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ABSTRACT

Between 1940 and 1980, the rate of homeownership among African-American households increased by close to 40 percentage points. Most of this increase occurred in central cities. We show that rising black homeownership was facilitated by the filtering of the urban housing stock as white households moved to the suburbs, particularly in the slower growing cities of the Northeast and Midwest. Our OLS and IV estimates imply that up to one half of the national increase in black homeownership over the period can be attributed to white suburbanization.

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1. Introduction

Between 1940 and 1980, the share of white metropolitan households that lived in a central city fell from 62 to 34 percent. The shift of white households to the suburbs, where the housing stock is dominated by single-family dwellings, was associated with a substantial increase in the overall rate of white homeownership.[1] In contrast, post-war suburbanization largely bypassed black households. 80 percent of metropolitan blacks lived in a central city in both 1940 and 1970; by 1980, this proportion had fallen only slightly to 72 percent. Yet despite the limited amount of black suburbanization, black households also managed to double their rate of homeownership between 1940 and 1980, from 24 to 49 percent.[2]

This paper asks how the black rate of homeownership increased so rapidly between 1940 and 1980 without a corresponding shift of black population to the suburbs. Building on previous work by Berry (1976), we suggest that some black households became home owners through the "racial filtering" of the urban housing stock. As white households left the city for the suburbs, their homes stayed put; some of these units were then purchased and occupied by black families. Our goal is to determine the causal magnitude of racial filtering and its heterogeneity across different city types.

We construct a new dataset of household counts for 98 metropolitan areas from 1940 to 1980 by race, location (central city or suburb), and ownership status. Because the boundaries of

[1] In 1960, 79 percent of the suburban housing stock consisted of detached, single-family dwellings, compared with 42 percent of housing units in central cities. Owner-occupancy is closely tied to building type; over 80 percent of all single-family dwellings were owner-occupied in 1960, compared with less than 20 percent of multi-family dwellings. Glaeser and Shapiro (2003) argue that owner-occupancy is the optimal contractual form for single family housing. Furthermore, the condominium as a legal form was only developed in the 1970s. By 1980, condominiums made up only 2.5 percent of the housing stock. All calculations in this note are the authors' own from the Integrated Public Use Micro-data Series (IPUMS).

[2] Note that the majority of the 1940 to 1980 increase in black owner-occupancy occurred by 1970, before the passage of the Fair Housing Act of 1968 and subsequent legislation and regulatory efforts – which were intended, in part, to open up the suburbs to black families – could have had much effect; see Collins and Margo (2011).

some central cities expanded over this period through annexation, we follow Baum-Snow (2007) in creating consistent definitions of central cities according to their 1950 borders.

Our empirical analysis begins with OLS regressions relating the number of black owner-occupants in a central city to the number of white households in the city, controlling for other aspects of city and metropolitan population and for year and SMSA fixed effects. That is, we ask whether cities that lose white population over a decade gain a corresponding number of black owner-occupants. Our baseline estimate implies that 87 black owner-occupying households were created for every 1,000 white households departing from the typical central city.

Our OLS estimates could be biased upward if, for example, the black demand for owner-occupancy increased and prospective black owners sought to buy homes in white neighborhoods, thereby prompting "white flight" to the suburbs. Alternatively the extent of white flight may have been greater in cities in which the black population was poor and therefore lacked the means to buy homes; in this case, the OLS estimate would be biased downward.

We address these sources of endogeneity by instrumenting for the number of white households in the central city with features of the Interstate Highway System. New road construction encouraged white households to move to the suburbs by reducing the cost of commuting from bedroom communities to downtown firms. We use Baum-Snow's (2007) detailed dataset on highway construction to compute the predicted number of completed highway rays passing within one mile of each central city by decade. Our first stage estimates are strong and demonstrate that white departures from the central city were increasing in the predicted number of new federal roads. The IV estimate of the racial filtering effect is slightly larger but not significantly different from the OLS estimate, suggesting that any endogeneity bias is small.

The second half of the paper examines heterogeneity in the strength of this racial filtering effect across cities. We establish that white departures had a stronger effect on black homeownership in cities with an initial housing stock conducive to owner-occupancy or a large and pre-existing black customer base. Social sanctions against selling homes to black households may have eroded more rapidly in central cities with a large black population share, in which the costs of discrimination (in terms of foregone buyers) would have been higher. While, on average, 1,000 white departures led to 87 new black homeowners, the same 1,000 departures could generate up to 450 new black owners in cities with a high black population share and a sufficient number of owner-occupied units.

Furthermore, we show that the national estimates of racial filtering are driven by cities that were losing white population over this period. In other words, some of the housing units vacated by white households leaving cities are converted to black owner-occupancy, while the arrival of white households to expanding cities has no effect on the rate of black homeownership. This pattern is consistent with a model of housing supply with durable housing (Glaeser and Gyourko, 2005). In this framework, cities can always respond to a positive demand shock by building new housing units. However, housing supply is not instantly destroyed when demand for housing in the city falls, leaving units available in declining cities for filtering from white to black households.

Our paper is related to a rich theoretical and empirical literature on the filtering of the urban housing stock. In the standard filtering model, new housing units are constructed at the highest quality level and are consumed by high income households (Sweeney, 1974). After some period of occupancy, the original owner vacates for a newer unit and the housing filters down to a lower income household. If a city is built from the center outward, filtering will induce a

positive relationship between household income and distance from the city center, with higher income households living in newer housing on the urban periphery and lower income households in older housing in the core.

Our study differs from previous work on filtering in two ways. First, previous studies have focused primarily on household income and paid only limited attention to race (for example, Weicher and Thibodeau, 1988; Brueckner and Rosenthal, 2009). Second, previous studies have focused on housing quality while we focus on home ownership *per se*. In particular, with the notable exception of Berry's (1976) important case study of Chicago in the 1960s, we are aware of no previous empirical work directly linking black homeownership in central cities with white suburbanization. We build on Berry's work by establishing the presence of racial filtering in a large sample of metropolitan areas.

Our paper also contributes to a large literature in economics and sociology on the effect of residential segregation on African-American outcomes. Cutler and Glaeser (1997) demonstrate that, in theory, neighborhood segregation can be either beneficial or harmful to minority groups. Much of the prior literature has shown that blacks suffer from low earnings and educational attainment in segregated metropolitan areas, at least since 1970 (Massey and Denton, 1993; Cutler, Glaeser, and Vigdor, 1999; Collins and Margo, 2000; Ananat, 2011). Our paper demonstrates that white suburbanization, a major source of segregation between city and suburb, may have had countervailing positive effects by increasing black owner-occupancy in the central city. At the household level, higher rates of homeownership contribute to wealth accumulation (Green and White 1997; Turner and Luea, 2009). Indeed, despite the crises that befell some cities in the late 1960s and 1970s, the value of black owner-occupied housing in central cities increased by 2.6 percent average annually from 1940 to 1980, equivalent to the rate observed in

the general metropolitan housing stock. Moreover, at the neighborhood level, higher rates of homeownership may have forestalled urban decline (Dietz and Haurin, 2003; Rosenthal 2008).

II. Race and Suburbanization in the United States, 1940-1980

A. Population trends

Table 1 displays statistics on the location (city versus suburb) and the homeownership rates of the metropolitan population from 1940 to 1980 by race. Metropolitan whites increasingly settled in the suburbs over this period, while blacks continued to reside in central cities. By 1980, 72 percent of metropolitan blacks still lived in central cities, compared with only 32 percent of metropolitan whites. As a result, the black population share became much higher in central cities than in the surrounding suburbs. By 1980, 26 percent of central city residents were black, compared with only six percent of suburban residents. The racial divide between central cities and suburbs contributed to the rise in residential segregation over the twentieth century (Cutler, Glaeser, and Vigdor 1999; Fischer, et al., 2004).

There is considerable qualitative evidence that, until recent decades, overt acts of racial discrimination hampered the ability of black households to settle in suburban areas (see, for example, Sugrue, 1996 and Wiese, 2004). Indeed, prior to the passage of federal legislation in 1968, private individuals in many states – real estate agents, bankers, owners of housing developments – were legally free to steer black customers away from white neighborhoods or to refuse to sell or rent property to black households outright (McAllister, 2009).[3] Various cities and states passed laws against housing discrimination before 1968; however, Collins (2004)

[3] While the Supreme Court ruled in the 1948 *Shelley v. Kraemer* decision that racial restrictive covenants written into property deeds were unenforceable in court, the *Shelley* decision did not forbid private acts of housing discrimination.

finds little evidence that these laws had quantitatively significant effects on African-American housing outcomes, including homeownership.

Yet despite the slow pace of black suburbanization, black homeownership grew at the same rate as – or faster than – white homeownership from 1940 to 1980. Table 1 indicates that, in 1940, the rate of black homeownership in central cities (14 percent) was substantially lower than either the homeownership rate among whites in cities (33 percent) or blacks in the suburban ring (41 percent). Suburban whites boasted the highest rate of homeownership in 1940 (56 percent). Over the next forty years, the rate of black homeownership in cities more than doubled, while the homeownership rate of the other groups increased by no more than 40 percent.

B. Racial filtering of the housing stock

Despite acute residential segregation by race, however, housing decisions took place in a well-articulated housing market. The dynamics of racial transition created a link between the supply of and demand for housing in black and white neighborhoods, giving rise to a dynamic of racial filtering. Although most cities contained distinct neighborhoods by race the zone at or near the boundary of these neighborhoods was contested terrain. Because the housing in white areas was typically of higher quality, housing prices in black neighborhoods often increased with proximity to a white area. Whites, however, were willing to pay a premium to avoid contact with blacks and so, in white neighborhoods, housing prices fell with proximity to the border zone. Therefore, in many cases, blacks were willing to pay more than whites for a housing unit near the neighborhood boundary. This premium may not induce whites to sell to blacks if whites experience a psychic cost (for example, the disapproval of neighbors and friends) for doing so. However, if black demand exceeded white demand by a sufficient margin, some white

households will begin selling to blacks, leading the boundary of the black ghetto to expand. For whites, the decision to leave a boundary area depended on the next best housing alternative, which included both other white neighborhoods in the central city and, increasingly, neighborhoods in the burgeoning suburban ring.[4]

As white households suburbanized, some homes in the boundary area between white and black neighborhoods became available for purchase by black households. Berry (1976) provides evidence of such a racial filtering process for the Chicago metropolitan area in the 1960s. Prior to World War Two, the black population in Chicago grew substantially but black neighborhoods were geographically constrained and housing prices in the ghetto were high relative to household income. After the war, "there was a vast increase in housing available in the metropolitan area, and a combination of accelerated filtering and rapid residential relocation produced a substantial sag in [white] demand in areas of traditional minority residence" (Berry, p. 417). Berry classifies 76 percent of the housing transactions in central city Chicago from 1968 to 1972, a four year period of (very) rapid change, as sales from white to black households. He calculates that approximately 37,000 black households in the central city purchased their own home over this period as a result of racial filtering.

However, the racial dynamic that Berry documents for Chicago need not have been present in every city losing white population. Most urban whites did not live in the immediate vicinity of black neighborhoods. When these households left for the suburbs, their homes would more likely have been purchased by other white households. Larger homes, even those near black neighborhoods, may have been converted into apartments or other types of multi-family

[4] Over time, white households increasingly opted to live to the suburbs, rather than in central cities. Suburban moves were encouraged by the falling time cost of commuting associated with the diffusion of the automobile and state and federal road building (LeRoy and Sonstelie, 1983; Baum-Snow, 2007; Kopecky and Suen, 2010) and with the relocation of many firms to the suburban ring (Boustan and Margo, 2009).

housing. In these cases, white households may have left for the suburbs without expanding the stock of owner-occupied housing available to black households. Furthermore, the existing stock of single family homes was not the only source of owner-occupied housing to black households; some cities had available land proximate to existing black neighborhoods on which to build owner-occupied housing. In these cities, black households would have been able to purchase new homes directly from developers without having to rely on the filtering of the existing stock.

As a practical matter, extending the meticulous assembly and analysis of individual housing market transactions that Berry accomplished for a Chicago to the 98 metropolitan areas examined in this paper is not possible. Instead, we opt for an econometric approach linking the overall number of black homeowners to the number of white departures from the central city. In the next section we discuss the data that we adopt for this purpose.

III. Empirical Analysis

A. Data and estimating equations

Our primary dataset consists of newly-collected aggregate counts of black and white households by location in the metropolitan area (central city or suburb) and tenure status (renters and owners). We compile these figures for 98 metropolitan areas over five Census decades (1940 to 1980).[5] A key feature of our data is that the geographic area of the central city and the surrounding suburbs are held constant over time using the 1950 central city boundary. Annexation of peripheral land was a common means of city growth during the 1950s and 1960s. As a city expands in land area, the number of white households in the central city rises mechanically, potentially masking any white mobility out of neighborhoods near the urban core.

[5] Our sample includes metropolitan areas that either: (1) were anchored by one of the l00 largest cities in 1940 or (2) had at least 250,000 residents by 1980. Note that the sample has fewer than 100 areas because some metropolitan areas have more than one central city.

To correct for these boundary changes, we follow Baum-Snow's (2007) division of Census tracts into those inside and outside of the 1950 city boundaries. We then use Census tract data from 1960, 1970 and 1980 to calculate household counts within the 1950 central city boundaries. By this definition, any household living outside of the 1950 central city is considered to be suburban, even if the land on which it resides was later annexed into the city.

For our main analysis, we pool household counts from 1940 to 1980 and estimate:

$$NUM\_BLACK\_OWN_{ijt} = \beta(NUM\_WHITE)_{ijt} + \Gamma X_{ijt} + \alpha_i + \delta_t + (\lambda_j \cdot \delta_t) + \varepsilon_{ijt} \quad \textbf{(1)}$$

where the subscript i indexes metropolitan areas, j indicates the state, and t is the Census year. NUM_BLACK_OWN is the number of black households in the central city of metropolitan area i who are owner-occupiers and NUM_WHITE is the total number of white households in that city. The vector X contains three population controls – the number of black households in the city; the number of white households in the metropolitan area; and the number of black households in the metropolitan area. We also include metropolitan area (α_i) and Census year (δ_t) fixed effects, along with interaction between state and Census year ($\lambda_j \cdot \delta_t$).

The coefficient β indicates how the number of black homeowners changes with increases or decreases in the number of white households in the central city. The magnitude of β is easily interpretable as the number of units that are converted into black owner-occupied housing for every white household that leaves the central city. We predict that black homeownership will increase as white households leave the city (that is, $\beta < 0$). By including the total number of black households in the central city along with the number of white households in the metropolitan area on the right-hand side, this specification is close to one in which the rate of black

homeownership in the central city is regressed on the share of white households living in the central city.

When using aggregate household counts, we cannot control for economic covariates like household income that may be associated with black homeownership. Therefore, as a robustness check, we conduct an analysis with household-level records from the Integrated Public-Use Microdata Series (IPUMS) in 1940 and 1980. Limitations of the micro data prevent us from incorporating observations in the intervening years (1950 through 1970).[6] Our sample includes nearly 53,000 African-American households that lived in a central city in one of the 108 metropolitan areas that can be consistently identified in the micro-data in 1940 and 1980.

In our household-level regressions, we stack the micro data from 1940 and 1980 and estimate:

$$OWN_{kit} = \gamma(SHARE\_WHITE\_CITY)_{jt} + Z_{kit}\beta + \alpha_i + \delta_t + \varepsilon_{kit} \quad \textbf{(2)}$$

where k indexes households in the central city of metropolitan area i at time t.[7] OWN is a dummy variable equal to one if a sample household owns the home that it occupies; SHARE_WHITE_CITY is the share of metropolitan area i's white population that lives in the central city; and Z is a vector of characteristics of the household head. These household-level controls include a quadratic in the age of the household head, dummy variables for the head's gender, marital status, and educational attainment, and the logarithm of household income. As

[6] Homeownership status is not reported in the 1950 IPUMS. The 1960 IPUMS does not identify the metropolitan area in which a household resides. In 1970, one sample identifies a household's metropolitan area but not its location within the area (central city versus suburb), while the other does not identify the metropolitan area of residence.

[7] In 1980, the Census adopted the "householder" definition of household headship – the household head was the person who either owned the home or, if the dwelling was rented, the person in whose name the unit was leased. Prior to 1980, the Census did not adopt a formal rule linking headship to ownership although it is widely presumed by scholars that, in the case of owner-occupied housing, the owner was designated as the household head; see Collins and Margo (2011).

before, we expect that $\gamma < 0$; that is, as more whites leave the central city, the probability of black homeownership increases.

B. White departures from cities and black homeownership

We begin our exploration of racial filtering with the aggregate household data. The first two columns of Table 2 report estimates of β from OLS regressions of the household counts specification in equation 1. Each column contains the full set of population controls in the vector X. In the first column, we include only metropolitan area and year fixed effects, while the second column allows each state to have its own time trend. In both cases, we find that between 80 and 90 black households transition into homeownership for every 1,000 white household departures from the central city. We also tried separately entering the number of white owner-occupiers and the number of white renters in the city. Reassuringly, black homeownership is more strongly related to the departure of white owners (coeff. = -137.56; s.e. = 15.41) than to the departure of white renters (coeff. = -51.15; s.e. = 11.93).

The composition of black households that settle in cities losing white population to the suburbs may be systematically different from black households in other areas. We address this concern by using the 1940 and 1980 micro data to control for household-level characteristics. In this case, we estimate the relationship between the probability of black homeownership (equivalent to the black homeownership rate at the aggregate level) and the share of white households living in the central city. The third and fourth column of Table 2 present our estimates of γ from equation 2 using the aggregate and household-level data, respectively. In each case, a one percentage point decrease in the share of white households living in the central

city is associated with a 0.2 percentage point increase in the black homeownership rate.[8] The regression in the fifth column adds a series of household characteristics on the right-hand side. Including these controls has no qualitative effect on the estimate of racial filtering. Therefore, the remainder of the analysis proceeds by using the aggregate household counts.

C. Predicted highway rays as an instrument for white departures

OLS estimates will be biased if white location decisions are directly influenced by black homeownership or are correlated with unobserved characteristics of the city that also predict black homeownership. White households were more likely to leave central cities as black migrants arrived from the rural South (Boustan, 2010). This "white flight" may have been particularly strong when the black arrivals were poor and thus unable to afford owner-occupancy. In this case, our OLS estimates will be biased downward. In contrast, if prospective black homeowners are more likely to move into white neighborhoods, black homeownership could directly influence some white households to leave the city, biasing the OLS estimates upward.

To correct for these sources of bias, we need an instrumental variable that is correlated with the share of whites living in the suburban ring but is otherwise uncorrelated with the black homeownership rate. We instrument for the white suburban share using the predicted number of interstate highway rays built within one mile of the central city between 1950 and 1980

[8] To reconcile the magnitude of the coefficients in the shares and counts specifications, consider the typical city, for which a one percentage point decline in the white urban share is equivalent to the departure of 2,000 white households. By our estimate of β (Table 2, column 2), a departure of this magnitude should generate 180 new black homeowners. For the typical city with 30,000 black households and 7,000 black homeowners, 180 new homeowners would increase the black homeownership rate by 0.5 percentage points, which is somewhat larger than (but not too dissimilar from) the estimate of γ in Table 2 (column 4). We would not expect these two estimates to be identical because the white urban share is affected both by white departures from the city and by white arrivals in the suburban ring from other parts of the country. White arrivals from elsewhere most likely did not have an effect on black homeownership in the city.

(PREDICTED_RAYS). The original plan for the Interstate Highway System was drafted in 1947 with the dual goals of serving national defense and inter-city commerce. Baum-Snow (2007) determined the total number of rays that were assigned to each central city in the 1947 plan. After the plan was established, local politicians could lobby the federal government to build extra highway miles through their city and were more likely to do so if there was a high demand for suburbanization in their area. Therefore, we predict the number of completed rays in each city *i* at time *t* by interacting the number of assigned rays in the 1947 plan with the national share of highway construction completed by date *t*. Our assumption is that the national rate of highway construction is not influenced by the demand conditions in any one city.[9]

Our first stage regression relates the number of white households in the central city to the predicted number of highway rays passing through the city, controlling for metropolitan area and Census year fixed effects and the full set of population controls in equation 1:

$$\text{NUM\_WHITE}_{it} = \rho(\text{PREDICTED\_RAYS})_{it} + \Phi X_{ijt} + \alpha_i + \delta_t + \varepsilon_{it} \quad \textbf{(3)}$$

Baum-Snow (2007) demonstrates that this instrument is correlated with overall population loss from central cities; thus, not surprisingly, we find a strong first stage relationship between predicted highway rays and white departures. The sixth column of Table 2 (second row) presents our estimate of ρ from equation 3. The coefficient is negative and large; each new planned highway that we predict to be built through the central city leads to the departure of 8,000 white households from the central city (on a base of around 100,000).

[9] Because construction of the interstate highways began in 1954, we set the number of highway rays in every city at zero in 1940.

The sixth column of Table 2 (first row) presents the second stage relationship between black homeownership and white departures, using predicted highway rays to instrument for the number of white households in a city. The second stage coefficient is slightly larger (in absolute value) than its OLS counterpart, but the two estimates cannot be statistically distinguished from each other. According to the IV estimate, every 1,000 white household departures from the central city generates 108 new black homeowners. The typical city lost 25,700 white households from 1940 to 1980 and gained 10,400 black homeowners.[10] By our estimate, white departures would have generated 2,700 new black homeowners (= -108 · -25.7), which can explain 26 percent of the growth in black homeowners (= 2,700/10,400).

The identifying assumption for the instrumental variables procedure is that highway construction is only related to black homeownership through its effect on white departures. Some scholars argue that interstate highways tended to be built through black neighborhoods, thereby reducing the stock of housing available to black households (Sevilla, 1971; Frieden and Sagalyn, 1989; Lewis, 1997). The evidence cited in these earlier studies, however, is largely anecdotal. In a recent paper, Collins and Shester (2010) show that urban renewal projects, similarly accused of clearing black neighborhoods, had no effect on a city's black population share or its degree of racial residential segregation. In addition, if highways did reduce opportunities for black homeownership, we would expect the estimated effect of white departures in the IV specification to be lower than its OLS counterpart; yet we find the opposite.

D. Heterogeneity in racial filtering by city type and over time

Thus far, we have focused on the average relationship between the number of white households in a city and opportunities for black homeownership. However, a number of factors

[10] The number of white households in the typical city peaked in 1960 and declined only between 1960 and 1980.

may strengthen or weaken this relationship in particular areas, including characteristics of the housing stock and the racial composition of the pool of prospective homebuyers. Furthermore, the effect of white departures from and white arrivals to a city may not be symmetric. Therefore, the strength of racial filtering may vary according to other demand shifters that attract or repel white households from an area. In this section, we investigate these sources of heterogeneity and find that, in some places and at some times, the relationship between white departures and black homeownership was much stronger than the national average.

Table 3 examines how the core relationship between the number of urban white households and the number of black homeowners varies across different subsamples. In the first column, we interact the change in the number of white households with two features of the housing market: the share of units that are owner-occupied and the black share of all households (as a proxy for the black share of prospective homebuyers). We measure these characteristics in 1940, before the rise of either white suburbanization or black homeownership, to capture initial differences in housing markets across cities.

We expect the relationship between white departures and black homeownership to be stronger in cities with a large initial stock of units conducive to owner-occupancy. If the housing stock is instead primarily made up of rental units, a filtering process whereby departures facilitate homeownership would not occur. We find that cities with a larger initial stock of owner-occupied housing experience a sharper increase in black homeownership for every white departure. In 1940, the urban owner-occupied share ranged between 15 and 55 percent. This 40 percentage point difference in initial owner-occupancy is associated with an additional 146 black owners for every 1,000 white departures (= $-366 \cdot 0.4$).

The relationship between white departures and black homeownership also depends on the racial composition of the pool of prospective homebuyers. If whites constitute the majority of prospective homebuyers, white sellers can easily find white buyers without needing to compromise on price. However, if many prospective homebuyers are black, sellers who chose to limit their market to white buyers would incur a large price penalty for doing so and, thus, sellers would more likely opt to sell to black buyers. Indeed, we find that white departures have a stronger effect on black homeownership in cities with a large initial black household share. In 1940, the black urban household share ranged between zero and 50 percent. This 50 percentage point difference in initial racial composition is associated with an additional 144 black owners for every 1,000 white departures (= -289 · 0.5).

The second column of Table 3 re-runs the interacted specification, weighting each city by the number of resident black households. The coefficients in the weighted regression all roughly double in size, suggesting that, during this period, the typical black household lived in a city conducive to racial filtering. This pattern may reflect the concentration of black population in the industrial cities of the Northeast and Midwest, many of which were stagnating or shrinking. Filtering occurs when an existing housing unit shifts occupancy from one race (or income group) to another. This process is likely to be stronger in cities with an existing housing stock that are otherwise losing population, rather than in cities are otherwise expanding and adding new housing units.

The third and fourth columns of Table 3 examine this hypothesis explicitly by splitting the sample into cities that experienced net losses (gains) in white population from 1940 to 1980. Consistent with a simple model of housing supply with durable housing, we find no relationship between the number of white households in a city and black homeownership in areas that were

gaining white population. For the typical growing city, the estimates suggest that 1,000 white departures were associated with 6 fewer black homeowners, a tiny and statistically insignificant relationship.[11] In other words, white arrivals do not compete with existing or new black residents for owner-occupied housing, presumably because, in these growing cities, new units are being constructed to house the expanding population.

In contrast, there is strong relationship between the number of white households and black homeownership in cities that were losing white population. For the typical city with net white population loss, 1,000 white departures were associated with 222 additional black homeowners.[12] As white households left these city and the housing stock remained, a portion of the vacated units filtered down to prospective black buyers. Note that the magnitude of the coefficients in population loss subsample are quite similar to those in the weighted national regressions, suggesting that black population is concentrated in these declining cities. Indeed, 75 percent of urban black households lived in a declining city in 1980. Therefore, the *typical black household* was a potential beneficiary of racial filtering, even as filtering in the *typical city* was more muted.

Among the 53 cities that lost white population from 1940 to 1980, the strength of the relationship between white departures and black homeownership varied according to initial housing market characteristics. Figure 1 uses the coefficients from the fourth column of Table 3 to predict the number of new black homeowners for every 1,000 white departures by city. 1,000 white departures would lead to only 50 new black homeowners in New York City, in which 15 percent of the housing stock was made up of owner-occupied units in 1940. On the other

[11] The typical growing city had an initial housing stock that was 37 percent owner-occupied and was 10 percent black in 1940.

[12] Similarly, the typical declining city had an initial housing stock that was 34 percent owner-occupied share was 10 percent black in 1940.

extreme, 1,000 white departures generated 450 new black homeowners in Birmingham, AL, a city with a high black population share (41 percent) and a larger share of owner-occupied units (29 percent) in 1940.

Figure 2 combines the predicted strength of racial filtering by city from the prior figure with the actual number of white departures over the 1960s. According to our estimates, 3,000 black households in the typical city became homeowners due to white departures during the 1960s. However, in a few cities, such as Chicago, IL, Detroit, MI and Oakland, CA, over 10,000 new black homeowners were created by racial filtering over this decade. These cities were characterized by sizeable black populations, a large number of white departures, and a housing stock conducive to owner-occupancy.

IV. Concluding Remarks

This paper documents a causal link between the suburbanization of white households after World War Two and the rise in black homeownership in central cities. Although city neighborhoods were residentially segregated by race, black and white neighborhoods were connected through the housing market. As white households moved to the suburbs, some of their homes were purchased by black households. We estimate that, on average, roughly 100 black households became homeowners for every 1,000 white households leaving the central city between 1940 and 1980.

The extent to which racial filtering drove the post-war increase in black central city homeownership varied across metropolitan areas. In cities where blacks had little presence and the housing stock was primarily made up of multi-family units, racial filtering was relatively unimportant. However, in cities with a substantial black population share and a largely owner-

occupied housing stock in 1940, white suburbanization had a powerful impact on black homeownership in central cities. Cities like Chicago and Detroit that attracted large number of southern black in-migrants were those most "at risk" for racial filtering.

The racial aspect of the filtering of the housing stock in American cities can be attributed to the particular timing of twentieth-century suburbanization. In the early twentieth century, European immigrants flocked to the central cities of America's urban areas, while the vast majority of African-Americans still lived in rural South. Had technical advances in the internal combustion engine and, therefore, suburbanization occurred half a century earlier, it is likely that it would have been the foreign born, rather than African-Americans, who were the beneficiaries of this filtering process. As the century progressed, foreign immigration declined sharply due to the establishment of restrictive quotas and rural blacks began moving to industrial cities (Goldin, 1994). By 1940, African-Americans were the urban population group that most stood to benefit from the filtering of the housing stock. Overall, our OLS and IV estimates imply that about 25 percent of the increase in black home ownership at the national level between 1940 and 1980 can be attributed to racial filtering.

The substantial, yet incomplete, racial convergence in homeownership over the twentieth century provides one important context for understanding the racial gaps in wealth and social outcomes today. Although this paper has focused on racial filtering of the housing stock, other causal factors likely contributed to the post-war rise in black home ownership. Legislative and regulatory efforts intended to mitigate housing market discrimination may have facilitated black homeownership, although the available evidence suggests that the effects of such policies were limited, particularly before 1970 (Collins 2004). Perhaps more important was the rise in African-American incomes and educational attainment between 1940 and 1980; increases in standards of

living are associated with higher rates of black (and white) home ownership in the long run (Collins and Margo 2011). In addition, black veterans may have benefitted from mortgage subsidies available through the GI Bill and other programs (Fetter 2011).

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Table 1: Race, Residential Location, and Owner-Occupancy, 1940-1980

	Metropolitan population, Share in central city		Black share owner-occupier		White share owner-occupier	
	White	Black	Central city	Suburbs	Central city	Suburbs
1940	0.645	0.806	0.140	0.414	0.333	0.562
1960	0.485	0.810	0.330	0.505	0.528	0.749
1980	0.318	0.724	0.344	0.542	0.488	0.762

Notes: Authors' computations from IPUMS. Samples include all metropolitan, non-farm households whose place of residence (city or suburb) was reported.

Table 2: White departures and black homeownership in the central city, 1940-80

Dependent variable = Number/share of black owner-occupier households in city

	(1)	(2)	(3)	(4)	(5)	(6)
Method	OLS	OLS	OLS	OLS	OLS	IV
Sample	Aggregate	Aggregate	Aggregate	IPUMS	IPUMS	Aggregate
Dependent variable	Number	Number	Share	Share	Share	Number
# white HH in city	-83.138*	-86.658*				-107.595*
(in 1000s)	(7.223)	(7.351)				(36.005)
Share whites in city			-0.169	-0.233*	-0.258*	
			(0.228)	(0.093)	(0.084)	
First stage: predicted highway rays						-7.795*
						(1.893)
State *x* Year FE	N	Y	N	N	N	Y
Individual controls	N	N	N	N	Y	N
N	488	488	196	52,797	52,797	488

Notes: Cells contain the coefficient of interest from equation 1 (columns 1 and 2) or equation 2 (columns 3-5) in text. Standard errors are clustered by metropolitan area and reported in parentheses. * = significant at the 5 percent level or better. Counts regressions (columns 1 and 2) use decadal observations from 1940 through 1980. Shares regressions (columns 3 through 5) include only the years 1940 and 1980. For comparison with the micro data, the aggregate share regression in column 3 is weighted by the number of black households in the central city. Individual controls in column 5 include a quadratic in the age of the household head, dummy variables for the head's gender, marital status, and educational attainment, and the logarithm of household income. The first stage coefficient in column 6 reports the coefficient on predicted highway rays from equation 3, the dependent variable of which is the number of white households in the central city (in 1,000s).

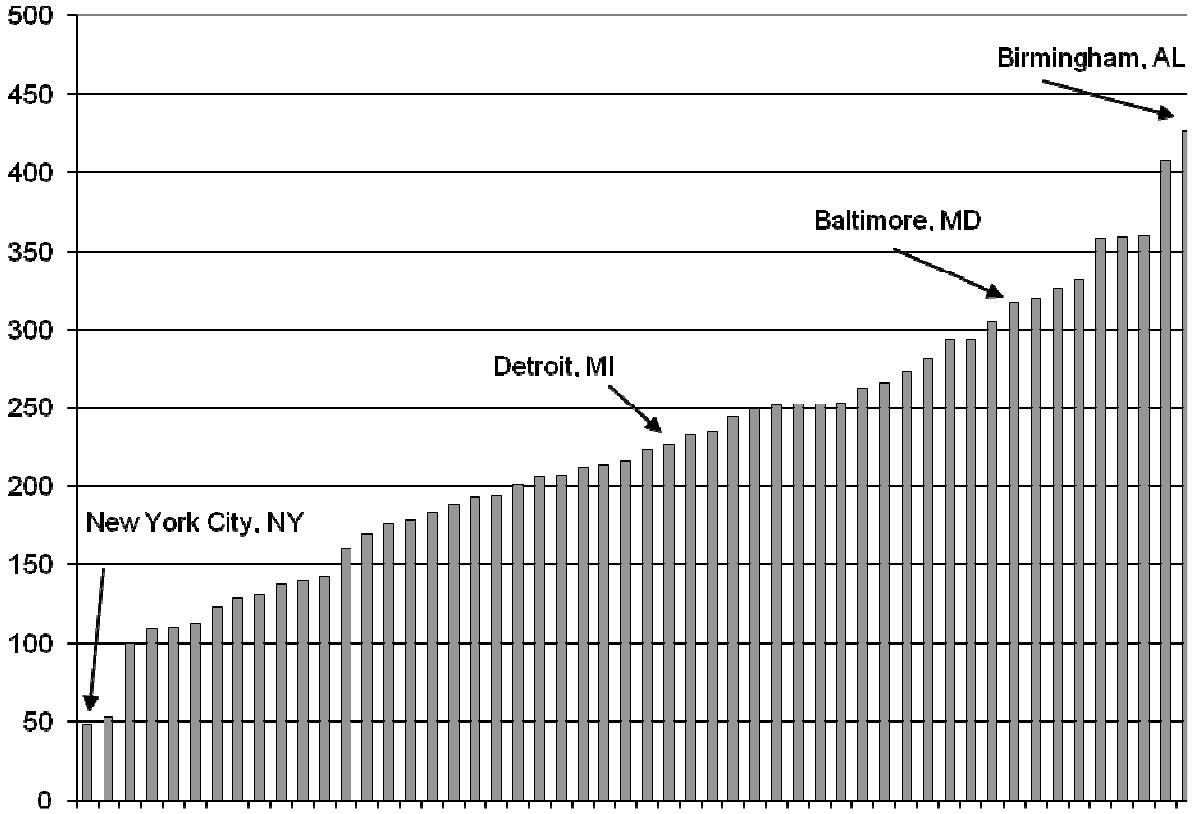
Table 3: Heterogeneity in racial filtering by city type

Dependent variable = Number of black owner-occupier households in city

	(1)	(2)	(3)	(4)
Sample	Full	Full, weighted	Gain, 1940-80	Loss, 1940-80
# white HH in city	25.440*	87.772*	-31.471	103.503*
	(18.075)	(14.553)	(31.039)	(14.553)
# white HH * Share owner occ, 1940	-366.947*	-656.053*	65.329	-710.148*
	(60.006)	(52.447)	(82.329)	(97.895)
# white HH * Share black, 1940	-289.105*	-748.312*	128.970*	-836.531*
	(132.409)	(207.603)	(44.876)	(233.251)
N	488	488	224	264

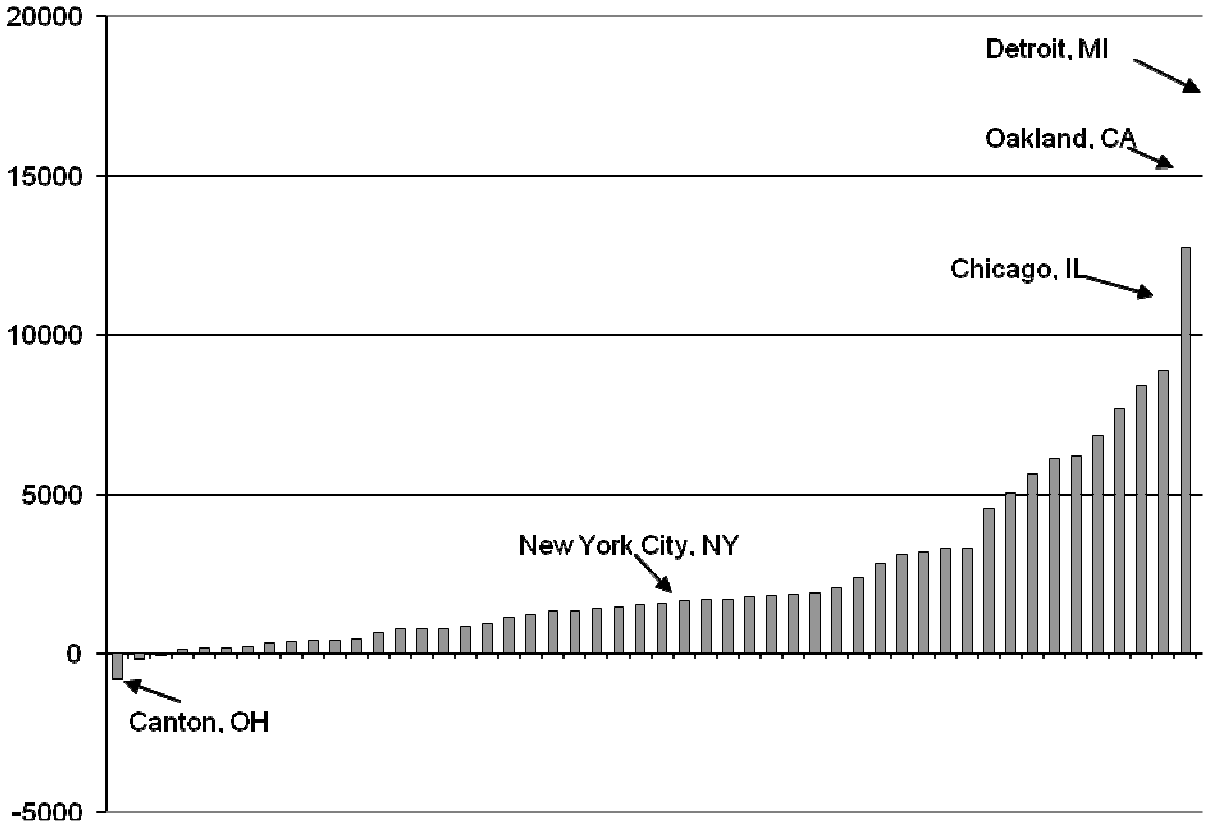
Notes: Standard errors are clustered by metropolitan area and reported in parentheses. * = significant at the 5 percent level or better. The number of white households in the city is entered in 1,000s. Each regression also contains interactions between the number of white households and both the share of housing units in the city that were owner-occupied in 1940 and the black share of households in 1940 and year and metropolitan area fixed effects. The regression in column 2 is weighted by the number of black households in the central city. Columns 3 and 4 subdivide the sample into cities that experienced a net gain/loss in white population between 1940 and 1980.

Figure 1: Variation in the estimated number of new black homeowners for every 1,000 white departures by city



Notes: Predicted number of new black homeowners per 1,000 white departures for 53 cities with net white population loss based on coefficients in Table 3, column 4.

Figure 2: Variation in the estimated number of new black homeowners generated by racial filtering by city, 1960-70



Notes: Number of new black homeowners generated from 1960 to 1970 in response to white departures. Predictions for 53 cities with net white population loss based on coefficients in Table 3, column 4.