Jim Crow and the Spatial Mismatch Hypothesis *

Martin Ruef
Department of Sociology
Duke University
Durham, NC 27708-0088

Angelina Grigoryeva
University of Toronto
Toronto, ON M5S Canada

September 2018

* Draft Version: Please do not copy, quote, or cite without permission of the authors. Address correspondence to Martin Ruef, Department of Sociology, Duke University, Durham, NC 27708-0088. E-mail: mr231@duke.edu.

Jim Crow and the Spatial Mismatch Hypothesis

Abstract

A robust body of social science research has investigated the spatial mismatch hypothesis (SMH), considering the consequences of geographic disparities between black residential locations and potential opportunities for employment. Focusing on U.S. urban areas between the 1970s and the present, studies have produced equivocal evidence on the implications of spatial mismatch for black employment. In this paper, we argue that the mixed evidence may result from a misspecification in both the historical period and mechanisms whereby spatial mismatch affects black employment opportunities. We show that national declines in black employment and labor force participation, particularly among black women, were especially pronounced in the Jim Crow era (1880s-mid 1960s), rather than the post-industrial era (1970s to present) in which the SMH has generally been tested. We then investigate the extent to which the SMH should be formulated as a commuting problem, involving the difficulties that blacks face in reaching non-residential sites of employment, or a problem of residential ecology, in which blacks who do not live near entrepreneurs or white neighbors are less likely to obtain jobs. Analysis of census micro-data between 1910 and 1970 suggests that residential segregation provides the most consistent account of black-white employment gaps, insofar as employment under Jim Crow suffered when black housing was separated from the homes of business owners and work opportunities in residential locales.

Introduction

Since its formulation by the economist John Kain, the spatial mismatch hypothesis has offered an influential structural account of unemployment and restricted labor force access among urban blacks. While sociologists have identified a variety of mechanisms that reflect racial bias among employers (Pager, Bonikowski, and Western 2009; Pager 2007) and within job referral networks (Smith 2007, 2010; Royster 2003), the spatial mismatch hypothesis (SMH) argues that employment problems can occur among urban minorities even in the absence of such direct labor market discrimination. All that is needed, according to the SMH, is a link between racial segregation in the housing market and the level of minority employment in urban areas, particularly if housing locations complicate access to suitable jobs. Writing during the 1960s, Kain believed that "postwar suburbanization [had] seriously aggravated the problem" (1968: 167) by moving retail and manufacturing jobs out of cities and concentrating poor minority residents in ghettoized inner city areas.

An extensive literature has since emerged to test the SMH, yielding mixed empirical results, with support for the hypothesis varying by metropolitan area, measures of mismatch, and demographic subgroup (Ihlanfeldt and Sjoquist 1998; Boardman and Field 2002; Fernandez and Su 2004). A number of scholars have cautioned against causal interpretation of evidence for the SMH based on cross-sectional data, noting that employment levels could reflect selective migration among (potential) workers and employers (Fernandez 2008; Mouw 2000). Others have called attention to the value of new geographic and transit micro-data in determining the commuting costs of workers (Covington 2018; Manning and Petrongolo 2017; see also Cohn and Fossett 1996; Logan 2012). A commonality in research on spatial mismatch in the United States is that it has focused on minority employment between the late 1970s and early 2000s, a historical era that is quite different than the late Jim Crow period in which Kain first developed his hypothesis.

In this paper, we argue that this shift in historical context may be a crucial to both the theoretical conceptualization and empirical evidence that has been marshalled for the spatial mismatch hypothesis. The SMH assumes that decisions regarding residential location are constrained (Kain 1968; Ellwood 1986). While housing discrimination, wealth inequality, and neighborhood

attachments continue to restrict the mobility of black residents in the post-Civil Rights era, those constraints were exacerbated under Jim Crow, by both legal and extra-legal means. The spatial mismatch model also assumes that there are (nontrival) transportation or search costs for jobs outside of black neighborhoods. Those costs persist today through unequal access to private vehicles, public transit, and news about jobs (Covington 2018), but they were far more severe in the presence of segregated public transit and the absence of modern tools for disseminating information on job openings. Finally, the SMH assumes that there are constraints on the location of businesses and other employers. In modern applications of the theory, these location constraints tend to be reasonably flexible, driven by economic concerns or zoning restrictions for businesses. Historically, those constraints were far more daunting, since businesses, schools, and other organizations were legally restricted from serving a mixed-race clientele in many states (Murray 1951). As a result, employers' location decisions were tied closely to residential demography under Jim Crow.

Given the paucity of prior work that examines spatial mismatch in the context of the Jim Crow era, we begin by revisiting the historical foundations of the spatial mismatch hypothesis and consider descriptive trends in the black-white gap in labor force participation and employment since the late 19th century. Focusing on urban areas, these trends reveal that black men and women had relatively strong labor force outcomes in the early 20th century that were progressively eroded by the end of the Jim Crow era. For both adults and youth, multivariate analyses also suggests that the disadvantage of being black in the urban labor market emerged by 1960, controlling for a variety of individual sociodemographic characteristics.

We then revisit the spatial mismatch model and, following Kain's own theoretical formulation, expand it beyond a narrow emphasis on distance-to-work or commuting time. Considering the distinct historical features of Jim Crow, we argue that spatial mismatch could affect labor force outcomes among blacks through the social stigma involved in reaching jobs from residential areas, the lack of information (or opportunity to learn about employment) under racial segregation, and reduced access to intimate residential spaces that were often the sites of domestic employment. Analysis of Census micro-data between 1910 and 1970, linking individuals with features of their

surrounding neighborhoods, suggests that residential ecology and residential segregation provide a compelling explanation for the declining historical fortunes of black men and women in the urban labor market. These findings also point to a more sociological version of the spatial mismatch hypothesis, in which black underemployment is a consequence of the exclusion of blacks from neighborhood referral networks and domestic spaces, rather than mere commuting difficulties.

History and the Spatial Mismatch Hypothesis

Although the spatial mismatch hypothesis is most often associated with a 1968 article published by John Kain in the *Quarterly Journal of Economics*, Kain actually presented a paper formulating the idea four years earlier at the meetings of the American Statistical Association. The 1964 paper, titled "The Effect of the Ghetto on the Distribution and Level of Nonwhite Employment in Urban Areas," would likely have remained obscure if not for the events that transpired in the succeeding years (Kain 2004). Social unrest and riots by black residents gripped a number of American inner cities, beginning with the Watts neighborhood in Los Angeles in August of 1965. During the "long hot summer" of 1967, Lyndon Johnson created a commission, under the direction of Illinois governor Otto Kerner, to investigate potential causes and remedies for these civil disorders. A key cause identified by the Kerner Commission Report built directly on Kain's thesis, arguing that "most new employment opportunities do not occur in central cities, near all-Negro neighborhoods. They are being created in suburbs and outlying areas – and this trend is likely to continue indefinitely" (National Advisory Commission on Civil Disorders 1968: 392). From the perspective of both public policy and social science, a link emerged between the residential segregation of African Americans and their frustrations in the labor market.

This excursus on the intellectual origins and reception of the spatial mismatch hypothesis highlights the historically-embedded nature of the argument (see, e.g., Griffin [1992] and Sewell [2005] on the role of temporality in social science explanations more generally). In its most basic terms, the spatial mismatch problem posited a history contrasting deindustrializing, jobless

inner city areas that were sites of black unemployment and social unrest with earlier black urban neighborhoods, which -- while still segregated and affected by poverty -- were within a stone's throw of white-owned businesses, residences, and industry. In more sophisticated form, this is also the argument that we see carried forward persuasively by Kain's successors, including prominent sociologists such as William Julius Wilson and John Kasarda. Wilson argued that "inner-city communities prior to 1960 exhibited the features of social organization – including a sense of community, positive neighborhood identification, and explicit norms and sanctions against aberrant behavior", but that the transition from institutional to jobless ghettos created the "new urban poverty" among black residents in U.S. cities (1987: 3; 1996). Kasarda called attention to the economic restructuring of these cities since the 1960s, from arenas for processing goods to arenas for processing information, as a source of spatial mismatch for urban African Americans, who have tended to be excluded from the knowledge economy (Kasarda 1985, 1989). Following these pioneering analyses, most empirical studies of spatial mismatch have used data from the last four decades to analyze the problem of residential location and black unemployment in urban areas (for reviews, see Fernandez and Su 2004; Gobillon, Selod and Zenou 2007).

Historical Trends in the Black-White Employment Gap

The temporal focus of recent studies begs the question: is the era of urban deindustrialization (roughly, 1970s to the present) the right time frame for studying the spatial mismatch problem? Is this the historical period where the black-white gap in labor force activity has seen the largest changes? And how do these changes compare to those observed during the Jim Crow era (1880s to mid-1960s), when the institutional ghettos identified by Wilson first emerged in American cities?

[Insert Figure 1 About Here]

We can obtain a preliminary empirical perspective by plotting long-term trends in black and white rates of labor force participation and employment (Figure 1).[1] Using Census records, labor force participation can be traced to the beginning of the Jim Crow era, in 1880, based on whether an individual had a "gainful occupation", irrespective of whether they were employed or unemployed at the exact time of the Census. Figure 1a documents three notable aspects of urban labor force participation in the United States. First, black city residents had high rates of labor force participation prior to World War II, with rates among black men exceeding those of white men by 1% to 4%. Second, labor force participation among black women was especially high relative to white women, with rates that were 20% to 31% higher. This dovetails with the observation of Wilson (1996) and others that many black inner-city neighborhoods may have historically been segregated and poor, but they were not plagued by joblessness.

However, the timing of changes in the black-white gap in labor force participation is more perplexing in light of the literature on spatial mismatch. Between 1930 and 1960, the rate of labor force participation among black men goes from 4% above that of white men to 9% below. During the same three decades, the rate for black women goes from 21% above that of white women to parity. The third notable feature of the chart is that the historical changes in labor force participation transpire in the culminating decades of Jim Crow. There is almost no change in the black-white gap during the era of urban deindustrialization, in which the spatial mismatch problem has been studied so extensively.

The Census time-series for urban employment rates is shorter (beginning in 1910), but remains informative (Figure 1b). Looking at current employment levels, black employment among city residents was strong until the Great Depression, with black men at parity with white men and black women at employment rates that were 19-30% above those of white women. The

[1] The formulation of the spatial mismatch problem originally covered employment and earnings, and has subsequently been extended to housing prices, home ownership, education, and other outcomes (Kain 2004). For the sake of specificity, we focus exclusively on employment outcomes, both in an effort to hew closely to Kain's initial conception and to ensure that high-quality data are available over an extended historical time period.

employment prospects for urban African Americans shifted noticeably over the next four decades: by 1970, the employment rate among black men was nearly 8% below that of white men, while the employment "advantage" among black women had dwindled to 5%. In contrast to labor force participation, the employment situation of urban black residents continued to deteriorate, leading to a -15% and -3.5% employment gap for black men and women, respectively, by the 2000 Census. Nevertheless, the majority of the century's decline in urban black employment had occurred before 1970 (54% for black men and 72% for black women), rather than thereafter.

[Insert Figure 2 About Here]

A limitation of these descriptive trends is that they ignore heterogeneity in the black and white labor force, as well as crucial transformations affecting the geographic distribution and human capital of African Americans in particular (e.g., the Great Migration, end of legal segregation of schools). Figure 2 displays the odds of black labor force participation and employment relative to whites between 1910 and 1970, accounting for underlying shifts in the demographic characteristics, education, and location of adult (age 20+) workers.[2] The trends in labor force participation can be summarized concisely: between 1910 and 1960, urban blacks experienced a secular decline in their odds of having a gainful occupation compared to urban white residents (Figure 2a). In 1910, black men in U.S. cities were nearly three times as likely to be in the labor force as white men, net of other factors, while black women were nine times as likely to be in the labor force as white women. By 1960, black men were less than half as likely to be in the labor force as white men, while black women were slightly less likely to be in the labor force than their white counterparts. After 1960, black labor force participation improved somewhat by this standard.

[2] Odds are plotted on a log scaled Y-axis. The sources of data and models for estimating black labor force participation and employment are discussed at greater length in the section on *Data and Method*.

The corresponding estimates for employment rates (Figure 2b) also point to a sharp decline during the first half of the 20th century for urban black men and women, albeit with a leveling off after 1950. Again, black women had especially high odds of employment relative to white women in 1910 (nearly eightfold, holding other factors constant), but were close to parity between 1950 and 1970. Black men suffered a growing employment disadvantage until 1950, when their odds of employment were roughly half those of white men, and experienced a slight rebound thereafter. Among black teenagers (ages 15 to 19), trends were similar for both urban employment and labor force participation, albeit with less difference among black youth by gender, fewer labor market advantages relative to white youth in the early 20th century, and larger disadvantages relative to white youth by 1950 and 1960 (Appendix, Figure A1).

These historical trends for urban blacks thus suggest that important shifts in labor market opportunities had occurred during the era of Jim Crow (i.e., by the 1960s) and that a focus on the deindustrializing cities of the 1970s, 80s, and 90s may miss much of this social change. In the next section, we consider how the theory of spatial mismatch might be extended in order to account for the distinctive mechanisms affecting black workers under Jim Crow.

Mechanisms of Spatial Mismatch under Jim Crow

Most modern studies of spatial mismatch present it as a logistical problem, whereby racial or ethnic minorities experience barriers in the labor market due to the distance or travel times between their residential neighborhoods and job sites. Empirical research emphasizing this mechanism has yielded equivocal results. For instance, Board and Feldman (2002) review ten distance-to-work studies across a diverse set of U.S. metropolitan areas and find that four support the SMH, four do not support it, and another two offer mixed evidence. More recently, researchers have recognized that spatial mismatch is also a function of the modes of transportation that individuals have access to (Grengs 2010). Ownership or access to personal vehicles has emerged as a potential tool against spatial mismatch among the poor (Gurley and

Bruce 2005), though one that also exhibits heterogeneity in increasing labor supply across different sub-populations (e.g., Bee 2016).

This emphasis on spatial mismatch as a result of commuting costs for minority workers – and, especially, African Americans – can also be applied in historical settings. Under Jim Crow, legislated residential segregation and zoning in the early 20th century relegated many black families to particular neighborhoods or city blocks (Trounstine 2018), areas that tended to be undesirable when considering commuting patterns or local amenities. At the same time, historical conditions also reveal issues in interpreting the spatial mismatch hypothesis too narrowly in terms of modern commuting challenges. Until the mid-20th century, workers often did not rely on private vehicles for commuting purposes. As late as 1960, about 60% of urban blacks and 43% of urban whites in the U.S. used other modes of transport to get to work, far more than current trends, which place transportation modes aside from private vehicles at only 15% of commuters within metropolitan areas (U.S. Census 1960; AASHTO 2013). Historically, many workers relied on common carriers (busses, streetcars, subways, etc.) and lived in close proximity to their place of work. This was even the case in manufacturing, the sector most commonly associated with the claim that deindustrialization served as a precursor to spatial mismatch. For instance, studies of factory workers in the 1940s found that more than half of manufacturing employees lived within three miles of their work. Within this radius, about 60% of workers commuted by walking, biking, or taking a common carrier (Carroll 1949). Of course, these early commuting studies sampled individuals who *were* employed and may thus understate the logistical challenges faced by the unemployed.

[Insert Figure 3 About Here]

Kain (1968), as well as more recent scholars (e.g., Gobillon, Selod and Zenou 2007), have identified other mechanisms that may lead to spatial mismatch for blacks and other minorities. Compared to the predominant emphasis on commuting distance, many of these alternate mechanisms were especially salient during the Jim Crow era (see Figure 3). Writing in the

1960s, Kain himself recognized that the transportation challenges for blacks were not simply a function of distance, but the "difficulty of reaching certain jobs from [black] residence areas" (1968: 179). These difficulties were compounded in cities where public transit was segregated by law and routes between black residential areas and workplaces were circuitous or absent (ibid: 180-181). Segregated transportation could result in increased commuting times, but more perniciously, it resulted in social stigma. Riding trains, busses, streetcars, or other segregated conveyances was an intensely degrading experience for blacks under Jim Crow (Tyler 2018). Black residents who chose not to endure these humiliations were likely to find that their employment options were severely restricted.[3]

Kain and some of his successors have identified another mechanism that was deeply affected by Jim Crow: the ability of blacks to acquire information and learn about job opportunities, especially those offered by white employers. A well-established sociological tradition highlights the importance of casual associations ("weak ties") with neighbors, former co-workers, and others in finding a job (Granovetter 1973, 1995). Economists have recognized that the efficiency of job search processes, including those relying on these casual associations, tend to decrease with a worker's distance from job sites (Gobillon, Selod and Zenou 2007). But racial segregation induces a second form of spatial mismatch that affects job search costs and efficiency. By separating black and white housing – whether directly, through local ordinances and covenants, or indirectly, through the segregation of other amenities – Jim Crow removed black residents from white neighbors, who were more likely to know about job opportunities and more likely to be employers themselves. Work on social capital (e.g., Lin 2001) documents the relevance of such ties for employment and status attainment, especially when the ties connect individuals from marginalized backgrounds or positions to alters with greater status or power.[4]

[3] Although the theory of social stigma was most famously developed by Erving Goffman (1986 [1963]) at the time of Jim Crow, it was conceptualized at a fairly abstract level and did not engage with the stigmatizing effects of racial segregation. Some scholars have argued that Goffman was intentionally apolitical in his approach to the topic and sought to avoid its implications for racism and racial inequality in America (Tyler, 2018).

[4] Notably, some research has found that the relationship between social capital and attained occupational status or income is not necessarily direct, but that social capital instead affects the optimism and intensity surrounding job search (Lin, 2001: 89).

Following Granovetter (1995: 170-171), then, the mechanism that drove spatial mismatch historically may not have been the geographic separation of black residents and job opportunities, but the inability of blacks to tap into job referral networks among their neighbors. However, in one crucial instance – that of domestic work – both of these mechanisms could have operated simultaneously to reduce black access to employment under Jim Crow. Among black women in particular, domestic service emerged as one of the most widespread options for employment in the late 19th and early 20th century, as "White women sought to distance themselves … from such dirty and onerous work" (Branch 2011: 4). Yet the institutionalization of Jim Crow threatened even this devalued source of income. By spurring the segregation of black and white housing, Jim Crow created a commuting problem for black domestic workers who had to travel to increasingly-distant white neighborhoods. It created a problem of job search, insofar as black women and men were less likely to hear about opportunities in white residential areas from their neighbors. Finally, Jim Crow may also have increased direct discrimination among residential employers against segregated black domestic workers, by stigmatizing the hiring of housekeepers, cooks, nannies, or tradesmen from the "ghetto". Although theories of spatial mismatch posit such direct discrimination as a general mechanism (e.g., Kain 1968; Gobillon et al. 2007), it is especially salient in the case of domestic workers, who were entering the intimate confines of white residential areas and homes.

Figure 3 summarizes our argument about the mechanisms of spatial mismatch under Jim Crow. In brief, it suggests that the standard emphasis on commuting costs and commuting distance as a deterrent to black employment ought to be supplemented by attention to the social stigma of travel in segregated public transportation, the deterioration of referral networks among neighbors following housing segregation, and the constraints that Jim Crow places on work opportunities in residential settings. As discussed in the following section, our empirical tests will focus on the constructs contained within the solid rectangles, while the constructs within the dotted rectangles either cannot be measured systematically in our historical data (e.g., social stigma, commuting time) or are outside the scope of this study (housing segregation itself).

Data and Method

Our historical data are drawn from the Integrated Public Use Microdata Series (IPUMS) for the period between 1910 and 1970 (Ruggles et al. 2015). We begin in 1910 because relatively few commuters relied on vehicular transportation (either public or private) before that decennial census.[5] Moreover, the first wave of urban laws enforcing the residential segregation of city blocks and neighborhoods began in 1910 (Rice 1968). We end in 1970, after Jim Crow statutes and ordinances had been overruled by the Civil Rights Act of 1964. This period also coincides with the availability of census information on residential ecology and neighborhoods at a reasonably fine-grained geographic scale (below the level of PUMAs, or public use microdata areas). Table 1 provides an overview of these data samples, the basis for neighborhood units in each census year, and the number of observations after accounting for missing data.

[Insert Table 1 About Here]

As shown in the table, we consider three definitions of neighborhood units in order to calculate the prevalence of commercial businesses near a resident, the residences of employers, and commuting opportunities. Between 1910 and 1950, neighborhoods are identified via enumeration districts. An enumeration district (ED) is the smallest geographic unit above the address level in historical census data. It provides a useful approximation of urban neighborhoods, insofar as districts were canvassed by enumerators who were residents of the area, who could easily traverse the area on foot, and who had "local knowledge" of every household and family (Ruggles and Menard 1994: 161). In 1910, the median ED in the continental United States had 277 households, while in 1950 the corresponding median was approximately 192 households.

[5] Cities such as New York City, which already had a subway system in 1904, and San Francisco, with its late 19th century trolley network, constituted important exceptions to this generalization. Electric vehicles witnessed an early wave of adoption between 1890 and 1905, but mass production and mass adoption of automobiles is typically traced to 1910, when Ford Motor Company opened its Highland Park Plant (Sovacool 2009).

The U.S. Census no longer used enumeration districts in 1960 and 1970 and the increasing dissemination of private vehicles suggests the utility of defining neighborhood units on a larger geographic scale. For 1960, we analyzed the miniature PUMAs from IPUMS, which are spatially continuous regions that are identified through the agglomerative clustering of census tracts (Guo 2008). For 1970, we used the census neighborhood sample, which geocoded residents within neighborhoods that were comparable to census tracts. Using the latter definition, the median neighborhood in the United States contained approximately 2,900 households in 1970.

Given the emphasis of the spatial mismatch hypothesis on urban employment, the analytical samples were restricted to residents age 15 and older within urban areas of the continental United States. Our analyses generally distinguish between the employment of youth, i.e., individuals who are between the ages of 15 and 19 and are not heads of households, and adults, individuals who are age 20 or older. As past scholars of the spatial mismatch problem have noted (Ellwood 1986), this distinction has both a substantive and methodological basis. The emergence of "jobless ghettos" may be particularly problematic for black teenagers, who have the most limited recourse to private modes of transportation in reaching worksites. A comparison of adult and teenage outcomes is also useful for purposes of evaluating evidence of causality. While gainfully employed adults may move near worksites, leading to reverse causation in interpreting spatial mismatch, teenage employment is less likely to contribute to residential self-selection, especially when those youth still reside with another head of household.

We identify places as being urban when they reach 50,000 or more residents, a relatively modest population threshold that considers the historical coverage of our study and the fact that most blacks did not live in large cities prior to the Great Migration. By 1960, we include every central city of a metropolitan area in the continental United States. Inmates in institutions (e.g., prisoners) are excluded from all analyses and models of current employment also exclude individuals who are attending school on a full-time basis.

Measures

We deploy two measures to assess the work prospects of urban residents. The first measure focuses on labor force participation, apart from whether a resident happened to be employed at the time that the census was taken. Using the occupations listed in each census record, we identify individuals with gainful occupations outside the home or school, as well as individuals working in domestic service for non-kin heads of household. Historical trends in this measure are plotted in Figure 1a. The second measure focuses on current employment status, considering whether a resident was employed shortly before census enumeration. Employment status was recorded for the last week of March in each decennial census, except in 1910, when it was recorded for mid-April. Trends for this measure are plotted in Figure 1b.[6]

The mechanisms outlined in Figure 1 call for the construction of several ecological variables pertaining to characteristics of cities and neighborhoods. Drawing on Murray (1951) and searches of HeinOnline's State Session Laws Library (SSLL), we identified statutes and ordinances segregating public transportation through 1960. A city was considered to have segregated public transit if *any* of its common carriers (e.g., busses, streetcars, subways, trains, etc.) were segregated by law. In order to ensure that cities with and without segregated transit did not differ in other notable aspects, we used sample balancing techniques, as discussed further in the *Results* section.

Following recent empirical work, we also recognize that the public transit capacity of cities may be an important determinant of labor market outcomes (Brandtner, Lunn and Young 2018), especially in the early 20th century, when auto ownership and highway infrastructure were limited. Transit networks and density (e.g., vehicle revenue miles per person) were not carefully tracked by urban area until the end of the 20th century, but population data allow us to proxy transit capacity in terms of the number of public transit workers per capita. In particular, we use the decennial censuses to measure the number of bus drivers, conductors (bus, streetcar, rail,

[6] Note that the census did not collect data on current employment status in 1920.

subway), and motormen for common carriers among every 10,000 people in all cities with 50,000 or more residents.

For the neighborhoods were residents lived, we were interested in the prevalence of two kinds of neighbors: (a) entrepreneurs, who either operated businesses that employed others or who were self-employed in their own businesses; and (b) residential employers, who had hired live-in employees (typically as domestic servants) within the confines of their own homes. We used a broad definition of entrepreneurs to reflect the fact that not all business owners who were interested in hiring employees had already done so and even self-employed individuals could produce "peer effects" that would encourage neighbors to seek employment. Given our interest in access to neighborhood referral networks, that measure assesses residential proximity to entrepreneurs, not necessarily to the businesses that they own. By contrast, the measure for residential employment considers the prevalence of potential worksites in a neighborhood. To account for variance in household scale (e.g., a residence that employs a single domestic servant versus one that employs several), the measure of residential employment is weighted by the number of domestic employees in each household. Consequently, the multivariate models include measures of entrepreneurs and residential employees who live in a neighborhood, as a percentage of all adult residents.

For 1960 and 1970, we also considered more traditional measures of spatial mismatch, which conceptualize it as a commuting problem. Following recent work on transportation opportunities (Gurley and Bruce 2005; Bee 2016), we identified whether residents in each household had access to a private vehicle. Local opportunities in retail and services were assessed through the percentage of residential properties in each urban neighborhood that were in buildings also utilized for commercial purposes (e.g., as a grocery store, barber shop, or doctor's office). Commuting opportunities to manufacturing sites were measured via the percentage of neighborhood residents who commuted to manufacturing jobs (excluding the focal resident).

Our multivariate models account for a wide range of other demographic, geographic, and educational characteristics. In particular, we control for resident age, age squared, gender, marital status, an interaction between marital status and gender, nativity, interstate migration, education level, neighborhood population, city population, and census region of residence. We include two dichotomous controls for nativity, considering whether a resident (a) was foreign-born or (b) was born in the American south or border region (within the seventeen states that still allowed slavery in 1860 or the District of Columbia). Interstate migration identifies out-of-state migration since birth in the 1910 to 1960 censuses or out-of-state migration over the last five years in the 1970 census. Between 1910 and 1930, we include a dichotomous measure of literacy as our control for human capital, while census data from 1940 onward address educational levels in more detail (college, high school, middle school, or completion of some elementary education). Census regions distinguish between the northeastern, midwestern, southern, and western United States.

Analytical Approach

Given the multilevel nature of our data, with individuals (level 1) nested within neighborhoods (level 2), we estimate mixed-effects logistic regressions that allow for both random intercepts and random slopes. Methodologically, the inclusion of random slopes avoids the "invariant coefficients assumption" that can lead to less precise estimates of contextual effects (Heisig, Schaeffer and Giesecke 2017). Substantively, the random slopes capture the possibility that the race of residents may have different effects on labor force participation and employment by neighborhood, depending on local transit access, racial prejudice, restrictive covenants, and other factors that are not observed in our study.

In order to focus attention on the black-white employment gap, our samples exclude individuals who are identified as having another race in the census.[7] The principle estimates of interest are

[7] During this historical time period, this primarily involves the exclusion of individuals identified as having a Native American or Asian-Pacific racial background.

the effect of being a black (versus white) resident on labor force participation and employment, differences between black men and black women (estimated via a race × gender interaction), and the extent to which these gaps can be explained by the moderating spatial mismatch variables shown in Figure 3.

Results

Spatial Mismatch as a Commuting Problem

The first stage of our analysis considers the spatial mismatch hypothesis in terms of access to private vehicles and residential access to businesses, using the 1960 and 1970 census data. The lack of private vehicle ownership in black households is a plausible explanation for the poor employment prospects of black men and youth at the time. In 1960, 56% of white residents in urban areas (age 15+) had access to a vehicle in their household, while only 38% of black residents had access. By 1970, the respective statistics stood at 93% for white residents and 80% for black residents. The urban neighborhoods of black residents also contained fewer mixed-use structures than white neighborhoods. In both 1960 and 1970, white residents were located in neighborhoods where roughly 13% more residential properties were located in buildings that also had commercial utilization as retail outlets or other businesses. Finally, blacks were less likely to live in manufacturing commuter zones, with ready access to jobsites for well-paying manufacturing jobs. In 1960, the average black resident lived in a neighborhood where 18% of other residents commuted to manufacturing jobs, while the average white resident lived in a neighborhood where 21% of other residents were able to commute to manufacturing worksites. By 1970, that gap had narrowed slightly, to 17% for black residents and 19% for whites.

[Insert Table 2 About Here]

To what extent do these factors mediate the racial gap in labor force participation and employment? Table 2a displays estimates from a multilevel logistic regression of adult labor

force participation in 1960 and 1970. In both years, the baseline estimates in Model 1 indicate large gaps in labor force participation between black and white men (with odds for black men estimated at 0.41 and 0.56, respectively, of those of white men) and only slight gaps between black and white women (odds ratios of 0.91 in 1960 and 1.17 in 1970). Model 2 adds controls for vehicle access, location in a manufacturing commuter zone, and the presence of mixed-use properties with commercial utilization in the neighborhood. The estimates for black men and women are virtually unchanged, indicating that these variables do not account for racial disparities in adult labor force participation. Among the commuting variables, vehicle access has the strongest association with labor force participation (increasing the odds by a factor of 1.08 in 1960 and 1.33 in 1970), though this cannot necessarily be interpreted as causal (since adults with gainful occupations may be more likely to purchase a vehicle).

[Insert Figure 4 About Here]

The third model in Table 2a considers the possibility that race may have a moderating effect on the commuting variables and presents separate estimates for black and white residents. Among adults, black residents appears to benefit slightly more from vehicle access than white residents (coefficients are significantly different at the 0.06 level in 1960 and 0.001 level in 1970), although this does not extend to location in a manufacturing commuter zone or a residential neighborhood with commercial properties. Given the difficulty of interpreting the results of logit models with interaction terms (e.g., Ai and Norton 2003), we plot the black-white gap in labor force participation in Figure 4a, using adjusted predictions at the means of all variables except for race, gender, and vehicular access. As the left panel of the figure shows, the black-white gap among adults is almost identical in 1960 and 1970 when comparing households with vehicles and those without.

One complication in interpreting the relationships between the commuting variables and labor force outcomes is that they are subject to reverse causation. Table 2b displays the corresponding estimates for the population of urban youth (ages 15-19) who are not heads of household and,

thus, less able to choose residential locations based on their own access to gainful employment. With the exception of commercial properties in 1970, the estimates for neighborhood characteristics are negligible or negative in these models, while the relationship between vehicle access and labor force participation is weaker than that observed for adults. There is also no evidence that access to private vehicles is more salient to labor force outcomes among black youth compared to white youth. Accounting for both the mediating and moderating effects in Model 3, the estimates suggest that the black-white gap would have been virtually unchanged by universal access to private vehicles in 1960 and potentially exacerbated in 1970, when young white men with access to vehicles in their households had a rate of labor force participation that was 12.0% higher than young black men with access to vehicles, compared to a 10.5% black-white gap for young men in households without vehicles. The corresponding predictions for young women in 1970 are similar, with a 9.6% black-white gap in households with access to vehicles and a 7.8% gap in households without access to vehicles.

[Insert Table 3 About Here]

Table 3 displays similar estimates for current employment status. Several similarities with the analysis of labor force participation are worth noting. First, access to vehicles and commuting aspects of neighborhoods are weak mediators for the black-white gap in current employment. Estimates for the effect of being a black man or women are very similar in Models 1 and 2 across these specifications. Second, vehicle access has the most statistically significant relationship to employment and differentiates blacks (who appear more car-dependent for employment) from whites. However, this correlation may be the result of reverse causation and the coefficients are smaller (and often statistically insignificant) in the models for youth employment. The plots for adjusted predictions in Table 4 nevertheless suggest a notable difference between labor force participation and employment: once mediating and moderating effects are accounted for, access to private vehicles did narrow the gap in current employment (or, in the case of adult black women, shift the gap in their favor) in both 1960 and 1970. As we discuss in the next section,

this empirical pattern can best be understood in the broader context of segregated modes of transportation under Jim Crow.

Spatial Mismatch as a Problem of Stigma in Segregated Transportation

If segregated transit generated social stigma for African Americans under Jim Crow, then we would expect that commuting workers shifted their modes of transportation in segregated cities: in particular, by avoiding common carriers, such as busses and streetcars, in favor of private transportation options, such as the use of automobiles or simply walking to work. This shift could, in turn, generate unemployment or reduced labor force participation, insofar as the viable commuting radius of black workers was reduced (e.g., to "walking distance") or the cost of transportation became too high for many prospective workers.

Table 4 displays modes of transportation for urban commuters in the 1960 Census, contrasting cities where public transportation was segregated by statute and those where it was not. The raw data (top panel) suggests that black workers in segregated cities were indeed somewhat less likely to use public transit and that their mode of transportation was more likely to involve private means, especially walking. However, the corresponding data for white commuters shows that they were *far* less likely to use public transit in segregated cities and far more likely to drive to worksites or work from home. If segregation produced social stigma, then it also appears that it stigmatized the use of common carriers among white workers, who sought to avoid sharing a commute with blacks, even if (or, perhaps, because) those commuters were visible presences at the "back of the bus".[8]

[Insert Table 4 About Here]

[8] One of the most widely publicized manifestations of "white flight" from public transit came during the bus boycott of 1955 and 1956, led by Rosa Parks and the Reverend Martin Luther King. When black residents in Montgomery, Alabama refused to get on segregated city busses during the first day of the boycott, the busses ran nearly empty.

A problem in comparing raw data between cities with segregated transit and without segregated transit is that the cities may differ fundamentally in other respects, including their public transit capacity, their populations, and their geographic location (especially, those in the U.S. South versus those in the Northeast). A simple solution to this issue would be to match proximate cities that are segregated and unsegregated and of similar size (e.g., Washington, D.C. and Baltimore, or Tampa and Miami, Florida).[9] In order to match sample characteristics more systematically, we employ entropy balancing (Hainmueller 2012) to create samples of segregated and unsegregated cities that are identical with respect to mean population, transit capacity (transit workers per capita), demographic composition of commuters (age, gender, % black, % foreign-born, % born outside the U.S. South), and location (latitude and longitude). The modes of transportation for commuters in the balanced samples are shown in the bottom panel of Table 4.

After sample balancing, the distinctions between segregated and unsegregated cities in 1960 are smaller, but statistically significant differences remain. Blacks in cities with segregated transit were more likely to walk to work, thereby reducing their commuting radius and (in theory) their options for employment. Whites in cities with segregated transit were less likely to use common carriers and more likely to rely on private vehicles to reach worksites.

[Insert Table 5 About Here]

To what extent did segregated public transit have an adverse association with labor force participation and employment among black and white urban residents? The estimates in Table 5 suggest that both labor market outcomes tended to suffer in cities with segregated common carriers between 1910 and 1960, with odds of labor force participation in segregated cities that were 0.76 to 0.92 those of comparable residents in unsegregated cities, and odds of employment under segregation that were 0.75 to 0.94 those of residents in cities without public transit

[9] Among Southern cities, Miami was a fairly early adopter of an ordinance (no. 883 in 1949) that prohibited any sign that would discriminate against someone on the basis of race in a "public conveyance" (Murray 1951). Of course, such de jure measures against segregation were often accompanied by persistent discrimination on the ground, as evidenced by numerous racially-tinged incidents in Miami during the 1950s (Cooke 2016).

segregation. However, the table also reveals two important caveats with respect to the role of transit segregation in generating spatial mismatch. One is that there is generally no differential effect of segregation on labor market outcomes between blacks and whites. Although the mechanisms may be quite distinct -- e.g., with blacks avoiding stigma on segregated transit by adopting walking commutes and whites preferring to drive their own vehicles or work from home – the net effect of segregation on labor force participation and/or employment was detrimental for both groups in 1910, 1950, and 1960.[10] The second caveat is that improvements in public transit capacity generally did little to improve the labor force outcomes of *all* urban workers. Other studies that use more recent data have suggested that labor market benefits from public transit tend to be concentrated among youth and are contingent on the prevalence of carless households within an urban area (Brandtner, Lunn and Young 2018). In general, however, we do not have empirical evidence that transit capacity or the segregation of public transit were significant historical mediators of the relationship between race and labor market outcomes.

Spatial Mismatch as a Problem of Residential Ecology

The third potential effect of Jim Crow was to generate spatial mismatch as a function of residential ecology, rather than as a function of commuting challenges or the social stigma of segregated transportation. This mechanism hypothesizes that black labor force outcomes were especially sensitive to the proximity of black households to the homes of business owners (given discrimination against black workers in formal hiring practices) and to residential opportunities for employment (in particular, given the historical concentration of urban black women in domestic service). By segregating residential areas, Jim Crow is posited to have disrupted both the neighborhood job referral networks of black residents and their access to employment in residential locales.

[10] An exception to this empirical generalization occurred during the Great Depression and in its immediate aftermath (1930 and 1940), when blacks in segregated cities had slightly better labor force prospects than those in unsegregated cities.

Table 6 provides descriptive statistics that reflect the evolution of residential ecology among urban blacks between 1910 and 1970. In 1910, the average black resident in a U.S. city lived in a district that was majority (nearly 61%) white. After accounting for this marginal distribution, employers living in the neighborhood – both those that owned small businesses and those that hired domestic servants in their homes – were disproportionately white. Workers in domestic service were distributed almost identically (by race) as the local population, while self-employed individuals without employees were disproportionately black.

[Insert Table 6 and Figure 5 About Here]

By 1970, the exposure of urban black residents to white neighbors had changed substantially after decades of Jim Crow segregation. The average black resident now lived in a neighborhood that had a same-race majority (58.5% black). Employers living in urban black neighborhoods remained disproportionately white, but employees in domestic service and self-employed individuals (i.e., those without incorporated businesses) were also drawn disproportionately from the local white population.

While the statistics in the table refer exclusively to the urban neighborhoods of black residents, a national comparison of black and white neighborhoods is plotted in Figure 5. Until World War II, blacks lived in neighborhoods in which entrepreneurs (both employers and self-employed individuals) were commonplace, comprising 12-22% of the local adult and adolescent population. White residents were less likely to have business owners living in their immediate vicinity. This changed in the post-war years, as the prevalence of entrepreneurs in black neighborhoods declined and fell below the levels observed in white neighborhoods. A similar trend could be observed among residential workers, who represented nearly 6% of adult and adolescent residents in black neighborhoods in 1930 and only 3% of those residents in white

neighborhoods in the same year. By 1960, the prevalence of residential workers had converged in both types of neighborhoods, representing merely 1% of the local population.[11]

To what extent was the presence of business owners and residential employment in a neighborhood associated with black labor force outcomes? As suggested by the estimates in Table 7, black labor force participation between 1910 and 1970 consistently increased with the presence of entrepreneurs in urban neighborhoods, while white labor force participation was unchanged (or decreased) with a greater percentage of entrepreneurs who lived in the neighborhood. The same pattern holds true of current employment, with the exception of 1910, when the difference between black and white residents was not statistically significant. For residential labor in a neighborhood, the models include interaction effects for both race and gender. Both employment and labor force participation among black residents benefitted from the presence of local residential work, with eight out of the eleven estimates indicating significant gains over white residents. Among women, these benefits were more equivocal, with evidence for advantages over men limited to labor force participation prior to 1960. We also tested a three-way interaction between race, gender, and residential labor in a neighborhood, but found that it generally did not improve model fit.

[Insert Table 7 and Figure 6 About Here]

To interpret the impact of historical changes in residential ecology on black labor force outcomes, we plotted the predicted black-white gap in labor force participation and employment, under three scenarios: (1) using the average density of entrepreneurs and residential work in urban neighborhoods during each decennial census; (2) using the average density of entrepreneurs and residential work in those neighborhoods for the 1940 census; and (3) using the average density of entrepreneurs and residential work for the 1910 census. As shown in Figure

[11] Census data in 1910 and 1920 differ somewhat from later data in their enumeration of family members who are employed as workers in the household. From 1930 onward, the "class of worker" item allows us to include residential workers who are unpaid family members, while this information is not available in 1910 and 1920. For consistency, we truncate the historical series that is plotted here, but run separate cross-sectional analyses for the early decennial censuses below.

6, we estimate that the precipitous decline in labor force opportunities for urban black men and women would have been alleviated substantially under each of the counterfactual scenarios. For instance, by 1960 the predicted labor force participation for black men (holding all variables at their means) was over 10% lower than that for white men. If the average prevalence of local entrepreneurs and residential work had been the same as in 1910, then the model predicts that the gap in labor force participation would have been less than 3% in favor of white men. In the same year, the predicted employment gap was over 7% in favor of white men, holding all variables at their means. If the prevalence of local entrepreneurs and residential work was the same in black and white neighborhoods as it was in 1940, then that gap declines to 3.6% in favor of white men and, using 1910 neighborhoods, it becomes a 1.5% gap, to the advantage of black men.

Discussion

Although spatial mismatch is most commonly conceived as a result of commuting barriers between minority neighborhoods and non-residential workplaces in deindustrializing cities, our historical perspective suggests that it can also be viewed as a result of the residential barriers that emerged during the Jim Crow era. With the progressive segregation of black and white neighborhoods in the United States, African American residents were less likely to have exposure to business owners who lived nearby, neighbors whose success could serve as a source of employment or inspiration. Black residents were also increasingly distant from white households that had historically served as a source of domestic employment in many urban neighborhoods, as well as rural areas. Both of these factors can help account for the declining opportunities of black workers in the urban labor market between 1910 and the 1960s.

If the changing residential ecology of urban neighborhoods is to explain these historical shifts in labor outcomes, then that explanation must also contend with several analytical questions. First, why was black labor force participation and employment so sensitive to residential contact with a dominant, yet often discriminatory, majority group? After all, many black intellectuals have noted the potential benefits of a self-sustaining "group economy" (e.g., DuBois 1899) and

statistical analyses of residents in black enclaves continue to find an association with upward mobility (Ruef and Grigoryeva 2018), albeit one that is contingent on enclave scale. Perhaps the simplest response is that the greater resources held by white residents, particularly during the Jim Crow era, meant that maintaining an economic interface with them remained critical to black employment. This interface was likely to be fruitful if it could be achieved through weak ties for job information and referrals within a neighborhood (Granovetter 1973), rather than the strong interracial ties that were widely proscribed under Jim Crow. Moreover, while both whites and blacks could benefit from residential proximity to successful business owners or wealthy heads of household, dual labor market theory (Doeringer and Piore 1975) suggests that such contact was far more important for black residents. White workers had greater opportunity to submit job applications through formal channels or to rely on friends who had already landed jobs within large firms, while black workers faced considerable discrimination in this "primary" labor market and were forced to seek employment through more informal means and within more informal settings.

A second question is why social scientists should continue to study this source of spatial mismatch if its most pernicious effects resulted during the era of Jim Crow, rather than the era of deindustrialization. Again, there is a simple response, which hinges on the formidable path-dependence of residential segregation. Historians have documented how racial segregation in urban places can persist across decades, even in the face of critical junctures that have the potential to encourage greater residential mixture (Benton 2018). Long after some peculiar features of Jim Crow were gone -- e.g., the legal segregation of public amenities, the exclusion of black consumers from white-owned businesses, and the expectation that blacks would enter white homes primarily as servants – the persistence of racial bias in residential "choice" meant that blacks were excluded from neighborhood networks that transmitted information about jobs (Royster 2003).

On a more practical footing, the mechanisms of spatial mismatch under Jim Crow also challenge solutions to problems of black unemployment that continue to be debated today. If spatial

mismatch does not result as a function of commuting costs and difficulty, then there may only be limited payoffs to programs that facilitate car access or ownership among poor and minority populations. If spatial proximity to businesses does not translate readily into black employment opportunities, then policy-makers need to rethink the creation of enterprise zones, in which businesses are lured to locate and invest in urban areas by government incentives. The mechanism of "residential mismatch" suggests a different, albeit more challenging approach. Building on research on neighbor networks (Grannis 2009), it views geographic proximity among black and white residents as an initial step toward the development of jobs contacts and trust that contribute to greater opportunities for African Americans in the U.S. labor market.

REFERENCES

AASHTO. 2013. *Commuting in America 2013: The National Report on Commuting Patterns and Trends*. Washington, DC: American Association of State Highway and Transportation Officials.

Ai, Chunrong and Edward C. Norton. 2003. "Interaction Terms in Logit and Probit Models." *Economics Letters* 80: 123-129.

Bee, C. Adam. 2010. "The Effect of Car Ownership on Employment: Evidence from State Insurance Rate Regulation." Working Paper, Department of Economics, Notre Dame.

Benton, Mark. 2018. " 'Just the Way Things are Around Here': Racial Segregation, Critical Junctures, and Path Dependence in Saint Louis." *Journal of Urban History* forthcoming.

Boardman, Jason and Samuel Field. 2002. "Spatial Mismatch and Race Differentials in Male Joblessness: Cleveland and Milwaukee, 1990." *Sociological Quarterly* 43(2): 237-255.

Branch, Enobong. 2011. *Opportunity Denied: Limiting Black Women to Devalued Work*. New Brunswick, NJ: Rutgers University Press.

Brandtner, Christof, Anna Lunn, and Cristobal Young. 2018. "Spatial Mismatch and Youth Unemployment in US Cities: Public Transportation as a Labor Market Institution." *Socio-Economic Review*, forthcoming.

Carroll, J. Douglas. 1949. "Some Aspects of the Home-Work Relationships of Industrial Workers." *Land Economics* 25(4): 414-422.

Cohn, Samuel and Mark Fossett. 1996. "What Spatial Mismatch? The Proximity of Blacks to Employment in Boston and Houston." *Social Forces* 75(2): 557-572.

Cooke, Bill. 2016. “Remembering Miami Beach’s Shameful History of Segregation and Racism.” *Miami New Times*, March 10th.

Covington, Kenya. 2018. “Overcoming Spatial Mismatch: The Opportunities and Limits of Transit Mode in Addressing the Black-White Unemployment Gap.” *City and Community* 17(1): 211-235.

Doeringer, Peter and Michael Piore. 1975. “Unemployment and the ‘Dual Labor Market’.” *The Public Interest* 38(Winter): 67-79.

DuBois, W.E.B (ed). 1899. *The Negro in Business*. Atlanta, GA: Atlanta University Press.

Ellwood, David. 1986. “The Spatial Mismatch Hypothesis: Are There Teenage Jobs Missing in the Ghetto?” Pp. 147-185 in Freeman, R., and H. Holzer (eds.) *The Black Youth Employment Crisis*. Chicago, IL: University of Chicago Press.

Fernandez, Roberto. 2008. “Race, Spatial Mismatch, and Job Accessibility: Evidence from a Plant Relocation.” *Social Science Research* 37(3): 953-975.

Fernandez, Roberto and Celina Su. 2004. “Space in the Study of Labor Markets.” *Annual Review of Sociology* 30: 545-569.

Gobillon, Laurent, Harris Selod and Yves Zenou. 2007. “The Mechanisms of Spatial Mismatch.” *Urban Studies* 44(12): 2401-2427.

Goffman, Erving. 1986. *Stigma: Notes on the Management of Spoiled Identity*. New York, NY: Simon and Schuster (originally published in 1963).

Grannis, Rick. 2009. *From the Ground Up: Translating Geography into Community through Neighbor Networks*. Princeton, NJ: Princeton University Press.

Granovetter, Mark. 1973. “The Strength of Weak Ties.” *American Journal of Sociology* 78(6): 1360-1380.

_____. 1995. *Getting a Job: A Study of Contacts and Careers* (2nd Edition). Chicago: University of Chicago Press.

Grengs, Joe. 2010. “Job Accessibility and the Modal Mismatch in Detroit.” *Journal of Transport Geography* 18(1): 42-54.

Griffin, Larry. 1992. “Temporality, Events, and Explanation in Historical Sociology.” *Sociological Methods and Research* 20(4): 403-427.

Guo, D. 2008. “Regionalization with Dynamically Constrained Agglomerative Clustering and Partitioning (REDCAP).” *International Journal of Geographical Information Science* 22(7): 801-823.

Gurley, Tami and Donald Bruce. 2005. “The Effects of Car Access on Employment Outcomes for Welfare Recipients.” *Journal of Urban Economics* 58(2): 250-272.

Hainmueller, Jens. 2012. “Entropy Balancing: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies.” *Political Analysis* 20(1): 25-46.

Heisig, Jan Paul, Merlin Schaeffer, and Johannes Giesecke. 2017. “The Costs of Simplicity: Why Multilevel Models May Benefit from Accounting for Cross-Cluster Differences in the Effects of Controls.” *American Sociological Review* 82: 796-827.

Ihlanfeldt, Keith and David Sjoquist. 1998. “The Spatial Mismatch Hypothesis: A Review of Recent Studies and Their Implications for Welfare Reform.” *Housing Policy Debate* 9(4): 849-892.

Kain, John. 1968. “Housing Segregation, Negro Employment, and Metropolitan Decentralization.” *Quarterly Journal of Economics* 82(2): 175-197.

_____. 2004. “A Pioneer’s Perspective on the Spatial Mismatch Literature.” *Urban Studies* 41(1): 7-32.

Kasarda, John. 1985. “Urban Change and Minority Opportunities.” Pp. 33-67 in P. Peterson (ed.), *The New Urban Reality*. Washington, DC: Brookings Institution.

_____. 1989. “Urban Industrial Transition and the Underclass.” *Annals of the American Academy of Political and Social Science* 501(1): 26-47.

Lin, Nan. 2001. *Social Capital: A Theory of Social Structure and Action*. Cambridge, UK: Cambridge University Press.

Logan, John. 2012. “Making a Place for Space: Spatial Thinking in Social Science.” *Annual Review of Sociology* 38: 507-524.

Manning, Alan and Barbara Petrongolo. 2017. “How Local are Labor Markets? Evidence from a Spatial Job Search Model.” *American Economic Review* 107(10): 2877-2907.

Mouw, Ted. 2000. “Job Relocation and the Racial Gap in Unemployment in Detroit and Chicago 1980-1990.” *American Sociological Review* 65(5): 730-753.

Murray, Pauli (ed). 1951. *States’ Laws on Race and Color*. Cincinnati, OH: Woman’s Division of Christian Service, Methodist Church.

National Advisory Commission on Civil Disorders. 1968. *Report of the National Advisory Commission on Civil Disorders*. Washington, DC: U.S. Department of Justice.

Pager, Devah. 2007. *Marked: Race, Crime, and Finding Work in an Era of Mass Incarceration*. Chicago, IL: University of Chicago Press.

Pager, Devah, Bart Bonikowski, and Bruce Western. 2009. "Discrimination in a Low-Wage Labor Market: A Field Experiment." *American Sociological Review* 74(5): 777-799.

Rice, Roger. 1968. "Residential Segregation by Law, 1910-1917." *Journal of Southern History* 34(2): 179-199.

Royster, Deirdre. 2003. *Race and the Invisible Hand: How White Networks Exclude Black Men from Blue-Collar Jobs*. Berkeley, CA: University of California Press.

Ruef, Martin and Angelina Grigoryeva. 2018. "Jim Crow, Ethnic Enclaves, and Status Attainment: Occupational Mobility among U.S. Blacks, 1880-1940." *American Journal of Sociology* 124(3): forthcoming.

Ruggles, Steven and Russell Menard. 1994. *Public Use Microdata Sample of the 1880 United States Census of Population: User's Guide and Technical Documentation*. Minnesota, MN: Social History Research Laboratory.

Ruggles, Steven, Katie Genadek, Ronald Goeken, Josiah Grover, and Matthew Sobek. 2015. *Integrated Public Use Microdata Series: Version 6.0* [Machine-readable database]. Minneapolis, MN: Social History Research Laboratory.

Sewell, William. 2005. *Logics of History: Social Theory and Social Transformation*. Chicago, IL: University of Chicago Press.

Smith, Sandra. 2007. *Lone Pursuit: Distrust and Defensive Individualism among the Black Poor*. New York: Russell Sage Foundation.

_____. 2010. “A Test of Sincerity: How Black and Latino Service Workers Make Decisions About Making Referrals.” *Annals of the American Academy of Political and Social Science* 629(1): 30-52.

Sovacool, Benjamin. 2009. “Early Modes of Transport in the United States: Lessons for Modern Energy Policymakers.” *Policy and Society*, 27(4): 411-427.

Trounstine, Jessica. 2018. *Segregation by Design: Local Politics and Inequality in American Cities*. Cambridge, UK: Cambridge University Press.

Tyler, Imogen. 2018. “Resituating Erving Goffman: From Stigma Power to Black Power.” *Sociological Review*, 66(4): 744-765.

Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago, IL: University of Chicago Press.

_____. 1996. *When Work Disappears: The World of the New Urban Poor*. New York: Knopf.

Table 1. Data Sources for Multivariate Analyses of Labor Force Participation and Employment

Year	Analytical Sample	Basis for Neighborhood Unit	Observations
1910	1.4% Census	Enumeration District (ED) *	252,645
1920	2% Census	ED *	474,892
1930	5% Census	ED	1,575,221
1940	2% Census	ED *	713,527
1950	1% Census	ED	360,162
1960	5% Census	Miniature Public Use Microdata Area (Mini-PUMA)	1,725,609
1970	2% Census	Census Tract	1,657,737

* Complete count data used to construct neighborhood variables.

Table 2a. Estimates for Transit Disparities from Mixed-Effects Models of Adult Labor Force Participation

	1960			
	Model 1	Model 2	Model 3	
	All Adults	All Adults	Blacks	Whites
Black Resident	-0.902 ***	-0.895 ***	-0.671 ***	---
	(0.019)	(0.019)	(0.048)	
Black × Female	0.806 ***	0.808 ***	0.809 ***	
	(0.012)	(0.012)	(0.012)	
Vehicle in Household (1=yes)		0.074 ***	0.092 ***	0.070 ***
		(0.013)	(0.011)	(0.005)
Manufacturing Commuters in		0.001	-0.012 ***	0.001
Neighborhood (%)		(0.002)	(0.003)	(0.002)
Properties in Neighborhood with		-0.007	0.014	-0.007
Commercial Utilization (%)		(0.018)	(0.032)	(0.018)
Random Slopes				
SD (Black Resident)	0.276	0.275	0.270	
	(0.014)	(0.014)	(0.014)	
Log Likelihood (df)	-710,668.7 (22)	-710,535.1 (25)	-710,518.0 (28)	
Sample Size		1,566,106		

	1970			
	Model 1	Model 2	Model 3	
	All Adults	All Adults	Blacks	Whites
Black Resident	-0.584 ***	-0.561 ***	-0.576 ***	---
	(0.019)	(0.019)	(0.033)	
Black × Female	0.741 ***	0.748 ***	0.748 ***	
	(0.018)	(0.018)	(0.018)	
Vehicle in Household (1=yes)		0.282 ***	0.339 ***	0.265 ***
		(0.009)	(0.018)	(0.010)
Manufacturing Commuters in		0.002 ***	-0.001	0.002 ***
Neighborhood (%)		(0.000)	(0.001)	(0.000)
Properties in Neighborhood with		0.001	0.009	0.000
Commercial Utilization (%)		(0.001)	(0.004)	(0.001)
Random Slopes				
SD (Black Resident)	0.393	0.379	0.381	
	(0.015)	(0.015)	(0.015)	
Log Likelihood (df)	-505,418.7 (22)	-504,939.4 (25)	-504,927.4 (28)	
Sample Size		1,446,369		

Note: Includes controls for resident age, age squared, gender, marital status, married x gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.

** p < .01; *** p < .001 (two-tailed tests).

Table 2b. Estimates for Transit Disparities from Mixed-Effects Models of Youth Labor Force Participation

	1960			
	Model 1	Model 2	Model 3	
	All Youth	All Youth	Blacks	Whites
Black Resident	-0.881 ***	-0.881 ***	-0.826 ***	---
	(0.036)	(0.036)	(0.088)	
Black × Female	-0.244 ***	-0.243 ***	-0.243 ***	---
	(0.034)	(0.034)	(0.034)	
Vehicle in Household (1=yes)		0.040 **	0.058	0.037 **
		(0.013)	(0.033)	(0.014)
Manufacturing Commuters in		-0.008 ***	-0.011	-0.007 ***
Neighborhood (%)		(0.002)	(0.005)	(0.002)
Properties in Neighborhood with		-0.056	-0.041	-0.057
Commercial Utilization (%)		(0.023)	(0.051)	(0.023)
Random Slopes				
SD (Black Resident)	0.324	0.322	0.322	
	(0.030)	(0.030)	(0.030)	
Log Likelihood (df)	-84,005.7 (22)	-83,988.5 (25)	-83,987.9 (28)	
Sample Size		155,845		

	1970			
	Model 1	Model 2	Model 3	
	All Youth	All Youth	Blacks	Whites
Black Resident	-0.729 ***	-0.709 ***	-0.705 ***	---
	(0.028)	(0.028)	(0.067)	
Black × Female	0.159 ***	0.159 ***	0.158 ***	---
	(0.032)	(0.032)	(0.032)	
Vehicle in Household (1=yes)		0.178 ***	0.113 **	0.212 ***
		(0.024)	(0.039)	(0.029)
Manufacturing Commuters in		-0.002 **	0.002	-0.002 **
Neighborhood (%)		(0.001)	(0.002)	(0.001)
Properties in Neighborhood with		0.012 ***	0.017	0.011 ***
Commercial Utilization (%)		(0.002)	(0.007)	(0.002)
Random Slopes				
SD (Black Resident)	0.721	0.724	0.721	
	(0.031)	(0.031)	(0.031)	
Log Likelihood (df)	-106,250.4 (22)	-106,160.5 (25)	-106,156.9 (28)	
Sample Size		204,406		

Note: Includes controls for resident age, age squared, gender, marital status, married x gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.

** p < .01; *** p < .001 (two-tailed tests).

Table 3a. Estimates for Transit Disparities from Mixed-Effects Models of Adult Employment

	1960			
	Model 1	Model 2	Model 3	
	All Adults	All Adults	Blacks	Whites
Black Resident	-0.474 ***	-0.463 ***	-0.339 ***	---
	(0.019)	(0.019)	(0.048)	
Black × Female	0.701 ***	0.705 ***	0.705 ***	
	(0.011)	(0.011)	(0.012)	
Vehicle in Household (1=yes)		0.110 ***	0.282 ***	0.075 ***
		(0.004)	(0.011)	(0.005)
Manufacturing Commuters in		-0.003 **	-0.014 ***	-0.003
Neighborhood (%)		(0.001)	(0.003)	(0.001)
Properties in Neighborhood with		-0.032	-0.044	-0.032
Commercial Utilization (%)		(0.013)	(0.030)	(0.013)
Random Slopes				
SD (Black Resident)	0.294	0.292	0.278	
	(0.014)	(0.014)	(0.014)	
Log Likelihood (df)	-721,771.1 (22)	-721,460.1 (25)	-721,290.3 (28)	
Sample Size		1,522,241		

	1970			
	Model 1	Model 2	Model 3	
	All Adults	All Adults	Blacks	Whites
Black Resident	-0.321 ***	-0.290 ***	-0.419 ***	---
	(0.013)	(0.013)	(0.027)	
Black × Female	0.577 ***	0.587 ***	0.589 ***	---
	(0.014)	(0.014)	(0.014)	
Vehicle in Household (1=yes)		0.370 ***	0.532 ***	0.308 ***
		(0.009)	(0.016)	(0.010)
Manufacturing Commuters in		0.002 ***	-0.001	0.003 ***
Neighborhood (%)		(0.000)	(0.001)	(0.000)
Properties in Neighborhood with		0.002	0.000	0.002
Commercial Utilization (%)		(0.001)	(0.003)	(0.001)
Random Slopes				
SD (Black Resident)	0.337	0.314	0.309	
	(0.012)	(0.012)	(0.013)	
Log Likelihood (df)	-677,861.9 (22)	-676,919.0 (25)	-676,838.9 (28)	
Sample Size		1,408,142		

Note: Includes controls for resident age, age squared, gender, marital status, married x gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.

Table 3b. Estimates for Transit Disparities from Mixed-Effects Models of Youth Employment

	1960			
	Model 1	Model 2	Model 3	
	All Youth	All Youth	Blacks	Whites
Black Resident	-0.635 ***	-0.641 ***	-0.494 ***	---
	(0.055)	(0.055)	(0.119)	
Black × Female	-0.497 ***	-0.497 ***	-0.498 ***	
	(0.054)	(0.054)	(0.054)	
Vehicle in Household (1=yes)		-0.013	0.148 **	-0.048
		(0.022)	(0.052)	(0.025)
Manufacturing Commuters in		-0.002	-0.010	-0.001
Neighborhood (%)		(0.002)	(0.006)	(0.003)
Properties in Neighborhood with		-0.038	-0.146	-0.027
Commercial Utilization (%)		(0.029)	(0.064)	(0.029)
Random Slopes				
SD (Black Resident)	0.306	0.304	0.288	
	(0.048)	(0.048)	(0.049)	
Log Likelihood (df)	-27,289.4 (22)	-27,287.8 (25)	-27,278.6 (28)	
Sample Size		49,545		

	1970			
	Model 1	Model 2	Model 3	
	All Youth	All Youth	Blacks	Whites
Black Resident	-0.682 ***	-0.681 ***	-0.953 ***	---
	(0.035)	(0.035)	(0.093)	
Black × Female	-0.108	-0.108	-0.102	
	(0.042)	(0.042)	(0.042)	
Vehicle in Household (1=yes)		-0.022	0.235 ***	-0.160 **
		(0.040)	(0.065)	(0.049)
Manufacturing Commuters in		0.006 ***	0.002	0.007 ***
Neighborhood (%)		(0.001)	(0.003)	(0.001)
Properties in Neighborhood with		0.005	0.002	0.005
Commercial Utilization (%)		(0.003)	(0.008)	(0.003)
Random Slopes				
SD (Black Resident)	0.195	0.208	0.184	
	(0.135)	(0.126)	(0.141)	
Log Likelihood (df)	-67,764.7 (22)	-67,621.1 (25)	-67,607.2 (28)	
Sample Size		122,059		

Note: Includes controls for resident age, age squared, gender, marital status, married x gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.

Table 4. Segregation of Public Transport and Commuting Patterns in the 1960 Census

	Urban Black Workers (raw data)		Urban White Workers (raw data)	
Means of Transport	Not Segregated by Statute	Segregated by Statute	Not Segregated by Statute	Segregated by Statute
Private Vehicle	40.3%	42.4%	54.5%	72.6%
Common Carrier (bus, streetcar, etc.)	50.3%	41.3%	31.2%	14.0%
Walk	7.2%	13.1%	10.6%	7.3%
Work from Home	1.7%	1.7%	2.6%	4.3%
Other	0.5%	1.5%	1.1%	1.8%
F Test Statistic	438.8 ($p < .001$)		4225.9 ($p < .001$)	
Sample Size	127,150		735,646	

	Urban Black Workers (balanced data) †		Urban White Workers (balanced data) †	
Means of Transport	Not Segregated by Statute	Segregated by Statute	Not Segregated by Statute	Segregated by Statute
Private Vehicle	45.6%	42.1%	68.9%	72.2%
Common Carrier (bus, streetcar, etc.)	42.0%	41.5%	17.1%	14.4%
Walk	9.7%	13.2%	9.1%	7.3%
Work from Home	1.5%	1.8%	3.3%	4.2%
Other	1.2%	1.5%	1.6%	1.9%
F Test Statistic	15.0 ($p < .001$)		33.2 ($p < .001$)	

† Samples balanced by city size, location (latitude and longitude), size of transit workforce (per capita), and demographic composition (age, gender, race, and nativity).

Table 5. Estimates of Transit Segregation from Mixed-Effects Models of Labor Force Participation and Employment

	Labor Force Participation					
	1910	1920	1930	1940	1950	1960
Black Resident	0.913 ***	0.474 ***	0.297 ***	-0.114 ***	-0.355 ***	-0.864 ***
	(0.101)	(0.042)	(0.032)	(0.034)	(0.030)	(0.024)
Public Transit Capacity (employees)	-0.016 ***	0.000	0.002	0.010 **	-0.006	-0.002
	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.009)
Segregation of Public Transit	-0.191 **	-0.082	-0.141 ***	-0.162 ***	-0.134 ***	-0.281 ***
	(0.057)	(0.033)	(0.027)	(0.029)	(0.032)	(0.063)
Segregation × Black	0.114	0.091	0.378 ***	0.252 ***	0.009	0.149
	(0.136)	(0.081)	(0.067)	(0.068)	(0.065)	(0.074)
Log Likelihood	-80,466.3	-246,294.2	-573,699.2	-308,687.2	-161,005.3	-827,354.0
Sample Size	252,645	474,892	1,575,221	713,527	360,162	1,725,609

	Employment				
	1910	1930	1940	1950	1960
Black Resident	0.290 ***	-0.237 ***	-0.421 ***	-0.571 ***	-0.480 ***
	(0.082)	(0.026)	(0.028)	(0.028)	(0.026)
Public Transit Capacity (employees)	-0.012 ***	0.000	0.005	-0.005	0.006
	(0.003)	(0.002)	(0.003)	(0.002)	(0.007)
Segregation of Public Transit	-0.285 ***	-0.113 ***	-0.066 **	-0.137 ***	-0.112
	(0.057)	(0.026)	(0.025)	(0.031)	(0.051)
Segregation × Black	0.213	0.174 **	0.092	0.022	-0.025
	(0.120)	(0.056)	(0.059)	(0.062)	(0.084)
Log Likelihood	-83,246.8	-629,472.6	-310,238.6	-166,173.3	-753,049.5
Sample Size	238,551	1,454,743	655,987	352,311	1,574,698

Note: Includes controls for age, age squared, gender, race x gender, marital status, married x gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.

** $p < .01$; *** $p < .001$ (two-tailed tests).

Table 6. Racial Composition of Entrepreneurs, Residential Employers, and Workers in Urban Black Neighborhoods

	1910		1940		1970	
	% White	% Black	% White	% Black	% White	% Black
Entrepreneurs †						
Employers	82.7%	17.3%	87.6%	12.4%	72.2%	27.8%
Self-Employed	45.5%	54.5%	60.6%	39.4%	60.0%	40.0%
Residential Work						
Employers	86.8%	13.2%	69.7%	30.3%	63.0%	37.0%
Workers	60.1%	39.9%	74.2%	25.8%	60.2%	39.8%
Residents (age 15+)	60.8%	39.2%	51.6%	48.4%	41.5%	58.5%

† In 1970, the category of "employers" refers to entrepreneurs with incorporated businesses, while the category of "self-employed" refers to entrepreneurs with unincorporated businesses.

Note: Percentages reflect composition by race within rows excluding residents from "other" races, who are not tabulated.

Table 7. Estimates for Neighborhood Demography from Mixed Effects Models of Labor Force Participation and Employment

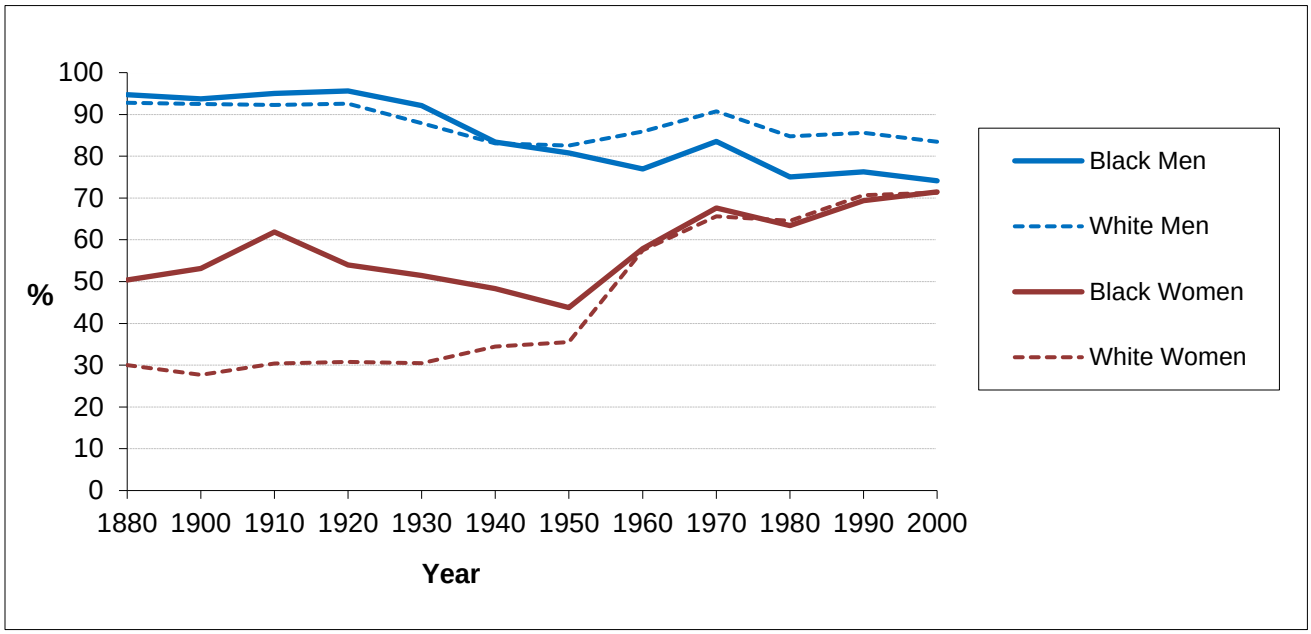
	Labor Force Participation					
	1910	1920	1930	1940	1960	1970
Black Resident	0.508 ***	0.390 ***	0.015	-0.431 ***	-1.107 ***	-0.713 ***
	(0.131)	(0.049)	(0.034)	(0.042)	(0.038)	(0.017)
% Residents Entrepreneurs	-0.005 *	0.000	-0.015 ***	0.002	-0.013 *	-0.022 ***
	(0.002)	(0.001)	(0.001)	(0.002)	(0.006)	(0.001)
% Entrepreneurs × Black	0.023 **	0.014 **	0.046 ***	0.059 ***	0.053 ***	0.038 ***
	(0.008)	(0.005)	(0.003)	(0.005)	(0.010)	(0.003)
% Residents in Residential Labor	-0.026 ***	-0.005 ***	-0.007 ***	0.007 ***	0.012	0.015 **
	(0.002)	(0.001)	(0.001)	(0.002)	(0.028)	(0.005)
% Residential Labor × Female	0.029 ***	0.007 ***	0.031 ***	0.058 ***	-0.091 ***	-0.038 ***
	(0.003)	(0.001)	(0.001)	(0.002)	(0.009)	(0.005)
% Residential Labor × Black	0.066 ***	0.009 *	0.047 ***	0.014 **	0.083	0.015
	(0.011)	(0.004)	(0.007)	(0.005)	(0.049)	(0.010)
Log Likelihood	-80,387.8	-246,273.5	-572,698.7	-307,305.2	-827,268.5	-653,729.2
Sample Size	252,645	474,892	1,575,221	713,527	1,725,609	1,657,737

	Employment				
	1910	1930	1940	1960	1970
Black Resident	0.114	-0.343 ***	-0.582 ***	-0.799 ***	-0.478 ***
	(0.109)	(0.027)	(0.036)	(0.042)	(0.015)
% Residents Self-Employed	0.008 ***	0.001	0.016 ***	0.005	-0.012 ***
	(0.002)	(0.001)	(0.001)	(0.005)	(0.001)
% Self-Employed × Black	0.011	0.019 ***	0.034 ***	0.048 ***	0.031 ***
	(0.007)	(0.003)	(0.005)	(0.011)	(0.003)
% Residents in Residential Labor	0.007 **	0.024 ***	0.010 ***	0.059 **	-0.004
	(0.003)	(0.001)	(0.002)	(0.022)	(0.004)
% Residential Labor × Female	0.002	0.001	0.003	-0.112 ***	-0.011 **
	(0.003)	(0.001)	(0.002)	(0.010)	(0.004)
% Residential Labor × Black	0.040 ***	0.028 ***	0.001	0.199 ***	0.023 *
	(0.009)	(0.004)	(0.004)	(0.056)	(0.009)
Log Likelihood	-83,217.5	-628,669.5	-310,002.2	-752,936.2	-756,099.0
Sample Size	238,551	1,454,743	655,987	1,574,698	1,536,175

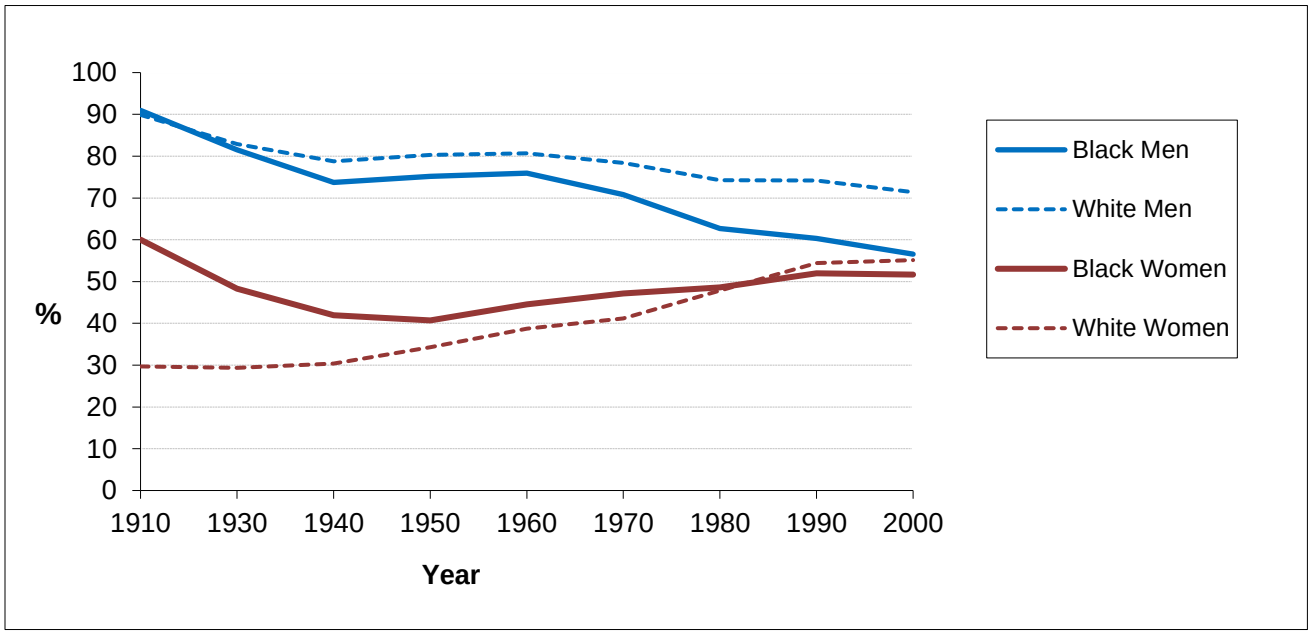
Note: Includes controls for age, age squared, gender, race x gender, marital status, married x gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence. Calculations for neighborhood variables exclude focal resident.

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests).

Figure 1. Black and White Labor Force Participation and Employment in U.S. Urban Areas



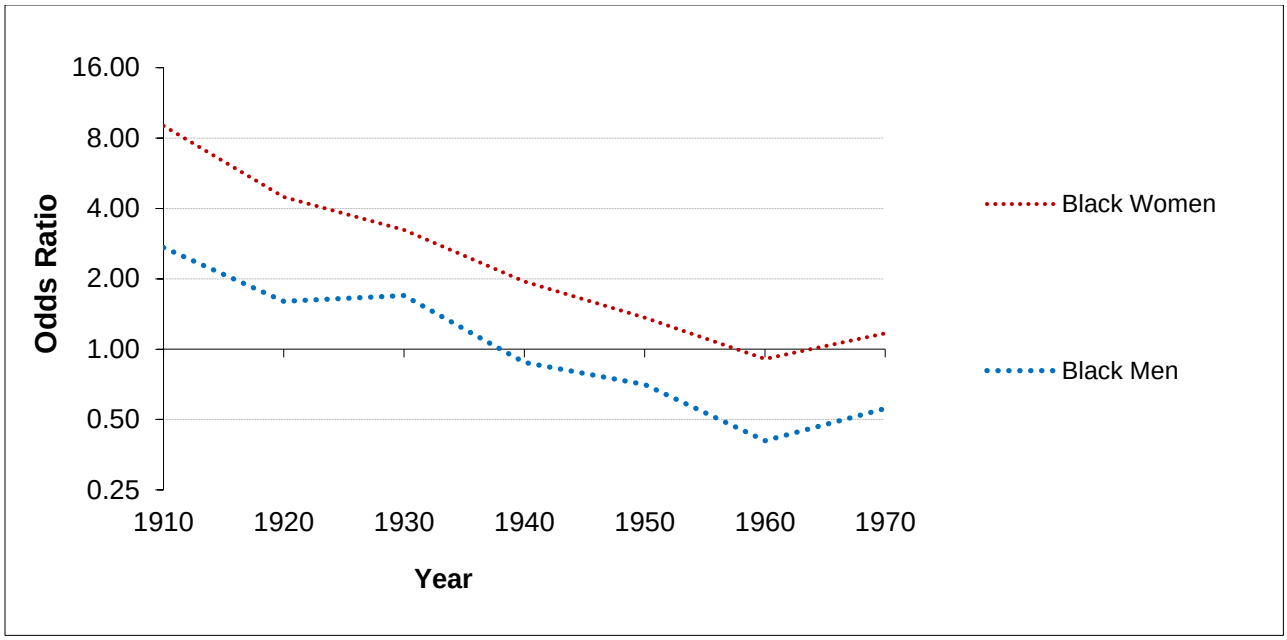
a. Individuals with Gainful Occupations, 1880-2000



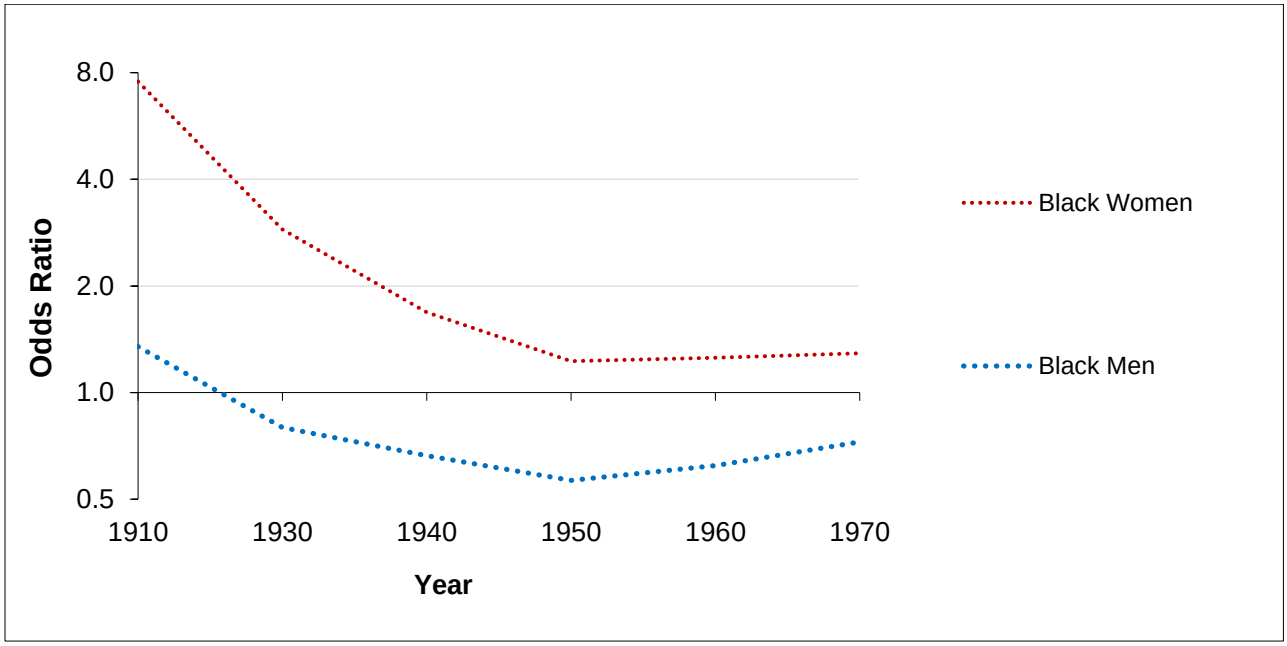
b. Individuals who are Currently Employed, 1910-2000

Note: Excludes institutional population (for both outcomes) and individuals currently in school (for employment). Urban areas are defined as cities with 50,000+ inhabitants until 1970, 100,000+ inhabitants thereafter. Individuals are U.S. residents age 15 or older.

Figure 2. Odds Ratios of Adult Labor Force Participation and Employment in Urban Areas, 1910-1970



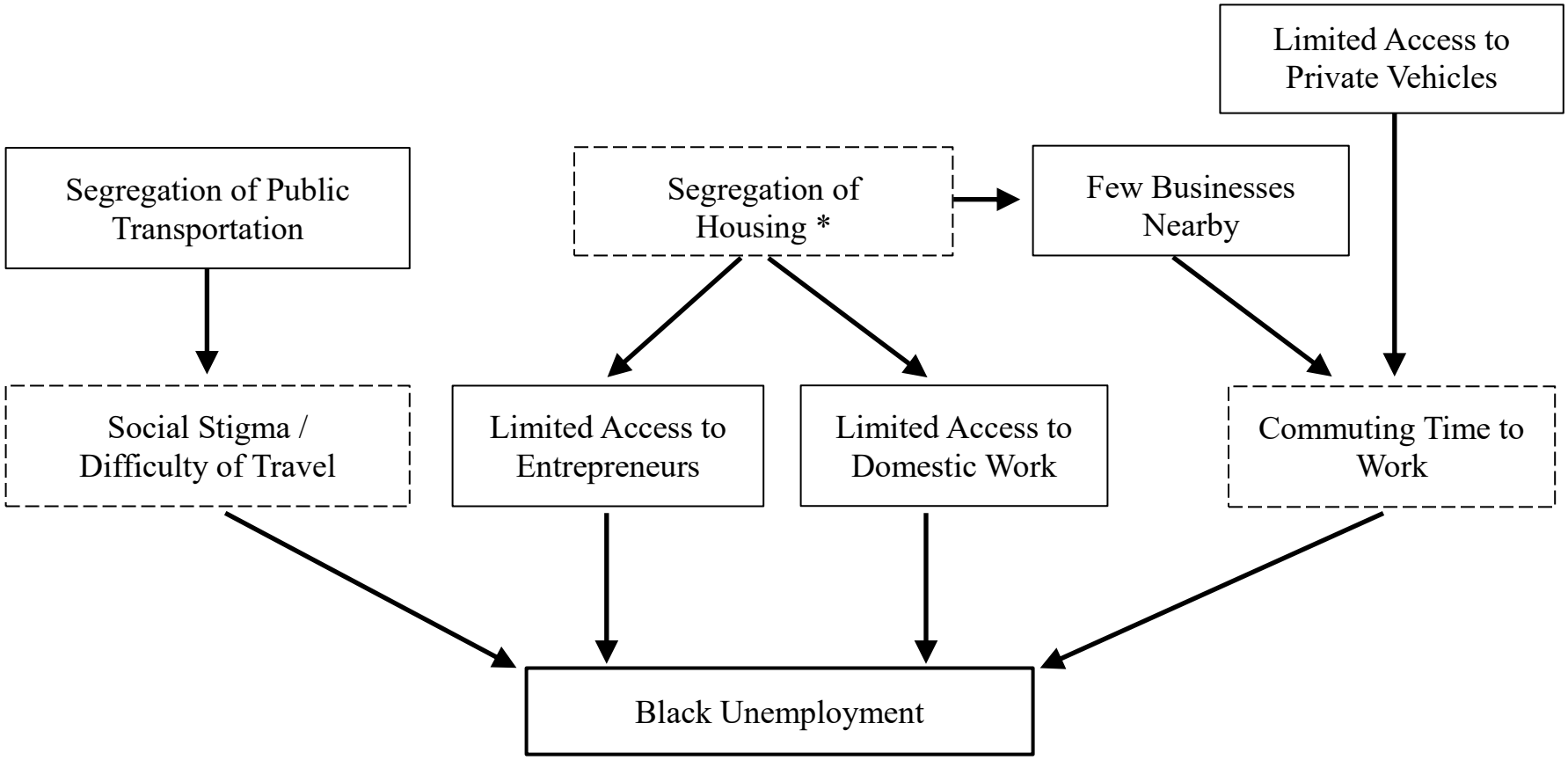
a. Odds that Individual has Gainful Occupation (relative to whites)



b. Odds that Individual is Currently Employed (relative to whites)

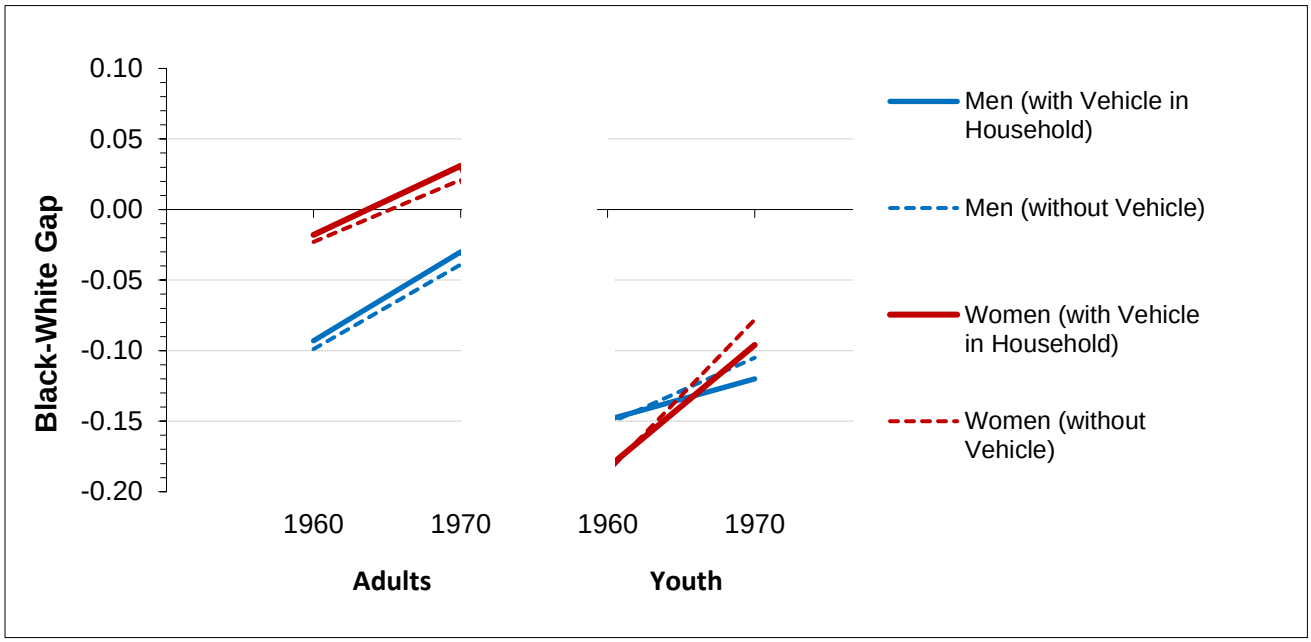
Note: Estimates for adults (age 20+) from mixed-effects logistics regressions, controlling for age, age squared, gender, marital status, married × gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.

Figure 3. A Theory of Spatial Mismatch for Black Employment Outcomes

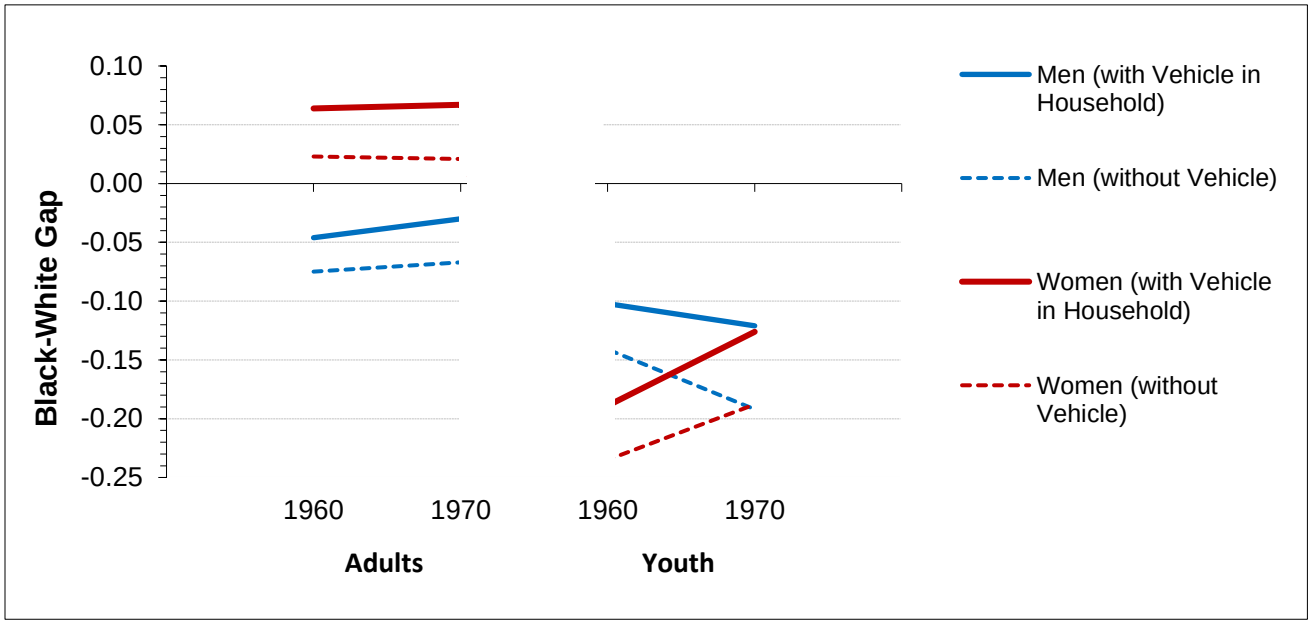


* As a function of direct segregation; segregation of businesses, amenities, and schools; restrictive covenants; prejudice; economic disparities; etc.

Figure 4. Predicted Black-White Gap in Labor Force Participation and Employment Based on Vehicle Access in Household, 1960-1970



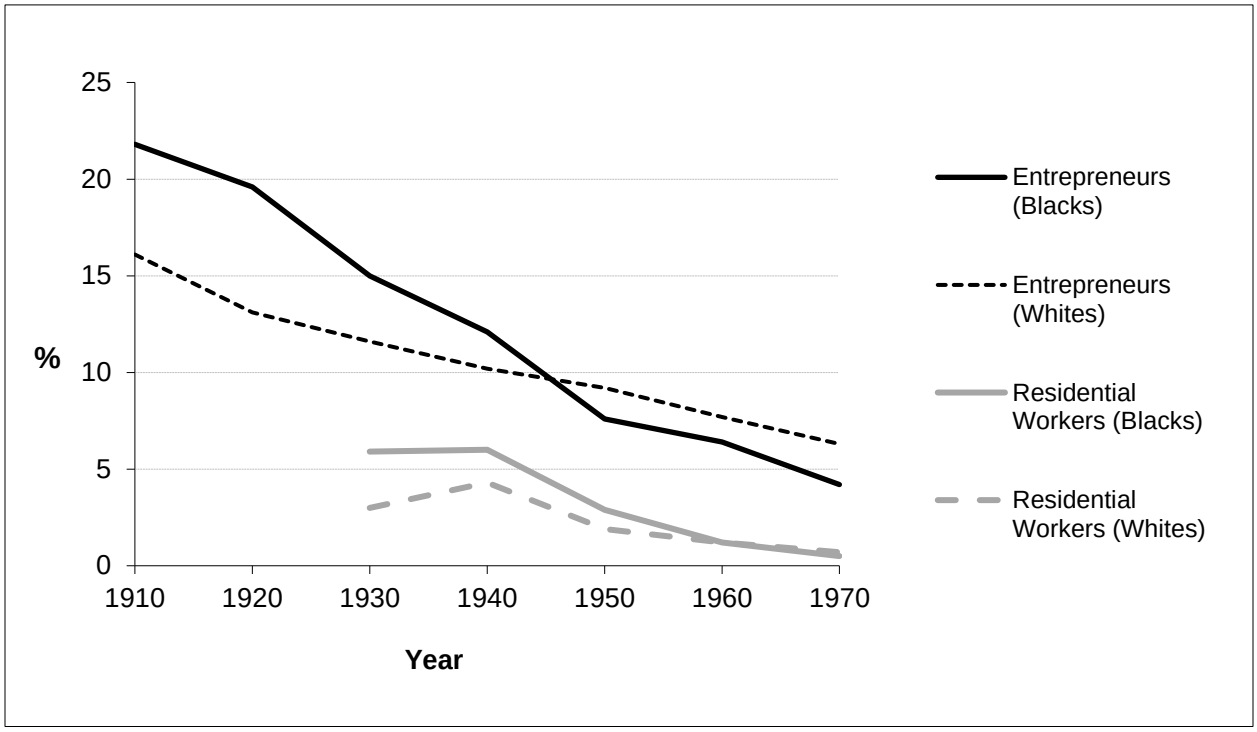
a. Gap in Adjusted Predictions at Means for Gainful Occupation



b. Gap in Adjusted Predictions at Means for Employment

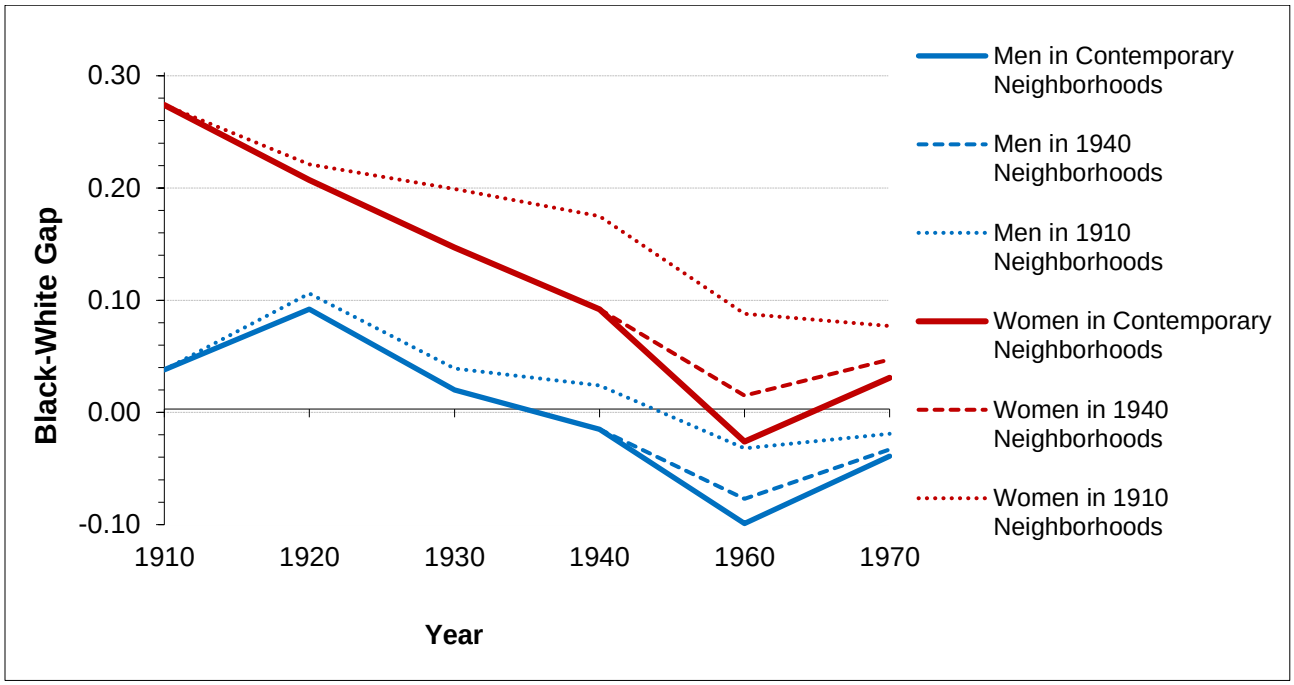
Note: Estimates from mixed-effects logistics regressions, controlling for age, age squared, gender, marital status, married × gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.

Figure 5. Types of Workers in Neighborhoods of Black and White Residents, 1910-1970

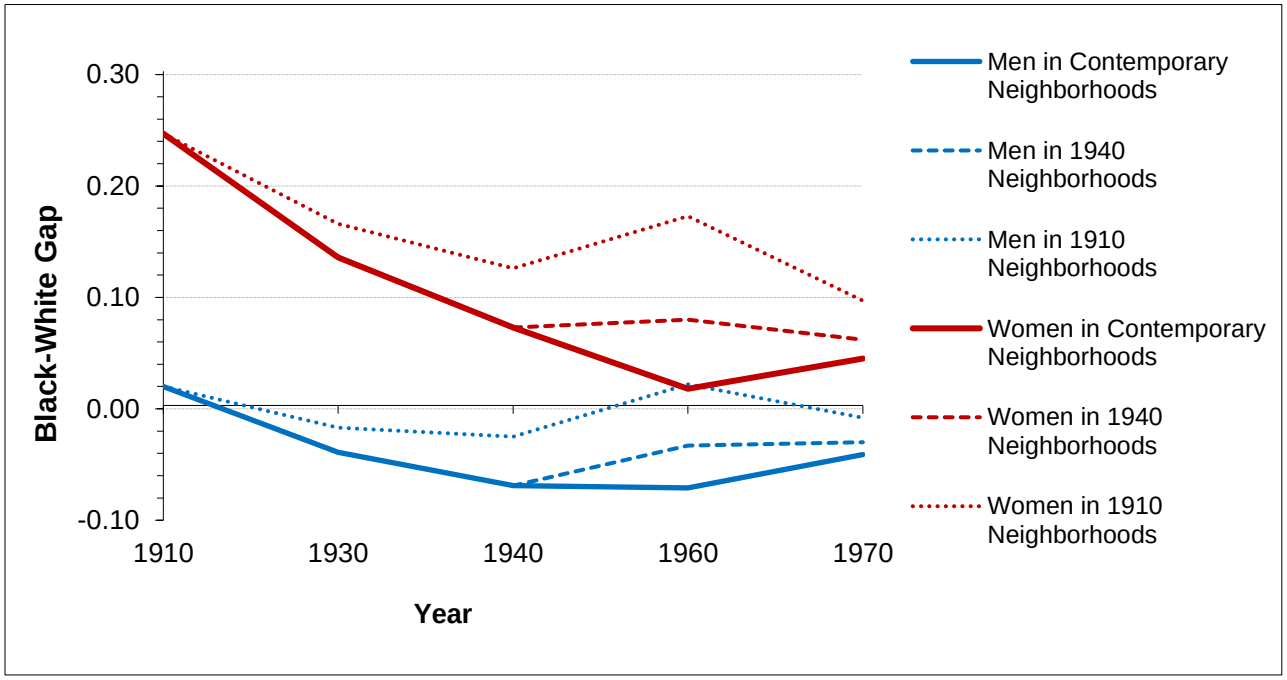


Note: "Entrepreneurs" refer to residents (age 15+) who are self-employed, either with or without paid employees. "Residential workers" include residents who live and are employed in the homes of others, as well as nonspouse residents (age 15+) who primarily do unpaid work for their own families.

Figure 6. Predicted Black-White Gap in Labor Force Participation and Employment in Contemporary and Historical Neighborhoods, 1910-1970

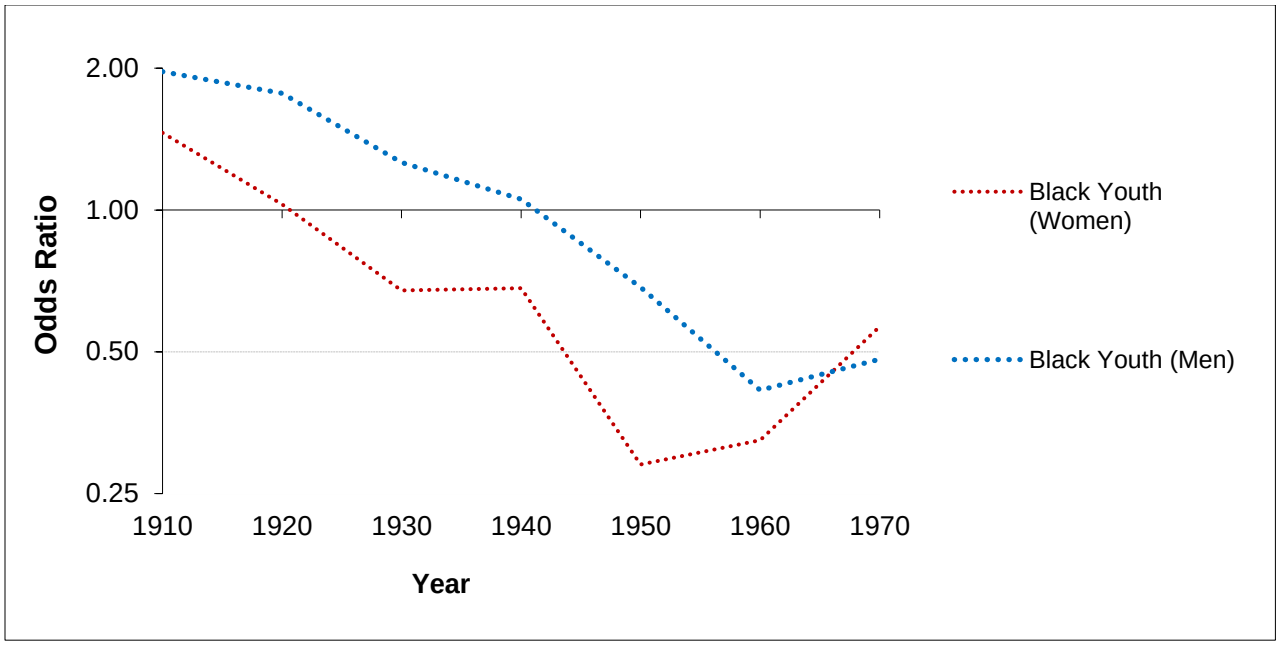


a. Gap in Adjusted Predictions at Means for Gainful Occupation

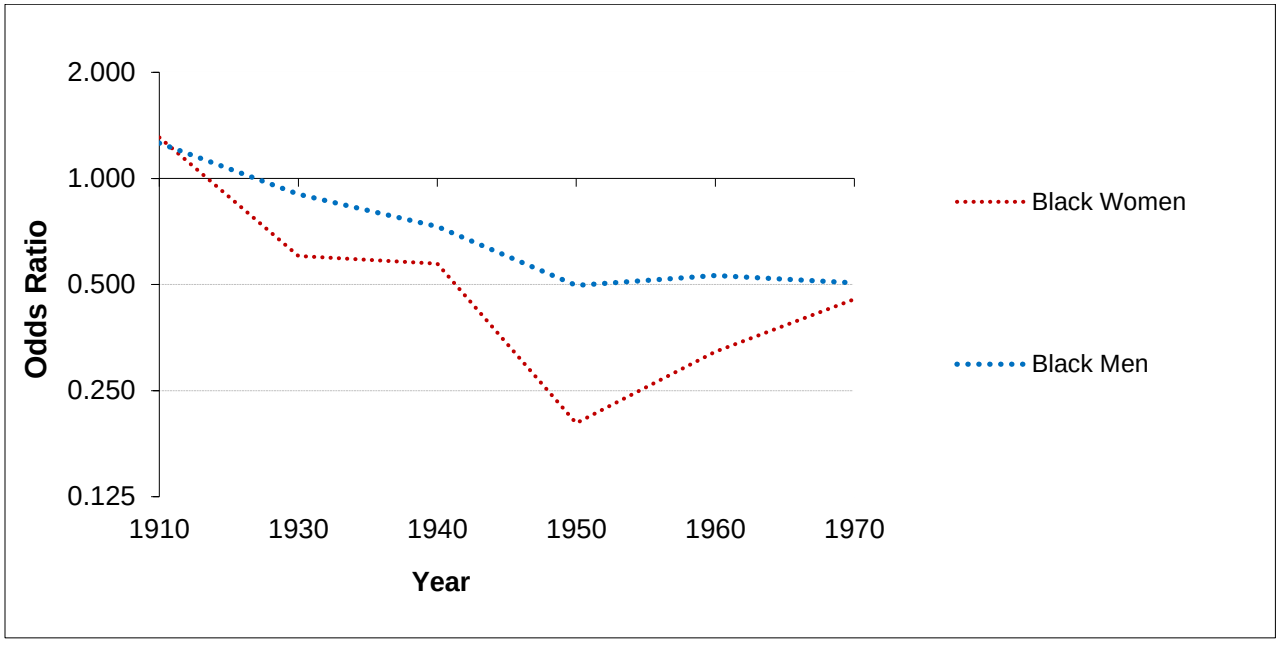


b. Gap in Adjusted Predictions at Means for Employment

Figure A1. Odds Ratios of Youth Labor Force Participation and Employment in Urban Areas, 1910-1970



a. Odds that Individual has Gainful Occupation (relative to whites)



b. Odds that Individual is Currently Employed (relative to whites)

Note: Estimates for youth (ages 15 to 19) from mixed-effects logistics regressions, controlling for age, age squared, gender, marital status, married × gender, nativity, interstate migration, education level, neighborhood population, city population, and census division of residence.