Was Postwar Suburbanization 'White Flight'? Evidence from the Black Migration

Leah Platt Boustan*
Harvard University
April, 2006

Abstract: Four million rural blacks migrated to northern cities in the postwar period (1940-1970). Cities with large black in-migrations lost white population to the suburban ring. This pattern is consistent with a white flight from black arrivals. Alternatively, black migrants may have been attracted by lower housing prices in the wake of white departures, or by the same economic factors that underlie the demand for suburbanization (for example, rising wages). I develop an instrument that predicts migrant flows from southern states using changes in agricultural production, and assigns these exogenous flows to northern cities using settlement patterns established during World War I. Even after accounting for migrant location choices, conservative estimates suggest that, if not for black migration, the growth in white suburbanization from 1940 to 1970 would have been 20 percent lower.

* Email: platt@fas.harvard.edu. I have benefited from conversations with Lee Alston, David Clingingsmith, William J. Collins, Carola Frydman, Claudia Goldin, Caroline Hoxby, Christopher Jencks, Lawrence Katz, Robert A. Margo, Katherine Newman, Jesse Rothstein, Raven Saks and Jeffrey Williamson, and from seminar participants at Harvard University, the NBER, the Society of Labor Economists, and the Minnesota Population Center. Nathaniel Baum-Snow, Gregg L. Carter, Price Fishback, Michael Haines, and Shawn Kantor generously provided some of the data used in this study. I gratefully acknowledge the support of the National Science Foundation Graduate Research Fellowship and the Multi-disciplinary Program on Inequality and Social Policy at Harvard University.

I. Introduction

In the decades following World War II, American cities underwent a period of rapid suburbanization. In 1940, only 45 percent of white residents in the average metropolitan area (SMSA) lived outside the central city. By 1970, the white suburban share in the average SMSA had increased to 70 percent.[1] The flow to the suburbs has been attributed to a number of factors, including rising household incomes (Margo, 1992); federal mortgage assistance (Jackson, 1985, p. 213-17, Gelfand, 1975, p. 216-22); the spread of automobile commuting (LeRoy and Sonstelie, 1981; Baum-Snow, 2005); and the deterioration of schools and the tax base in central cities (Frey, 1979).

In addition, postwar suburbanization coincided with a wave of black migration to urban areas from the rural South. Over four million African-Americans left the South between 1940 and 1970, and migrants disproportionately settled in central cities.[2] As a result, the black share of central city populations increased from 11 to 28 percent. To white residents, the resulting changes in racial composition may have been an unattractive feature of city life, due to an aversion to living near black neighbors, a desire to send their children to school with white classmates, or a preference for the bundle of public goods selected by the predominately white electorates in the suburbs.

Despite the conventional wisdom that suburbanization was, in part, a "white flight" from increasingly black cities, the relationship between southern black migration and white relocations to the suburban ring remains an open question. A few studies of the determinants of

[1] These figures are based on 104 SMSAs with 250,000 or more residents in 1970. The borders of central cities and their surrounding metropolitan areas are held constant to facilitate comparison over time (see section III.B for details). The decline in city population was attenuated somewhat by the annexation of suburban land; when using actual rather than counterfactual city borders, only 55 percent of whites lived in the suburban ring in 1970.
[2] 74 percent of black arrivals between 1965-69 settled in the central city, compared to 32 percent of white in-migrants. These figures provide a lower-bound for the period, as black suburbanization increased over time (Schnore, André, and Sharp, 1974).

suburbanization have included the urban black population share as an explanatory variable. These papers use cross-city variation at a point in time, and, in this context, do not find a consistent relationship between racial composition and levels of suburbanization (see, for example, Guterbock, 1976; Frey, 1979; Marshall, 1979; Grubb, 1982; and Mills and Price, 1984). In contrast with previous work, this paper evaluates the effect of *changes* in central city racial composition on changes in white residential locations within metropolitan areas over time. This approach controls for fixed city characteristics, such as the existing transportation network or industrial composition, that may have both attracted black migrants and encouraged white suburbanization.

I focus on metropolitan areas in the North or West, the growth of whose black population was primarily a function of in-migration from the South. My sample includes the 68 SMSAs with 250,000 or more residents in 1970. Section III documents a strong empirical correlation between increases in the black population share of center cities and the share of whites who live in the suburban ring. A one standard deviation increase in the black share – or an influx of 6,000 migrants for the average city – is associated with one half of a standard deviation increase in the white suburban share. This translates into a move of 10,000 whites into the suburban ring, a more than one-for-one suburbanization response.

Of course, the causal interpretation of a positive relationship between black in-migration and white suburbanization requires caution. This correlation may reflect the tendency of white households to abandon cities receiving large numbers of black migrants ("white flight"). However, this pattern could also arise from the location decisions of black migrants themselves. Migrants may have been attracted to particular cities by economic characteristics underlying the demand for suburban living – for example, rising incomes, or centrally-located manufacturing

jobs[3] – or by lower prices for central city housing left in the wake of white suburbanization ("migrant location choice"). On the other hand, OLS coefficients will *understate* the effect of center city diversity on white residential choices if black migrants avoided suburbanizing areas, which may have suffered from a lower urban tax base and more extensive racial segregation. Furthermore, any aspect of urban life that rooted whites in a city – decent schools, efficient transportation, clean government – may have attracted prospective black migrants.

To disentangle these alternatives, Section IV design an instrumental variables procedure that isolates a stream of "chain migrants" to a northern city – that is, migrants who followed existing channels northward rather than choosing the best northern location after observing current economic shocks. The power of the instrument rests upon three features of the black migration experience: (1) black migration followed persistent transportation routes and community networks from southern states to specific cities in the North/West (Grossman, 1989), (2) the black out-migration rate from a given southern state was sensitive to local agricultural conditions (Fligstein, 1981), and (3) southern regions experienced large scale agricultural transformations from hand labor to mechanization at different times during the postwar period (Wright, 1986). Taken together, these patterns suggest that northern cities received exogenous migrations flows during periods in which their traditional sending states underwent agricultural and economic changes.[4]

[3] Margo (1992) provides empirical evidence on the relationship between permanent income and suburban residence. Steinnes (1977) and Thurston and Yezer (1994) show that a concentration of manufacturing employment in the central city encourages suburbanization, perhaps because the noise and pollution of factories outweigh the desire to live close to manufacturing employment.

[4] This approach is related to Card (2001), which explores the effect of immigration on the labor market outcomes of native workers. To predict in-migration to metropolitan areas, Card pairs pre-established settlement patterns by country of origin with the flow of new immigrants from each sending country. However, Card uses the actual, rather than predicted, in-migration by source country, assuming that the "total number of immigrants from a given source country who enter the United States is independent of….demand conditions in any particular city" (p.43). However, given that migrants cluster in particular cities, it is not unreasonable to imagine that positive economic shocks in common destination areas could stimulate migration flows.

I rely on a number of historical sources in building the instrument. First, to isolate the flow of migrants leaving the South *due to push factors alone*, I predict net migration rates across southern counties using a series of local agricultural and policy variables – for example, the share of arable land planted in cotton and the number of tractors per acre.[5] I calculate counterfactual migration flows under the assumption that the estimated "push rate" reflects the true out-migration rate, and aggregate these to the state level. Finally, I assign these flows to northern destinations according to settlement patterns established during the depression era (1935-40) or during the first wave of the Great Migration (1915-34). Settlement patterns are determined from a combination of mobility and state of birth data from the 1940 Census.

Even after accounting for migrant location choices, I still detect a strong, positive relationship between changes in a city's racial composition and the white suburban share of the surrounding metropolitan area. The IV coefficients are never statistically different from OLS, but the point estimates are usually slightly larger, suggesting that, if anything, black migrants were attracted *away* from suburbanizing areas. Overall, I find that white flight accounts for around 20-30 percent of postwar suburbanization. This magnitude is consistent with earlier work by Margo (1992), whose estimates suggest that suburbanization from 1950 to 1980 cannot be explained by rising real income alone.

Understanding the historical development of the suburban ring contributes to a growing literature on the consequences of racial residential segregation. Segregation followed an inverted U-shaped pattern over the 20th century, peaking in 1970 (Glaeser and Vigdor, 2001). But, while

[5] For the purposes of this paper, the South includes the following states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia. Delaware and Maryland, which are net recipients of black migration in this period, are considered part of the North. The instrument's construction underscores the need to limit the sample of cities to the North and West. Because the vast majority of black migrants into southern cities came from areas in the surrounding state, it is particularly hard to separate periods of black in-migration from times of rapid economic change.

segregation within jurisdictions has declined by 60 percent since 1960, segregation *between* jurisdictions – including the central city and its suburbs – increased by 40 percent over this period (Fischer, et al., 2004).[6]

Inter-jurisdictional segregation contributes to racial inequality in access to locally provided public resources, of which public education is perhaps the most important. Suburbanization also imposed a fiscal cost on central cities (Baumol, 1967). The loss of middle class residents reduced the property tax base, the primary source of municipal revenue. At the same time, the population remaining in the city was poorer and had a greater need for public services. The increasingly dire situation culminated in a decade of urban fiscal crises, most notably the bankruptcy of New York and Cleveland in the late 1970s (Teaford, 1986, p. 126-150). Segregation between jurisdiction, and the resulting disparity in public services, may help explain why black graduation rates and labor market outcomes are lower in segregated metropolitan areas today (Cutler and Glaeser, 1997; Weinberg, 2000).[7]

II. White Flight vs. Migrant Location Choice

Any correlation between increasing urban diversity and white suburbanization arises from the location choices of two populations: white residents of central cities, and black migrants leaving the South. This section will discuss some of the factors that might have encouraged whites to leave cities as blacks entered, or, alternatively, might have drawn black migrants to suburbanizing areas.

[6] Fischer, et al. (2004) use Theil's entropy index to decompose changes in national segregation into segregation by region, metropolitan area, jurisdiction, and neighborhood. Before 1960, the Census Bureau did not fully overlay the suburban ring of metropolitan areas with tracts, rendering a full decomposition impossible.

[7] Upon replicating Cutler and Glaser's analysis in 1940 and 1970, Collins and Margo (2000) find that this "segregation cost" appears only in 1970, after white flight had run its course.

Why would black in-migration have encouraged whites to leave central cities? Most simply, whites may have been averse to personal interactions with black neighbors.[8] Faced with new black arrivals, white households had two feasible responses: they could either fight to maintain the racial character of their neighborhood, or they could relocate to a predominately white area. One common mode of neighborhood "preservation," the use of racially restrictive covenants, was rendered legally unenforceable by the Supreme Court in 1948.[9] Without the support of the legal system, neighborhood associations continued to rely on a variety of informal techniques to exclude black families, from collusion with realtors to intimidation, but many white households chose to leave their old neighborhoods instead.[10]

Being highly segregated, center cities offered a large supply of predominately white neighborhoods.[11] However, by remaining in the city, whites had to vote in common municipal elections with black residents, and to interact with their children in public schools.[12] One unique benefit of the suburbs were their political autonomy, which offered residents local control over fiscal decisions and the school system. In this context, we can interpret suburbanization as the outcome of white households "voting with their feet," effectively selecting their preferred bundle

[8] In a 1958 Gallup poll, 44 percent of white respondents indicated that they would move if a black family moved in next door (Ellen, 1999, p. 107-108).

[9] Racial covenants are legal contracts by which neighbors voluntarily agree to write restrictions against black ownership into the titles to their property. While the full reach of such covenants is unknown, over 75 percent of *new* subdivisions in suburbs of New York City and Kansas City respectively were deed restricted in the 1940s (Dean, 1947; Gotham, 2001). However, the empirical evidence – in this case, from Chicago – on the effectiveness of restrictive covenants in limiting black entry is mixed (Brooks, 2002).

[10] In the case of Detroit, Sugrue (1996, p. 209-258) reports the founding of 192 neighborhood associations in the 1940s and 1950s intended to limit black entry. He documents over 200 actions against black homes, including picketing, window breaking and arson. For a national overview of such activity, see Meyer (2000, p. 115-132).

[11] In 1940**,** for example, 81 percent of Census tracts in central cities were at least 90 percent white and 60 percent were over 99 percent white. Following Cutler, Glaeser and Vigdor (1999), I code tracts with fewer than 25 black residents (the true number of black residents in which is suppressed) as having no black residents, which gives an upper-bound on the share of tracts that are predominately white. If instead we assume that all such tracts had 24 black residents, it appears that 79 (52) percent of tracts were 90 (99) percent white in 1940.

[12] Before the implementation of court-ordered desegregation plans in the early 1970s, city residents sent younger children to neighborhood elementary schools which, like neighborhoods themselves, were predominately own-race. However, large public high schools drew students from different neighborhoods and were often racially mixed.

of public services among available options in the metropolitan area (Tiebout, 1956).[13] The second chapter addresses this hypothesis in more detail.

The effect of new arrivals on housing prices may also help explain the suburbanization response. Black migrants disproportionately settled in central cities, which had fixed supplies of land and relatively low elasticities of housing supply. By increasing demand in the center, in-migration may have bid up urban housing prices relative to the periphery, and encouraged the marginal resident to decamp for the suburbs.[14]

The housing market may have played a similarly important role in the location choices of black migrants. Any factor that led the city's existing residents to leave for suburbs would have lowered demand for – and thus prices of – housing in the city center. These lower housing prices may have drawn prospective black migrants to particular northern destinations. In a study of neighborhood transition in the Boston area, Gerald Gamm (1999) argues that black migrants were attracted to the lower housing prices in Dorchester and Roxbury, two neighborhoods abandoned by Jewish residents on their way to the suburbs.[15] While there have been no quantitative studies of the role of housing costs – or wages, for that matter – in attracting southern black migrants to particular cities, housing prices were an important determinant of interregional migration in the 1980s (Gabriel, Shack-Marquez and Wascher, 1992).

[13] While the term "white flight" implies that white city residents were reacting only to the *race* of the new arrivals, black migrants were also poorer than the existing population. Relocating to the suburbs could also have reflected a desire for segregation by income, rather than by race.

[14] The marginal resident in the postwar period was likely to be white. Choosing a suburban location requires trading off a longer commute for lower housing prices (per square foot). Whites were, on average, wealthier than blacks. The rich have a higher demand for housing and thus benefit disproportionately from lower prices on the periphery (Mills, 1972). Furthermore, at the time, the rich were also more likely to commute by car (Leroy and Sonstelie, 1983). As a result, the rich had both a higher demand for housing and a comparative advantage in commuting (Glaeser, Kahn, and Rappaport, 2000).

[15] Gamm (1999) writes: "In the early 1920s…middle-class white ethnics forged their paths from urban neighborhoods to the suburbs…Only after the urban exodus had nearly run its course, emptying apartments and lowering rents" did blacks arrive in any great numbers (p. 16, 27).

The relationship between white suburbanization and black in-migration may also be a spurious one, if black migrants were attracted to areas with high wage growth or centralized manufacturing industries, two factors that encouraged suburbanization.

While this paper aims to disentangle "white flight" from "migrant location choice," it cannot separate the various causes of white suburbanization discussed here. Thus, the appropriate counterfactual to keep in mind is an historical one ('what would white suburbanization have looked like without the actual migration of poor southern blacks?'). This paper cannot answer what suburbanization would have looked like if the migration flow had been white instead of black, or rich instead of poor.

III. Correlations between Urban Racial Diversity and White Suburbanization

A. An Econometric Framework

The previous section outlines a number of reasons why white residents may experience black arrivals as an urban disamenity. The larger the black share of the central city population, the higher the probability of having a black neighbor, and the greater the proportion of black voters in the electorate, either of which may prompt white households to relocate to the suburban ring.[16] The black share of the central city in metropolitan area *m* at time *t* can be expressed:

$$b_{mt} = \frac{BC_{mt}}{BC_{mt} + WC_{mt}} \quad (1)$$

[16] In a spatial equilibrium, with a fixed number of housing units in the city and suburban ring, city disamenities would be fully compensated by lower prices. However, in a model with a positive elasticity of housing supply, a larger urban disamentity could affect both prices and quantities. Glaeser and Gyourko (2005) argue that the housing supply function has a kinked shape: higher prices generate more construction, but lower prices do not lead to an immediate destruction of the existing housing stock. Thus, a housing market equilibrium is likely to be achieved through some combination of reductions in housing *prices* in the city and new suburban construction and an increase in the *population* in the suburban ring.

where BC_{mt} and WC_{mt} are the numbers of black and white residents in the center city in (*m, t*). Similarly, the share of whites in the metropolitan area who live in the suburban ring can be written:

$$w_{mt} = \frac{WS_{mt}}{WS_{mt} + WC_{mt}} \quad (2)$$

where WS_{mt} is the number of white residents in the suburban ring. Notice that the denominators of both b_{mt} and w_{mt} include the number of whites living in the city. To avoid introducing a mechanical relationship between the left- and right-hand side variables, I lag the denominator of the black share ten years, thus measuring city population before any of the current decade's white suburbanization took place. I use this modified "share" (b'_{mt}) throughout the paper.

To determine the empirical role of racial diversity in the historical process of white suburbanization, I estimate the following equation:

$$w_{mrt} = \alpha + \beta (b'_{mrt}) + M_m + T_t + (R_r \times T_t) + \varepsilon_{mrt} \quad (3)$$

where *m, r* and *t* index metropolitan areas, four Census regions, and decades respectively.[17] By including SMSA fixed effects and region-specific time trends, β is estimated from changes in the black share within a city over time, as compared to other cities in its Census region.[18]

The benefit of using a panel of metropolitan areas is twofold: first, the relative size of a city's black population may be correlated with fixed aspects of an area's industrial base,

[17] Census regions are slightly modified here, and include: the Northeast (Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, Rhode Island, and Pennsylvania); the East North Central (Illinois, Indiana, Michigan, Ohio and Wisconsin); the West North Central (Iowa, Kansas, Minnesota, Missouri and Nebraska); and the West (California, Colorado, Oregon, Utah and Washington).

[18] The current specification constrains a percentage point increase in the black population share to have an equal effect on white suburbanization regardless of the initial size of the black community. I also experimented with using the logarithm of the black population share, or splitting the sample according to the black population share in 1940 (not shown). It appears that white residents respond to absolute rather than proportional changes in the black population.

transportation network, or housing stock. These characteristics may also encourage suburban development, leading to a spurious correlation between the black share of a center city and the white suburban share at a point in time. Secondly, the size of central cities – in land area – relative to their metropolitan region varies widely due to geographic constraints and local political history, obscuring comparisons of suburban shares across metropolitan areas in a cross-section.[19]

B. Measuring Suburbanization Using Political Boundaries

Differences in city size across metropolitan areas will be absorbed by the SMSA fixed effects. However, the borders of central cities and of metropolitan areas themselves also change over time in ways that are plausibly endogenous to the flow of black migration. I adjust for these changes in two ways:[20]

Metropolitan expansion: SMSAs are composed of a set of economically-integrated counties. As settlement around an urban center expands outward, the Census Bureau redraws SMSA boundaries accordingly. If black migrants were attracted to growing cities (i.e., cities that were also attracting other internal migrants), black migration may have been positively associated with metropolitan expansion. Rather than use the contemporary SMSA boundaries, I retroactively apply the 1970 county-based metropolitan area definition in all years. This method

[19] This concern prompted Bradford and Kelejian (1973) to propose an alternative measure of suburbanization for cross-sectional comparisons: the *ratio* of the suburban share in population to the suburban share in land. If suburban land area were stable over time, this measure would simply provide the proper scaling. However, as metropolitan areas grow, they expand in land area along the periphery into formerly rural areas. It is not clear, *a priori*, whether the suburban population share will increase faster than its land share, or vice versa, and thus, with this measure, a metropolitan area could end up looking *more* concentrated after a round of suburbanization (Mills, 1992).

[20] Some studies of urban space use the population density gradient as an alterative measure of suburbanization; the density gradient measures the rate at which density falls with distance from a central business district. One benefit of the density gradient is that it is invariant to such changes in political boundaries. However, in the case of white flight, the appeal of the suburbs may lie *precisely* in their political separation from the city, with the concomitant ability to make local decisions about taxation and public goods. Thus, my preferred measure of suburbanization explicitly takes into account political boundaries.

treats equivalently suburbanization that occurred through the filling in of existing counties and suburbanization that occurred through the addition of new counties.[21]

Annexation: The 1950s and 60s was a period of renewed annexation activity.[22] Austin (1999) argues that cities with growing black populations were more likely to annex neighboring land in order to dilute the political power of new arrivals and retain a majority-white electorate. In contrast, Alesina, Baqir and Hoxby (2004) find that racial diversity reduces the number of successful annexations, particularly in states that require both city and suburb to agree to a consolidation.

To adjust for annexation, I construct three measures of the white suburban and black population shares using alternative definitions of central city borders. The first allows actual annexation activity to enlarge the boundaries of the central city over time. The remaining measures create counterfactual city borders by reassigning residents who *would have* lived in central cities if not for annexation back to the city.[23] The second (third) measure assumes that the population living in the annexed area had the same white share as the suburban area as a whole (city as a whole).

The choice between measures entails a tradeoff. Counterfactual boundaries will misclassify moves from annexed city territory to an outlying suburb, for example to avoid city property taxes or city schools, as suburb-to-suburb moves. However, in its ability to reverse decades of suburbanization in a single stroke, annexation can conceal individual responses to urban diversity.

[21] Because SMSAs in New England often include fractions of counties, I use the New England County Metropolitan Area (NECMA) definitions instead.
[22] For the rise and fall of annexation as a political tool in the late nineteenth and early twentieth centuries, see Jackson (1985, p. 138-156). Dye (1964) discusses the return to annexation in the 1950s and 60s.
[23] The Census Bureau estimated the number of individuals drawn into the central city through annexation from block level data (Bogue, 1953; US Census, 1960, 1970).

C. OLS Results

Table 1 compares estimates of the relationship between changes in urban racial diversity and the white suburban share under various definitions of the central city. The first column uses actual annexation activity, while the second and third use counterfactual measures with consistent city boundaries. Increasing a city's black population share by 1 percentage point is associated with a 0.7-0.9 percentage point increase in the fraction of white residents living in the suburban ring. As expected, the lower values correspond to the counterfactual boundary measures, which misclassify moves from territory annexed to the center city.

To interpret the magnitude of this effect, consider the median city in the sample, which had around 200,000 residents, 9.6 percent of whom were African-American, and which was located in a metropolitan area with 500,000 total residents. A one standard deviation increase in the black population share over a decade – equal to 3 percentage points, or around 6,000 black arrivals – is associated with a 2.3 percentage point increase in the white suburban share. This increase translates into the relocation of 10,000 white residents from the city to the suburban ring, a more than one-for-one suburbanization response.

The second row of the table replaces the somewhat arbitrary Census designation of a "central city" with an alternative definition by which any municipality that had 50,000 or more residents in 1940 is considered part of the urban core.[24] This measure, which treats all large jurisdictions comparably, implies a somewhat stronger white response, suggesting that whites were leaving all parts of the inner ring, not just the officially defined "central city." To be consistent with the literature, though, I retain the Census definition of a central city throughout the paper. Furthermore, to avoid conflating endogenous annexation with suburbanization, I rely

[24] For example, the Census Bureau considers Albany, Schenectady, and Troy, NY to be central cities of a unified SMSA, whereas Cambridge, MA is simply part of the Boston metropolitan area, and thus technically a "suburb."

on the consistent area measures. Summary statistics for this preferred measure are presented in Appendix Table 1.

(i). Adding SMSA level covariates

Because the white suburban share is bounded between zero and one, the suburbanization response to any shock will be larger in areas with low initial levels of suburbanization. The first column of Table 2 splits the sample according to the SMSA's white suburban share in 1940 (median = 43 percent). Indeed, the measured suburbanization response is twice as large in areas below the median in 1940.

This base specification includes only one time-varying aspect of a metropolitan area – the black share of its central city. The coefficient of interest will be biased if black migrants were attracted to omitted economic conditions that also underlie the demand for suburban residence. The second and fourth columns add two sets of SMSA-level covariates: the first are available in all decades, and the second only from 1950 on.[25] Growing areas, and areas that are increasing their stock of human capital (column 2) are more likely to suburbanize, but these factors do not significantly change the coefficient on the black population share. Column 4 replaces education with median family income, which is also positively associated with mobility to the suburbs. The number of miles of interstate highway that run through the center city has a strong effect on suburbanization, with a one standard deviation increase (50 miles) associated with a 2.6 percent increase in the white suburban share.[26] Again, including these covariates reduce the point

[25] In order to conform with the 1970 SMSA definitions, covariates are built up to the SMSA level from the county data in the *County and City Data Books*. I use only SMSA level covariates because the compositional change of city population that accompanies the loss of white middle class complicates the interpretation of any city-level measures.

[26] Because longer stretches of road are needed to facilitate commuting in cities covering a larger land area, the number of interstate miles is interacted with the size of the center city. The calculation above assumes the average city of 58 square miles. Major (two-digit) interstates and branch (three-digit) highways have qualitatively similar effects on the white suburban share. I thank Nathaniel Baum-Snow for sharing his data on highway miles.

estimates on share black slightly (around 15 percent), but the change is not statistically significant. There is limited evidence that black migrants were attracted to areas with rising real incomes or an expanding transportation network.

(ii). Heterogeneous Effects by Period, Region, and Population Sub-Group

Thus far, the regression coefficients have represented the mean white response to growing urban diversity for all periods and regions of the country. Table 3 explores variation around this mean. The first panel (columns 1-2) presents results from a first-differenced specification in which the right-hand side variable, changes in the black population share, is interacted with decade dummies, allowing comparisons of the white relocation response over time. The strongest association between changes in urban diversity and the white suburban share is in the 1950s. The post-war boom in housing construction may have facilitated white flight, which had been constrained by the wartime housing freeze (Jackson, 1985, p. 231-45).

The urban riots of the 1960s may have amplified the white suburbanization response. Collins and Margo (2004) document a negative relationship between the incidence of rioting and the value of black-owned housing at the city level, suggesting that violence depressed the demand for central city locations. The second column of Table 3 adds a set of decade-specific interactions between the black population share and indicator of 1960s riot activity.[27] The small and insignificant interactions in the 1940s and 1950s indicate that cities that later had riots did not have a pre-existing propensity toward white flight. In contrast, over the 1960s, the

[27] Data on the location of 1960s riots was generously provided by Gregg L. Carter. To measure rioting activity, I rely on Collins and Margo's (2004) index of riots severity. The index considers five components of severity – deaths, injuries, arrests, arsons and days of rioting – indexed by *i*, and assigns to each riot *j* a value $S_j = \Sigma_i (X_{ij} / X_{iT})$ where X_{iT} is the sum of component *i* across all riots. The index value for a city *c*, the sum over all local riot activity, measures the share of all riot damage occurring in city *c*. I define an indicator variable equal to one for all cities with rioting activity above the median (median index value = 0.011). Because this characteristic is time-invariant, I estimate only the interaction between the riot indicator and decadal changes in the black population share.

occurrence of a riot doubles the relationship between the black population and white suburban shares.

The second panel of Table 3 (columns 3-4) allows a separate response to the black population share by region. Column 3 contains coefficient estimates, and column 4 presents the implied response to a one standard deviation increase in the black population share. Cities in the Northeast appear to undergo the most white flight, with the Midwest close behind. In contrast, changes in urban diversity have *no* effect on suburbanization in the West, an empirical regularity that corresponds with the low levels of racial segregation in the contemporary period (see, for example, Glaeser and Vigdor, 2001).

The white suburban share of a metropolitan area can increase either with positive net migration from the central city to the suburbs, or with higher in-migration from outside the SMSA to the suburban ring (relative to the central city). Table 4 examines these two channels using aggregate mobility data from the 1960 Census, which recorded place of residence five years prior.[28] The panels consider the probability of residing in the suburban ring in 1960 for those who lived in the central city in 1955 (columns 1-2) or for new arrivals to the SMSA (columns 3-4).[29]

Changes in urban diversity are associated with a similar pattern of mobility for city residents and new arrivals, but the effect on intra-SMSA moves is around three times as large (compare the response to a one standard deviation increase in the black population share in

[28] Mobility data are published by detailed category only for 62 of the 68 SMSAs in the sample.
[29] These conditional probabilities are calculated from aggregate mobility counts. For example:
pr(living in suburb in 1960 | in city in 1955) = $\frac{\text{\# who lived in city in 1955 and moved to suburb by 1960}}{\text{(\# who lived in same house in city in 1955 and 1960 + \# who moved within city + \# who lived in city and moved to suburb)}}$

columns two and four).[30] An increasing black population share has no effect on the likelihood that blacks already living in the central city relocate to the suburbs (row 2). Perhaps as a result, the lowest income group, which is disproportionately composed of African-Americans, does not respond to changes in urban diversity.[31] Higher incomes households exhibited stronger responses to black presence in the central city (rows 4-6). Fifteen percent of both middle and high income families who lived in the central city in 1955 had moved to the suburbs by 1960.[32] A one standard deviation increase in the black population share is estimated to increase the share of suburban movers by 1.4 percentage points for middle income households and by 2.6 percentage points for their higher income counterparts. Interestingly, the group *most* sensitive to changing diversity is white families with elementary school-aged children (row 3).

IV. Establishing Causality

A. Using the Southern Black Migration to Instrument for Racial Composition

The previous section documented a correlation between the black share of central cities and white suburbanization in surrounding metropolitan areas, a relationship which can be attributed to some combination of black migrant location choices and white flight. To identify the role of white household decisions alone, I develop an instrumental variables procedure that isolates a flow of black migration exogenous to the prevailing economic conditions in destination cities.

The decision to migrate entails a comparison between the stream of expected utility in a current location and in all other potential destinations (Sjaastad, 1962). Using this framework, we

[30] In a similar vein, Cullen and Levitt (1999) find that changes in urban crime rates elicit a stronger mobility response among current city residents than among new entrants to the metropolitan area. They attribute this disparity to differences in information about local conditions.
[31] The limited response of the lowest income groups to black in-migration is not entirely compositional. We observe a similar income gradient in 1970, when mobility data are available by race-income cell.
[32] Middle income households are defined as those earning $22,000-52,000 in Y2000 dollars. High income households earned more than $52,000.

can think of black migrants as having been both pulled to the North by the expansion of economic opportunities in the unskilled industrial sector, and pushed from the South as the demand for agricultural labor weakened. Push factors can thus be used to generate a migrant flow that is invariant to northern economic conditions.

I begin by predicting what net black migration from each southern state *s* would have been if migrants were responding only to local economic factors ($pred\_mig_{st}$). I then assign this counterfactual migration flow to the North using pre-established settlement patterns, measured as the share of out-migrants from a southern state that settled in each northern city during the first wave of black migration (w_{ns}). The stability of train routes and community networks generates persistent settlement patterns over time.[33] The predicted in-migration to a northern city *n* over a decade *t* is thus a weighted sum of the predicted out-flows from each southern state:

$$pred\_mig_{nt} = \sum_{s=1\ldots14} (w_{ns} \text{ x } pred\_mig_{st}) \qquad (1.4)$$

I use this predicted in-flow to advance a city's black population forward from 1940, with the resulting black population share becoming the instrument for the endogenous share.

Recall that the regressions are all estimated within regions. If the black migrant stock in a region's cities all hailed from the same southern states, this approach would not generate sufficient variation to identify the effect of urban diversity. Much of the variation in the destinations of black migrants is indeed between regions – migrants leaving the South Atlantic settled primarily in the Northeast, migrants from the Mississippi Delta moved to the Midwest, while Texans and Oklahomans ventured to California. However, there is also considerable

[33] Grossman (1989, p. 66-119) and Gottlieb (1987, p. 39-62) outline the role of train routes and information networks, including the letters of pioneer migrants and wide-circulation black newspapers, in the black migration to Chicago and Pittsburgh, respectively. Carrington, Detragiache, and Viswanath (1996) model chain migration as a reduction in the uncertainty costs of migration, and Bartel (1989) shows that contemporary immigrants are still likely to cluster near co-nationals, despite declines in transportation and communication costs.

variation *within* regions. Consider the case of Alabama and Mississippi, two neighboring, cotton-producing states in the traditional "black belt."[34] Figure 1 charts the share of migrants from these two states residing in the four largest Midwestern cities – Chicago, Cleveland, Detroit and St. Louis. Migration from Mississippi is overwhelmingly concentrated in two top destinations, Chicago (15 percent) and St. Louis (7 percent). Chicago is also the top destination for Alabamans, but receives a much smaller share of the total (9 percent), with Detroit a close second, followed by Cleveland.

The differences in the migration patterns from these neighboring states was heavily influenced by the existing railroad infrastructure. The black population in Mississippi was clustered in the west, along the Mississippi river, a region served only by one inter-state railroad, the Illinois Central, whose main hubs on the route north were Memphis, St. Louis and Chicago.[35] In contrast, Mobile and Birmingham, the departure points for black Alabamans, were each served by two major railroads – the Gulf, Mobile, and Ohio railroad, which connected to the Illinois Central network in St. Louis, and the Alabama Great Southern Railroad, which brought riders east to Cincinnati and on to Cleveland and Detroit.[36]

B. Building the Instrument with Historical Data

(i). Predicting Migration from the South

Southern blacks, 64 percent of whom lived in rural areas in 1940, were gradually being uprooted at mid-century by changes in the nature of agricultural production, compounded by federal farm

[34] A similar share of blacks leaving these states between 1915 and 1934 settled in the Midwest (27 and 29 percent, respectively). A much larger share of black migrants who left Mississippi and Alabama *for the North* settled in the Midwest (92 and 76 percent respectively). For illustration, the Midwest here includes both the East and West North Central Census regions.

[35] As Grossman (1989) writes, "geography and rail routes helped many black southerners make a decision based on accessibility, and most moved due north….. The first [migrant from Mississippi] to leave for Chicago probably chose the city because of its position at the head of the Illinois Central" (p. 99).

[36] A map of rail links from the South in 1916 is available at http://alabamamaps.ua.edu/historicalmaps/railroads/.

policy. The traditional sharecropping system was giving way to more fluid wage labor arrangements. The shift from tenancy to wage work increased the scale of production on many cotton plantations, inducing planters to invest in capital, such as the mechanical harvester, which further displaced agricultural labor.[37] Federal cotton policy may have also played an unintentional role in spurring northward migration. The Agricultural Adjustment Act (AAA) of 1933 gave cotton growers an incentive to leave fields fallow, a burden they often imposed on their tenants, who turned as a result to wage labor or migration (Alston, 1981).

I model the variation in net black migration rates (mig_rate_{ct}) at the county level *c* over decade *t* as arising from differences in initial agricultural conditions and earlier episodes of federal spending. These relationships are expressed in as expressed in equation 5:[38]

$$mig\_rate_{ct} = \alpha + \gamma(\text{agricultural})_{ct} + \delta(\text{policy})_{c} + \varepsilon_{ct} \quad (5)$$

I calculate a counterfactual migration flow from each county by multiplying the initial black population in a county by the fitted migration rate, and then aggregate these flows to the state level.[39]

The dependent variable, net black migration rates by county, is approximated by Gardner and Cohen (1971) for the 1940s and by Bowles, et al. (1990) for 1950s and 1960s using forward census survival ratios.[40] Because true inter-county migration is unknown, this approach

[37] For a thorough description of this process, see Wright (1986, p. 226-238) and Fligstein (1981, p. 137-151). Lemann (1991) provides a narrative account.
[38] While Fligstein (1981) finds that both the initial level and decadal changes in agricultural factors have significant effects on black migration rates, I include only the former out of concern that contemporaneous changes in the southern economy may be a *response* to, rather than cause of, migration. Consider the cotton share: planters may scale back cotton production if wages rise after a loss of labor to northern industry.
[39] While intra-state migration should net out when aggregating *actual* county-level migration to the state level – that is, migrants who leave one county only to enter another in the same state will have no net effect on a state's out-migration rate – the same may not be true with *predicted* migration. Thus, the predicted state aggregates may erroneously include and assign to the North some internal migrants.
[40] Michael Haines kindly provided cleaned electronic versions of this data.

compares the actual population in a race-sex-age cohort in county *c* at time *t* to a counterfactual population determined by multiplying that cohort's population at time *t-10* by its national survival ratio. The difference between the actual and predicted population counts are attributed to in- or out-migration.[41]

The county-level push factors included in equation 5 are primarily agricultural conditions, such as the share of tilled land planted in cotton, the percent of the labor force in agricultural production, and the share of farmers operating as tenants. The number of tractors per acre of planted land is a proxy for the degree of agricultural mechanization. To capture the effect of federal policy, I include measures of total AAA appropriations per capita from 1933-37 and of war contracts from 1940-45, which may have attracted black workers to the county.[42]

In Table 5, I present the total effect of a one standard deviation change in each county-level variable on net black migration. A negative value implies that the variable is associated with out-migration. (The coefficients themselves are difficult to interpret, due to a series of interactions, and are reported in Appendix Table 2.) The average southern county experienced an out-migration of 1 black resident per hundred in each decade from 1940 to 1970, but this mean hides considerable variation by state and over time. Some of this variation can be explained by differences in the nature of local agricultural production. All else equal, a one standard deviation increase in the cotton share of planted land increases black out-migration by around one-quarter

[41] Even when measured by race, the national survival ratio may understate mortality in the South, leading to an over-estimate of out-migration. Fishback, Horrace and Kantor (2005) calculated improved migration estimates for the 1930s using births and deaths collected in the national vital statistics registry. It would be worthwhile to extend their methods forward through 1970.

[42] I thank Price Fishback and Shawn Kantor for sharing their data on appropriations through the AAA, which is recorded in the US Office of Government Reports (1940). The remainder of the southern county data were taken from the electronic versions of the *County and City Data Books*, with the exception of cotton acreage. Information on cotton acreage is available electronically for some states at the National Agricultural Statistical Service's historical data website (http://www.usda.gov/nass/pubs/histdata.htm) and for others at the website of the Population and Environment in the US Great Plains project of the ICPSR (http://www.icpsr.umich.edu/PLAINS/). The remainder were collected by hand from the Censuses of Agriculture.

of a standard deviation in each decade (which translates into 31 additional out-migrants per decade on average). The other quantitatively important factors associated with out-migration are the percent of the labor force employed in agriculture and the number of tractors per acre, though the strength of these relationships diminish over time. After controlling for this set of agricultural variables, the per capita AAA spending in the county is associated with *in*-migration, but the interactions between the AAA and the cotton share is negative, which accords with the fact that the program offered incentives for cotton planters to keep land fallow. Allocations from the AAA may also be picking up other fixed aspects of counties – their political connections, their crop mix, etc. – because the AAA "effect," while declining in magnitude, persists throughout the period.

(ii). Assigning the Migrant Flow to the North

To allocate the predicted migrant flow to destination cities in the North, I use settlement patterns established during two earlier periods of black migration: the first wave (1915-34) and the depression era (1935-40). Before 1915, black migration to the North was minimal. The growth in industrial employment during World War I and the slowing of immigration from Europe spurred the first wave of migration (Collins, 1997). Migration rates temporarily fell during the Depression, and resumed in the early 1940s. Depression-era destinations are reconstructed from mobility data in the 1940 Census, which indicates the state of residence in 1935 for all black residents of northern cities. Settlement patterns during the first wave (1915-34) are estimated by combining information on mobility and state of birth. Blacks who were born in the South but were already living in a northern city by 1935 are considered part of the first wave.

Aggregate data by race on state of residence in 1935 are available for the central cities of 53 northern/western SMSAs, while state of birth data are available for only 36 of these areas.[43] One benefit of using Depression-era settlement patterns is that they are available for a larger set of cities. However, if migrants are attracted to areas with positive economic shocks, and these shocks are serially correlated, destination choices in the late 1930s are likely to be related to economic conditions in the subsequent decade(s). Thus, predictions of migrant in-flows on the basis of 1930s settlement patterns may violate the requirement that the instrument must be uncorrelated with the error term in the second stage. To address this concern, I consider IV results only for 1950-1970, leaving a full decade between the pre- and post-periods. I also compare results using Depression-era and earlier weights, and do not find a qualitative difference, suggesting that endogeneity of this type is not an important concern.

C. Instrumental Variables Results

The first column of Table 6 reports coefficients from two sets of first stage regressions, the first of which (panel A) uses Depression-era settlement patterns to assign the migrant flow to the North, and the second of which (panel B) uses weights from the first migration wave. Data are pooled from 1950 to 1970, with the 1940s omitted because of potential serial correlations in economic shocks over time. The dependent variables are interactions between the actual black population share in a city and an indicator variable equal to one if the metropolitan area was above/below the median level of white suburbanization in 1940. Each regression includes a set of SMSA dummies and region-specific time trends.

[43] The sample reduction is due to reporting restrictions for published Census data. Tabulations of mobility by race is available for all cities with a population of 100,000 or more in 1940. Information on the states of birth of current residents is only reported by race for cities with at least 5,000 non-white residents in 1940. While tallies are for non-whites rather than for blacks, blacks constituted the vast majority in 1940 of non-whites born in the South.

Predicted migration flows are strongly correlated with the actual growth in the black population share; all coefficients are significant at the 5 percent level. Migrants pushed from the South are only one source of black population growth. Thus, these instruments under-predict actual changes in the black population share, by a factor of four for depression-era weights and a factor of two for weights using migration during the 1910s and 20s.[44]

Because the data used to construct the settlement patterns are available only for large SMSAs, I re-estimate the OLS regressions with these diminished samples in the second column of Table 6. These coefficients are somewhat smaller than those for the full sample (Table 2).

Column 3 presents the IV results. The point estimates are always slightly larger than, but never statistically different, from their OLS counterparts. If the attraction of black migrants toward suburbanizing cities was partially responsible for the correlations established in the previous section, the IV estimates would be *smaller than* OLS. If anything, black migrants seem to have avoided suburbanizing areas, perhaps because those central cities were losing their middle class tax base and facing pressure to increase property tax rates or to cut services as a result. The qualitative pattern is similar whether one predicts in-migration using settlement patterns from the 1930s or from the 1910s and 1920s, attesting to the persistence of migrant flows between source and destination areas, and minimizing concerns about the instrument's validity.

Taking the IV coefficients in panel A as the best causal estimates, we can construct a counterfactual to assess whether black migration, and the attendant increase in urban diversity, were important determinants of white suburbanization. For simplicity, I consider the mean effect

[44] This disparity is due, in part, to differential rates of inter-regional migration during the two periods. Only 22 percent of black migrants settled in the North during the Depression, compared to 39 percent of the first wave.

of changes in the black population share, regardless of the initial level of a metropolitan area's suburbanization (coeff. = 0.761, s.e. = 0.262).

Let's begin with an extreme thought experiment: what if the second wave of the black migration (1940-1970) had not occurred? Roughly 3 million African-Americans lived in the North and West in 1940. With the influx of black southerners, along with natural increase, the population rose to 10.5 million in 1970. By the most conservative estimate, which ignores any northern-born offspring of southern migrants, migration contributed slightly more than half of the total black population growth. In the average city, black population rose by 11.7 percentage points from 1940 to 1970. Without migration, this increase would have been only 6.2 percentage points. As a result, the growth in the white suburban share would have been 4.2 percentage points lower (= 0.761 x (0.117-0.062)), reducing the *level* of the white suburban share from 70 to 66 percent in 1970. On average, the white suburban share increased 25 percentage points from 1940 to 1970. These estimates suggest that the white response to southern black migration can account for around 20 percent of the growth in white suburbanization.

The no-migration counterfactual, while large, is not out of the realm of actual urban experience. For example, in 1940, the populations of both Detroit and Pittsburgh were 10 percent black. By 1970, Detroit was 39.5 percent black, while Pittsburgh was only 17.4 percent black. Only 33.2 percent of Detroit's white population lived outside the city in 1940. By 1970, 75.3 percent did. If Detroit's black population had instead grown at Pittsburgh's rate, only 58.1 percent of its white population would have lived in the suburban ring in 1970.[45] In other words, the difference in the black migration experiences of Detroit and Pittsburgh can account for

[45] Detroit's black population share increased by 29.5 percentage points, while Pittsburgh's increased by only 7.4 percentage points, a difference of 22.1 percentage points. Subtracting the amount of white flight predicted *not* to have happened if Detroit's black population followed Pittsburgh's trends (16.8 = 0.761 x 22.1) from Detroit's actual white suburban share of 75.3 percent produces the counterfactual share.

around 40 percent of the actual increase in Detroit's white suburban share. The Detroit/ Pittsburgh comparison, while within sample, is one of most extreme. If, instead, Detroit had had Chicago's migration pattern (an increase of 23 rather than 30 percentage points), its white suburban share would have been around 10 percent lower.

VI. Conclusion

In the postwar period, cities with large black in-migrations lost white population to the suburban ring. Taken alone, this relationship does not prove that white urban residents relocated to the suburbs in response to black arrivals. The location decisions of black migrants must also be taken into account. Southern migrants may have been attracted to cities undergoing a process of suburbanization, either because of the lower prices for city housing left in the wake of white suburbanization, or because of the economic fundamentals underlying the demand for suburban living.

To put relative weights on these two causal factors, I develop an instrument that predicts black in-migration to northern/western cities. The instrument calculates a flow of black migrants pushed from southern states with the mechanization of local agriculture, and then allocates this flow to northern cities using settlement patterns from an earlier wave of black migration. This constructed flow did not migrate to pursue economic opportunities in the North, nor did they select a northern destination according to contemporary economic performance. Yet, even after isolating the growth of northern black populations due to chain migration, there is a strong, positive relationship between changes in racial composition of central cities and the white suburban share in the surrounding metropolitan area. Estimates suggest that, if the second wave

of the black migration (1940-1970) had not occurred, the growth in white suburbanization would have been 20 percent lower over this period.

Works Cited

Alesina, Alberto, Reza Baqir, and Caroline Hoxby. "Political Jurisdictions in Heterogeneous Communities." *Journal of Political Economy*, 112, 2004, pp. 348-396.

Alston, Lee J. "Tenure Choice in Southern Agriculture, 1930-1960." *Explorations in Economic History*, 18, 1981, pp. 211-232.

Austin, D. Andrew. "Politics vs. Economics: Evidence from Municipal Annexation." *Journal of Urban Economics*. 45, 1999, pp. 501-532.

Bartel, Ann. "Where Do the New U.S. Immigrants Live?" *Journal of Labor Economics*, 7(4), 1989, pp. 371–391.

Baum-Snow, Nathaniel. "The Effects of Changes in the Transportation Infrastructure on Suburbanization: Evidence from the Construction of the Interstate Highway System." Manuscript, 2005.

Baumol, William. "The Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis." *American Economic Review*, 57(3), June 1967, pp. 415-426.

Bogue, Donald J. *Population Growth in Standard Metropolitan Areas, 1900-1950.* Washington, D.C.: Housing and Home Finance Agency, 1953.

Boustan, Leah P. "Inside the Black Box of White Flight: The Role of Suburban Political Autonomy and Public Goods." Manuscript, 2005.

Bowles, Gladys K., James D. Tarver, Calvin L. Beale, and Everette S. Lee. Net Migration of the Population by Age, Sex, and Race, 1950-1970 [computer file]. ICPSR ed., Study no. 8493, 1990.

Bradford, David F. and Harry H. Kelejian. "An Econometric Model of the Flight to the Suburbs." *Journal of Political Economy*. 81(3), 1973, pp. 566-589.

Brooks, Richard R. W. "Covenants and Coventions." Law and Economics Research Paper Series, Northwestern University School of Law, No. 02-8, 2002.

Card, David. "Immigrant Inflows, Native Outflows, and the Local Market Impacts of Higher Immigration." *Journal of Labor Economics,* 19(1), 2001, pp. 22-64.

Carrington, William J., Enrica Detragiache, and Tara Vishwanath. "Migration with Endogenous Moving Costs." *American Economic Review*, 86(4), 1996, pp. 909-30.

Collins, William J. "When the Tide Turned: Immigration and the Delay of the Great Black Migration." *Journal of Economic History*, 57(3), Sept., 1997, pp. 607-632.

Collins, William J. and Robert A. Margo. "Residential Segregation and Socioeconomic Outcomes: When Did Ghettos Go Bad?" *Economics Letters*, 69(x), 2000, pp. 239-243.

Collins, William J. and Robert A. Margo. "The Economic Aftermath of the 1960s Riots: Evidence from Property Values." NBER Working Paper No. 10493, May, 2004.

Cullen, Julie Berry and Steven D. Levitt. "Crime, Urban Flight, and the Consequences for Cities." *Review of Economics and Statistics*, 81(2), 1999, pp. 159-169.

Cutler, David M. and Edward L. Glaeser. "Are Ghettos Good or Bad?" *Quarterly Journal of Economics*, 112(3), August 1997, pp. 827-872.

Cutler, David M., Edward L. Glaeser and Jacob Vigdor. "The Rise and Decline of the American Ghetto." *Journal of Political Economy*. 107(3), 1999, pp. 455-506.

Dean, John P. "Only Caucasian: A Study of Race Covenants." *Journal of Land and Public Utility Economics*. 23(4), 1947, pp. 428-432.

Dye, Thomas R. "Urban Political Integration: Conditions Associated with Annexation In American Cities." *Midwest Journal of Political Science*. 8(4), 1964, pp. 430-446.

Ellen, Ingrid Gould. *Sharing America's Neighborhoods: The Prospects for Stable Racial Integration.* Cambridge: Harvard University Press, 2000.

Fischer, Claude S., Gretchen Stockmayer, Jon Stiles, and Michael Hout. "Distinguishing the Geographic Levels and Social Dimensions of U.S. Metropolitan Segregation, 1960-2000." *Demography*, 41(1), 2004, pp. 37-59.

Fishback, Price, William Horrace and Shawn Kantor. "The Impact of New Deal Expenditures on Mobility During the Great Depression." *Explorations in Economic History*, 43(2), 2006, p. 179-222.

Fligstein, Neil. *Going North: Migration of Blacks and Whites from the South, 1900-1950.* New York: Academic Press, 1981.

Frey, William H. "Central City White Flight: Racial and Nonracial Causes." *American Sociological Review*. 44(3), 1979, pp. 425-448.

Frey, William H. "Black In-Migration, White Flight, and the Changing Economic Base of the Central City." *American Journal of Sociology*. 85(6), 1980, pp. 1396-1417.

Gabriel, Stuart A., Janice Shack-Marquez and William L. Wascher. "Regional House-Price Dispersion and Interregional Migration." *Journal of Housing Economics*, 2, 1992, pp. 235-256.

Gamm, Gerald H. *Urban Exodus: Why the Jews Left Boston and the Catholics Stayed*. Cambridge: Harvard University Press, 1999.

Gardner, John and William Cohen. *County Level Demographic Characteristics of the Population of the United States: 1930-1950* [computer file]. Compiled by University of Chicago Center for Urban Studies. ICPSR ed, Study no. 0020, 1971.

Gelfand, Mark I. *A Nation of Cities: The Federal Government and Urban America, 1933-1965.* New York: Oxford University Press, 1975.

Glaeser, Edward L. Matthew E. Kahn, and Jordan Rappaport. "Why Do the Poor Live in Cities?" NBER Working Paper No. 7636, April, 2000.

Glaeser, Edward L. and Jacob L. Vigdor. "Racial Segregation in the 2000 Census: Promising News." *The Brookings Institution Survey Series,* Center on Urban and Metropolitan Policy, 2001.

Glaeser, Edward L. and Joseph Gyourko. "Urban Decline and Durable Housing." *Journal of Political Economy*, 113(2), 2005, pp. 345-375.

Gottlieb, Peter. *Making Their Own Way: Southern Blacks' Migration to Pittsburgh: 1916-30*. Urbana: University of Illinois Press, 1987.

Gotham, Kevin Fox. "Urban Space, Restrictive Covenants and the Origins of Racial Residential Segregation in a US City, 1900-50." *International Journal of Urban and Regional Research.* 24(3), 2000, pp. 616-633.

Great Plains Research Project, *Population and Environment in the U.S. Great Plains* (web site), Inter-University Consortium for Political and Social Research, Sept. 15, 2005, <http://www.icpsr.umich.edu/PLAINS/>.

Grossman, James R. *Land of Hope: Chicago, Black Southerners, and the Great Migration.* Chicago: University of Chicago Press, 1989.

Grubb, W. Norton. "The Flight to the Suburbs of Population and Employment, 1960-1970." *Journal of Urban Economics*, 11, 1982, pp. 348-367.

Guterbock, Thomas M. "The Push Hypothesis: Minority Presence, Crime, and Urban Deconcentration." *The Changing Face of the Suburbs*, ed. Barry Schwartz. Chicago: The University of Chicago Press, 1976, pp. 137-161.

Jackson, Kenneth T. *Crabgrass Frontier: The Suburbanization of the United States*. New York: Oxford University Press, 1985.

Lemann, Nicholas. *The Promised Land: The Great Black Migration and How It Changed America.* New York: Vintage Books, 1991.

LeRoy, Stephen and Jon Sonstelie. "Paradise Lost and Regained: Transportation Innovation, Income, and Residential Location." *Journal of Urban Economics*, 13, 1983, pp. 67-89.

Margo, Robert A. "Explaining the Postwar Suburbanization of Population in the United States: The Role of Income." *Journal of Urban Economics*, 31(.), 1992, pp. 301-310.

Marshall, Harvey. "White Movement to the Suburbs: A Comparison of Explanations." *American Sociological Review.* 44(6), 1979, pp. 975-994.

Meyer, Stephen Grant. *As Long As They Don't Move Next Door: Segregation and Racial Conflict in American Neighborhoods*. New York: Rowman and Littlefield, Inc, 2000.

Mills, Edwin S. *Studies in the Structure of the Urban Economy*. Baltimore: Johns Hopkins Press, 1972.

Mills, Edwin S. "The Measurement and Determinants of Suburbanization." *Journal of Urban Economics*. 32, 1992, pp. 377-387.

Mills, Edwin S. and Richard Price. "Metropolitan Suburbanization and Central City Problems." *Journal of Urban Economics*. 15(.), 1984, pp. 1-17.

National Agricultural Statistical Service, *Historical Data* (website), U.S. Department of Agriculture, Sept., 15, 2005, <http://www.usda.gov/nass/pubs/histdata.htm>.

Schnore, Leo F., Carolyn D. André, and Harry Sharp. "Black Suburbanization, 1930-1970." *The Changing Face of the Suburbs*, ed. Barry Schwartz. Chicago: The University of Chicago Press, 1976, pp. 69-94.

Sjaastad, Larry A. "The Costs and Returns of Human Migration." *Journal of Political Economy*, 70(5), 1962, pp. 80-93.

Teaford, Jon C. *The Twentieth-Century American City: Problem, Promise, and Reality.* Baltimore: Johns Hopkins University Press, 1986.

Thurston, Lawrence and Anthony M. J. Yezer. "Causality in the Suburbanization of Population and Employment." *Journal of Urban Economics*. 35, 1994, pp. 105-118.

Tiebout, Charles M. "A Pure Theory of Local Expenditures." *Journal of Political Economy*. 64(5), 1956, pp. 416-424.

U.S. Bureau of the Census. *16th Census of the United States: 1940,* State of Birth of the Native Population, Washington: Government Printing Office, 1944.

U.S. Bureau of the Census. *18th and 19th Censuses of the United States: 1960 and 1970,* Characteristics of the Population, Vol. 1, Washington: Government Printing Office.

U.S. Bureau of the Census. *16th Censuses of the United States: 1940,* Internal Migration, 1935-40, Washington: Government Printing Office.

U.S. Bureau of the Census. *18th and 19th Censuses of the United States: 1960, and 1970,* Geographic Mobility for Metropolitan Areas, Washington: Government Printing Office.

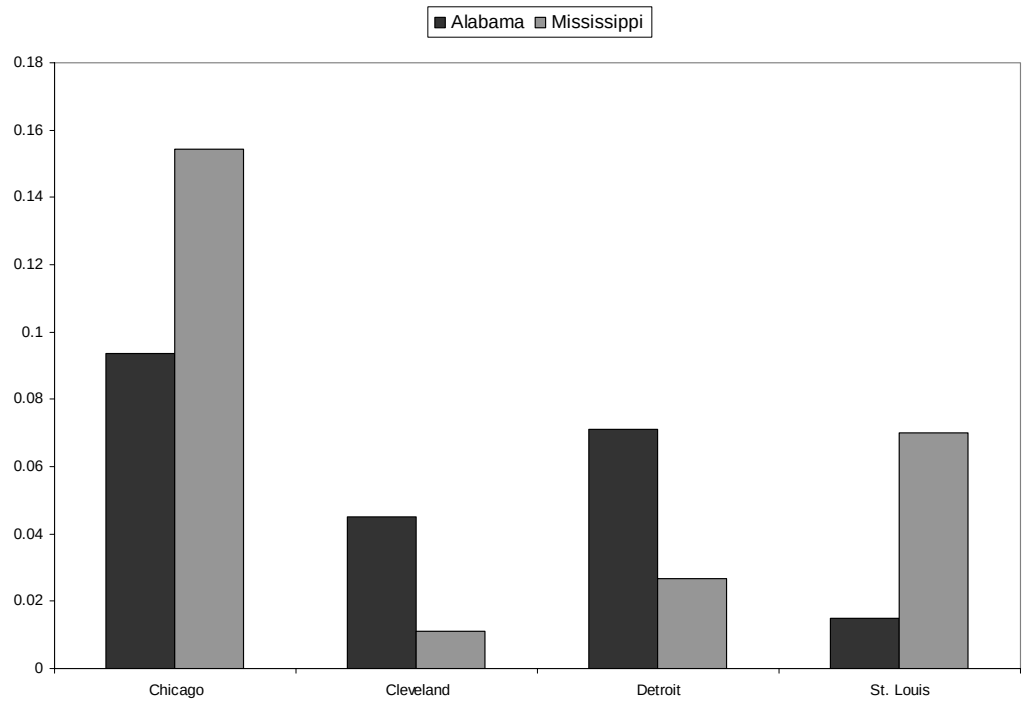
U.S. Bureau of the Census. *County and City Data Book, Consolidated File: City/County Data,* 1947-1977, ICPSR version, Study No. 7735-7736.

U.S. Office of Government Reports. "County Reports of Estimated Federal Expenditures March 4 1933 – June 30, 1939," Statistical Section, Report No. 10, vol. 1, 1940.

Weinberg, Bruce A. "Black Residential Segregation and the Spatial Mismatch Hypothesis." *Journal of Urban Economics*. 48, 2000, pp 110-134.

Wright, Gavin. *Old South, New South: Revolutions in the Southern Economy Since the Civil War*. New York: Basic Books, 1986

Figure 1: Share of black migrants from Alabama and Mississippi who settled in various Midwestern cities, 1915-34



Notes: The total number of black migrants leaving each state from 1915-34 are calculated as the number born in but living outside the state in 1940, minus the number who left the state from 1935-39. This calculation relies on aggregate mobility and state of birth counts from the 1940 Census. Note that the number of migrants settling in each city is expressed as a share of *all* migrants from Alabama or Mississippi, rather than just as a share of migrants who arrived in the North.

Table 1: OLS relationship between the black share of central cities and the white suburban share of metropolitan areas, 1940-70

Dependent variable = Share of whites in suburban ring

	City/Suburban borders		
City definition	Actual Annexation	Counterfactual 1	Counterfactual 2
Census definition	0.899	0.754	0.741
	(0.175)	(0.152)	(0.152)
Pop > 50,000, 1940	0.971	0.822	0.808
	(0.167)	(0.143)	(0.143)
SMSA dummies	Y	Y	Y
Year, region x year	Y	Y	Y
N	272	272	272

Notes: Standard errors, clustered by SMSA, are reported in parentheses. The sample includes all SMSAs in the North or West with more than 250,000 residents in 1970. The black share of the city's population is calculated as the number of black residents at time *t* divided by the city population time *t-10*. The second and third column use counterfactual city borders. The borders are created by reassigning residents who *would have* lived in central cities if not for annexation back to the city. The second (third) column assumes that the population living in the annexed area had the same white share as the suburban area as a whole (city as a whole).

Table 2: OLS relationship between black share of central city and white suburban share, Additional covariates, 1940-70

Dependent variable = Share of whites in suburban ring

	(1)	(2)	(3)	(4)
%black x (=1 high sub share, 1940)	0.476	0.384	0.342	0.288
	(0.173)	(0.145)	(0.178)	(0.151)
%black x (=1 low sub share, 1940)	0.913	0.864	0.873	0.771
	(0.133)	(0.130)	(0.144)	(0.148)
Share high school grad, SMSA		0.405		
		(0.246)		
ln(SMSA population)		0.094		-0.055
		(0.046)		(0.051)
ln(median family income), SMSA				0.125
				(0.102)
Share age > 65, SMSA				-2.635
				(0.657)
Interstates (in 100s miles)				0.055
				(0.011)
Interstates x city area (sq. miles)				-0.0001
				(0.00003)
SMSA dummies	Y	Y	Y	Y
Year, region x year	Y	Y	Y	Y
Decades	1940-70	1940-70	1950-70	1950-70
N	272	272	204	192

Notes: Standard errors, clustered by SMSA, are reported in parentheses. The sample includes all SMSAs in the North or West with more than 250,000 residents in 1970. The black share of the city's population is calculated as the number of black residents at time *t* divided by the city population time *t-10*. The indicator variable for high (low) initial suburbanization equals one if the suburban share was above (below) the median (43 percent) in 1940. The number of highway miles includes both two- and three-digit interstates that run through the center city. Three-digit numbers usually refer to branches off the main highway, or to beltways. A central city's area is measured in square miles as of 1940. The sample size is reduced in the fourth column because highway data are missing for four metropolitan areas. These are: Lorain-Elyria, OH; northern New Jersey (Newark-Jersey City-Paterson), NJ; Wilkes-Barre, PA; and Worcester, MA.

Table 3: OLS relationship between black share of central city and white suburban share, Heterogeneity by decade and region, 1940-70

By decade Dependent variable = Δ white suburban share			**By region** Dependent variable = white suburban share		
	(1) Coeff.	**(2)** Coeff.		**(3)** Coeff.	**(4)** Response to 1 SD
Δ% black x (=1 if high suburban share)			% black x region		
1940-50	0.642	0.658	Northeast	0.880	0.692
	(0.172)	(0.272)		(0.213)	
1950-60	0.560	0.538	West	-0.153	0.085
	(0.234)	(0.366)		(0.424)	
1960-70	0.044	-0.119	East North Central	0.884	0.595
	(0.162)	(0.229)		(0.198)	
Δ% black x (=1 if low suburban share)					
1940-50	0.679	0.703	West North Central	1.128	0.492
	(0.153)	(0.296)		(0.706)	
1950-60	0.938	0.910			
	(0.207)	(0.335)			
1960-70	0.565	0.306			
	(0.117)	(0.197)			
Δ% black x riots					
1940-50		-0.023			
		(0.209)			
1950-60		0.026			
		(0.244)			
1960-70		0.291			
		(0.164)			
SMSA dummies	N	N	SMSA dummies	Y	Y
Year, region x year	Y	Y	Year, region x year	Y	Y
N	204	204	N	272	272

General notes: Standard errors are clustered by SMSA and reported in parentheses. The sample includes all SMSAs in the North or West with more than 250,000 residents in 1970. The black share of the city's population is calculated as the number of black residents at time *t* divided by the city population time *t-10*.
Left-hand panel: Changes in the white suburban share are regressed on changes in the black population share. The RHS variable is interacted with an indicator variable for high (low) initial suburbanization, which equals one if the suburban share was above (below) the median (43 percent) in 1940. The second column also includes interactions with a dummy variable for 1960s riot activity. Following Collins and Margo (2004), each city is coded according to the share of all 1960s riot activity occurring therein; details are provided in the text. The riot dummy equals one in any city with more than the median share of riot activity (1.1 percent).
Right-hand panel: The white suburban share is regressed on the black population share. The RHS variable is interacted with a regional indicator. The Northeast region includes Connecticut, Massachusetts, New Jersey, New York, Rhode Island, and Pennsylvania; the West contains Arizona, California, Colorado, Oregon, Utah, and Washington; the East North Central is Illinois, Indiana, Michigan, Ohio, Wisconsin, and the West North Central is Iowa, Kansas, Minnesota, Missouri and Nebraska.

Table 4: OLS Relationship between change in black share of the central city and mobility to the suburbs, 1955-60

	pr(suburb 1960 | city 1955)		pr(suburb 1960 | out SMSA, 1955)	
	Coefficient	Response to 1 SD Δ /Mean	Coefficient	Response to 1 SD Δ /Mean
All whites	0.744 (0.222)	0.024/ 0.149	0.961 (0.652)	0.031/ 0.601
All blacks	-0.019 (0.141)	0.0006/ 0.034	---	---
Whites, 5-14 years	0.938 (0.353)	0.030/ 0.190	0.812 (0.646)	0.027/ 0.677
<u>By family income</u> < 22,000 ($, 2000)	-0.006 (0.187)	0.000/ 0.080	-0.591 (0.697)	-0.019/ 0.495
22k-52k ($, 2000)	0.464 (0.233)	0.014/ 0.150	0.409 (0.691)	0.013/ 0.610
>52,000 ($, 2000)	0.807 (0.248)	0.026/ 0.150	1.386 (0.745)	0.045/ 0.671
N	62	62	62	62

Notes: Standard errors are reported in parentheses. The sample includes the 62 SMSAs in the North or West with available aggregate mobility data from the 1960 Census. The black share of the city's population is calculated as the number of black residents at time *t* divided by the city population time *t-10*. Probabilities of living in the suburbs in 1960 conditional on having lived in the center city or outside the SMSA in 1955 are calculated from aggregate counts. For example, p (suburb 1960 | city 55) = # who lived in city in 1955 and moved to suburb / (# who lived in city in 1955 and still live in same house + # who lived in city in 1955 and moved within the city + # who lived in city in 1955 and moved to suburb).

Table 5: Marginal effect of southern agricultural and policy variables on net black migration rate by decade, 1940-70

Dependent variable = Migration rate per 100 in base population

1940-49	
Mean migration rate	13.78
Standard deviation	168.07
Effect of one SD increase in…	
% acres planted in cotton	-57.00
% labor force in agriculture	-65.96
$AAA per capita $_{33\text{-}37}$	47.42
% tenant	-7.00
Tractors/acre of planted land	-18.17
$ WWII per capita $_{40\text{-}45}$	-2.17
1950-59	
Mean migration rate	-13.82
Standard deviation	54.15
Effect of one SD increase in…	
% acres planted in cotton	-10.43
% labor force in agriculture	-4.45
$AAA per capita $_{33\text{-}37}$	9.47
1960-69	
Mean migration rate	-3.29
Standard deviation	69.42
Effect of one SD increase in…	
% planted in cotton	-26.32
$AAA per capita $_{33\text{-}37}$	26.32
% tenant	-3.96
% LF in manufacturing	6.53

Notes: The effects of southern characteristics on migration rates are based on coefficients from the decade-specific models presented in Appendix Table 2. Interaction effects are calculated using the mean value of southern county characteristic for the decade and (sub)region in question. Negative values indicate that a particular characteristic is associated with black *out*-migration.

Table 6: Comparing OLS and IV estimates of the relationship between black share of the center city and white suburban share, 1950-70

	First stage	OLS	IV
Dependent variable:	Actual black population share	White suburban share	White suburban share
A. Depression-era (N=159)			
Pred. %black x (=1 if high suburb share in 1940)	4.136	0.406	0.526
	(0.426)	(0.164)	(0.243)
Pred. %black x (=1 if low suburb share in 1940)	4.201	0.769	0.909
	(0.372)	(0.153)	(0.242)
B. First wave (N=108)			
Pred. %black x (=1 if high suburb share in 1940)	1.593	0.279	0.318
	(0.311)	(0.179)	(0.352)
Pred. %black x (=1 if low suburb share in 1940)	2.236	0.628	0.775
	(0.282)	(0.175)	(0.334)
SMSA dummies	Y	Y	Y
Year, region x year	Y	Y	Y

Notes: Specification and sample: Standard errors, clustered by SMSA, are reported in parentheses. The sample includes all SMSAs in the North or West with more than 250,000 residents in 1970. The black share of the city's population is calculated as the number of black residents at time *t* divided by the city population time *t-10*. The black share is interacted with an indicator variable for the level of white suburbanization in the SMSA as of 1940. SMSAs with a white suburban share above (below) the median (43 percent) in 1940 are classified as having a high (low) suburban share.
Instrument: The instrument allows the black population share of a city to increase only with the arrival of black migrants pushed from southern states due to changes in the nature of agricultural production. These exogenous migrant flows are then assigned to northern destinations according to pre-established settlement patterns. Panel A uses settlement patterns from the late 1930s. Panel B uses patterns from the first wave of black migration (1915-34). Both are calculated from state of birth and mobility data from the 1940 Census.

Appendix Table 1: Summary statistics, 1940-1970

	Mean	Standard Deviation
Population shares		
White suburban share	0.565	0.159
Δ White sub share, *t-t+10*	0.078	0.046
Black share of center city	0.096	0.087
Δ Black pop share, *t-t+10*	0.039	0.030
SMSA covariates		
Share high school grad	0.414	0.124
Population	1,076,394	1,673,143
Med family income ($2000)	$28,268	$18,719
Share age > 65	0.068	0.041
Interstate hwy in 100s miles	0.323	0.527
City area, square miles	58.281	77.393
Instruments		
Predicted Δ black pop share, First wave weights	0.016	0.013
Predicted Δ black pop share, Depression weights	0.006	0.007

Notes: Statistics presented for the 68 SMSAs in the North or West with more than 250,000 residents in 1970. The black share of the city's population is calculated as the number of black residents at time *t* divided by the city population time *t-10*. The white suburban and black population shares are calculated using counterfactual city borders. The borders are created by reassigning residents who *would have* lived in central cities if not for annexation back to the city, under the assumption that the population living in the annexed area had the same white share as the suburban area as a whole. The instruments allows the black population share of a city to increase only with the arrival of black migrants pushed from southern states due to changes in the nature of agricultural production, who are then assigned to northern destinations according to pre-established settlement patterns.

Appendix Table 2: Determinants of the net black migration rate from southern counties by decade, 1940-1970

Dependent variable = Migration rate per 100 in base population

	1940-49	1950-59	1960-69
% land planted in cotton	-122.086	-25.636	-96.639
	(39.073)	(7.486)	(39.175)
% LF in agriculture	61.079	-131.04	
	(29.313)	(90.822)	
$ AAA per capita $_{33-37}$	2.200	0.169	0.470
	(0.316)	(0.046)	(0.110)
$ AAA_{33-37} * % cotton	-0.900		
	(0.247)		
$ AAA_{33-37} * % agriculture	-2.039		
	(0.580)		
Tractors/acre	-22.323		
	(9.111)		
Tractors/acre * % cotton	28.290		
	(14.318)		
% farmers acting as tenants	-146.81		-244.856
	(46.796)		(78.416)
% tenant * % cotton	117.191		182.444
	(73.252)		(113.308)
$ WWII contracts per capita $_{40-45}$	36.928		
	(16.582)		
$ $WWII_{40-45}$ * % agriculture	-86.026		
	(0.432)		
% tenant * South Atlantic			161.738
			(81.513)
% LF in manufacturing			-203.535
			(64.521)
% manufacturing * South Atlantic			204.884
			(86.479)
State fixed effects?	Y	Y	Y
N	1313	1335	1283

Sources: Black migration rates by county are estimated using forward census survival ratio methods by Gardner and Cohen (1971) for the 1940s and by Bowles, et al.'s (1990) for 1950s and 60s. Spending allocated by the Agricultural Adjustment Act (AAA) from 1933-37 is recorded in the US Office of Government Reports (1940). Data on tenancy, tractors and the labor force are from the County and City Data Books. Information on cotton acreage is taken, variously, from the National Agricultural Statistical Service's historical data website, the website of the Population and Environment in the US Great Plains project of the ICPSR, and Census of Agriculture volumes.
Notes: The South Atlantic includes Florida, Georgia, the Carolinas and the Virginias. Regressions include only southern conditions found to have a significant effect on black migration rates.