# WAS POSTWAR SUBURBANIZATION "WHITE FLIGHT"? EVIDENCE FROM THE BLACK MIGRATION[*]

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Residential segregation by jurisdiction generates disparities in public services and education. The distinctive American pattern—in which blacks live in cities and whites in suburbs—was enhanced by a large black migration from the rural South. I show that whites responded to this black influx by leaving cities and rule out an indirect effect on housing prices as a sole cause. I instrument for changes in black population by using local economic conditions to predict black migration from southern states and assigning predicted flows to northern cities according to established settlement patterns. The best causal estimates imply that each black arrival led to 2.7 white departures.

## I. Introduction

American metropolitan areas are segregated by race, both by neighborhood and across jurisdiction lines. In 1980, after a century of suburbanization, 72% of metropolitan blacks lived in central cities, compared to 33% of metropolitan whites. Because many public goods are locally financed, segregation between the central city and the suburbs can generate disparities in access to education and other public services (Benabou 1996; Bayer, McMillan, and Rueben 2005). These local disparities have motivated large policy changes over the past fifty years, including school finance equalization plans within states and federal expenditures on education.

Racial segregation by jurisdiction has historical roots in two population flows: black migration from the rural South and white relocation from central cities to suburban rings. Both flows peaked during World War II and the subsequent decades. Between 1940 and 1970, four million black migrants left the South, increasing

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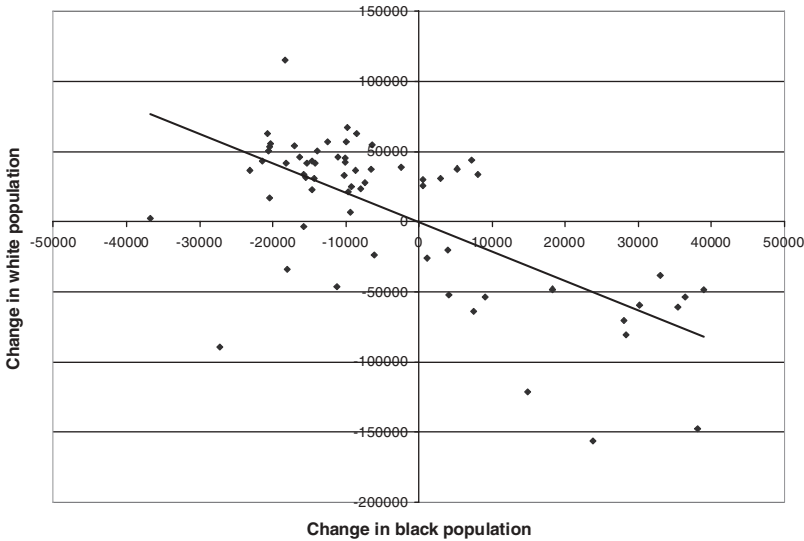
FIGURE I

Change in Black and White Population in Central City, 1950–1960

Each point in the scatter diagram represents the residual change in a city's black and white populations after controlling for region fixed effects and changes in the metropolitan area's population over the decade. The slope of a regression line through these points is −2.010 (s.e. = 0.291). Although the four largest cities—Chicago, IL; Detroit, MI; Los Angeles, CA; and New York City, NY—are omitted for reasons of scale, they fall close to the regression line. With these cities included, the slope is −2.465 (s.e. = 0.132).

the black population share in northern and western cities from 4% in 1940 to 16% in 1970. Over the same period, the median nonsouthern city lost 10% of its white population.

This paper shows that white departures from central cities were, in part, a response to black in-migration.[1] In every decade, cities that received a larger flow of black migrants also lost a larger number of white residents. Figure I provides an initial look at the relationship between black arrivals and white departures in nonsouthern cities over the 1950s. The slope of the regression line through these points suggests that each black arrival was associated with two white departures.

The relationship between black arrivals and white departures provides suggestive evidence of "white flight," a process by which

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1. An extensive literature argues that white households have a preference for white neighbors. See Crowder (2000), Ellen (2000), Emerson, Chai, and Yancey (2001), and the references contained therein. Boustan (2007) shows that demand for urban residence is also affected by citywide demographics.

white households left central cities to avoid living in racially diverse neighborhoods or jurisdictions. However, the correlation between black arrivals and white departures could also be driven by the potentially endogenous location decisions of southern black migrants. If whites left particular northern cities for other reasons (for example, due to the construction of a new interstate highway), migrants might have been attracted by lower housing prices left in the wake of white departures (Gabriel, Shack-Marquez, and Wascher 1992; Saiz 2007).[2] Alternatively, migrants might have flocked to areas with high wages or centrally located manufacturing jobs, factors that also underlie the demand for suburban residence (Steinnes 1977; Margo 1992; Thurston and Yezer 1994).

I employ an instrumental variables procedure to address these potential alternatives. The instrument makes use of the fact that black migrants from given southern states clustered in particular northern cities. As a result, northern cities received exogenous flows of black migrants when their traditional southern states of origin underwent agricultural and economic change. In particular, I use variation in local agricultural conditions to predict black out-migration from southern states and assign these predicted migrant flows to northern cities using settlement patterns established by an earlier wave of black migration. These predicted changes in black population serve as an instrument for actual black in-migration.

After adjusting for migrant location choices, I estimate that each black arrival was associated with 2.7 white departures. The median city, which had 200,000 white residents, absorbed 19,000 black migrants over this period. My estimates imply that these arrivals prompted the departure of 52,000 white residents, resulting in a 17% net decline in the urban population. Although primarily driven by household mobility, I find that the decline in white population is also partly due to a reduction in the size of the remaining white households.

Observing white departures in response to black arrivals is not sufficient evidence to demonstrate the presence of white flight. White departures may be prompted by the fact that black migrants bid up the price of city housing units. In a simple spatial model, I demonstrate that if white households have no distaste

2. Gamm (1999) argues that black migrants were attracted to the Dorchester and Roxbury neighborhoods of Boston by the decline in housing prices following a wave of Jewish suburbanization.

for racial diversity, each black arrival will lead to one white de-
parture with no long-run effect on housing prices. In contrast, if
white households have a distaste for racial diversity, black mi-
gration will be associated with more than one white departure
for every black arrival, declining urban population, and, in some
cases, falling housing prices. I show that in otherwise declining
areas, black migration leads to an increase in the vacancy rate
and an associated decline in housing prices. In growing areas,
black migration instead slows the rate of new home construction,
leading to a smaller housing stock with no effect on housing prices.

Early studies of urban population loss suggest that house-
holds left cities to escape mounting urban problems, including a
rising crime rate, fiscal mismanagement, and a growing concen-
tration of racial minorities and the poor (Bradford and Kelejian
1973; Guterbock 1976; Frey 1979; Marshall 1979; Grubb 1982;
Mills and Price 1984; Mieszkowski and Mills 1993). These papers
find mixed evidence for the relationship between urban racial di-
versity and suburbanization in 1960 and 1970 cross sections. Re-
cent studies put more emphasis on transportation improvements,
including the automobile and new road building, which reduce
the time cost of commuting from bedroom communities (LeRoy
and Sonstelie 1983; Baum-Snow 2007; Kopecky and Suen 2007).[3]
The decline in urban population following the typical black in-
migration found here is equivalent to Baum-Snow's (2007) esti-
mates of the decline in urban population after the construction of
one new highway through the central city.

This paper documents that black arrivals reduced the overall
demand for city residence in the mid-twentieth century, leading
to white out-migration and, in some cases, falling housing prices.
However, the mechanisms by which cities lost their luster are less
clear. Because poverty and race are highly correlated, I cannot
distinguish here between a distaste for the race and for the income
level of southern arrivals. Moreover, with a metropolitan area–
level analysis, I cannot separate changes to local neighborhoods
and schools from changes to citywide characteristics, including
the property tax rate and local spending priorities. Card, Mas,
and Rothstein (2008) demonstrate that neighborhoods can "tip"
from predominantly white to predominantly minority areas after

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3. An exception is Cullen and Levitt (1999), which studies the relationship
between crime rates in the central city and suburbanization. Historians continue to
emphasize the connection between racial diversity and suburbanization (Jackson
1985; Sugrue 1996; Meyer 2000).

reaching a critical minority share. However, because cities were highly segregated by neighborhood, few neighborhoods fell into the range in which they would be at risk for tipping. I find that at most 20% of the estimated white departures can be traced to neighborhoods in the tipping range. Exploring other mechanisms for white departures is a fruitful area for future research.

## II. WHITE FLIGHT IN A SIMPLE SPATIAL MODEL

In the postwar period, black migrants settled disproportionately in central cities. This section illustrates potential channels by which black arrivals may have affected both the number of white residents and housing prices in receiving cities. The model demonstrates that, as long as the housing supply is not perfectly elastic, some white departures will occur even without a distaste for racial diversity due to the effect of new arrivals on housing prices.[4] However, if whites have some distaste for living near blacks, black migration will be associated with declining urban population and, in some cases, falling housing prices.

Consider a central city in the North with a given number of white households. With free mobility, utility in this city cannot fall below $\underline{u}$, the utility level for a white household in the suburban ring of the city's own metropolitan area and in other metropolitan areas around the country. Household utility can be written

$$(1) \qquad\qquad U(p, b, z) = \underline{u}.$$

$U$ is decreasing both in the price of housing $(p)$ and (weakly) in the share of the city residents who are black ($b = B/(B + W)$, where $B$ and $W$ are the numbers of black and white households, respectively). $z$ is a demand shifter representing either local amenities or productivity. The price of housing is a function of the number of households in the city, $N$ ($N = W + B$). The sensitivity of price to the number of households is determined by $\varphi$, the price elasticity of housing supply.

Initially, all blacks live in the South. Blacks will migrate to the North if their utility level in the northern city is higher than some reservation southern utility. Southern utility $\underline{s}$ is determined by the wage rate in southern agriculture $(w)$, which is decreasing in

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4. A distaste for racial diversity could arise either directly from racist attitudes or indirectly from concerns about local amenities such as crime rates or school quality.

the number of blacks in the South. The utility function of a black household in the North is identical to that of a white household, except that black utility may be increasing in the number of blacks in the city:

$$(2) \qquad\qquad U(p, b, z) = \underline{s}(w).$$

The price elasticity of housing supply ($\varphi$) is determined by the decisions of a profit-maximizing construction sector. For prices below construction cost ($c$), each unit built yields negative profits. In this region, firms will not build new units and the housing supply elasticity is zero. In the simplest case, housing supply will be perfectly elastic at a price equal to construction cost. Alternatively, we could imagine that the city rations building permits. To build an additional unit, firms must incur a lobbying cost $L(N)$, which is increasing with the size of the city. In this case, housing supply elasticity will be positive but not infinite at prices above construction cost. This kinked supply curve generates an asymmetric response to changes in demand: increasing demand leads to new construction, but declining demand does not lead to an (immediate) reduction in the housing stock (Glaeser and Gyourko 2005).

The city is in spatial equilibrium when all white and black residents weakly prefer their own locations to the alternatives and when firms in the construction sector earn zero profits. Spatial equilibrium determines a city housing price $p^*$, which will be equal to or below construction costs, and the share of the city residents who are black ($b^*$).

How will the city respond to an influx of black arrivals? Consider a decline in southern wages following mechanization in the agricultural sector, prompting black migration to the city. This case corresponds to the instrument for black migration described in the next section, which relies on exogenous variation in southern agricultural conditions. When $\underline{s}$ falls, black migrants move to the city. Migration continues until the southern wage rises sufficiently to make blacks indifferent between the South and the North. The city's construction sector responds to the new arrivals. If housing supply is perfectly elastic at prices above construction costs, firms will build new units until prices return to $p^* = c$ and no white households will leave the city. If housing supply is less than perfectly elastic, housing prices will increase somewhat with

black in-migration, encouraging some white households to leave the city in response.

How many whites will leave the city in this scenario? To begin with, assume that whites have no distaste for black residents ($U_b' = 0$). According to equation (1), spatial equilibrium for white households will only be restored when city prices return to $p^*$. Given that prices are a function of the total number of households in the city, this relationship holds when each black arrival displaces exactly one white resident. From this reasoning, we can conclude that *if whites exhibit no distaste for racial diversity (and housing supply is not perfectly elastic), black migration to a central city will lead to (a) exactly one white departure for every black arrival and (b) no long-run change in city housing prices.*

Black migration increases both housing prices and the black population share in the city. If white households dislike racial diversity ($U_b' < 0$), black migration will prompt more white departures than in the previous case. This decline in city population will lead housing prices to fall below construction costs. I assume that the housing stock will decline at some rate $\lambda$ until prices eventually return to $p^*$.[5] From this reasoning, we can conclude that *if whites exhibit a distaste for racial diversity, black migration to a central city will lead to (a) more than one white departure for every black arrival and (b) a short-run decline in city housing prices.*

Define $\lambda$ as the (exogenous) speed with which city housing prices return to $p^*$, either through depreciation of the existing housing stock or a slowdown in new construction. In cities that are otherwise expanding, the housing stock can easily decline (in a relative sense) through a slowing of the rate of new construction. That is, expanding cities are characterized by a high $\lambda$. However, in cities that are otherwise shrinking, a decline must occur through a slower process of depreciation of the existing housing stock. This distinction generates an additional prediction: *In declining areas, white departures will be coupled with a high vacancy rate and falling prices, whereas in growing areas, white departures will lead to a decline in the rate of new construction and housing prices will remain at construction costs.*

The model suggests a set of empirical relationships to be explored in the data. First, white departures from the central city

5. In the meantime, low housing prices in the city will induce additional black migration, which, in turn, will prompt more white departures. The city will not tip from all white to all black because the loss of black population from the South will increase southern wages, eventually bringing migration to a halt.

will respond to the *number* of black arrivals, rather than the percentage change in the black population. However, spatial equilibrium for white households indicates that housing prices will respond to the black share of the city's population, rather than to the number of black arrivals. If the number of white departures with every black arrival is statistically greater than one, we can rule out housing prices as a sole cause of the white outflow.

Thus far, I have considered how the urban equilibrium is affected by black migration pushed from the South by a decline in southern wages. However, changes to the northern city itself may also attract black migrants. An increase in northern productivity ($z$) could simultaneously attract black migrants and encourage some white households to move to the suburbs.[6] This process could generate a *spurious correlation* between these two population flows. Alternatively, if whites leave the city for any other reason (modeled as an increase in $\underline{u}$), housing prices may fall, encouraging black in-migration from the South. In this case, an association between black arrivals and white departures would not be driven by white racism but rather by black location choice (*reverse causality*). The spatial model helps to demonstrate the importance of focusing on southern conditions as a source of exogenous variation in black population growth in the North. In the next section, I introduce an instrument for black migration using factors that exogenously change the utility of southern blacks.

### III. Using Southern Black Migration to Instrument for Black Arrivals to Northern Cities

#### III.A. Historical Context and Conceptual Approach

Rural blacks were attracted northward by economic opportunities in the manufacturing and service sectors. The demand-pull component of this migrant flow is undoubtedly correlated with economic conditions in destination cities. Southern push factors can be used to create an instrument for changes in urban diversity in the North. I use local economic conditions to predict black migrant flows from each southern state. These local factors are

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6. A productivity-driven increase in wages may encourage some white households to move to the suburbs. Living in the suburbs involves a trade-off between the price of housing services and the distance to work. An increase in income will prompt households to move to the suburbs as long as the elasticity of housing services with respect to income is greater than the income elasticity of the opportunity cost of time (Becker, 1965).
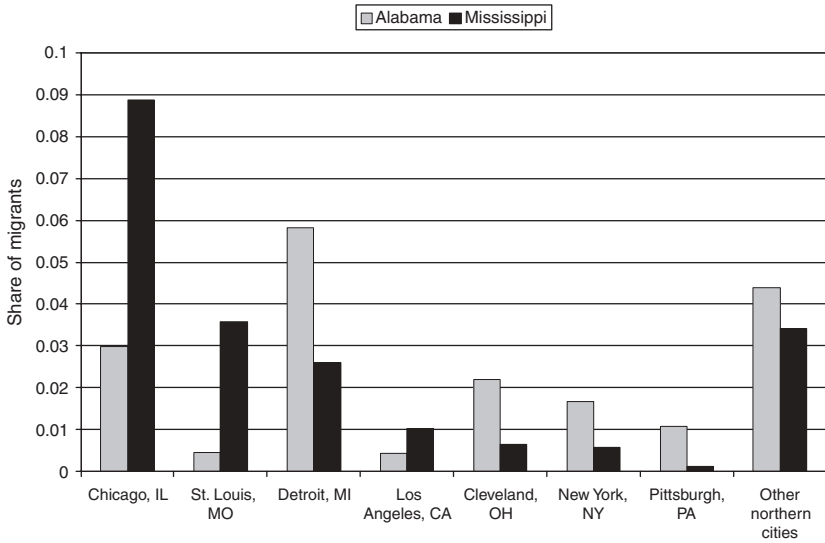
FIGURE II

Top Destinations of Northern Black Migrants from Alabama and Mississippi, 1935–1940

Data on migration flows are calculated from aggregate mobility tables from the 1940 Census (U.S. Bureau of the Census, *Internal Migration, 1935–1940*).

unlikely to be correlated with aspects of the northern economy. I assign predicted flows to northern destinations using settlement patterns established by an earlier wave of black migration.[7] The predicted black population in a northern city is used to instrument for the actual black population.

Key to this procedure is the fact that blacks leaving particular southern states settled in certain northern cities. These settlement patterns were highly persistent, in part due to the stability of train routes and community networks.[8] Much of the variation in source/destination pairs occurs *between* regions, with migrants simply moving due north—say, from the Mississippi Delta to industrial cities in the Midwest. However, there is also considerable variation *within* regions. Consider the case of Alabama and Mississippi, two neighboring, cotton-producing states in the traditional "black belt." Figure II displays the shares of northern black

7. The first wave of black migration was prompted by growth in industrial employment during World War I and the imposition of strict immigration quotas in 1924, which slowed migration from Europe (Collins 1997).

8. Carrington, Detragiache, and Vishwanath (1996) model this type of chain migration as a reduction in the uncertainty costs of migration.

migrants from these two states that settled in various cities between 1935 and 1940. Migration from Mississippi to the North was overwhelmingly concentrated in two destinations, Chicago and St. Louis. By contrast, Detroit received the largest flow from Alabama, followed by Chicago and Cleveland.

The difference in migration patterns between these neighboring states is consistent with disparities in their railroad infrastructure, which were in place long before 1940. The black population in Mississippi was clustered along the Mississippi river, a region served by only one interstate railroad (the Illinois Central), whose main hubs were St. Louis and Chicago. In contrast, the large cities in Alabama, Mobile and Birmingham, 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 Cleveland and Detroit.[9]

### III.B. Building an Instrument from Historical Data

The instrument for northern black population is made up of two components: predicted migrant flows from southern states and the settlement pattern established by blacks leaving these states in an earlier wave of migration. To predict black migration from a southern state, I start by estimating net black migration rates at the county level as a function of agricultural and industrial conditions:

$$(3) \qquad \text{mig\_rate}_{ct-t+10} = \alpha + \gamma(\text{push factors})_{ct} + \varepsilon_{ct}.$$

I use county characteristics at the beginning of a decade to predict migration over the subsequent ten-year period because contemporaneous changes in southern economic conditions could be a response to, rather than a cause of, migration (Fligstein 1981). For instance, planters may scale back cotton production as agricultural wages rise with out-migration. I also present results using only 1940 county characteristics to predict migration in each of the three following decades.

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9. Grossman (1989, p. 99) writes that "the first [migrant from Mississippi] to leave for Chicago probably chose the city because of its position at the head of the Illinois Central." A map of rail links from the South c. 1915 can be found at http://alabamamaps.ua.edu/historicalmaps/railroads/. See Gottlieb (1987, pp. 39–62) and Grossman (1989, pp. 66–119) for a broader discussion of the role of train routes and information networks in black migration.

TABLE I

DETERMINANTS OF NET BLACK MIGRATION RATES BY SOUTHERN COUNTY, 1940–1970

|  | 1940–1950 | 1950–1960 | 1960–1970 |
|---|---|---|---|
| Share land planted in cotton | −63.575 | −9.695 | −49.886 |
|  | (13.519) | (7.064) | (19.863) |
| Share farmers as tenants | −73.290 | −22.836 | −76.232 |
|  | (31.404) | (15.778) | (46.834) |
| Share agriculture | 96.909 | −144.440 | 159.350 |
|  | (27.776) | (100.353) | (47.875) |
| =1 if tobacco state | 20.390 | −60.438 | 45.501 |
|  | (26.614) | (58.781) | (20.783) |
| Sh agriculture (=1 tobacco) | −119.379 | 185.865 | −230.003 |
|  | (49.753) | (169.730) | (81.407) |
| Share mining | 16.750 | −63.233 | 59.030 |
|  | (82.892) | (36.631) | (73.275) |
| =1 if oil state | 58.331 | 8.919 | 21.538 |
|  | (11.040) | (7.680) | (12.750) |
| Share mining (=1 if oil state) | 146.970 | 267.268 | −126.308 |
|  | (182.76) | (78.670) | (98.638) |
| $ in defense *pc*, 1940–1945 | 19.806 | 2.151 | 2.720 |
|  | (7.042) | (4.077) | (8.566) |
| Constant | 16.377 | 40.695 | −2.801 |
|  | (14.330) | (33.557) | (11.489) |
| *N* | 1,378 | 1,352 | 1,350 |

*Notes.* See Data Appendix for source details. Table A.2 contains summary statistics. The dependent variable for each regression is the net black migration rate by southern county.

Table I contains coefficients from the regression of net migration rates on county characteristics.[10] The results from this exercise coincide with predictions from southern economic history. A county's cotton share strongly predicts black out-migration in the 1940s, as the planting and weeding components of cotton production were mechanized, and again in the 1960s, when a viable cotton harvester diffused throughout the South—but not in the 1950s (Grove and Heinicke 2003, 2005).[11] A ten–percentage

10. Source details are contained in the Data Appendix, and the associated summary statistics are presented in Table A.2.

11. Federal cotton policy may have spurred the first wave of cotton mechanization in the late 1930s and 1940s. The Agricultural Adjustment Act (AAA) of 1933 encouraged cotton growers to leave fields fallow, a burden they often imposed on their tenants. This policy inadvertently increased the average size of cotton farms, thus providing an incentive to invest in high fixed cost capital goods. See Fligstein (1981, pp. 137–151), Whatley (1983), and Wright (1986, pp. 226–238). Correspondingly, tenancy rates are an important predictor of out-migration in the 1940s, when the traditional sharecropping system was giving way to wage labor arrangements (Alston 1981).

point increase in the share of land planted in cotton predicts six
additional out-migrants per 100 black residents in the 1940s and
five additional out-migrants in the 1960s. In contrast, agricultural
counties in tobacco-growing states, which were slow to mechanize,
lost black population only in the 1960s (Wright 1986). Counties
that received federal funds for war-related industry in the 1940s
attracted black migrants in that decade, though the effect of this
wartime spending dissipated by the 1950s. The discovery of major
oil fields and the expansion of natural gas attracted black en-
trants to mining counties in Oklahoma and Texas in the 1940s
and 1950s.

I generate a predicted migration flow from each county by
multiplying the fitted migration rate by the county's initial black
population. These predicted flows are aggregated to the state level
($\mathrm{pred\_mig}_{st}$) and allocated to northern cities according to the set-
tlement patterns of blacks who left the state between 1935 and
1940. Let $w_{ns}$ be the share of blacks who left state $s$ after 1935
and resided in city $n$ in 1940.[12] The number of black migrants
predicted to arrive in city $n$ at time $t$ is the weighted sum over the
fourteen southern states of migrants leaving state $s$ and settling
in city $n$:

$$(4) \qquad \mathrm{pred\_mig}_{nt} = \Sigma_{s=1,\ldots,14}(w_{ns} \cdot \mathrm{pred\_mig}_{st}).$$

I use this predicted in-flow to advance a city's black population
forward from 1940, with the predicted black population serving
as the instrument for the actual population.

Card (2001), Lewis (2005), and Doms and Lewis (2006) use a
similar approach to study the effect of immigration on local labor
markets.[13] One important difference, however, is that these pa-
pers allocate the *actual* inflow of immigrants to cities rather than
predicting the inflow from a set of local push factors. As a result,
the method assumes that the "total number of immigrants from
a given source country who enter the United States is indepen-
dent of ... demand conditions in any particular city" (Card 2001,
p. 43). However, given that migrants cluster, a positive economic
shock in a destination city could stimulate additional migration

12. The 1940 Census is the first to collect systematic data on internal migra-
tion. Aggregate mobility tables are available by race for 53 cities in the sample.
The mobility data provide the city and state of residence in 1935 for residents of a
given city in 1940.

13. In a related method, Munshi (2003) uses rainfall in Mexican villages as
an instrument for the size of different migrant networks in the United States.

flows from source areas. I present results using both actual and predicted migration flows.

## IV. The Causal Relationship between Black Arrivals and White Departures from Central Cities

### IV.A. Data and Estimation Framework

I compile a data set of population and household counts from 1940 to 1970 in seventy large metropolitan areas (SMSAs) in the North and West.[14] Stacking data from the four Census years, I begin by estimating the relationship between the number of non-black ("white") residents (W_CITY) and the number of black residents (B_CITY) in the central cities of these metropolitan areas ($m$),

$$\text{(5)} \quad \begin{aligned} \text{W\_CITY}_{mrt} = {} & \alpha_m + \beta_1(\text{B\_CITY}_{mrt}) \\ & + \gamma_1(\text{POP\_METRO}_{mrt}) + \upsilon_{rt} + \varepsilon_{mrt}, \end{aligned}$$

where $t$ and $r$ indicate Census decades and regions, respectively.[15] $\upsilon_{rt}$ are Census region by decade fixed effects.[16] $\beta_1$ is thus estimated from changes in black population within a city over time, compared to other cities in the region. I control for the size of the metropolitan area (POP_METRO) because growing areas will attract a large flow of both black and white in-migrants. The instrument discussed above is only available for 53 of the sample cities.

Earlier work on the role of race in the suburbanization process compares cross sections of cities with different black population shares at a point in time. The benefit of a panel is twofold: first, the size of a city's black population may be correlated with fixed aspects of an area's industrial base, transportation network, or housing stock. Such characteristics may also encourage suburban development, leading to a spurious correlation in the cross

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14. I exclude the South because the vast majority of black migrants into southern cities came from the surrounding state, making it difficult to separate changes in urban diversity from periods of local economic change. Sample selection is discussed in more detail in the Data Appendix.

15. Although the model relates the number of white households to the number of black households in a central city, I begin by estimating the relationship between black and white *population* for two reasons. First, the instrument generates variation at the individual, rather than the household, level. Second, I am unable to correct the households counts for possibly endogenous annexation. Table III contains household-level results in OLS.

16. I combine the Western and Mountain Census regions and the New England and Mid-Atlantic Census regions into Pacific and Northeastern regions, respectively.

section. Second, the size of central cities—in land area—relative to their metropolitan areas varies widely. Although this variation can obscure comparisons of suburbanization across metropolitan areas, city size is largely unchanging within a metropolitan area over time.

Cities can expand in land area over time by annexing nearby unincorporated land (or, less commonly, neighboring suburbs). My preferred measure of the central city fixes city boundaries according to their 1940 definition, foreclosing the possibility of an endogenous annexation response to changes in racial diversity (Austin 1999; Alesina, Baqir, and Hoxby 2004).[17] The Data Appendix discusses alternative definitions of the central city and assesses the robustness of the results to the choice of measure. The mean city is 9.2% black and is located in a metropolitan area with 1.3 million residents, 41% of whom live in the city itself.

### IV.B. First-Stage Results

The stability of migrant settlement patterns generates a strong association between actual changes in black population and changes due to predicted black in-migration alone. The first column of Table II reports results from a series of first-stage regressions. In the first row, the instrument is generated by allocating actual southern flows to the North akin to those reported by Card (2001) and others. The subsequent rows use predicted migrant flows based on southern push factors. Not surprisingly, the relationship between actual and simulated changes in black population is stronger when actual rather than predicted migrant flows are assigned. Each predicted black arrival is associated with 4.4 actual new black residents when real migrant flows are assigned (row (1)) and 3.5 new black residents when predicted migrant flows are assigned (row (2)). The coefficient is highly significant in both cases. The magnitudes suggest that, over a decade, each migrant arrival leads to the equivalent of one new black household (assuming a mean household size of 3.5 residents) in the central city, a process that presumably occurs through family formation and child bearing in the North.

Figure III graphs the first stage relationship using predicted migrant flows in the 1950s, again controlling for region fixed

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17. Only five cities in the sample annexed enough territory to expand their populations by at least five percent. These are Phoenix, AZ; Fresno, Sacramento, and San Bernardino, CA; and Wichita, KS.

TABLE II

BLACK MIGRATION TO CENTRAL CITIES AND WHITE POPULATION LOSS

| Dependent variable: | Actual black population in city | White population in city | |
|---|---|---|---|
| Instrument type | First stage | OLS | IV |
| Assign actual migrants | 4.442 | −2.099 | −2.365 |
| | (0.652) | (0.549) | (0.805) |
| Assign predicted migrants, 1940–1970 | 3.466 | −2.099 | −2.627 |
| | (0.671) | (0.549) | (0.782) |
| Assign predicted migrants, 1950–1970 | 4.488 | −2.278 | −2.983 |
| | (0.968) | (0.604) | (0.768) |
| Predict with 1940 variables, 1950–1970 | 4.365 | −2.278 | −3.085 |
| | (0.799) | (0.604) | (0.708) |
| Long-run changes, 1940–2000 | 6.800 | −0.771 | −1.050 |
| | (0.421) | (0.166) | (0.199) |
| Long-run changes, white foreign-born population in the city | — | 0.264 | 0.169 |
| | | (0.066) | (0.078) |

*Notes*: Standard errors are clustered by SMSA and reported in parentheses. Standard errors are bootstrapped when using the generated instrument (rows (2)–(6)). The sample includes 53 SMSAs with published 1935–1940 mobility counts by race from 1940–1970 ($N = 212$) or 1950–1970 ($N = 159$). The OLS results report estimates of $\beta_1$ from equation (5) in the text. The instrument in the first row assigns actual migration flows out of southern states to northern cities according to the 1935–1940 settlement patterns. The instrument in the second through sixth rows assign predicted migration flows. Section III.B contains a detailed description of the instrument's construction. The fourth row uses county characteristics from 1940 to predict out-migration in the 1950s and 1960s. The fifth (sixth) row estimates the relationship between the change in white (foreign-born white) and black populations in the central city from 1940 to 2000.

effects and metropolitan area growth. Larger positive deviations from the regression line correspond to cities such as Baltimore, MD, that experienced more black population growth than would be predicted by migration from their typical sending states, perhaps due to positive economic shocks that attracted arrivals from new source areas. The reverse is true of cities such as St. Louis, MO, that fall below the regression line. In general, the positive relationship between actual and predicted black population growth is strong and is not driven by any obvious outliers.

*IV.C. Second Stage Results*

The remainder of Table II conducts the IV analysis. If migrant location choice were driving the correlation between black arrivals and white departures, the IV estimates would be smaller (less negative) than OLS. A comparison between columns (2) and (3) reveals that the IV point estimates are never markedly different from their OLS counterparts. If anything, the IV coefficients are slightly more negative than OLS, suggesting that black migrants
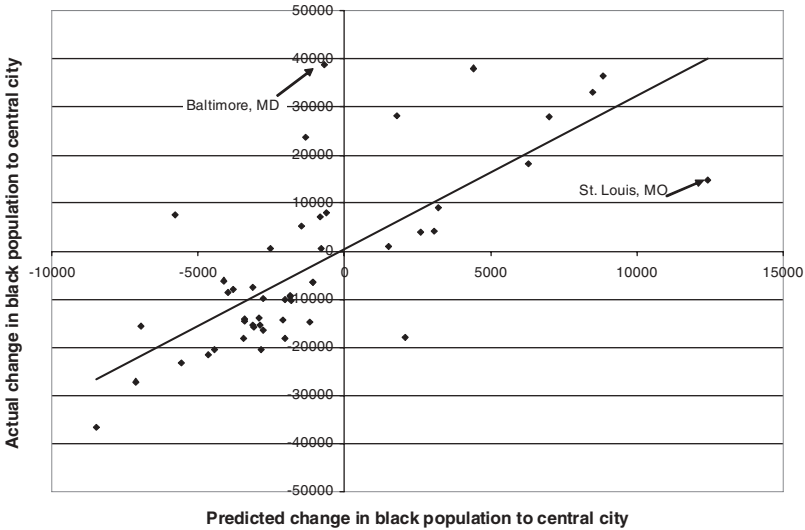
FIGURE III

First Stage: Predicted versus Actual Change in Black Population, 1950–1960

The sample includes the 53 SMSAs with available mobility counts by race in 1940 (without the four largest cities, for reasons of scale). The predicted change in black population is calculated by assigning predicted migration flows from southern states to northern cities using 1935–1940 settlement patterns. See Section III.B for a detailed description of the instrument's construction. The slope of a regression line through these points is 3.187 (s.e. = 0.419).

avoided cities that were otherwise losing white population. Interestingly, the results are nearly identical whether I use actual or predicted migrant flows to generate the instrument.[18]

If economic shocks are serially correlated, migrants' destination choices in the late 1930s may be related to local economic conditions in subsequent decade(s). The third row presents IV results for 1950–1970, leaving a full decade between the pre- and post-periods. The fourth row uses 1940 county characteristics to predict out-migration from the South in every decade to avoid changes in the southern economy that could be a response to, rather than a cause of, migration. The results are similar in both cases.

There is no evidence that the correlation between black arrivals and white departures from central cities is due to

18. Although intrastate migration will net out when actual county-level migration is aggregated to the state level, 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.

TABLE III

BLACK HOUSEHOLDS, WHITE HOUSEHOLDS, AND THE NUMBER OF HOUSING UNITS IN CENTRAL CITIES: COEFFICIENT ON # OF BLACK HOUSEHOLDS (IN 1,000S)

| Dependent variables | Full sample | Low-growth metro | High-growth metro |
|---|---|---|---|
| # white households | −1,602.495 | −1,715.816 | −1,790.906 |
| | (178.513) | (271.964) | (433.305) |
| White household size | −0.003 | −0.0009 | −0.004 |
| | (0.0007) | (0.0006) | (0.001) |
| | *(448 residents)* | *(164 residents)* | *(475 residents)* |
| # housing units | −559.562 | −202.652 | −747.981 |
| | (211.192) | (237.212) | (414.455) |
| # of vacant units | 46.192 | 513.163 | 47.328 |
| | (168.318) | (61.391) | (24.982) |
| *N* | 280 | 140 | 140 |

*Notes.* Standard errors are clustered by SMSA and are reported in parentheses. The number of black and white households and the number of housing units are from the *Census of Housing* for relevant years. The second and third columns split the sample by the metropolitan area growth rate from 1940 to 1970 (median = 58%). In the second row, household size is translated into the number of white residents lost using the average number of white households (149,400, 182,200, and 118,750 in the three columns, respectively).

the endogenous location choices of black migrants. Even after constraining black migrants to follow settlements patterns established in the 1930s, I find that each black entrant leads to 2.3–3.0 white departures. The final two rows of Table II examine the long-run implications of black migration for urban population growth. I estimate the relationship between the sixty-year change in the black and nonblack populations of central cities from 1940 to 2000, instrumenting for changes in the black population with migration from 1940 to 1970. In the long run, each black arrival leads to only one nonblack departure and, therefore, has no effect on the overall urban population. Over time, some nonblack residents without a distaste for racial diversity may have been attracted to these central cities by lower housing prices. The last row of Table II shows that the foreign-born, whose numbers have increased greatly since 1970, have contributed to this trend. Each black arrival increased the number of white foreign-born residents in these central city by 0.2 persons, accounting for around 20% of the long-run renewal of urban population.

Thus far, I have examined the relationship between black and white *residents* in central cities, whereas the model focused on *households*. The population and household effects could be different if black and white households are systematically different in size. Table III contains OLS regressions relating black household entry to the number of white households in the central city

and the average size of the remaining white households. The arrival of one black household led to the departure of 1.6 white households; we can statistically rule out a displacement rate of one for one. Black arrivals also led to a reduction in the size of the remaining white households, perhaps because larger households with children were more concerned about racial diversity. However, the change in household composition is small, resulting in a reduction of 0.13 white residents for every new black arrival.[19]

Black in-migration led to a net reduction in the number of households in receiving cities. This decline could either result in vacancies in the existing housing stock or a decline in the housing stock itself as units depreciate and/or fewer new units are built. The model predicts that in otherwise declining areas, white departures will be coupled with a high vacancy rate and falling prices, whereas in growing areas, white departures will lead to a decline in the rate of new construction and housing prices will remain at construction costs. The second and third columns separate the sample into low- and high-growth metropolitan areas (above or below the median growth rate of 58% from 1940 to 1970). Consistent with this prediction, the arrival of 1,000 black households in a high-growth area, which results in a net decline of 800 households, leads to 750 fewer housing units being built and only 50 units standing vacant. In contrast, 1,000 new black households in a low growth areas (a net decline of 700 households) is associated with 500 additional vacancies. I will show a similar pattern with respect to housing prices below.

### IV.D. Assessing the Quantitative Role of White Flight

The estimated number of white departures for every black arrival allows us to calculate the likely effect of black migration on urban population loss. Let's begin with an extreme thought experiment: What if the four million black migrants had not left the South during this period? The median northern and western city received 19,000 black migrants from 1940 to 1970. The estimated response implies that 52,000 whites left the city as a result, translating into a 27% decline in the city's white population and a 17% decline in the total urban population. To put this magnitude

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19. The arrival of 1,000 black households (= 3,500 residents) leads to −0.003 fewer residents in the average white household. In the typical city, this decline in household size translates into the loss of 448 residents. These figures imply that each new black resident results in the loss of 0.13 white residents through the household size channel.

into context, consider that Baum-Snow (2007) estimates that the construction of one new interstate highway through a central city leads to a similar 16% decline in urban population.

Although this "no-migration" counterfactual is large, it is not entirely out of sample. The effect of shutting off the flow of black migrants is equivalent to imposing the growth rate of Pittsburgh's black population rather than that of Detroit's black population on the typical city (150% versus 440%). If instead one considers the difference in the black inflow between Chicago and Detroit (400% versus 440%), the median city would have experienced an 8% decline in its white population.[20]

Can the estimated response to the black migration be wholly explained by the tipping of certain neighborhoods from majority white to majority black (Schelling 1971)? In 1970, Card, Mas, and Rothstein (2008) estimate that neighborhoods tipped after reaching a 9%–12% minority share. The estimated tipping point has increased over time, so the tipping point in 1950 might have been as low as, say, 5%. To assess the quantitative importance of this phenomenon, imagine that, in 1940, before the wartime migration, no neighborhood in sample metropolitan areas had yet reached the tipping point. By 1950, 5.8% of Census tracts in sample cities fell within the candidate range (5%–12% black). Card, Mas, and Rothstein document that neighborhoods directly above the tipping point lose 10%–16% of their white population over the next decade relative to neighborhoods directly below. Let's take the case of the median city with 200,000 white residents, which received 6,000 black arrivals over the 1940s. If all candidate neighborhoods lost 16% of their white population over the next decade, this would translate into the departure of 1,856 white residents ($= 200{,}000 \cdot 0.058 \cdot 0.16$). The paper's causal estimates suggest that a total of 16,200 white residents would have left the city in response to these black arrivals ($= 6{,}000 \cdot 2.7$). Of these departures, 6,000 residents, or one white departure for every black arrival, may be in direct response to higher housing prices. At most 20% of the remainder can be explained by neighborhood tipping ($= 1{,}856/10{,}200$). Other departures may have been in response to more continuous shifts in neighborhood composition or to changes in citywide attributes.

20. Some blacks were attracted to the North by the availability of manufacturing work. If blacks had not filled these positions, others may have. One possibility is that blacks would have been replaced by Mexicans through an expansion of the Bracero guest worker program into urban areas. The white response to this alternative set of migrants is unknown.

TABLE IV

BLACK POPULATION SHARE AND THE VALUE OF OWNER-OCCUPIED HOUSING
IN THE CITY, 1950–1970

| | OLS | | IV | Low growth | High growth |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Black population share in city | −0.610 (0.227) | −0.470 (0.194) | −0.689 (0.108) | −0.618 (0.266) | 0.030 (0.295) |
| Housing controls | N | Y | Y | Y | Y |
| N | 159 | 159 | 159 | 99 | 102 |

*Notes.* Standard errors are clustered by SMSA and are reported in parentheses. Housing quality controls include the median number of rooms, the share of housing units that are in detached, single-family buildings, and the share of housing units that were built in the previous ten years. The fourth and fifth columns split the sample by the metropolitan area growth rate from 1940 to 1970 (median = 58%).

## V. THE EFFECT OF RACIAL DIVERSITY ON HOUSING PRICES

Thus far, I have shown that each black arrival to a central city at midcentury prompted more than one white departure. This pattern suggests that white mobility not only was a response to higher housing prices but also reflected a distaste for racial diversity. I can test this proposition directly by looking for a negative association between the black population share in the central city and the price of urban housing, again using the southern push instrument to predict black arrivals.

Aggregate data on housing values are available from 1950 to 1970. For these years, I estimate

$$\text{PRICE\_CITY}_{mrt} = \alpha_m + \beta_2(\text{PERB\_CITY}_{mrt})$$
$$(6) \qquad\qquad + \gamma_2(\text{PRICE\_METRO})_{mrt} + \Gamma' \mathbf{X}_{mrt} + \upsilon_{rt} + \varepsilon_{mrt},$$

where PERB_CITY measures the city's black population share. $\beta_2$ estimates the effect of urban diversity on the prices of city housing relative to metropolitan areawide trends. The vector $\mathbf{X}_{mrt}$ contains average housing quality measures, including the median number of rooms in city housing units, the share of units that are in detached, single-family structures, and the share of units that were built in the previous ten years.

Table IV examines the relationship between the black population share and the mean value of owner-occupied housing in the central city. The first column of Table IV contains the basic specification, whereas the second adds housing quality controls for the Census of Housing. In both cases, an increase in the black population share of the central city reduces housing prices. In the

raw data, a ten–percentage point increase in the black population share is associated with a 6% decline in housing prices. Twenty percent of this decline can be explained by a limited set of housing quality controls.

It is unlikely that the observed price decline was driven by lower prices paid by new black arrivals. Cutler, Glaeser, and Vigdor (1999) show that, in this period, blacks actually paid *more* than whites for equivalent housing units, perhaps because blacks faced a supply constraint created by white households unwilling to sell to black buyers.

Again, one may be concerned that black migrants were attracted to areas with falling housing prices. Instrumenting with predicted migrant flows augments the negative relationship between racial diversity and urban housing prices (compare columns (2) and (3)).[21] If anything, black migrants seem to be attracted to cities with higher wages or amenities that translate into higher city housing prices.

Falling housing prices together with the decline in urban population are suggestive of a drop in the demand for cities that experience black in-migration. However, we would not expect housing prices to fall in all cities. In otherwise declining cities, falling demand may lead some existing units to stand vacant and housing prices to fall. In growing cities, a decline in urban demand may instead slow the rate of new construction until housing prices return to construction costs. As before, I split the sample by the rate of metropolitan area growth from 1940 to 1970. Consistent with this reasoning, I find that increasing racial diversity has no effect on housing prices in growing cities, where, as we have already seen, the net decline in urban households resulted in fewer housing units being built (Table III). In declining areas, by contrast, increasing racial diversity is associated with falling housing prices alongside a higher vacancy rate.

## VI. Conclusions

Black migration from the rural South to industrial cities in the North and West coincided with the development of postwar suburbs. Did black migrants happen to arrive in cities at the wrong time, just as suburbanization got underway? Or was their

21. To instrument for the black population share, I use the city's population in 1940 as the denominator of the predicted black population share in all years to prevent a mechanical correlation arising between the instrument and the endogenous black population share.

arrival an important explanation for suburban growth? This paper shows that cities that received more black migrants from 1940 to 1970 lost a greater number of white residents. I rule out explanations for this pattern based on the endogenous location decisions of black migrants or the effect of migration on urban housing prices alone. My estimates suggest that the change in racial diversity associated with black migration resulted in a 17% decline in urban population.

An ancillary goal of the paper has been to develop an instrument for changes in urban diversity in American cities over time. The instrument exploits shocks to southern industry and agriculture and the persistence of black migration patterns between southern states and northern cities. This method has many additional applications to questions in urban and public economics as well as to the economic history of American cities in the twentieth century.

Although this paper quantifies the relationship between black arrivals and white departures from postwar cities, it has less to say about the mechanisms by which racial diversity affected the demand for urban residence. Some white residents were undoubtedly concerned about the changing racial and socioeconomic composition of their immediate neighborhoods. However, many others lived in all-white enclaves far from burgeoning black ghettos. These residents may have been motivated by changes in local policy accompanying a shift in the racial and socioeconomic composition of the urban electorate. The desegregation of public schools in the 1960s and 1970s provided another reason to leave the city. Exploring these mechanisms offers a promising direction for future research.

DATA APPENDIX

*A. Northern Data*

The sample includes all nonsouthern SMSAs that (1) were anchored by one or more of the hundred largest cities in 1940 or (2) had at least 250,000 residents by 1970. Only two SMSAs that meet the first criterion fall short of the later population benchmark (Bridgeport, CT, and New Bedford, MA). The second criterion adds ten metropolitan areas to the sample, including growing western cities (e.g., Phoenix, AZ) and smaller areas in Pennsylvania, Ohio, and upstate New York (e.g., Harrisburg, PA). Excluding

TABLE A.1

Summary Statistics for 1940–1970, 70 Nonsouthern Metropolitan Areas

|  | Mean | Standard deviation |
|---|---|---|
| Population |  |  |
| Whites in city | 457,107 | 919,030 |
| Δ whites in city | −16,158 | 100,509 |
| Blacks in city | 70,877 | 182,963 |
| Δ blacks in city | 28,209 | 68,553 |
| Share black | 0.092 | 0.093 |
| Total in SMSA | 1,289,456 | 3,238,178 |
| Instrument |  |  |
| Predicted black population | 48,834 | 102,440 |
| Predicted Δ black | 5,703 | 12,687 |
| Households |  |  |
| Whites in city | 149,491 | 295,826 |
| Δ whites in city | 10,232 | 34,177 |
| Blacks in city | 20,552 | 54,172 |
| Δ blacks in city | 8,440 | 22,097 |
| Vacant units | 7,724 | 16,429 |

*Notes:* Statistics are presented for the 70 SMSAs in the North or West that either (1) were anchored by one of the l00 largest cities in 1940 or (2) had at least 250,000 residents by 1970. The white and black population are calculated for counterfactual city borders. The borders are created by reassigning residents who *would have lived in the suburbs* if not for annexation back to the suburbs, under the assumption that the population living in the annexed area had the same white share as the suburban area as a whole.

these ten areas has no discernable effect on the main results (compare a coefficient of −2.110 (s.e. = 0.548) to the coefficient of interest in Table II, column (2)). For consistency, I apply the 1970 county-based definition of a metropolitan area in every year. I use the New England County Metropolitan Area (NECMA) classifications for the New England region to avoid divided counties. See Table A.1 for summary statistics for nonsouthern metropolitan areas.

City boundaries can expand through the annexation of neighboring territory (Dye 1964; Jackson 1985, pp. 138–156). The direction of any bias created by annexation activity is unknown. Austin (1999) argues that politicians in diversifying cities have a stronger incentive to annex neighboring land in order to retain a majority-white electorate. In contrast, Alesina, Baqir, and Hoxby (2004) find that racial diversity reduces the number of successful school district consolidations, particularly in states that require both districts to agree to consolidate.

To adjust for annexation, I create a parallel set of population counts that define central cities according to their 1940 borders.

That is, I reassign residents *who would have lived in the suburban ring* if not for annexation back to the suburbs.[22] Each measure involves a trade-off. Counts based on actual borders might conceal patterns of individual mobility erased by annexation activity. However, counts based on consistent borders will misclassify moves from annexed city territory to the suburbs as suburb-to-suburb moves.

The tables in the paper are based on the fixed-border population counts. Using actual city boundaries instead produces an estimate of 2.317 (s.e. = 0.609) white departures for every black arrival. This coefficient is qualitatively similar to the comparable estimate in the second column of Table II.

### B. Southern Data

Black migration rates are approximated from population counts in race–sex–age cohorts in two Censuses, adjusted by national survival ratios (Gardner and Cohen 1971; Bowles et al. 1990). That is, the actual population in a cohort in county $c$ at time $t$ is compared to a predicted population count determined by multiplying that cohort's population at time $t - 10$ by the national survival ratio. The differences between the actual and predicted population counts are attributed to in- or out-migration. Even when measured by race, the national survival ratio may understate mortality in the South, leading to an overestimate of out-migration (Fishback, Horrace, and Kantor 2006). As long as this bias is not systematically related to economic factors across counties, it should simply attenuate the coefficients in equation (3).

All southern county-level variables are drawn from the electronic *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 U.S. Great Plains project of the ICPSR (http://www.icpsr.umich.edu/PLAINS/). The remainder were collected by hand from the Censuses of Agriculture. See Table A.2 for summary statistics for southern counties.

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22. The Census Bureau estimated the number of individuals drawn into the central city through annexation from block level data (Bogue 1953; U.S. Census 1960, 1970).

TABLE A.2
SUMMARY STATISTICS FOR 1940–1960, 1,350 SOUTHERN COUNTIES

|  | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| Net black migration rate | 1.811 | 147.253 | −100 | 4,400 |
| Share land in cotton | 0.329 | 0.397 | 0 | 1 |
| Share farmers as tenant | 0.312 | 0.195 | 0 | 0.942 |
| Share LF in agriculture | 0.335 | 0.183 | 0.001 | 0.885 |
| Share LF in mining | 0.028 | 0.074 | 0 | 0.818 |
| $ defense *pc*, 1940–1945 | 0.162 | 0.599 | 0 | 9.025 |

*Note.* See Data Appendix for source details. Spending on defense contracts in current dollars.

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