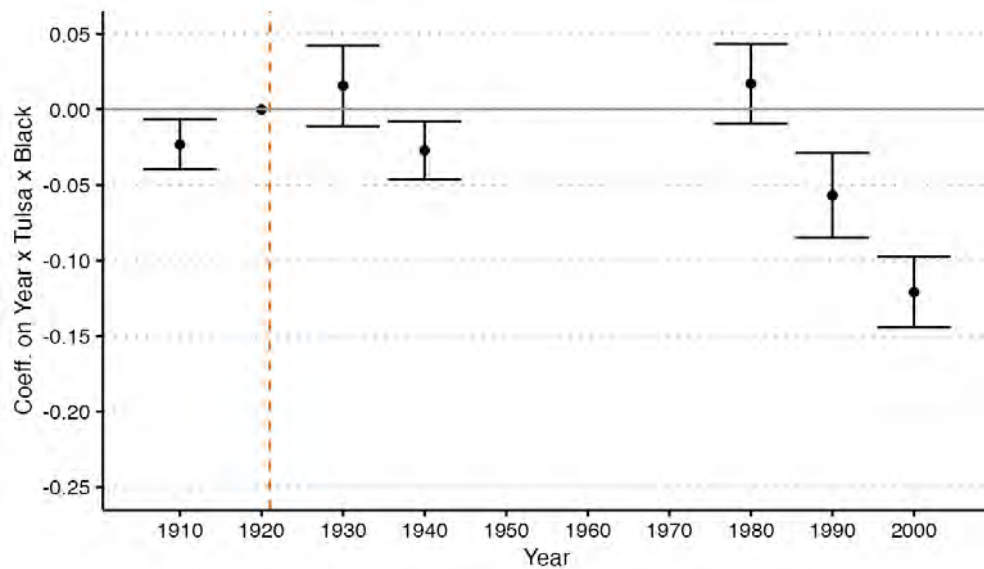
Notes: The reported estimates are for the sample of all household heads in counties that align with the 60-city sample. Point estimates are displayed as dots, 95% confidence intervals are displayed as bars. The gray horizontal line shows a 0 point estimate, while the vertical orange dashed line shows the year of the Tulsa Massacre.

Figure A20: Dynamic DD Estimates, 1910–2000: Direct Tulsa Effects on Home Ownership (94 city sample)
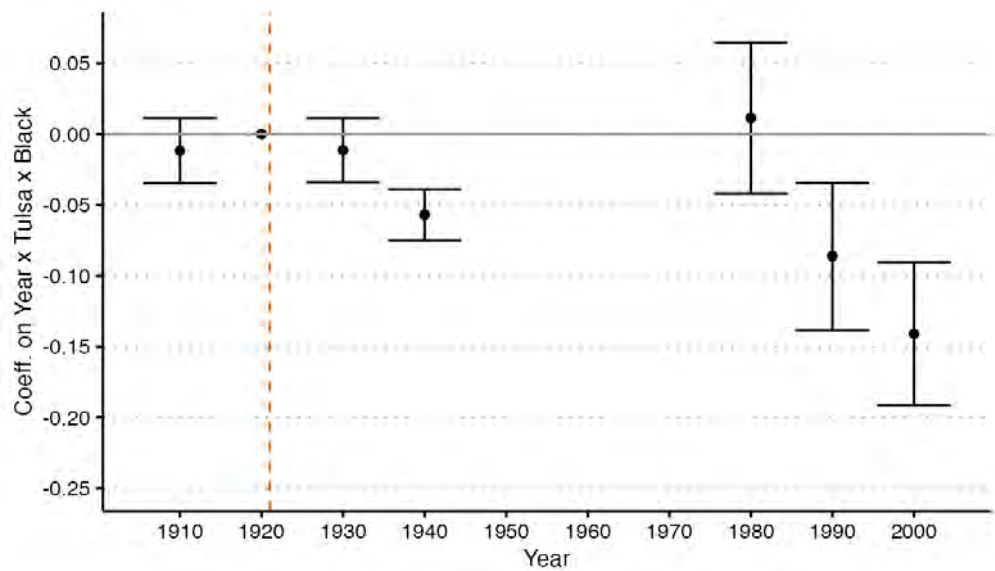
Notes: The reported estimates are for the sample of all household heads in counties that align with the 94-city sample. Point estimates are displayed as dots, 95% confidence intervals are displayed as bars. The gray horizontal line shows a 0 point estimate, while the vertical orange dashed line shows the year of the Tulsa Massacre.

A5. Appendix Tables

Table A1: Individuals Killed in the Massacre

Last Name	First Name	Gender	Race	Birthplace	Age	Source
Adams	Ed	Male	Black	...	32	Death Certificate, Funeral Record or Grave
Alexander	Greg	Male	Black	...	35	Death Certificate, Funeral Record or Grave
Austin	Edward	Male	White	...	38, 39 †	Newspaper (Source Conflict)
Austin	Earnest	Male	White	NY	39	Death Certificate, Funeral Record or Grave
Baker	F.M.	...	White	KY	48, 28 †	Wrong name reported
Barker	Harry	...	Black	CO	37	Death Certificate, Funeral Record or Grave
Barrens	Howard	...	Black	CO	19	Death Certificate, Funeral Record or Grave
Belshmer	E.F.	Male	White	...	...	Newspaper
Berrell	John	Male	White	PA	85, 86 †	Death Certificate, Funeral Record or Grave
Brown	Andy	Male	Black	...	...	Likely Alive (Source conflict)
Bryant	Tom	Male	Black	...	...	Newspaper
Cline	Homer C.	Male	White	AR	16, 17 †	Death Certificate, Funeral Record or Grave
Curry	H. Lewis	Male	White	...	28	Likely Alive (Source Conflict)
Daggs	George Walter	Male	White	...	27	Death Certificate, Funeral Record or Grave
Deary	... (Mrs.)	Female	White	...	...	Wrong name reported
Diamond	Carrie	Female	Black	...	...	Death Certificate, Funeral Record or Grave
Everett	Reuben	Male	Black	...	...	Death Certificate, Funeral Record or Grave
Fisher	Lee	Male	White	...	21	Likely Alive (Source Conflict)
Gilliland	Norman	Male	White	...	...	Newspaper
Gilmore	Ila	...	White	...	...	Likely Alive (Source Conflict)
Hawkins	George	Male	Black	...	78	Death Certificate, Funeral Record or Grave
Hawkinson	Robert C.	Male	White	IN	22	Death Certificate, Funeral Record or Grave
Hill	Clarence	Male	White	...	...	Newspaper
Hobson	Billy	Male	Black	...	...	Newspaper
Howard	Ed		Black	...	...	Death Certificate, Funeral Record or Grave
Jackson	Andrew C.	Male	Black	...	40	Death Certificate, Funeral Record or Grave

Continued on next page

Last Name	First Name	Gender	Race	Birthplace	Age	Source
James	Arthur	Male	White	OK	35	Death Certificate, Funeral Record or Grave
James	...	...	White	...	...	Wrong name reported
Jeffrey	George	...	Black	...	36	Death Certificate, Funeral Record or Grave
Johnson	H.	...	Black	...	...	Death Certificate, Funeral Record or Grave
Knox	Commodore	Male	White	MS	21	Death Certificate, Funeral Record or Grave
Lewis	...	Male	Black	...	...	Death Certificate, Funeral Record or Grave
Lockard	Ed	Male	Black	...	33	Death Certificate, Funeral Record or Grave
Lotspeich	Charles D.	Male	White	IO	22	Death Certificate, Funeral Record or Grave
Miller	Joe	...	Black	...	35	Death Certificate, Funeral Record or Grave
Morrison	...	Female	Black	...	...	Newspaper
Olson	...	...	White	...	...	Wrong name reported
Osborne	Robert L.	...	White	CO, IN	25	Death Certificate, Funeral Record or Grave
Palmer	Robert	Male	White	...	23	Likely Alive (Source Conflict)
Palmer	John	...	White	...	28	Likely Alive (Source Conflict)
Paris	James R.	...	White	TX	33	Death Certificate, Funeral Record or Grave
Pierce	S.H.	...	Black	...	...	Death Certificate, Funeral Record or Grave
Ree	Sam	...	Black	...	30	Death Certificate, Funeral Record or Grave
Roberts	Harry	Male	White	OK	27	Death Certificate, Funeral Record or Grave
Sandridge	M.M.	...	Black	...	...	Death Certificate, Funeral Record or Grave
Selby	Olive	Female	White	Tulsa, OK	...	Newspaper
Shelton	Lewis	Male	Black	TN	77	Death Certificate, Funeral Record or Grave
Sherrill	T.J.	...	White	...	51	Death Certificate, Funeral Record or Grave
Shumate	Cleo	...	White	OK	24	Death Certificate, Funeral Record or Grave
Slinkard	L.C.	Male	White	...	25	Newspaper
Stovall	...	Male	Black	...	...	Newspaper

Continued on next page

Individuals Killed in the Massacre (Continued)

Last Name	First Name	Gender	Race	Birthplace	Age	Source
Talbot	...	Male	Black	...	...	Newspaper
Talbot	...	Female	Black	...	...	Newspaper
Turner	William	Male	Black	...	35	Death Certificate, Funeral Record or Grave
Walker	Henry	...	Black	...	40	Death Certificate, Funeral Record or Grave
Walker	Curly	Male	Black	...	30	Death Certificate, Funeral Record or Grave
Weaver	G.E.	...	White	...	24	Death Certificate, Funeral Record or Grave
Wheeler	John	...	Black	...	63	Death Certificate, Funeral Record or Grave
Wilson	J.H.	...	White	...	74	Death Certificate, Funeral Record or Grave
Withrow	Samuel J.	Male	White	IN	19, 28 †	Death Certificate, Funeral Record or Grave
Woffard	Shirly F.	...	Black	...	...	Death Certificate, Funeral Record or Grave

Notes: This table lists individuals killed in the Massacre according to four lists of casualties found in the Oklahoma Historical Society's Tulsa Race Riot Commission Collection. These lists identified deaths on the basis of the following distinct kinds of primary sources: death certificates, funeral records, graves, and newspaper articles. The "Source" column describes the source used to determine that an individual was killed (Death Certificate, Funeral Record or Grave, or Newspaper). A person is listed as Likely Alive (Source Conflict) if post-1920 Census data or other historical records lists the individual as still alive. Individuals are listed alphabetically by last name and first name. † In some cases, sources offer conflicting ages for individuals. We report both ages here.

Table A2: Individuals Injured in the Massacre

Last Name	First Name	Gender	Race	Source
Abernathy	J.L.	...	Black	Newspaper
Arnley	Cal	Male	Black	Newspaper; Red Cross
Arnold	Vance	...	Black	Newspaper
Austin	Edward	...	White	Newspaper
Baker	Johnny	...	Black	Newspaper
Barry	James	...	Black	Newspaper
Baskin	Ed	...	Black	Newspaper
Belshmer	E.F.	...	White	Newspaper
Bentley	William	...	Black	Newspaper
Brown	Willie	...	Black	Newspaper
Carr	Ruth	...	Black	Newspaper
Carter	Charles	Male	...	Newspaper; Red Cross
Chapple	P.A.	...	Black	Newspaper
Collins	J.L.	...	White	Newspaper
Crouch	Garland	Male	White	Newspaper
Curry	H. Lewis	Male	White	Newspaper
Cytron	J.	...	White	Newspaper
Danney	George L.	...	Black	Newspaper
Davis	Dan	...	Black	Newspaper
Dow	A.N.	...	White	Newspaper
Elmer	Robert	...	White	Newspaper
Epps	William	...	Black	Newspaper
Fisher	Lee	Male	White	Newspaper
Foster	Lonnie	...	Black	Newspaper
Gamble	Henry	Male	...	Newspaper
Gamble	V.M.	...	White	Newspaper; Red Cross
Gilliland	Norman	...	White	Newspaper
Gilmore	Ila/S.A.	Female	White	Newspaper
Glaze	Miranda	...	Black	Newspaper
Griffin	Clarence	...	Black	Newspaper
Gurner	William	...	Black	Newspaper
Hartshone	E.	...	White	Newspaper
Hastings	W.R.	...	White	Newspaper
Hileman	Earl R.	...	White	Newspaper
Hode	J.S.	...	Black	Newspaper
Ingram	Ed	...	Black	Newspaper
Jackson	S.	...	Black	Newspaper
Jackson	Ulysses	...	Black	Newspaper
Jenkins	M.J.	...	White	Newspaper
Johnson	Charles	...	Black	Newspaper

Continued on next page

Individuals Injured in the Massacre (Continued)

Last Name	First Name	Gender	Race	Source
Johnson	H.	...	Black	Newspaper
Johnson	Marie	...	Black	Newspaper
Joiner	G.F.	...	White	Newspaper
Knox	Commodore	...	Black	Newspaper
Lane	Oliver	...	Black	Newspaper
Lasley	Leroy	...	Black	Newspaper
Lee	J.	...	White	Newspaper
Lewis	G.J.	...	Black	Newspaper
Lewis	Tony	...	Black	Newspaper
Logsdon	K.G.	...	White	Newspaper
Mardick	C.E.	...	White	Newspaper
Masek	A.E.	...	White	Newspaper
Maynor	Willis	...	Black	Newspaper
McDonald	H.D.	...	White	Newspaper
Meadows	Chester	...	Black	Newspaper
Miller	Curd	Male	White	Newspaper
Miller	Frank	Male	...	Newspaper; Red Cross
Miller	Jake	Male	...	Newspaper; Red Cross
Montgomery	Ben	...	Black	Newspaper
Moore	Ruth	...	Black	Newspaper
Moore	Will	...	Black	Newspaper
Morrison	Arthur	Male	Black	Newspaper; Red Cross
Neel	Andrew	...	Black	Newspaper
Nelson	Tom	...	Black	Newspaper
Oliver	Ruth	...	Black	Newspaper
Owens	Ross G.	...	White	Newspaper
Palmer	Robert	Male	White	Newspaper
Paris	James	...	White	Newspaper
Perry	A.	...	White	Newspaper
Prunkard	G.T.	Male	White	Newspaper
Renkin	Latha	...	Black	Newspaper
Rhodes	Homer	...	White	Newspaper
Rivers	Bob	...	Black	Newspaper
Robinson	Lane	...	Black	Newspaper
Seltzer	R.N.	...	White	Newspaper
Sherrick	Otto	...	White	Newspaper
Shields	Lewis	...	White	Newspaper
Shigley	M.R.	Female	White	Newspaper
Slinkard	L.	...	White	Newspaper
Smith	Florida	...	Black	Newspaper

Continued on next page

Individuals Injured in the Massacre (Continued)

Last Name	First Name	Gender	Race	Source
Smith	Franklin T.	...	Black	Newspaper
Sterling	A.T.	...	White	Newspaper
Stevenson	Alex	Male	Black	Newspaper
Stick	A.B.	Male	White	Newspaper
Switzgood	Gordon	Male	White	Newspaper
Taliafirio	Lily	...	Black	Newspaper
Thomas	C.C.	...	White	Newspaper
Tyson	Sam	...	Black	Newspaper
Vickers	E.F.	...	White	Newspaper
Walker	Elsie	Female	Black	Newspaper; Red Cross
Washington	L.	...	Black	Newspaper
Wheeler	E.L.	...	White	Newspaper
White	George N.	Male	White	Newspaper
Whitty	Celia	...	Black	Newspaper
Williams	Porter	...	Black	Newspaper
Wissenger	J.E.	...	White	Newspaper
Woffard	Shirley	...	Black	Newspaper
Woodard	Ora	Male	Black	Newspaper

Notes: This table lists individuals admitted to hospitals due to Massacre-induced wounds. These individuals come from listings in the June 1, June 2, and June 3, 1921 editions of the Tulsa World, the June 1 and June 2, 1921 editions of the Tulsa Tribune, and the 1921 Red Cross report on the Massacre. The "Source" column describes the documentation used to determine that an individual was injured (Newspaper or Red Cross). Individuals are listed alphabetically by last name and first name.

Table A3: Ten Most Common White-Collar Occupations by Race and Gender in 1920 Tulsa

	Panel A: Men			
Rank	White Men Top Occupations	White Men Count	Black Men Top Occupations	Black Men Count
1	Accountant	464	Clergyman	29
2	Lawyer or Judge	279	Physician or Surgeon	20
3	Physician or Surgeon	160	Teacher	18
4	Engineers, Civil	105	Musician or Music Teacher	9
5	Teacher	104	Lawyer or Judge	8
6	Pharmacist	99	Pharmacist	7
7	Musician or Music Teacher	62	Actor	2
8	Dentist	59	Dentist	2
9	Clergyman	58	Accountant	1
10	Draftsman	46	Editors/Reporters	1
	Panel B: Women			
Rank	White Women Top Occupations	White Women Count	Black Women Top Occupations	Black Women Count
1	Teacher	606	Teacher	51
2	Nurse, Professional	107	Nurse, Professional	6
3	Musician or Music Teacher	60	Musician or Music Teacher	5
4	Accountant	23	Artist or Art Teacher	1
5	Actor	16	Physician or Surgeon	1
6	Nurse, Student Professional	15	NA	NA
7	Photographer	9	NA	NA
8	Professor/Instructor	8	NA	NA
9	Recreation or Group Worker	6	NA	NA
10	Editors/Reporters	5	NA	NA

Notes: The table reports the most common white-collar occupations for white and Black individuals in 1920 Tulsa, separated by gender. These tables use the standard white-collar definition described in the paper.

Table A4: Comparison Cities, 1920 Characteristics

City	Population	Black Population	Pct. Black
Mobile, AL	60,789	23,926	0.39
Little Rock, AR	65,400	17,624	0.27
San Diego, CA	74,923	1,090	0.01
Bridgeport, CT	143,677	2,228	0.02
Hartford, CT	138,083	4,216	0.03
Wilmington, DE	110,129	10,792	0.10
Jacksonville, FL	91,008	41,511	0.46
Tampa, FL	51,502	11,510	0.22
Augusta, GA	52,567	22,521	0.43
Macon, GA	52,904	23,075	0.44
Savannah, GA	83,322	39,444	0.47
East St. Louis, IL	67,391	7,389	0.11
Peoria, IL	76,095	2,135	0.03
Springfield, IL	59,214	2,771	0.05
Evansville, IN	88,661	6,340	0.07
Fort Wayne, IN	88,613	1,455	0.02
Gary, IN	55,391	5,321	0.10
South Bend, IN	71,156	1,265	0.02
Terre Haute, IN	66,259	3,603	0.05
Des Moines, IA	126,665	5,481	0.04
Sioux City, IA	71,197	1,120	0.02
Kansas City, KS	101,223	14,501	0.14
Topeka, KS	50,042	4,331	0.09
Wichita, KS	72,230	3,553	0.05
Covington, KY	57,126	3,017	0.05
Cambridge, MA	109,709	5,227	0.05
New Bedford, MA	121,396	5,068	0.04
Springfield, MA	129,693	2,650	0.02
Flint, MI	91,600	1,689	0.02
Grand Rapids, MI	137,657	1,100	0.01
Saint Joseph, MO	78,149	4,280	0.05
Atlantic City, NJ	50,711	10,939	0.22
Camden, NJ	116,439	8,631	0.07
East Orange, NJ	50,693	2,317	0.05
Elizabeth, NJ	95,843	1,949	0.02
Paterson, NJ	135,899	1,577	0.01
Trenton, NJ	119,055	4,361	0.04
Albany, NY	113,403	1,202	0.01
Yonkers, NY	100,234	1,957	0.02

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Comparison Cities, 1920 Characteristics (Continued)

City	Population	Black Population	Pct. Black
Canton, OH	87,087	1,298	0.01
Springfield, OH	60,794	7,026	0.12
Youngstown, OH	132,402	6,630	0.05
Oklahoma City, OK	91,463	8,383	0.09
Tulsa, OK	72,203	8,901	0.12
Chester, PA	58,029	7,316	0.13
Harrisburg, PA	75,947	5,280	0.07
Johnstown, PA	67,326	1,658	0.02
Reading, PA	107,805	1,374	0.01
Charleston, SC	70,374	34,349	0.49
Chattanooga, TN	57,909	18,861	0.33
Knoxville, TN	77,821	11,487	0.15
Nashville, TN	118,333	35,712	0.30
El Paso, TX	77,776	1,359	0.02
Fort Worth, TX	106,569	15,904	0.15
Houston, TX	138,275	34,037	0.25
Norfolk, VA	116,103	43,087	0.37
Portsmouth, VA	54,405	23,367	0.43
Roanoke, VA	50,851	9,355	0.18
Huntington, WV	50,439	2,878	0.06
Wheeling, WV	56,140	1,613	0.03

Notes: This table reports 1920s characteristics of the comparison cities (as well as Tulsa) used in our regression analysis. Cities are listed in alphabetical order by state and city name.

Table A5: Cities in 1910 Census but not 1900 Census and their 1910 & 1920 Populations

City	Total Population		Black Population	
	1910	1920	1910	1920
Bellingham, WA	27,221	25,592	54	44
Muskogee, OK*	25,322	30,389	8,011	7,289
Jackson, MS*	21,321	22,818	10,621	9,964
Beaumont, TX*	20,657	40,623	6,969	13,213
Boise, ID	19,784	21,438	235	78
Oak Park Village, IL	19,444	39,767	113	170
Durham, NC*	18,267	21,754	6,905	7,667
Tulsa, OK*	18,238	72,203	2,050	8,901
Gary, IN*	17,486	55,391	381	5,321
Hutchinson, KS*	16,362	23,299	885	1,040
Aberdeen, WA	15,634	15,330	98	53
Sharon, PA	15,278	21,744	177	669
Riverside, CA*	15,224	19,338	418	509
Elyria, OH	14,854	20,477	244	531
Olean, NY	14,769	20,503	180	247
Missoula, MT	14,692	12,669	122	101
Cicero, IL	14,556	44,999	4	4
Lackawanna, NY	14,503	17,766	207	271
Waycross, GA*	14,487	19,157	6,842	9,811
Hot Springs, AR*	14,471	11,694	3,939	2,824
Fargo, ND	14,355	21,962	104	42
Enid, OK*	13,799	16,576	783	472
Selma, AL*	13,649	15,592	7,905	8,212
Salem, OR	13,465	17,681	39	65
Escanaba, MI	13,201	13,139	25	24
Tucson, AZ	13,193	20,291	219	348
Lancaster, OH	13,115	14,707	231	197
Mcalester, OK*	12,956	12,102	3,003	2,091
Ironwood, MI	12,823	15,790	3	0
Anniston, AL*	12,795	17,733	4,659	5,859
Bakersfield, CA*	12,727	18,831	285	231
Coffeyville, KS*	12,686	13,453	1,313	1,469
Du Bois, PA	12,623	13,681	15	19
Shawnee, OK*	12,484	15,347	853	704
Parsons, KS*	12,476	16,028	1,040	1,392
Grand Forks, ND	12,473	14,015	50	29
Champaign, IL*	12,396	15,877	773	1,241
Rome, GA*	12,265	13,257	3,929	3,358
Traverse City, MI	12,134	10,929	6	15

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Cities in 1910 Census but not 1900 Census, 1910 & 1920 Population (Continued)

City	Total Population		Black Population	
	1910	1920	1910	1920
Eureka, CA	11,821	13,119	15	49
Chambersburg, PA*	11,798	13,171	791	626
Berlin, NH	11,781	16,132	12	1
Hattiesburg, MS*	11,765	13,270	4,443	4,958
Santa Barbara, CA	11,664	19,446	79	180
Batavia, NY	11,599	13,530	48	27
Cortland, NY	11,500	13,300	31	18
Waterville, ME	11,460	13,350	109	8
Marshall, TX*	11,455	14,270	4,996	5,841
Hudson, NY*	11,416	11,786	409	349
Cambridge, OH*	11,331	13,111	363	346
Paris, TX*	11,270	15,039	3,160	3,588
Willimantic, CT	11,231	12,331	86	65
Mason City, IA	11,230	20,555	154	341
Alexandria, LA*	11,211	17,511	5,879	8,041
Santa Cruz, CA	11,151	10,800	96	27
Plattsburg, NY	11,144	10,911	5	14
Phoenix, AZ*	11,142	28,807	343	1,093
Bluefield, WV*	11,134	15,277	2,237	2,732
Warren, PA	11,088	14,302	78	5
Albuquerque, NM*	11,040	15,231	250	193
Billings, MT	10,975	15,109	153	127
Temple, TX*	10,972	11,037	2,824	2,137
Moberly, MO*	10,923	12,817	982	827
Peru, IN	10,912	12,564	78	140
Lincoln, IL*	10,895	11,885	284	264
Reno, NV	10,868	12,219	93	59
Adrian, MI	10,763	11,877	157	138
Aberdeen, SD*	10,751	14,565	278	19
Barre, VT	10,736	10,016	3	4
Martinsburg, WV*	10,699	12,513	1,007	997
La Porte, IN	10,642	15,161	41	133
Staunton, VA*	10,604	10,625	2,465	1,814
Gadsden, AL*	10,557	14,742	3,447	4,085
Brownsville, TX	10,513	11,798	48	51
Independence, KS*	10,513	11,922	734	778
Palestine, TX*	10,496	11,039	3,569	2,997
Frederick, MD*	10,488	11,063	1,502	1,224
Fulton, NY	10,479	13,043	16	16
Canton, IL	10,454	10,936	104	146
Tyler, TX*	10,404	13,455	3,005	3,018

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Cities in 1910 Census but not 1900 Census, 1910 & 1920 Population (Continued)

City	Total Population		Black Population	
	1910	1920	1910	1920
Monroe, LA*	10,379	12,672	5,484	5,601
Cleburne, TX*	10,364	12,835	905	950
Boone, IA	10,347	12,504	89	82
Chickasha, OK*	10,329	10,178	1,358	1,188
San Angelo, TX*	10,327	10,139	658	682
Grand Island, NE	10,326	13,995	121	131
Huntington, IN	10,276	14,003	7	0
St. Cloud, MN	10,234	16,025	8	18
Trinidad, CO	10,207	10,920	180	138
Laconia, NH	10,182	10,899	8	12
Anaconda, MT	10,145	11,624	113	92
Iowa City, IA	10,094	11,267	42	53
Keene, NH	10,070	11,165	13	5
Saint Petersburg, FL	4,127	14,224	1,100	2,422

Notes: The table lists the sample of 94 comparison cities that, like Tulsa, were in the 1910 census but were not in the 1900 census. * Indicates the city belongs to the more restricted sample of 45 comparison cities that additionally have a total population above and Black population equal to or above 250. The cities are ordered in descending order by their 1910 total population.

Table A6: Economic Effects of the Tulsa Massacre, 1910–1940, Sample of Men and Women

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1
	(1)	(2)	(3)	(4)
Tulsa × Black × Post	−0.008	−0.032***	−0.089***	−0.022***
	(0.006)	(0.007)	(0.008)	(0.001)
Year-City FEs	Y	Y	Y	Y
Race-City FEs	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y
Sample	HH Heads	All	In Labor Force	In Labor Force
Dep. Var. Avg. for Black Tulsans, 1920	0.315	0.287	2.599	0.036
Observations	5,596,647	21,642,442	9,476,299	9,476,299

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual, living in a city, and observed in a census year. The sample includes individuals living in Tulsa or one of the 59 comparison cities. The dependent variables are reported at the top of the table. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). All specifications include controls for gender, age, age squared, marriage, and children, year-race fixed effects, year-city fixed effects, and city-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A7: Economic Effects of the Tulsa Massacre, 1910–1940, Sample of Men and Women from Cities that are in 1910 Census but not in 1900 Census

	Dependent Variable:			
	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1
	(1)	(2)	(3)	(4)
Panel A: Cities in 1910 Census but not in 1900 Census (n=94)				
Tulsa × Black × Post	−0.030***	−0.064***	−0.074***	−0.023***
	(0.009)	(0.009)	(0.009)	(0.003)
Panel B: Cities in 1910 Census but not in 1900 Census with total population $\geq$5,000 and Black population $\geq$250 (n=45)				
Tulsa × Black × Post	−0.040***	−0.070***	−0.075***	−0.023***
	(0.007)	(0.008)	(0.009)	(0.003)
Year-City FEs	Y	Y	Y	Y
Race-City FEs	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y
Sample	HH Heads	All	In Labor Force	In Labor Force
Dep. Var. Avg. for Black Tulsans, 1920	0.315	0.287	2.599	0.036
Observations (Panel A)	1,865,804	7,033,882	2,947,570	2,947,570
Observations (Panel B)	983,467	3,724,205	1,582,564	1,582,564

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual, living in a city, and observed in a census year. The sample for Panel A includes individuals living in Tulsa or one of the 93 comparison cities. The sample for Panel B includes individuals living in Tulsa or one of the 44 comparison cities. The dependent variables are reported at the top of the table. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). Home ownership and occupation specifications include controls for age, age squared, marriage, and children, year-race fixed effects, year-city fixed effects, and city-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A8: Effects of the Tulsa Massacre – Excluding "Other Race" Category, 1910–1940

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1	In School 0/1	In School 0/1	In School 0/1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tulsa × Black × Post	−0.013**	−0.030***	−0.050***	−0.026***	−0.039***	−0.014***	−0.026***
	(0.006)	(0.007)	(0.007)	(0.001)	(0.008)	(0.005)	(0.006)
Year-City FEs	Y	Y	Y	Y	Y	Y	Y
Race-City FEs	Y	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y	Y
Sample	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force	Males Ages 7-18	Females Ages 7-18	Full Ages 7-18
Dep. Var. Avg. for Black Tulsans, 1920	0.322	0.279	2.928	0.034	0.817	0.791	0.803
Observations	4,655,331	10,594,424	6,862,347	6,862,347	2,209,557	2,285,420	4,494,977

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual, living in a city, and observed in a census year. The sample includes individuals living in Tulsa or one of the 59 comparison cities. The dependent variables are reported at the top of the table. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). Home ownership and occupation specifications include controls for age, age squared, marriage, and children, year-race fixed effects, year-city fixed effects, and city-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A9: Percentage of Males 16+ with Missing Occscore

	Tulsa		All cites		59 cities		93 cities		44 cities	
	Black	White	Black	White	Black	White	Black	White	Black	White
1910	40.7	8.1	4.3	5.7	4.2	5.7	5.8	7.4	5.9	8.0
1920	4.4	5.9	5.2	7.9	5.0	8.4	6.5	10.6	6.5	10.4
1930	6.4	8.5	7.4	10.1	8.0	10.4	8.8	13.0	8.9	12.3
1940	19.3	13.5	15.6	15.4	14.4	14.9	15.5	17.6	15.7	17.1

Notes: The table reports the percentage of males 16 and older with a missing occupational classification (IPUMS variable occ1950) by Census decade and race for the city of Tulsa, all cities in the Census, and the three sets of comparison cities from Tables 1 and 2.

Table A10: Occupation Outcomes also using data from 1910 City Directory for Black Respondents, Sample of Men Comparison Cities

	Replace Missing Occscore Values		Replace All Occscore Values	
	ln(Occscore)	White-Collar 0/1	ln(Occscore)	White-Collar 0/1
	(1)	(2)	(3)	(4)
Tulsa × Black × Post	−0.050***	−0.025***	−0.046***	−0.024***
	(0.007)	(0.001)	(0.007)	(0.001)
Year-City FEs	Y	Y	Y	Y
Race-City FEs	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y
Sample	Males In Labor Force	Males In Labor Force	Males In Labor Force	Males In Labor Force
Dep. Var. Avg. for Black Tulsans, 1920	2.928	2.928	0.034	0.034
Observations	6,873,713	6,873,713	6,873,713	6,873,713

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual, living in a city, and observed in a census year. The sample includes individuals living in Tulsa or one of the 59 comparison cities. The dependent variables are reported at the top of the table. The relevant population is indicated by the "Sample" row. All specifications include controls for age, age squared, marriage, and children, year-race fixed effects, year-city fixed effects, and city-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A11: Occupation Outcomes also Using the Average Value from 1910 City Directory for Black Respondents or omitting 1910, Sample of Men Comparison Cities

	Replace Missing with City Directory Average	Omitting 1910	
	ln(Occscore)	ln(Occscore)	White-Collar 0/1
Tulsa × Black × Post	−0.057***	−0.032***	−0.020***
	(0.007)	(0.006)	(0.001)
Year-City FEs	Y	Y	Y
Race-City FEs	Y	Y	Y
Year-Race FEs	Y	Y	Y
Sample	Males In Labor Force	Males In Labor Force	Males In Labor Force
Dep. Var. Avg. for Black Tulsans, 1920	2.928	2.928	0.034
Observations	6,873,962	5,647,650	5,647,650

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual, living in a city, and observed in a census year. The sample includes individuals living in Tulsa or one of the 59 comparison cities. The dependent variables are reported at the top of the table. The relevant population is indicated by the "Sample" row. All specifications include controls for age, age squared, marriage, and children, year-race fixed effects, year-city fixed effects, and city-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A12: Summary of 1910 Comparison City Groups Characteristics

	Tulsa	All cities	Comparison City Groups		
			59 cities	93 cities	44 cities
Black (%)	10.8	5.8	11.4	10.2	20.3
		[0.000]	[0.733]	[0.744]	[0.001]
Age					
Black	25.5	27.8	27.4	25.9	25.7
		[0.000]	[0.000]	[0.261]	[0.619]
White	27.5	27.8	27.9	28.1	27.6
		[0.118]	[0.023]	[0.011]	[0.749]
Married (%)					
Black	40.6	41.5	41.5	39.6	39.5
		[0.003]	[0.090]	[0.107]	[0.110]
White	41.0	39.7	41.0	40.2	40.3
		[0.000]	[0.857]	[0.087]	[0.097]
Has children (%)					
Black	19.1	21.5	21.7	23.4	23.5
		[0.000]	[0.000]	[0.000]	[0.000]
White	28.2	28.9	29.4	28.5	28.8
		[0.000]	[0.000]	[0.650]	[0.482]
HH head home ownership (%)					
Black	28.7	17.3	18.0	30.1	29.9
		[0.000]	[0.000]	[0.353]	[0.452]
White	36.7	31.9	35.0	46.1	43.6
		[0.117]	[0.213]	[0.000]	[0.000]
Family home ownership (%)					
Black	20.6	15.2	15.7	27.2	27.1
		[0.000]	[0.001]	[0.000]	[0.000]
White	31.9	29.7	32.1	41.9	39.2
		[0.425]	[0.896]	[0.000]	[0.000]
ln(Occscore)					
Black	3.041	2.970	2.988	2.970	2.970
		[0.000]	[0.000]	[0.000]	[0.000]
White	3.296	3.255	3.265	3.249	3.284
		[0.000]	[0.000]	[0.000]	[0.327]
White collar (%)					
Black	7.089	2.572	2.334	3.331	3.331
		[0.000]	[0.000]	[0.000]	[0.000]
White	6.770	4.962	4.707	5.594	6.172
		[0.000]	[0.000]	[0.000]	[0.105]
In school, males & females ages 7 – 18 (%)					
Black	77.1	71.3	69.9	70.9	70.6
		[0.000]	[0.000]	[0.000]	[0.001]
White	84.2	77.7	78.0	83.3	83.2
		[0.000]	[0.000]	[0.121]	[0.293]

Notes: Characteristics are for males, with the exception of schooling. p-values from differences in means between city group and Tulsa are in brackets, clustered at the city level. The group of 59 cities includes cities with 1920 total population between 50,000 and 150,000 and a Black population $\geq 1,000$. The group of 93 cities are cities in the 1910 Census but not in the 1900 Census. The group of 44 cities are cities in the 1910 Census but not in the 1900 Census and with a total population $\geq 5,000$ and a Black population ≥ 250.

Table A13: Summary of 1920 Comparison City Groups Characteristics

			Comparison City Groups		
	Tulsa	All cities	59 cities	93 cities	44 cities
Black (%)	11.6	6.4	11.3	9.3	18.2
		[0.000]	[0.842]	[0.148]	[0.013]
Age					
Black	26.4	29.0	28.6	27.5	27.4
		[0.000]	[0.000]	[0.000]	[0.000]
White	27.9	28.7	28.6	28.9	28.3
		[0.000]	[0.002]	[0.003]	[0.368]
Married (%)					
Black	44.9	45.9	46.0	43.1	43.1
		[0.000]	[0.015]	[0.091]	[0.107]
White	44.7	42.5	43.6	43.3	43.5
		[0.000]	[0.000]	[0.001]	[0.036]
Has children (%)					
Black	23.7	21.4	22.0	23.0	23.2
		[0.000]	[0.000]	[0.438]	[0.574]
White	28.4	30.5	30.9	30.9	31.1
		[0.000]	[0.000]	[0.000]	[0.000]
HH head home ownership (%)					
Black	32.2	17.4	19.8	30.4	30.5
		[0.000]	[0.000]	[0.365]	[0.431]
White	38.3	35.2	38.6	47.9	45.3
		[0.312]	[0.836]	[0.000]	[0.000]
Family home ownership (%)					
Black	27.9	15.4	17.7	28.2	28.5
		[0.000]	[0.000]	[0.877]	[0.783]
White	35.0	34.1	36.9	46.1	43.3
		[0.771]	[0.179]	[0.000]	[0.000]
ln(Occscore)					
Black	2.928	3.007	3.016	2.970	2.969
		[0.000]	[0.000]	[0.009]	[0.017]
White	3.325	3.281	3.293	3.271	3.289
		[0.000]	[0.000]	[0.000]	[0.007]
White collar (%)					
Black	3.433	2.238	2.013	2.870	2.909
		[0.000]	[0.000]	[0.045]	[0.085]
White	8.468	5.339	5.043	5.670	5.916
		[0.000]	[0.000]	[0.000]	[0.000]
In school, males & females ages 7 – 18 (%)					
Black	80.3	71.3	71.9	73.4	73.2
		[0.000]	[0.000]	[0.000]	[0.000]
White	80.9	76.4	75.8	80.2	80.3
		[0.000]	[0.000]	[0.184]	[0.352]

Notes: Characteristics are for males, with the exception of schooling. p-values from differences in means between city group and Tulsa are in brackets, clustered at the city level. The group of 59 cities includes cities with 1920 total population between 50,000 and 150,000 and a Black population $\geq$ 1,000. The group of 93 cities are cities in the 1910 Census but not in the 1900 Census. The group of 44 cities are cities in the 1910 Census but not in the 1900 Census and with a total population $\geq$ 5,000 and a Black population $\geq$ 250.

Table A14: Economic Effects of the Tulsa Massacre, 1910–1940, Full Sample

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1
	(1)	(2)	(3)	(4)
Tulsa × Black × Post	−0.042***	−0.050***	−0.071***	−0.015***
	(0.007)	(0.008)	(0.007)	(0.001)
Year-County FEs	Y	Y	Y	Y
Race-County FEs	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y
1919 Riot Controls	Y	Y	Y	Y
Sample	HH Heads	All	In Labor Force	In Labor Force
Dep. Var. Avg. for Black Tulsans, 1920	0.296	0.266	2.765	0.034
Observations	28,852	30,276	29,227	29,227

Notes: The table reports WLS estimates. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. The dependent variables, reported at the top of the table, are averages for each observation. Regressions are weighted by the relevant population in each county, racial group, and year. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). All specifications include year-race fixed effects, year-county fixed effects, and county-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A15: Estimates for HH Head Home Ownership, 1910–1940

	Dependent Variable: Average of HH Head Home Ownership	
	Only Men	Full Sample
	(1)	(2)
Tulsa × Black × Post	−0.042***	−0.042***
	(0.007)	(0.007)
Year-County FEs	Y	Y
Race-County FEs	Y	Y
Year-Race FEs	Y	Y
1919 Riot Controls	Y	Y
Sample	HH Heads	HH Heads
Dep. Var. Avg. for Black Tulsans, 1920	0.298	0.298
Observations	28,653	28,852

Notes: The table reports WLS estimates when the dependent variable is the average of household head ownership. The table shows results when you subset to men only or you include the full sample. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. The dependent variables, reported at the top of the table, are averages among all household heads in that group. Regressions are weighted by the relevant population in each county, racial group, and year, which is also indicated by the "Sample" row. All specifications include year-race fixed effects, year-county fixed effects, and county-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A16: Estimates for Migration Out of Tulsa, 1920–1930, Sample of Linked Men

	Dependent Variable: Migration 0/1			
	No Selection	Self Employed 0/1 Selection	Employer 0/1 Selection	Working on Own Account 0/1 Selection
	(1)	(2)	(3)	(4)
Panel A: 60-City Sample of Comparison Cities (from Table 1)				
Tulsa × Black	0.100***	0.082***	0.100***	0.086***
	(0.011)	(0.011)	(0.011)	(0.012)
Tulsa × Black × Selection		0.194***	0.323***	0.148***
		(0.030)	(0.047)	(0.040)
Sample	All Males	Males In Labor Force	Males In Labor Force	Males In Labor Force
Dep. Var. Mean	0.32	0.32	0.32	0.32
Observations	757,833	706,007	706,007	757,833
Panel B: 94-City Sample of Comparison Cities (from Panel A of Table 2)				
Tulsa × Black	0.107***	0.099***	0.108***	0.095***
	(0.013)	(0.016)	(0.014)	(0.015)
Tulsa × Black × Selection		0.187***	0.418***	0.160***
		(0.034)	(0.051)	(0.038)
Sample	All Males	Males In Labor Force	Males In Labor Force	Males In Labor Force
Dep. Var. Mean	0.38	0.38	0.38	0.38
Observations	232,456	213,346	213,346	232,456
Panel C: 45-City Sample of Comparison Cities (from Panel B of Table 2)				
Tulsa × Black	0.115***	0.109***	0.116***	0.106***
	(0.013)	(0.015)	(0.015)	(0.015)
Tulsa × Black × Selection		0.159***	0.392***	0.135***
		(0.033)	(0.043)	(0.038)
Sample	All Males	Males In Labor Force	Males In Labor Force	Males In Labor Force
Dep. Var. Mean	0.41	0.41	0.41	0.41
Observations	105,046	96,660	96,660	105,046

Notes: The table reports OLS estimates. Coefficients are reported with standard errors, clustered by city, in parentheses. The unit of observation is an individual. Following Bailey et al. (2020b), we use inverse propensity weights to adjust for observable differences between matched and unmatched people in our census-linked sample. The dependent variable is an indicator for migration, defined by an individual changing their city or county or state of residence between 1920 and 1930. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). All specifications include fixed effects for age, marital status, number of children (if any), as well as race and city fixed effects. For columns 2–4, we include interactions between the specific 1920 variable of heterogeneity focus and both race and city fixed effects. Our measures of heterogeneity are all based on the `classwkr` variable from IPUMS. In column 2, we define someone as self-employed if they are coded as either an employer or working on their own account. In column 3, we define someone as an employer if they are $classwkr = 11$. In column 4, we define someone as working on their own account if they are $classwkr = 12$. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A17: Economic Effects of the Tulsa Massacre with Linking-Based Similarity Spillovers, 1910–1940

	HH Head Home Ownership 0/1	Family Home Ownership 0/1	ln(Occscore)	White-Collar 0/1	In School 0/1	In School 0/1	In School 0/1
			Dependent Variable:				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Log LinkSim							
Tulsa × Black × Post	−0.1445***	−0.1697***	0.0710***	−0.0322***	−0.0901***	−0.0866***	−0.0898***
	(0.0139)	(0.0152)	(0.0105)	(0.0026)	(0.0103)	(0.0094)	(0.0096)
LinkSim (log) × Black × Post	−0.0156***	−0.0189***	0.0142***	−0.0015***	−0.0061***	−0.0071***	−0.0068***
	(0.0023)	(0.0025)	(0.0016)	(0.0004)	(0.0016)	(0.0014)	(0.0015)
Panel B: LinkSim (k)							
Tulsa × Black × Post	−0.0550***	−0.0614***	−0.0120***	−0.0230***	−0.0580***	−0.0485***	−0.0538***
	(0.0028)	(0.0032)	(0.0026)	(0.0006)	(0.0029)	(0.0026)	(0.0027)
LinkSim (k) × Black × Post	−0.0061***	−0.0073***	0.0050***	−0.0004	−0.0040***	−0.0043***	−0.0042***
	(0.0014)	(0.0017)	(0.0008)	(0.0002)	(0.0006)	(0.0006)	(0.0006)
Year-County FEs	Y	Y	Y	Y	Y	Y	Y
Race-County FEs	Y	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y	Y
Sample	Male HH Heads	All Males	Males In Labor Force	Males In Labor Force	Males Ages 7-18	Females Ages 7-18	Full Ages 7-18
Dep. Var. Avg. for Black Tulsans, 1920	0.298	0.255	2.971	0.032	0.79	0.774	0.782
Observations	28,540	29,695	28,886	28,886	25,548	25,216	26,338

Notes: The table reports WLS estimates. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. The dependent variables, reported at the top of the table, are averages for each observation. Regressions are weighted by the relevant population in each county, racial group, and year. The relevant population is indicated by the "Sample" row. For the sample of individuals in the labor force, we examine individuals who report being in the labor force and who have a valid occupational code (see the Appendix for further explanation). Our LinkSim measures capture familial and social connections between Tulsa and other counties. To do so, we construct extended family networks through census linking. We first link all 1920 Tulsa residents to earlier censuses (1850-1910), then identify their household members in those earlier censuses, and link those family members across all available censuses. We repeat this process once more to create a three-degree network connecting Tulsa to other counties. The resulting log count (Panel A) or count in 1000s (Panel B) of family links serves as our measure of social connection, with more connected counties likely to receive more detailed and personal accounts of the Tulsa massacre. All specifications include year-race fixed effects, year-county fixed effects, and county-race fixed effects. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A18: Surname Similarity and Migration Patterns, 1910–1930

	Dependent Variable: Number of Individuals Migrating According to Linked Census Records									
	1910-1920					1920-1930				
	Total	Black		White		Total	Black		White	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Migration to Tulsa										
Cosine Similarity (All)	5.42***	11.76***		5.44***		7.24***	11.51***		7.29***	
	(0.51)	(2.82)		(0.51)		(0.58)	(2.52)		(0.59)	
Cosine Similarity (Black)			5.66***					6.80***		
			(1.04)					(1.10)		
Cosine Similarity (White)					5.91***					7.76***
					(0.51)					(0.53)
Log Distance (Miles)	-1.10***	-1.16***	-1.32***	-1.06***	-1.02***	-1.12***	-0.96***	-1.14***	-1.11***	-1.05***
	(0.10)	(0.23)	(0.27)	(0.10)	(0.10)	(0.09)	(0.24)	(0.28)	(0.09)	(0.08)
State FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	3,026	1,020	956	3,026	3,026	3,019	870	814	3,019	3,019
Panel B: Migration from Tulsa										
Cosine Similarity (All)	7.80***	3.07		7.77***		8.42***	22.24***		8.24***	
	(0.91)	(5.78)		(0.91)		(1.65)	(3.67)		(1.62)	
Cosine Similarity (Black)			5.03***					9.14***		
			(1.83)					(1.24)		
Cosine Similarity (White)					8.13***					8.30***
					(0.87)					(1.51)
Log Distance (Miles)	-1.32***	-1.28***	-1.46***	-1.31***	-1.26***	-1.07***	-1.07***	-1.48***	-1.07***	-1.03***
	(0.12)	(0.39)	(0.45)	(0.12)	(0.12)	(0.12)	(0.32)	(0.37)	(0.12)	(0.12)
State FEs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,848	457	434	2,802	2,802	2,938	1,429	1,331	2,938	2,938

Notes: The table reports PPML estimates. Coefficients are reported with robust standard errors in parentheses. The unit of observation is a non-Tulsa county. The dependent variables count the number of people linked from one census to another who migrated to (Panel A) or from (Panel B) Tulsa. We include all counties, including those with zero people linked to or from Tulsa. However, with our state fixed effects, some outcomes are perfectly predicted when a given state has no linked people (either in total or by race) to or from Tulsa, which is why the number of observations varies across specifications. In addition, there are 247 counties with no Black population in 1920 and hence no cosine similarity in Black names with Tulsa. Statistical significance is denoted by: *$p<0.1$; **$p<0.05$; ***$p<0.01$.

Table A19: Direct Effects of the Tulsa Massacre on Occupational Choices, 1910–1940

		Dependent Variable: Geographic Concentration of Occupations in County				
		Share in Top HHI Occupations				Share Non-White Collar
	Mean HHI	Top 5	Top 10	Top 25	Top 50	and Portable
	(1)	(2)	(3)	(4)	(5)	(6)
Tulsa × Black × Post	−0.012***	−0.010***	−0.011***	−0.014***	−0.040***	0.047***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
Year-County FEs	Y	Y	Y	Y	Y	Y
Race-County FEs	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y
Dep. Var. Avg. for Black Tulsans, 1920	0.010	0.000	0.000	0.004	0.026	0.944
Dep. Var. Avg. for Black Americans, 1920	0.009	0.000	0.000	0.016	0.048	0.940
Observations	27,896	27,896	27,896	27,896	27,896	27,942

Notes: The table reports WLS estimates. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. Our dependent variables are measures of how geographically concentrated the set of occupations are in each county by racial group by year in our panel. We calculate this as follows: For every occupation o coded by IPUMS, we calculate the geographic concentration of occupations using the Herfindahl-Hirschman Index (HHI) in 1920. We do this separately for each racial group. Column 6 presents the share of employment in non-white collar and portable occupations, where we define an occupation to be non-white collar if it is occ1950 greater than 100 and portable if it has an HHI below the median. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.

Table A20: Spillover Effects of the Tulsa Massacre on Occupational Choices, 1910–1940

	Dependent Variable: Geographic Concentration of Occupations in County					
	Mean HHI			Share Non-White Collar and Portable		
	(1)	(2)	(3)	(4)	(5)	(6)
Tulsa × Black × Post	−0.012***	−0.034***	−0.044***	0.047***	0.067***	0.059***
	(0.001)	(0.003)	(0.004)	(0.003)	(0.008)	(0.013)
Cosine Similarity (Black) × Black × Post		−0.031***			0.027*	
		(0.004)			(0.014)	
Cosine Similarity (All) × Black × Post			−0.043***			0.016
			(0.005)			(0.017)
Year-County FEs	Y	Y	Y	Y	Y	Y
Race-County FEs	Y	Y	Y	Y	Y	Y
Year-Race FEs	Y	Y	Y	Y	Y	Y
Dep. Var. Avg. for Black Tulsans, 1920	0.010	0.010	0.010	0.944	0.944	0.944
Dep. Var. Avg. for Black Americans, 1920	0.009	0.009	0.009	0.940	0.940	0.940
Observations	27,896	26,394	27,896	27,942	26,439	27,942

Notes: The table reports WLS estimates. Coefficients are reported with standard errors, clustered by county, in parentheses. The unit of observation is a racial group (Black, white, and other), living in a county, and observed in a census year. Our dependent variables are measures of how geographically concentrated the set of occupations are in each county by racial group by year in our panel. We calculate this as follows: For every occupation o coded by IPUMS, we calculate the geographic concentration of occupations using the Herfindahl-Hirschman Index (HHI) in 1920. We do this separately for each racial group. Columns 4-6 present the share of employment in non-white collar and portable occupations, where we define an occupation to be non-white collar if it is occ1950 greater than 100 and portable if it has an HHI below the median. Statistical significance is denoted by: *p<0.1; **p<0.05; ***p<0.01.