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Abstract

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JEL Classification: H41, J15, N32

Keywords: N/A

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Racial Heterogeneity and Local Government Finances: Evidence from the Great Migration*

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September 2019

Abstract

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1 Introduction

Central cities–suburbs inequality is a recurrent feature of US Metropolitan Statistical Areas (MSAs). Such inequality is evident along a number of dimensions: inner city residents are usually poorer, less educated, less likely to be white, and live further away from well-paying jobs relative to their suburban counterparts (Table 1). Moreover, affluent suburbs often provide higher quality public goods and services, relative to those offered inside the urban ring (Boustan, 2013). In turn, disparity in the quality of and in access to key public goods such as education and health care is considered one of the main factors behind the persisting inner cities-suburbs, and the related racial, inequality (see, among others, Fryer and Katz, 2013, or Katz, 2015).[1]

One commonly proposed explanation for the low level of redistribution and for the distressed financial conditions prevailing in US cities is racial heterogeneity. First, racial heterogeneity can reduce demand for public services either because non-coethnics have conflicting preferences over government spending or because whites' utility from public goods falls when these have to be shared with non-white individuals (Alesina et al., 1999; Luttmer, 2001). In turn, lower demand for public spending can reduce government revenues, via cuts in the tax rate.

Second, white residents can respond to racial heterogeneity by leaving the central city and relocating to richer and more racially homogeneous suburbs (Boustan, 2010; Sugrue, 2014). Alternatively, prospective white migrants may choose not to move to the central city precisely because of higher racial heterogeneity. In either case, demand for housing in the inner city falls, driving down house prices and possibly encouraging a long-lasting process of urban decline (Glaeser and Gyourko, 2005). Since most local government revenues come from property taxes, reductions in property values can impose a negative fiscal externality on central cities (Boustan, 2012). Raising taxes may not be enough to compensate for the deterioration of the tax base, and cities may be forced to cut spending to deal with a tighter budget constraint.

The negative relationship between racial heterogeneity and redistribution across US jurisdictions today has been documented in a number of works (Alesina et al., 1999; Alesina and La Ferrara, 2002; Luttmer, 2001; Tesei, 2016). However, since the racial composition of cities, city finances, and public goods provision are jointly determined and are simultaneously affected by a myriad of factors, it is hard to attach a causal interpretation to such

[1] Very recent trends suggest that poverty and inequality might be spreading to the suburbs as well (Kneebone, 2017). In particular, while suburban areas that are further away from the central cities are still thriving, standards of living and the quality of local amenities (including schools and hospitals) are deteriorating in inner suburbs (Allard, 2017).

relationship.[2] To identify the causal effect of racial heterogeneity on public spending and city finances, one would like to conduct the following thought experiment. Starting from a situation where US cities were racially homogeneous, unexpectedly and exogenously allocate to different cities a different number of individuals (e.g. migrants) belonging to a new racial group. Then, compare changes in public spending and in city finances before and after the migration shock, for cities that received large and small numbers of migrants.

This paper exploits a historical episode of migration to replicate, as accurately as possible, the thought experiment just described. I focus on the First Great Migration, when more than 1.5 million African Americans migrated from the rural South to the urban North of the United States between 1915 and 1930.[3] Between 1940 and 1970 a second, even larger migration episode – the Second Great Migration – occurred, during which more than 4 million blacks moved to the North and the West of the United States (Boustan, 2016). However, relative to the 1940-1970 period, the First Great Migration offers several advantages.

First, black in-migration altered the racial profile of several northern cities for the first time in American history, allowing me to test how a sudden increase in racial diversity affected local finances and redistribution. Second, at the time, cities were independent fiscal units, and had to independently raise funds to provide key public services (such as education and policing) to their residents. Third, the availability of rich data on city finances that I collected and digitized from historical sources makes it possible to investigate the mechanisms. In particular, the data not only allow me to explore the impact of black in-migration on city spending across categories, but also to disentangle any observed change in tax revenues between changes in the tax rate and changes in property values.

A necessary condition to identify the causal effect of black in-migration on city finances and redistribution is that, conditional on controls, black arrivals across cities over time are as good as randomly assigned. This condition would not be satisfied if, for instance, black migrants moved to places with better employment opportunities or with sounder city finances. To overcome these and similar endogeneity concerns, I construct a version of the shift-share instrument (Card, 2001; Boustan, 2010) that predicts black in-migration to northern cities by interacting 1900 settlements of southern born blacks with outmigration of African Americans from each southern state in each decade between 1910 and 1930.

This instrument does not simply assign more blacks to cities with larger enclaves in 1900.

[2]Moreover, this literature has not separated the effect of racial heterogeneity on public goods provision due to (lower) preferences for redistribution from that induced by changes in property values.

[3]Throughout the paper, when referring to northern cities, I mean cities outside the South. I follow the Census definition of the South, but, as in Boustan (2010), I exclude the border state of Maryland, which received substantial net in-migration of blacks during the Great Migration (see appendix Table A1 for the list of southern states).

Instead, it combines two separate sources of variation. First, cross-sectional variation in settlements of blacks born in different southern states and living in different northern cities in 1900. Second, time-series variation in black emigration from different southern states between 1910 and 1930. The validity of the instrument rests on one identifying assumption: the evolution of economic and political conditions after 1910 should not be simultaneously correlated with the 1900 composition of blacks' enclaves in northern cities and with post-1910 migration across southern states (see also Borusyak et al., 2018, and Goldsmith-Pinkham et al., 2018, for a formal discussion). There are three threats to identification, which I tackle in different ways.

First, the characteristics of northern cities that attracted blacks from specific southern states before 1900 might have persistent, confounding effects both on changes in city finances and on migration patterns. For instance, larger urban centers may have attracted more blacks from specific southern states prior to 1900, and may have experienced stronger economic growth between 1915 and 1930. If this were the case, and if the same southern states that sent more blacks before 1900 also had higher emigration rates during the First Great Migration, then, the identifying assumption would be violated. To deal with this issue, I first test that predicted black in-migration after 1910 is not correlated with pre-1910 changes in either local government finances or economic conditions across northern cities. Next, I allow cities to be on differential trends by interacting year dummies with a variety of 1900 city characteristics such as black share, city population, and different proxies for economic activity.

Second, one may be worried that changes in European immigration induced by the Immigration Acts of the 1920s (Collins, 1997) partly influenced the location decision of African Americans. Reassuringly, I show that the instrument is uncorrelated with the local exposure to the immigration quotas, as predicted by the distribution of pre-existing immigrant enclaves across cities (Ager and Hansen, 2018). Moreover, I document that the pre-1910 change in European immigration across cities is orthogonal to the post-1910 black migration predicted by the instrument.

Finally, the instrument would not be valid if outmigration from each southern state were correlated with local pull factors systematically related to the state of origin of 1900 black settlers. To tackle this potential concern, I follow Boustan (2010) and Derenoncourt (2018), and construct a modified version of the instrument that exploits only variation in local push factors across southern counties to predict black outflows from the US South over time.

Using this empirical strategy, and controlling for city time-invariant and region time-varying characteristics, I find that black inflows had a strong, negative effect on public spending per capita. These effects are quantitatively large: for a city like Detroit, which received around 115,000 blacks between 1910 and 1930, public spending per capita would have grown twice as fast had the Great Migration not occurred. Said differently, according to my estimates, the inflow of 10,000 more blacks reduced public spending per capita by 1.15 dollars, relative to a 1910 sample mean of 15.2 dollars. Alongside the reduction in public spending, cities also experienced a sharp reduction in tax revenues, which was almost identical in size to the contraction in public goods provision. Since more than 90% of city revenues at the time came from property taxes, the drop in the latter accounted for the entire reduction in total tax revenues. Moreover, I verify that the reduction in public spending and tax revenues per capita does not merely reflect the mechanical increase in city population due to black in-migration. In fact, black population had a negative and statistically significant impact not only on per capita, but also on total spending and revenues.

As noted above, a negative relationship between racial heterogeneity, public goods provision, and city finances can be due to two, non-mutually exclusive, mechanisms. First, a reduction in the desired level of spending among the (white) majority. Second, a negative fiscal externality induced by the decline in house prices that in turn lowers property tax revenues. In the second part of the paper, I seek to disentangle which of these two forces was at play during the First Great Migration.

I start by showing that spending cuts were not associated with changes in the share of the budget allocated to different categories. This finding, somewhat in contrast with results in Alesina et al. (1999) and Luttmer (2001) for the more recent period, is not consistent with black inflows altering preferences for redistribution among white residents. Instead, it suggests that cities may have been forced to cut public spending in response to a (housing market induced) negative fiscal externality. In line with the latter interpretation, I find that the decline in tax revenues was entirely driven by a steep reduction in property values, whereas there was no change in the tax rate.

One explanation for the reduction in house prices is that black inflows lowered the demand for housing among whites who reacted by moving to the suburbs or by choosing not to migrate to the central city altogether (Boustan, 2010; Shertzer and Walsh, 2019). I provide different pieces of evidence that both "white flight" and lower in-migration of whites who would have moved to the central city absent black inflows, and who chose not to do so precisely because of the arrival of African Americans, contributed to the decline in housing demand in central cities.

First, I construct an instrument for black induced white flight by interacting (predicted) black in-migration with a number of geographic characteristics (presence of hills, lakes, oceans, and rivers) of the area surrounding central cities that should increase the cost that whites faced when moving to the suburbs.[4] Absorbing the direct effects of geography and using this instrument, I replicate the baseline analysis by separately controlling for white flight. I show that, when accounting for white outmigration, the estimated effects of black in-migration on property values, tax revenues, and public spending are an order of magnitude smaller (in absolute value) than in my baseline specification. This pattern suggests that the negative effect of the Great Migration was at least partly mediated by whites' residential decisions.

Second, I split the sample between high and low growth cities, and test whether black arrivals had a differential effect on city finances depending on the local conditions of the housing market. As expected, the reduction in property values was significantly larger in cities with population growth below the median. Furthermore, exploiting information gathered from historical newspapers, I document that the arrival of African Americans was associated with a significant increase in terms such as "ghetto", "decay", and "segregation", but only in low growth cities, precisely where the (negative) effects of white flight should have been more pronounced.

Third, I find that black in-migration slowed down the construction of new housing units and the expansion of city boundaries. I also show that in MSAs that received more blacks between 1910 and 1930, the number of local jurisdictions increased more between 1940 and 1970, while more highways were built from 1950 onwards.[5] These findings are consistent with the idea that black in-migration increased whites' demand for suburbanization, as proxied by highways. Once in the suburbs, whites set up their own local jurisdictions so as not to share public goods with poorer blacks (Alesina et al., 2004; Burns, 1994), and resisted annexation to the central city (Danielson, 1976).[6]

Taken together, the substantial drop in property values, which was larger when not accounting for (predicted) white outmigration, the fact that cities did not alter the allocation of the budget, and the heterogeneous patterns that depended on the local conditions of the housing market are all strongly consistent with a negative fiscal externality. As house prices fell, local government finances deteriorated, and cities were forced to spend less to meet a tighter budget constraint.

My findings speak to several strands of the literature. First, they complement the existing

[4] Intuitively, black arrivals increased whites' desire to relocate to the suburbs. But, whites' ability to leave the city depended on house prices and on the costs they incurred when commuting from the suburbs to the central city. In areas with more hills or water bodies, house prices are higher and commuting is more expensive, suggesting that, *ceteris paribus*, white flight should be lower.

[5] Data constraints prevent me from looking at the contemporaneous change in the number of local jurisdictions: the Census of Governments started collecting this data only in 1942.

[6] Annexation was the most common way for cities to expand their boundaries in this period (Jackson, 1985).

literature on white flight (Boustan, 2010; Shertzer and Walsh, 2019) and on residential segregation (Card et al., 2008; Cutler et al., 1999 and 2008; Logan and Parman, 2017) by documenting the negative effects that these phenomena had on local government finances and, ultimately, on cities' ability to provide public services to their residents. Consistent with Boustan (2012), my results suggest that white flight imposed a substantial fiscal externality, and possibly encouraged a persistent process of urban decline that may be at the roots of the current inequality between (poor) central cities and surrounding (rich) suburbs. This interpretation is also in line with recent findings in Derenoncourt (2018), who shows that the Second Great Migration reduced intergenerational mobility of receiving areas in the long run. My results complement those in Derenoncourt (2018) by providing evidence for a specific channel through which the (Second) Great Migration might have reduced intergenerational mobility in the long run.

Second, my paper complements the literature on the relationship between ethnic diversity and public spending across US cities (Alesina et al., 1999) and across countries (Alesina et al., 2001; Alesina and Glaeser, 2004) in two ways. First, by exploiting the first change in the racial profile of US cities, by including city and time fixed effects, and by using an instrumental variable approach, I can more confidently identify causal effects. Second, I show that racial heterogeneity can affect public spending not only by altering natives' preferences for redistribution (Luttmer, 2001) or reducing agreement over budget allocation (Beach and Jones, 2017), but also by generating fiscal externalities that, in turn, impact on governments' ability to provide public goods to their citizens. Dahlberg et al. (2012) find that the inflow of refugees to Sweden between 1985 and 1994 reduced support for redistribution in receiving municipalities.[7] I complement this work by showing that racial heterogeneity can have direct effects on actual policies and not only on natives' preferences.

Third, my findings are related to the vast and growing literature on the Great Migration. Several works have analyzed the effects of the First and the Second Great Migration on whites' residential decision, on long-run intergenerational mobility, on the assimilation of previously arrived immigrants, and on support for civil rights legislation (Boustan, 2010; Shertzer and Walsh, 2019; Derenoncourt, 2018; Fouka et al., 2018; Calderon et al., 2019). I instead focus on a set of variables (government finances and public spending) overlooked by the existing literature that likely had an effect on outcomes of both migrants and natives.

Finally, my paper speaks to the growing literature on the political consequences of immigration. Dustmann et al. (2019) and Halla et al. (2017) show that immigration increased the vote share of right wing, extremist parties in Denmark and Austria respectively.[8] My

[7] Nekby and Pettersson-Lidbom (2017) revisit the work by Dahlberg et al. (2012), and argue that findings in the latter paper might be sensitive to the sample used and to measurement of preferences for redistribution.

[8] In a related paper, Tabellini (2019), I find that European immigration to US cities between 1910 and 1930

work complements this literature by analyzing the effects of in-migration on public spending and government finances, and by suggesting avenues for future work. For instance, a policy relevant question is whether the changes in electoral outcomes documented in the aforementioned papers lead to changes in public spending or in other policies.

The remainder of the paper is organized as follows. Section 2 describes the historical background of the First Great Migration. Section 3 discusses the potential channels through which racial heterogeneity can affect government resources and public spending. Section 4 describes my data, while Section 5 lays out the empirical strategy, constructs the instrument for black in-migration, and presents first stage results. Section 6 presents the main results for the effects of the Great Migration on public spending and city finances, and explores the mechanisms. Section 7 summarizes the robustness checks, which are then discussed extensively in the appendix. Section 8 concludes.

2 Historical Background: The Great Migration

Between 1915 and 1930, during the first wave of the Great Migration, more than 1.5 million African Americans left the rural South for northern cities. Such unprecedented migration wave was triggered by a number of push and pull factors (Boustan, 2016). On the one hand, World War I dramatically increased labor demand in northern industries while temporarily reducing European immigration, which was then permanently blocked by the Immigration Acts of the 1920s (Collins, 1997). Employers in the North started looking at southern born blacks as a source of cheap labor to replace European immigrants and to deal with the war-induced surge in demand. Between 1915 and 1919, more than 2 million jobs – most of them requiring minimal levels of skills – were created in northern cities, thereby increasing labor market opportunities for blacks (Boustan, 2016). On the other hand, a series of weather shocks hit the South in the early 1900s, reducing labor demand for agriculture, where most blacks were employed.[9] Racism and violence provided further incentives for African Americans to leave the South (see Tolnay and Beck, 1990, among others). Pushed by these factors and attracted by newly available jobs, blacks started moving to the North, taking advantage of the recently completed railroad network (Collins and Wanamaker, 2014; Black et al., 2015).

The combination of the factors discussed above, further reinforced by the process of chain

triggered natives' hostile reactions despite the positive effect that immigrants had on natives' employment.

[9] In 1892, a cotton pest - the Boll Weevil - entered in Texas and then spread throughout the South in subsequent decades, inducing substantial damages to local agriculture (Lange et al., 2009). In 1927, the Mississippi flood displaced a large number of agricultural workers in several counties of Mississippi, Louisiana, and Arkansas (Boustan et al., 2012; Hornbeck and Naidu, 2014).

migration, resulted in massive migration flows: between 1915 and 1930, approximately 1.5 million blacks moved from the rural South to the urban North of the United States, with the fraction of African Americans living in the North rising from 10% in 1910 to 25% in 1930 (Figures 1 and 2). More than 60% of African Americans settled in the five most common destinations – New York, Chicago, Los Angeles, Detroit, and Philadelphia – but black in-migration was a widespread phenomenon in many other large non-southern cities (Figure A1). As a result, the number of blacks living in northern urban areas increased dramatically, altering the racial composition of receiving places. For instance, in Chicago, Cleveland, or Youngstown (just to mention a few), the fraction of blacks over city population moved from 2% in 1910 to more than 8% in 1930.

3 Racial Diversity, Redistribution, and City Finances

Racial heterogeneity can affect government resources and public goods provision in several ways. In what follows, I focus on two channels that might have been particularly relevant for US cities during the early twentieth century. First, racial heterogeneity can reduce demand for public spending and alter preferences for redistribution; second, it might lower property values by generating disamenity effects and reducing housing demand, and, in turn, impose a fiscal externality on more diverse areas. In this section, I discuss each of these two channels separately, and derive some testable implications that will guide my empirical analysis.

3.1 Demand for Public Goods and Preferences for Redistribution

As discussed in Alesina et al. (1999) among others, racial diversity can reduce the desired level of public spending. On the one hand, people from different ethnicities and cultures may disagree on what they consider the optimal amount of government spending or its allocation across public goods (Beach and Jones, 2017). On the other, individuals tend to be more altruistic with coethnics and less willing to redistribute towards non-coethnics (Luttmer, 2001; Dahlberg et al., 2012; Munshi and Rosenzweig, 2018). Moreover, the utility from consumption of public goods may be lower when these have to be shared with people from different races.[10] As individuals want to spend less, they also demand lower taxes, implying that public resources should be lower in more diverse communities.

This discussion provides two testable predictions. First, if a negative relationship between ethnic diversity and government revenues were due to lower demand for public goods, one

[10] For instance, the utility that white parents get from sending their children to public schools may be lower when schools are more ethnically diverse (Baum-Snow and Lutz, 2011; Cascio and Lewis, 2012).

should also find a negative relationship between ethnic diversity and the tax rate. Second, an increase in racial heterogeneity should lead to a larger drop in spending shares of categories where either inter-racial interactions are more salient (e.g. education) or poorer minorities would get larger implicit transfers (e.g. spending on poverty relief).

3.2 White Flight and Fiscal Externality

In addition to the "demand side" effects discussed in the previous paragraph, racial heterogeneity can affect government resources and public spending through the housing market. In particular, if natives have a distaste for living in racially diverse places, in-migration of a minority group may reduce house values and impose a negative fiscal externality on receiving areas (Boustan, 2010; Saiz and Wachter, 2011). The reduction in house prices induced by higher racial diversity should be larger in cities with lower population growth where housing demand is weaker: in these areas, white flight (or, lower in-migration of whites from elsewhere) should raise the vacancy rate, in turn driving down house prices. This effect should instead be less severe in booming areas, where overall population growth should at least partly offset the effects of white departures on vacancy rates and house prices.

In the US, most local government revenues come from property taxes. Hence, declining house values mechanically lower tax revenues and, potentially, impose a fiscal externality on areas experiencing in-migration (Boustan, 2012). While, in principle, the tax rate can be increased to compensate for a lower tax base, political and economic constraints might prevent municipalities from doing so. For instance, politicians may realize that, by increasing the tax rate, they would further depress housing demand and reinforce the process of urban decline. Also, precisely because of higher racial heterogeneity, voters may be reluctant to accept higher taxes. As a result, more diverse communities may be forced to cut spending in order to meet a more binding budget constraint. Lower quality public goods can in turn have a feedback effect on property values and trigger a self-reinforcing cycle of lower spending and worse government finances.

To sum up, if racial diversity affects public goods provision only (or, mainly) through a fiscal externality, one should find a negative effect on house prices and no (or a positive) effect on the tax rate. Moreover, this effect should be larger in cities where population growth is lower. When interpreting my results, I will use these predictions, and contrast them with those obtained above, to discriminate between the demand and the fiscal externality effects of ethnic diversity on public spending and government finances. In practice, both channels can be simultaneously at play. However, testing these predictions will allow me to shed some light on the relevance of each of the two mechanisms in my setting.

4 Data

My analysis is based on the three Census years that span the period of the first Great Migration, i.e. 1910, 1920, and 1930. The sample is composed of the 42 non-southern US central cities that were anchored to a MSA, had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration.[11] The 42 cities in my sample (Figure A2 and Table A2) absorbed more than 95% of southern black migrants that settled in northern or western urban areas during the first wave of the Great Migration, and include more than 85% of the black, white, or city population of non-southern urban areas in each decade between 1910 and 1930.

I collected, and in many cases digitized, data from two main sources. First, I used data on city population by race in each decade from the (full count) Census of Housing and Population. From this source, I also collected data on the number of families, the number of dwellings, and other city-level socioeconomic and demographic characteristics used either as outcomes (in addition to public finance variables) or to perform robustness checks. To construct the instrument for black migration, I used data from the US Census of Population made available by IPUMS (Ruggles et al., 2015), and from ICPSR study 2896 (Haines et al., 2010).

Second, I digitized a detailed dataset on public spending and city finances from the Financial Statistics of Cities. These are annual reports, available from 1906 onwards for cities with population above 30,000 or 100,000, depending on the years. Since population data are available only at decennial frequencies, data from the Financial Statistics of Cities were collected for years 1910, 1919, and 1930.[12] In my analysis, I consider public spending (total and by category), tax revenues, tax rates, and property values.[13] Table 2 reports the summary statistics for the main variables used in my analysis.

4.1 City Demographics and City Finances

During this period, many northern and western cities were booming: for the 42 cities in my sample, the 1910-1930 average (median) population growth rate was as high as 60%

[11] As in Baum-Snow (2007) and Boustan (2010), central cities are defined as the largest urban center of a given MSA. My results appear robust to alternative definitions. Since I am interested in city-level fiscal outcomes, differently from Baum-Snow (2007) or Boustan (2010), I do not fix city boundaries. However, I do fix MSA boundaries as of 1940 in order to keep the geographic unit of analysis constant.

[12] Since data for 1920 were missing, I used the 1919 volume - results are robust to using 1921, but 1919 is preferable because 1921 data were not reported for several cities. I digitized PDFs for the relevant years, including also 1906, which is used below to perform some robustness checks.

[13] In the Financial Statistics of Cities, property values refer to the assessed valuation of property. The tax rate on 1,000$ of such assessed value is also separately reported.

(50%). The median city rose from 215,000 residents in 1910 to almost 300,000 in 1930 (Table A3). Comparing these numbers to the post 1940 period, estimates in Boustan (2010) suggest that the median non-southern MSA grew by 58% between 1940 and 1970. Yet, while population growth in central cities and in suburbs was very similar before 1930, it was mostly concentrated in the suburban ring from 1940 to 2000 (Hobbs and Stoops, 2002).

Around 1910, for the first time in American history, blacks started to migrate to non-southern urban areas. The number of African Americans in the average (resp. median) city in my sample increased from 15,335 (resp. 3,245) to 42,415 (resp. 7,779) between 1910 and 1930. While in 1910 international (most often European) immigrants accounted for a relevant share of the population in many cities (Table A3), a white-black racial dichotomy was absent before the Great Migration, but rapidly entered the public domain, possibly influencing the assimilation of European immigrants between 1910 and 1930 (Fouka et al., 2018).

Rising racial diversity might have affected city finances either by changing preferences for redistribution of the white majority or by imposing a negative fiscal externality due to lower whites' demand for housing in the central city, as discussed in Section 3 above. Consistent with a fiscal externality channel, a large literature has shown that, between 1910 and 1930, black in-migration to northern cities increased dramatically (racial) residential segregation – and this was not just a mechanical effect of growing city size (Logan and Parman, 2017). In fact, Cutler et al. (1999) document that collective action by native whites was the main mechanism responsible for this pattern.[14] Similarly, Shertzer and Walsh (2019) find that at least one third of the rise in residential segregation between 1910 and 1930 was due to whites' decision to leave neighborhoods where black migrants were moving to.

The pre-1930 period is particularly appealing to investigate these issues because, until the Great Depression, US cities were responsible for the provision of public goods such as education, police, and spending on welfare or on infrastructure (e.g. roads, sewerage, etc.), while federal and state governments played only a marginal role (Monkkonen, 1988). Since federal and state transfers were very limited, cities had to independently raise funds to finance their expenditures. Furthermore, differently from today, it was very rare for political jurisdictions to overlap within the same city. That is, cities were independent fiscal units, and (local) public officials had substantial control over the collection and the allocation of public resources.

Local taxes represented the main source of revenues, with property taxes accounting for more than 90% of total tax revenues (Fisher, 1996). As shown in Table A4, tax revenues and

[14] Cutler et al. (1999) show that, even if blacks on average paid lower rents relative to whites, the white-black gap was significantly lower in more segregated cities.

spending per capita rose substantially between 1910 and 1930, moving, on average, from 15 to around 30 dollars.[15] Both taxes and public expenses were higher in larger cities (Table A5), not only in absolute value, but also in per capita terms. As expected, the largest spending category was education, which accounted for 30% (resp. 40%) of the budget in 1910 (resp. 1930). During this period, the increase in the share of spending in education was compensated by a relative decline in the share of spending in fire and police as well as in roads and public infrastructures (Figure A3).

5 Empirical Strategy

In this section, I present the baseline estimating equation (Section 5.1), construct the instrument for black population (Section 5.2), and report first stage results (Section 5.3).

5.1 Baseline Estimating Equation

To study the effects of the Great Migration on public spending and city finances, I stack the data for the three Census years 1910, 1920, and 1930, and estimate

$$Y_{crt} = \alpha_c + \delta_{rt} + \beta_1 B_{crt} + \beta_2 Pop_{crt}^{MSA} + X_{crt} + u_{crt} \tag{1}$$

where Y_{crt} is the outcome for city c in Census region r in year t;[16] my main focus is on public spending and tax revenues per capita, but to investigate the mechanisms I also consider the spending share of different categories, property values, and tax rates. The main regressor of interest is the number of blacks in city c in year t, B_{crt}. I always include city and region by year fixed effects (α_c and δ_{rt}), and, as in Boustan (2010), I separately control for MSA population, Pop_{crt}^{MSA}.

X_{crt} is a vector of interactions between year dummies and city constant characteristics. In my baseline specification, these are the 1900 fraction of blacks and city coordinates, but in Appendix C I add a number of additional controls such as 1900 city population, the 1900 fraction of immigrants, and several proxies for 1900 economic conditions. Standard errors are clustered at the MSA level. Coefficient β_1 should be interpreted as the effect of 1,000 more blacks in the central city. Since I always control for city and year by region fixed effects, β_1 is estimated from changes in the number of blacks within the same city over time, as compared to other cities in the same region in a given Census year, holding constant total

[15] All spending and revenues data are expressed in 1910 dollars. Nominal values for 1920 and 1930 are deflated using the CPI from the Minneapolis FED.

[16] When defining regions, I follow the Census classification.

MSA population.

5.2 Instrument for Black Population

A priori, we may expect blacks to be attracted to cities with better job opportunities, or with more appealing tax-public spending bundles. Alternatively, African Americans may settle in otherwise declining cities, where house prices were lower. In either case, OLS estimates of equation (1) will likely be biased. To reduce these and similar endogeneity concerns, I instrument the location decision of black migrants using a version of the "shift-share" instrument commonly adopted in the immigration literature (Card, 2001; Boustan, 2010).

Specifically, I first estimate outmigration from each southern state for each decade using the forward survival method (Gregory, 2005).[17] Using data for the United States as a whole, survival ratios were computed for each age-sex-race group and were then used to estimate net migration from each southern state (for each group). Next, outmigration flows are apportioned to northern cities depending on the share of southern born African Americans from each state living in each city in 1900. Formally, the number of blacks in the central city, B_{crt}, is instrumented with

$$Z_{crt} = \sum_{j \in South} \alpha_{jc}^{1900} O_{jt} \tag{2}$$

where α_{jc}^{1900} is the share of blacks born in southern state j residing in the non-South who were living in northern city c in 1900, and O_{jt} is the number of African Americans leaving state j between $t - 10$ and t.

The instrument constructed in equation (2) exploits two sources of variation. First, cross-sectional variation in settlements of blacks born in different southern states and living in different northern cities in 1900, α_{jc}^{1900}. Second, time-series variation in black outflows from different states over time, O_{jt}.

5.2.1 Initial Black Shares

The location decision of early black migrants, and thus their initial settlements across northern cities, was strongly influenced by the railroad network. For example, as noted in Grossman (1989), "the first [black migrant from Mississippi] to leave for Chicago probably chose the city because of its position at the head of the *Illinois Central*". The *Illinois Central*

[17] Before 1940, no dataset on US internal migration exists, and so migration rates must be estimated. For robustness, I compared my measure of estimated outmigration with that computed in Lee et al. (1957), and the two were very similar.

was also connecting a number of southern railroads to northern hubs in Missouri and Illinois (Black et al., 2015). This, in turn, shaped the early migration patterns of blacks from e.g. Alabama to Chicago or St. Louis.[18] For blacks born in Mississippi or Alabama it was much harder to reach Philadelphia, or even a hub like New York City - these cities were instead easier to reach from Florida. The stability of train routes, together with the process of chain migration, made early settlements highly persistent: over time, migrants tended to move where other migrants from the same county (or state) had moved in the past (see, among others, Wilkerson, 2010).

Figure A4 plots the share of southern born blacks from selected states living in a number of northern cities in 1900, and confirms visually that there was indeed large variation across both sending and receiving places. For instance, a large enclave of blacks from Mississippi was present in Chicago in 1900, whereas much fewer of them were living in either New York or Philadelphia. On the other hand, while New York City hosted a very large community of blacks born in Florida, less than 5% of them were living in either St. Louis or Kansas City (MO).

5.2.2 Instrument Validity and Identifying Assumptions

The key assumption behind the instrument is that cities receiving more blacks (from each southern state) before 1900 must not be on differential trends for the evolution of public spending and government finances in subsequent decades.[19] This assumption can be violated for three main reasons. First, if the city characteristics that attracted early movers had persistent effects both on black migration and on the evolution of city finances. For example, larger and more industrialized urban centers, which might have attracted more African Americans from specific states before 1900, might have experienced stronger growth in city finances after 1910. If this were the case, and if southern states with higher emigration before 1900 also experienced stronger out-migration during the First Great Migration, a spurious correlation between the instrument and changes in city finances would be introduced.

I deal with this and similar concerns by performing two sets of robustness checks, which are described in detail in Appendix C. First, I document that pre-1910 changes in city finances, public spending, and economic conditions are uncorrelated with changes in black in-migration predicted by the instrument after 1910. Second, I interact year dummies with several 1900 city characteristics, such as the fraction of blacks, city coordinates (to proxy for distance from the South), city population, the fraction of immigrants, and the share of

[18] Migration from Alabama to Chicago and St. Louis was largely facilitated by the presece of the *Mobile&Ohio* (which later became the *Gulf, Mobile&Ohio*) and its intersection with the *Illinois Central.*

[19] See also Borusyak et al. (2018) and Goldsmith-Pinkhan et al. (2018) for a formal discussion of Bartik instruments - a class of instruments that include the shift-share used in my paper.

employment in manufacturing. Notably, controlling for the interaction between the 1900 fraction of blacks and year dummies implies that the effects of black in-migration are identified exploiting only variation in the (southern state) composition of African Americans' enclaves across northern cities, holding constant the size of their black populations.

Second, one may be worried that the instrument is spuriously correlated with changes in the immigration regime triggered by the Immigration Acts of the 1920s (Collins, 1997). Specifically, although the immigration restrictions were passed at the national level, they likely had a differential effect across cities depending on pre-existing ethnic composition. I tackle this concern by showing that the instrument is orthogonal to the local exposure to the quotas, as predicted by the distribution of immigrant groups across cities in 1900 (Ager and Hansen, 2018). Also, and importantly, I verify that the instrument is uncorrelated with the pre-1910 change in the immigrant population across cities.

Finally, the identifying assumption would be violated if outmigration from southern states were not independent of cross-city pull factors systematically related to 1900 settlers' state of origin (Borusyak et al., 2018; Goldsmith-Pinkham et al., 2018). To deal with this potential threat, I follow Boustan (2010) and Derenoncourt (2018) among others, and replace actual outmigration from the South with that estimated by exploiting only initial conditions across southern counties. I discuss the construction of this alternative instrument in detail in Appendix C, and only briefly describe the main steps here. First, outmigration from southern counties is predicted by exploiting only local demographic and agricultural conditions prevailing at the beginning of each decade. Next, predicted flows are aggregated from the county to the state level to obtain the predicted number of blacks leaving each southern state in each decade. Finally, I replace the actual number of blacks leaving state j in decade t (O_{jt} in equation (2) above) with the predicted number of black migrants constructed in the previous step.

By construction, this (predicted) measure of black outmigration from the South is orthogonal to any specific shock occurring in the North. Moreover, by exploiting southern shocks to agricultural conditions, this alternative instrument is less likely to suffer from the problem of high serial correlation in migration patterns between sending and receiving areas (Jaeger et al., 2018). Reassuringly, both first stage and 2SLS results are robust to using this alternative instrument (see Appendix C).

5.3 First Stage

Table 3 estimates the first stage relationship between actual black population and the instrument constructed in equation (2). Column 1 only includes year and city fixed effects, while columns 2 and 3 add, respectively, interactions between year dummies and region dummies, and the contemporaneous MSA population. In all cases, there is a positive and statistically significant relationship between black population and the instrument. The coefficient becomes smaller in magnitude when controlling for MSA population (column 3), but remains highly statistically significant. Although the F-stat for weak instruments (reported at the bottom of the table) is lower in column 3 relative to previous specifications, it is nonetheless close to the threshold value of 10.

Next, in columns 4 and 5, I add interactions between year dummies and the 1900 fraction of blacks and city coordinates. Reassuringly, both the precision and the magnitude of the coefficient is left unchanged. Even though the point estimate in column 5, which reports my most preferred specification, is smaller than that in Boustan (2010) for the Second Great Migration, it is very similar to that estimated in Shertzer and Walsh (2019) and in Fouka et al. (2018) for neighborhoods and MSAs respectively for the First Great Migration. It implies that every 10 new predicted black migrants are associated with 9 more black residents in the city. Figure 3 confirms visually the strong relationship between actual and predicted black population, by plotting the graphical analogue of column 5.

Appendix C verifies that results are unchanged when including additional interactions between year dummies and 1900 city characteristics, and when considering the "push factor" version of the instrument.

6 Results

This section studies the effects of the Great Migration on public spending and tax revenues in northern cities. Section 6.1 shows that black in-migration reduced both public spending and tax revenues per capita. Section 6.2 explores the mechanisms. It finds that cities did not change the allocation of spending across categories, and did not cut tax rates. Instead, the effect of black in-migration on city finances was entirely driven by a reduction in property values. Section 6.3 introduces an instrument for white outmigration induced by black inflows, and provides evidence that whites' residential response to black in-migration (white flight) likely imposed a negative fiscal externality, forcing cities to cut spending in order to meet a tighter budget constraint. Section 6.4 presents additional results consistent with this interpretation.

6.1 Main Findings

I begin my analysis by estimating the effect of black in-migration on public spending per capita, and report results in Panel A of Table 4. Column 1 estimates equation (1) with OLS, controlling for MSA population, and for city and region by year fixed effects. Black population is negatively correlated with public spending per capita, but the coefficient is not statistically significant, and relatively small in magnitude. Column 2 turns to 2SLS estimation: once black population is instrumented with the shift-share instrument constructed in equation (2), the coefficient on black population becomes larger in magnitude (in absolute value) and statistically significant. The difference between OLS and IV coefficients is consistent with black migrants endogenously selecting cities with more generous public spending, where city finances were probably sounder and economic conditions more appealing.

Columns 3 and 4 gradually add more controls, interacting year dummies with the 1900 black share and with city coordinates. In both cases, reassuringly, the coefficient remains statistically significant and quantitatively close to that reported in column 2. According to my most preferred specification, reported in column 4, 10,000 more blacks – less than one tenth of those received by cities like Detroit, Chicago, or New York during the Great Migration – reduced public spending per capita by almost 1.5 dollars. Considering that the 1910 sample mean for public spending per capita was 15.2 dollars, this effect is quantitatively large, and amounts to almost 10 percent relative to the baseline mean.

As noted above, during this period cities had to independently finance the public goods and services offered to their citizens. Hence, one would expect a similar, negative relationship between black in-migration and tax revenues. Panel B of Table 4 confirms this conjecture. Both OLS (column 1) and 2SLS (columns 2 to 4) estimates for the effects of black population are negative and statistically significant. As for public spending, also in this case the OLS point estimate is smaller (in absolute value) than the IV one, consistent with blacks moving to cities with sounder finances. The same pattern discussed for redistribution appears for tax revenues, and results are unchanged when including additional controls. The coefficient in column 4 of Panel B is slightly more negative than that reported in the corresponding column of Panel A, but the two are not statistically different from each other. Consistent with the fact that more than 90% of city tax revenues came from property taxes, Table A6 (Panel A) shows that the effects of black in-migration on property tax revenues were almost identical to those on total tax revenues.[20]

If the political process whereby cities decided on redistribution were sticky, it is possible that the reduction in public spending and tax revenues per capita documented in Table 4 was

[20] To ease comparison, Panel B of Table A6 reports the same results presented in Panel B of Table 4.

due, at least in part, to the mechanical effect of black in-migration on city population. However, in contrast with this possibility, Table A7 replicates Table 4 considering as dependent variable the log of total public spending (Panel A) and tax revenues (Panel B). Reassuringly, the pattern remains the same: black inflows had a negative, statistically significant, and economically relevant impact on both spending and city revenues. Furthermore, the implied magnitude of coefficients reported in Table A7 is close to that of coefficients presented in Table 4. Specifically, according to the 2SLS point estimates in column 4 of Table A7, 10,000 more blacks reduced public spending and tax revenues by around 15%.

6.2 Mechanisms

6.2.1 Racial Diversity and Spending Shares

What can explain the negative effect of the Great Migration on public goods provision in northern and western cities? One possible explanation, consistent with a large body of the literature (Easterly and Levine, 1997; Luttmer, 2001; Alesina and La Ferrara, 2002), is that increased racial heterogeneity reduced preferences for redistribution among the white majority. If this were to be the case, as discussed in Section 3 above, one should see larger cuts in categories where inter-racial interactions are more salient, such as education.[21] More generally, if black arrivals altered the desired level of redistribution, one should observe a change in the spending share of different categories of public goods (Alesina et al., 1999).

Figure 4 tests this prediction by estimating equation (1) with 2SLS, using the share of spending in different categories as the dependent variable.[22] In contrast with the previous conjecture, black population had no statistically significant effect on the spending share of any of the five categories considered in the figure – education, fire and police, sewerage and garbage collection, road maintenance, and charities and hospitals.[23] Moreover, except for charities and hospitals and for roads, the point estimates are always very close to zero. This finding is in contrast with Alesina et al. (1999) and most of the subsequent literature documenting that, today, racial diversity is negatively associated with the share of spending devoted to public education, but positively correlated with spending on police across US jurisdictions.

One potential explanation for the difference between my results and those from the more

[21] Indeed, a large literature in economics has shown that white parents are particularly sensitive to racial diversity in schools (Baum-Snow and Lutz, 2011; Cascio and Lewis, 2012), suggesting that cities may have allocated the budget away from education.

[22] Table A8 reports OLS and 2SLS coefficients corresponding to the IV estimates plotted in Figure 4.

[23] Spending shares are constructed by dividing each spending category by total expenditures. The shares do not sum to one, as an extra residual category (that included administrative and other expenditures) was also created.

recent period is that, in the past, cities may have had less room to change the allocation of the budget across categories. However, this seems unlikely: if anything, in the early twentieth century, cities had more – and not less – discretion in the allocation of the budget. Furthermore, mechanisms like spending limits did not exist at the time. An alternative possibility is that during the First Great Migration a different mechanism was at play. Perhaps, the reduction in public spending due to black in-migration was not caused by changes in white voters' preferences for redistribution, but rather by a negative fiscal externality that forced cities to cut public spending. Specifically, black in-migration might have reduced demand for housing among whites who, unwilling to live in more racially diverse neighborhoods, moved to the suburbs, or chose not to in-migrate to the central city. In turn, both white flight and reduced white in-migration may have lowered house prices, eroding cities' tax base.

6.2.2 Black Inflows, Tax Rates, and Property Values

To shed light on the mechanism described above, Table 5 studies the effects of the Great Migration on the property tax rate (column 1) and on property values (columns 2 to 4). Focusing on 2SLS results reported in Panel A, it immediately appears that black in-migration had no effect on the tax rate, but a negative and statistically significant impact on property values. Since it is not obvious how to define the tax base, columns 2 to 4 of Table 5 scale property values by, respectively, 1900, 1910, and contemporaneous population. In all cases, results point in the same direction: black in-migration had a large, negative effect on property values. As for public spending and tax revenues, the magnitude of these effects is quantitatively large. For instance, the coefficient in column 4 implies that 10,000 more blacks in the city reduced property values per capita by almost 10% relative to the 1910 mean.

A perhaps puzzling result in Table 5 is why, despite the reduction in property values, cities did not choose to increase the tax rate. At least three possibilities exist. First, municipal officials may have been concerned that raising the tax rate would have further depressed housing demand, in turn reinforcing the process of urban decline. Second and related, voters may have been particularly reluctant to accept higher taxes precisely because of the increase in racial heterogeneity caused by black in-migration. Third, cities may have decided to change the assessed valuation of properties rather than the tax rate. Using this strategy, politicians may have limited the decline in house prices by artificially inflating assessed valuations while keeping tax rates constant. Note that if this were to be the case, results in Table 5 would be under-estimating the negative impact of black in-migration on property values.

The estimates reported in Table 5 are remarkably similar to those in Boustan (2012), who finds that, during the 1970s, the rise in racial diversity following desegregation lowered urban house prices and rents by 6%. One important difference to keep in mind when comparing my results with Boustan (2010 and 2012) is that overall population growth in central cities was positive between 1910 and 1930, but negative between 1950 and 1970. Similarly, while after WWII several northern cities entered a period of financial distress (Sugrue, 2014), tax revenues were growing on average between 1910 and 1930 (see also Table A4). Hence, a more compelling interpretation of my results is that property values in northern cities would have been higher, had the Great Migration not occurred.

Overall, Table 5 documents that black in-migration reduced tax revenues by lowering house prices. One possible explanation for this pattern is that the Great Migration reduced housing demand among whites. The decline in housing demand might have come from two sources. First, existing residents of central cities might have moved to the suburbs, to leave racially diverse neighborhoods (Boustan, 2010; Shertzer and Walsh, 2019). Second, prospective migrants from other parts of the country may have decided not to in-migrate to the city precisely because of the increased racial diversity brought about by the Great Migration. In the next section, I investigate both channels.

6.3 Black Inflows and White Flight

6.3.1 Instrumenting Black-Induced White Flight

I begin by investigating the possibility that white flight, triggered by black inflows, partly contributed to the drop in house values and to the resulting deterioration in city finances. Specifically, I estimate a different version equation (1) where, in addition to black population, I also control for the number of whites in the central city:

$$Y_{crt} = \alpha_c + \delta_{rt} + \tilde{\beta}_1 B_{crt} + \tilde{\beta}_2 W_{crt} + X_{crt} + u_{crt} \quad (3)$$

where all variables are as before, and W_{crt} is the number of whites in the central city. My goal is to perform a simple exercise: if the impact of black arrivals on public spending and city finances were partly mediated by whites' residential decision, the coefficient on black inflows, $\tilde{\beta}_1$, should be smaller (in absolute value) than that estimated when not accounting for white flight, i.e. β_1 in equation (1).

The main empirical challenge faced when estimating equation (3) is that the number of whites in the central city is an endogenous variable, itself affected by black in-migration. Thus, to attach any meaningful interpretation to $\tilde{\beta}_1$, one would need an instrument for W_{crt}. I propose to overcome this problem in Appendix B, where I describe in detail the construction of an instrument for white flight. Here, instead, I only briefly summarize the main steps. The intuition behind my strategy is that whites were induced to leave the central city by black arrivals (Boustan, 2010), but their ability to do so depended on MSA or city characteristics, like availability of land. In places with less available land (e.g. due to water, mountains, etc.), moving out was more expensive, because of higher rents and house prices (Saiz, 2010), or higher commuting costs. For this reason, one would expect white flight to be lower in places surrounded by less friendly geography, other things being equal.

To capture this intuition, I interact predicted black inflows, Z_{crt} in equation (2) above, with the geographic characteristics (hills, ocean, lakes, and rivers) of the area surrounding central cities that arguably increased the costs faced by whites when moving to the suburbs and commuting back and forth from the suburbs to the city.[24] Then, I use this interaction as an instrument for the number of white residents in the central city. To reduce concerns that geography can have a direct effect on city-level outcomes, when constructing the instrument, I exclude the area corresponding to the central city. Also, note that any direct effect of geography on outcomes is absorbed by city fixed effects, and so the excluded instrument for W_{crt} in equation (3) is identified only out of the interaction between predicted black inflows and geography.

The main concern on the validity of the instrument just described is that geography may have direct, time-varying effects on house prices, or on blacks' settlement patterns.[25] To deal with this concern, as I show in Appendix C, results are unchanged when augmenting the vector of controls X_{crt} with a full set of interactions between year dummies and dummies indicating the presence of hills, oceans, or lakes above different thresholds. Table B1 estimates first stage regressions for a model where both the number of blacks and the number of whites in the central city are endogenous.[26] It shows that both instruments are strongly correlated with the corresponding endogenous regressors, and that all interactions between predicted black inflows and geography have the expected sign on white population (i.e. in cities surrounded by less friendly geography, white flight due to black inflows is predicted to be lower).

[24] Before the 1960s, most jobs remained concentrated in central cities, and so suburban residents had to commute to the inner city for work every day (Jackson, 1985).

[25] For example, by limiting land available for the construction of new buildings, hills and water bodies will mechanically increase house prices as cities receive more migrants. One may also be concerned that, over time, mountains and oceans become valuable amenities, in turn affecting the trend in house values of different cities differently.

[26] Table B2 test the robustness of results to the exclusion of cities with "extreme" geography.

6.3.2 Comparing Estimates: the Role of White Flight

Equipped with the instrument for W_{crt}, Table 6 estimates equation (3) with 2SLS, to test if the coefficient on black population becomes smaller (in absolute value) once whites' residential decision is controlled for. To ease comparisons, Panel A reports the baseline results obtained when estimating equation (1). I first consider public spending and tax revenues per capita (columns 1 and 2). In both cases, $\tilde{\beta}_1$ is negative and statistically significant. However, it is an order of magnitude smaller (in absolute value) than the baseline coefficient.

Next, in columns 3 and 4, I turn to the tax rate and to property values. While controlling for white population has no detectable effect on the size of the coefficient for the tax rate (column 3), a significant difference emerges for property values (column 4). Consistent with whites' residential decision being one of the channels behind the drop in property values caused by black arrivals, the coefficient reported in Panel B is almost 4 times smaller (in absolute value) than that reported in Panel A. This pattern, in line with the discussion in Boustan (2016), suggests that white flight was economically costly for cities. Lower demand for housing by whites had a negative effect on property values and, mechanically, reduced the tax base, imposing a negative fiscal externality on northern cities. To meet a tighter budget constraint and unable or unwilling to further raise the tax rate, cities were forced to cut public spending.

My estimates are also consistent with findings in Derenoncourt (2018), who documents that the Second Great Migration had a large and negative effect on intergenerational mobility of northern cities in the long run. She shows that in cities receiving more blacks between 1940 and 1970 prospects for intergenerational mobility are lower today, especially for black kids, probably because cities cut spending in response to black inflows. While the First and the Second Great Migration were different along several dimensions, my results suggest that at least part of the effects identified in Derenoncourt (2018) may be due to the negative fiscal externality induced by white departures (Boustan, 2010; Sugrue, 2014).

6.3.3 White Migrants from Other States

As discussed in Section 3, many of the cities in my sample were booming during this period. It is thus possible that at least part of the effect of black inflows on whites' residential decision was due to a reduction in white in-migration from other parts of the country, rather than from white departures from central cities. Testing the effects of the Great Migration on the possible decline in (white) in-migration is complicated by the fact that, prior to 1940, data on internal migration are not available. To overcome this issue, following Bandiera et al. (2019) and Tabellini (2019), I use the number of white household heads born in another state as a proxy for the number of internal (white) migrants – an admittedly imperfect measure, which fails to capture any within state migrant.

With this caveat in mind, Figure A5 plots the residual scatterplot for a reduced form regression of the number of white household heads born in another state against the predicted number of blacks, after partialling out city and year by region fixed effects, and all the other controls included in my baseline specification. There is a negative relationship between (predicted) black population and white migrants from other states, which is also economically relevant and statistically significant (at the one percent level). According to the reduced form estimates in Figure A5, ten more predicted black in-migrants are associated with 8 fewer white migrants from other states.[27] This suggests that a slowdown in whites' internal migration, triggered by black arrivals, accounts for at least part of the negative effects of the Great Migration on whites' residential decision, which in turn triggered the decline in property values estimated above.

6.4 Further, Suggestive Evidence on White Flight

In this section, I provide additional, suggestive evidence for the role played by white flight. First, following Boustan (2010), I split the sample between high and low growth cities, and interact the main effect of black population with a dummy equal to one if the 1910-1930 city population growth rate is above the median growth rate of the cities in my sample (0.48). I start by testing if the Great Migration had a significantly different effect on property values for high and low growth cities. Columns 1 and 2 of Table 7 present 2SLS results, and document that, consistent with the hypothesis advanced above, the fall in property values was significantly larger in cities with population growth below the median.

Second, in columns 3 to 6, I make use of historical data from local newspapers, and search for the frequency of specific terms that should be indicative of urban decay and losses in property values.[28] In column 3, I start by searching for neutral terms "black" and "blacks"; then, in columns 4 to 6, I consider, respectively, the terms "decay", "ghetto", and "segregation". To adjust for the fact that larger cities have larger newspapers circulation, the frequency of each term is scaled by the total number of articles appearing in a city in a decade.[29] Two main results stand out. First, black inflows increased significantly not only the frequency of neutral terms "blacks" and "black" (column 3), but also that of words "decay" (column 4), "ghetto" (column 5), and "segregation" (column 6), which might indicate (white)

[27]Unreported 2SLS estimates corresponding to the reduced form relationship presented in Figure A5 imply that for every ten new black residents, 9 fewer white household heads migrated from other states.

[28]The data were collected by D'Amico e Tabellini (2018) through the website newspapers.com, and are available for 31 of the 42 cities in my sample.

[29]To ease the interpretation of coefficients, these relative frequencies are multiplied by 100.

residents' perceptions of housing conditions in a city. Second, this effect was significantly lower in high-growth cities, where, as noted above, the negative fiscal externality operating through the housing market was less pronounced.

Third, in Table A9, I explore the effects of the Great Migration on different proxies for whites' demand for suburbanization. In column 1, I show that the growth in the number of dwellings (scaled by 1900 population) was lower in cities that received more blacks.[30] This pattern is consistent with Boustan (2010), who finds that the second Great Migration slowed down the construction of new housing units and increased the number of vacant dwellings in northern cities. Similarly, in column 2, I document that places receiving more blacks experienced a lower expansion of city-area. As explained in Jackson (1985), during this period, most cities expanded their boundaries by annexing neighboring towns and villages. If whites moved to the suburbs so as not to pay for and share public goods with blacks, they should have also tried to resist annexation by central cities. Findings in column 2 are indeed consistent with this idea.

Next, columns 3 and 4 focus on the number of highway rays constructed between 1950 and 2000 and passing through the central city (Baum-Snow, 2007), which I use as a proxy for (whites') demand for suburbanization.[31] In these regressions, the main regressor of interest is the 1910-1930 (instrumented) change in black population. Column 3 partials out the usual controls, while column 4 also includes the number of highway rays originally planned in the Federal Highway Act of 1944.[32] Interestingly, even after accounting for the number of rays centrally planned in 1944, black in-migration between 1910 and 1930 is positively associated with the construction of highways after 1950. While only suggestive, these results are consistent with the idea that black inflows increased demand for suburbanization, and lead to the construction of more highways in places where incentives to leave the central city were higher.

Finally, in columns 5 and 6, I regress the 1940-1970 change in the number of special districts and municipalities in the MSA (collected from the Census of Governments) against the 1910-1930 (instrumented) change in black population.[33] As discussed in Alesina et al. (2004), racial heterogeneity may increase whites' desire for political fragmentation and, in

[30] Data on the number of dwellings are missing for Milwaukee in 1930.

[31] Results are unchanged when focusing on the 1950-1975 change in highway rays.

[32] As in previous tables, these regressions also account for possible differential trends associated with the variables included in X_{crt} above, i.e., region dummies; 1900 fraction of blacks; latitude and longitude. Data on highways were taken from Baum-Snow (2007), and were not available for Bridgeport (CT).

[33] Data limitations prevent me from examining the contemporaneous effect of black migration on this outcome, since the number of local governments at the county level was first reported in the Census of Governments of 1942. To account for the fact that, by construction, larger MSAs will have more jurisdictions, I scale both the number of special districts and the number of municipalities by 1940 MSA population.

turn, the number of local governments (see also Burns, 1994). Consistent with this idea, there is a positive and significant relationship between the 1910-1930 inflow of African Americans and the subsequent change in the number of special districts and municipalities. These findings are also in line with Boustan (2016), who argues that many whites were leaving central cities not necessarily to avoid inter-racial interactions in the housing or in the labor market, but in order to avoid sharing public goods with African Americans.

7 Summary of Robustness Checks

Appendix C presents several robustness checks for results presented in the main paper. First, I address concerns that 1900 settlements of southern born blacks might be correlated with other city-specific characteristics that had a time varying effect on the evolution of public spending and local government finances. To do so, I check that: *i*) there is no correlation between black in-migration (after 1910) predicted by the instrument and the 1900-1910 change in either public spending or tax revenues (Table C1); *ii*) changes in different proxies for economic growth of manufacturing – the key sector absorbing blacks in the North during the Great Migration – between 1900 and 1910 are not correlated with post-1910 change in black in-migration predicted by the instrument (Table C2); *iii*) results are robust to interacting year dummies with several 1900 characteristics, including city and black population, skill ratios, the immigrant share, and different proxies for manufacturing activity (Figures C2 and C3).

Second, I deal with the concerns that pre-1910 patterns of immigration from Europe and the immigration quotas introduced in the 1920s may be spuriously correlated with black in-migration across cities predicted by the instrument. I first verify that the 1900-1910 change in immigration is uncorrelated with the post-1910 change in black inflows as predicted by the instrument (Table C2). Next, following Ager and Hansen (2018) and Fouka et al. (2018), I construct a measure of "quota exposure" for each city, by interacting region of origin specific immigration restrictions (introduced at the national level) with 1900 settlements of different immigrant groups across cities. Using this variable, I show that the instrument for black in-migration is orthogonal to the number of "missing" immigrants that a city would have received had the immigration restrictions not been introduced (Figure C1).

Third, I address the possibility that time-specific shocks in northern cities (mechanically related to local economic and public finance conditions) might have driven outmigration flows from the South in a way that is correlated with the initial spatial distribution of southern born blacks in the North. To tackle this issue, as in Boustan (2010), Derenoncourt (2018), and Fouka et al. (2018), I construct a version of the instrument that only exploits variation in push factors across southern counties to predict black emigration from the South. Using this instrument, I verify that both first and second stage results remain close to those from my baseline specification (Tables C3 to C5).

Finally, I document that results are not sensitive to the exclusion of potential outliers or of large cities (Figures C4 and C5). I also check that the instrument for white flight is unlikely to pick up direct, time-varying effects of geography on city finances (Table C6).

8 Conclusions

Between 1915 and 1930, more than 1.5 million African Americans moved from the rural South to the urban North of the United States, altering the racial composition of several northern cities for the first time in America history. I exploit this historical episode to study how the arrival of blacks, and the resulting increase in racial heterogeneity, affected public spending and government finances. I predict black inflows by interacting 1900 settlements of southern born African Americans across northern cities with differential rates of emigration from the South after 1910, using a version of the shift-share instrument (Boustan, 2010; Card, 2001).

Black in-migration had a strong, negative effect on public goods provision and on tax revenues in northern cities. I provide evidence that this was not due to cities' decision to cut tax rates, but was driven by steep declines in property values – the main source of revenues for cities at the time. These patterns suggest that the First Great Migration imposed a negative fiscal externality to northern cities, likely triggered by whites' residential response to black inflows. Unable or unwilling to raise tax rates, cities were forced to cut spending to meet a tighter budget constraint. Consistent with this interpretation, I document that black in-migration did not lead to any change in the allocation of spending across categories of public goods. This is contrary to what one would have expected, had white residents demanded less redistribution in categories where inter-racial interactions are typically more salient (e.g. education).

In the second part of the paper, I provide different pieces of suggestive evidence in support of the idea that whites' residential response to black inflows lowered property values and imposed a negative fiscal externality on northern cities that, in turn, were forced to cut public spending. First, I construct an instrument for white flight by interacting predicted black arrivals with MSA geography to capture the cost faced by whites when leaving central cities in response to black in-migration. Comparing results with my baseline estimates, I show that when accounting for white flight, the negative effects of black in-migration on public spending, tax revenues, and property values are an order of magnitude smaller (in absolute value). Second, I show that the reduction in house values (and tax revenues) was significantly larger in cities where population growth was lower. I also, document that in these cities black arrivals were systematically related to a higher frequency of terms referring to urban decay in local newspapers. Finally, I find that cities receiving more blacks during the First Great Migration were more likely to be connected to highways and to become more politically fragmented after 1940, suggesting that whites' desire for suburbanization increased in these areas.

Findings in this paper provide motivation for future work along several directions. First, I only focused on the contemporaneous effects of black in-migration, but a natural extension would be that of considering the medium to long run consequences of the Great Migration on both city finances and public goods provision, complementing recent work by Derenoncourt (2018) on the intergenerational mobility consequences of the Second Great Migration. Second, it may be interesting to compare the Great Migration with other episodes of (im)migration experienced by the United States, such as the Mass Migration of Europeans between 1870 and 1915 or the more recent Hispanic immigration. Finally, it would be particularly informative for the current situation in both Europe and the US to investigate if the Great Migration fueled natives' backlash and favored the election of "anti-black" mayors, and if changes in public spending documented in my work were correlated with the identity of elected politicians in northern cities.

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Table 1. Central Cities-Suburbs Inequality (2010)

	Central Cities	Suburbs	Central City to Suburban Outcome
Non-Hispanic Whites	56.9%	77.2%	0.74
Blacks	26.7%	11.6%	2.04
Hispanics	24.8%	16.3%	1.52
Poverty rate, families	22.1%	10.6%	2.08
Unemployed men (age 25-65)	10.8%	8.6%	1.26
High school graduates (men, age 25-65)	83.4%	90%	0.92
Median wage (employed men, age 25-65)	$33,300	$40,000	0.83

Note: Author's calculation from Census Bureau (2010).

Table 2. Summary Statistics

VARIABLES	*Mean*	*Median*	*St. Dev.*	*Min*	*Max*	*Obs.*
City population	537,344	237,395	974,513	39,578	6,930,446	126
White population	506,340	229,755	931,592	38,465	6,587,225	126
Black population	27,537	5,568	50,851	410	327,706	126
Predicted black population	9,670	2,350	19,613	0	141,200	126
Expenditures PC	17.88	15.35	7.929	6.640	43.64	126
Total tax revenues PC	19.81	16.51	9.582	7.091	53.98	126
Educ. spending PC	6.199	4.830	2.947	1.900	14.76	126
Tax rate per 1,000$ of assessed valuation	29.74	25.03	16.78	10.39	100.7	126
Property values PC	1,255	1,117	644.4	189.2	3,769	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration, as discussed in the main text. *Predicted blacks* in the fourth row of the table refers to predicted black immigration, i.e. the instrument for black population constructed in Section 5. All spending and revenues data are expressed in 1910 dollars. Nominal values for 1920 and 1930 are deflated using the CPI from the Minneapolis FED.

Table 3. First Stage

	Dep. Variable: *Black Population*				
	(1)	(2)	(3)	(4)	(5)
Predicted black population	1.883***	1.916***	0.806***	0.956***	0.902***
	(0.388)	(0.350)	(0.262)	(0.290)	(0.296)
Region by Year FEs		X	X	X	X
MSA population			X	X	X
1900 black share				X	X
Latitude and longitude					X
F-stat	23.69	30.30	9.590	10.94	9.347
Observations	126	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The table reports first stage results for regressions where the dependent variable is black population in the city, and the main regressor of interest is the instrument constructed in Section 5. Column 1 only includes city and year fixed effects. Columns 2 and 3 add, respectively, interactions between year dummies and region dummies, and contemporaneous MSA population. Columns 4 and 5 further augment the specification in column 3 by interacting year dummies with, respectively, the 1900 fraction of blacks and city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Black Inflows, Public Spending, and Tax Revenues

	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
Panel A. Public Spending per Capita (1910 mean: 15.21)				
Black population	-0.053	-0.112**	-0.108**	-0.131**
	(0.032)	(0.047)	(0.045)	(0.064)
Panel B. Tax Revenues per Capita (1910 mean:15.63)				
Black population	-0.098**	-0.113**	-0.121**	-0.154**
	(0.039)	(0.056)	(0.053)	(0.076)
F-stat		9.590	10.94	9.347
1900 black share			X	X
Coordinates				X
Observations	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The dependent variable is public spending per capita (resp. tax revenues per capita) in Panel A (resp. Panel B). OLS (resp. 2SLS) estimates for the effects of 1,000 more blacks in the central city are reported in column 1 (resp. columns 2 to 4). Regressions in columns 1 and 2 control for MSA population and for city and year by region fixed effects. Columns 3 and 4 further include interactions between year dummies and, respectively, the 1900 black share and city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Tax Rate vs Property Values

	Property tax rate	Property values		
		Over 1900 population	Over 1910 population	Per capita
	(1)	(2)	(3)	(4)
Panel A. 2SLS				
Black population	0.030	-60.36***	-23.45**	-8.864*
	(0.094)	(18.57)	(9.594)	(4.621)
F-stat	9.347	9.347	9.347	9.347
Panel B. OLS				
Black population	0.046	-18.95	-4.953	-2.021
	(0.069)	(12.22)	(4.557)	(3.537)
1910 dep. variable	23.12	1,308	860.1	860.1
Observations	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The dependent variable is the property tax rate per 1,000 USD of assessed valuation in column 1, and property values in 1,000 USD divided by 1900, 1910, and contemporaneous population in columns 2, 3, and 4 respectively. Panel A (resp. Panel B) presents 2SLS (resp. OLS) results. The coefficient should be interpreted as the effects of 1,000 more blacks in the central city. All regression control for MSA population, for city and year by region fixed effects, and for interactions between year dummies and i) the 1900 black share; and ii) city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Controlling for White Flight

VARIABLES	(1) Public spending per capita	(2) Tax revenues per capita	(3) Property tax rate	(4) Property values over 1900 population
Panel A. Baseline Specification				
Black population	-0.131**	-0.154**	0.030	-60.36***
	(0.064)	(0.076)	(0.094)	(18.57)
KP F-stat	9.347	9.347	9.347	9.347
Panel B. Controlling for White Flight				
Black population	-0.044*	-0.109***	0.066	-18.73**
	(0.026)	(0.038)	(0.076)	(9.391)
AP F-stat black population	263.9	263.9	263.9	263.9
AP F-stat white population	806.8	806.8	806.8	806.8
KP F-stat	8.809	8.809	8.809	8.809
Observations	126	126	126	126

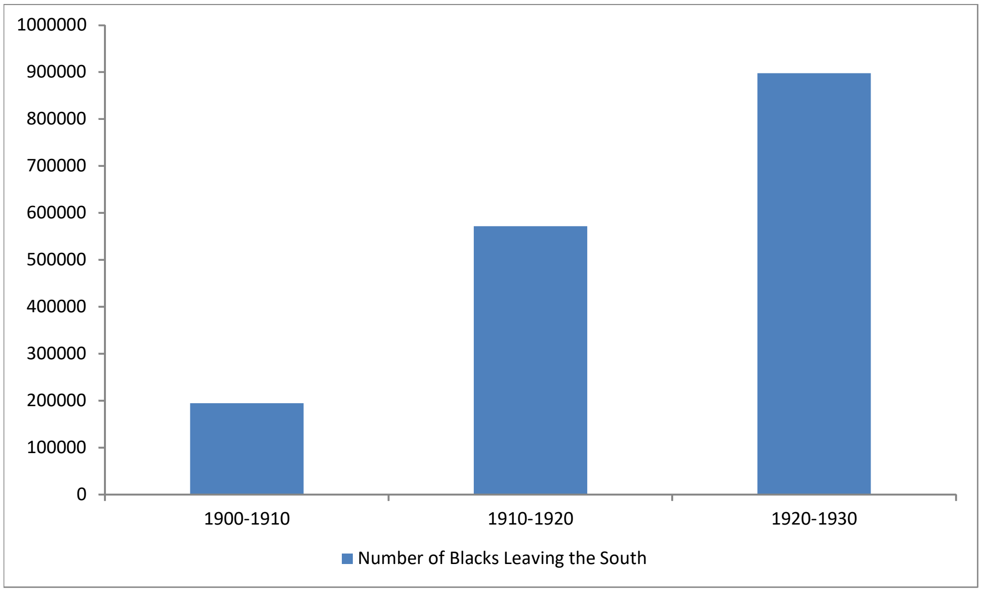
Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. Panels A and B report 2SLS estimates for, respectively, the baseline specification (equation (1)) that does not control for white population, and for the alternative specification (equation (3)) that separately includes the number of whites in the central city. The dependent variable is displayed at the top of each column. The coefficient should be interpreted as the effect of 1,000 more blacks in the central city, and is instrumented with predicted black in-migration. P-value on t-test (reported at the bottom of the table) refers to the t-test for the equality of coefficients in Panel A and Panel B. KP F-stat is the Kleibergen-Paap F stat for weak instruments, whereas AP F-stat refers to the partial F-stat for joint significance of the instruments in the two separate first-stage regressions. All regressions also control for MSA population, city and year by region fixed effects, and include interactions between year dummies and dummies for: i) 1900 fraction of blacks; and ii) city coordinates. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 7. High vs Low Population Growth Cities

	Housing Market		Relative Frequency of Each Term over Word "And" in Local Newspapers			
	(1)	(2)	(3)	(4)	(5)	(6)
	Prop. values over 1900 pop	Prop. values over 1910 pop	Black	Decay	Ghetto	Segregation
Black population	-57.30***	-22.41***	2.728**	0.077**	0.009**	0.014*
	(14.87)	(8.170)	(1.289)	(0.035)	(0.004)	(0.007)
Blacks*(High growth)	16.33***	5.588***	-1.893**	-0.054**	-0.013***	-0.009**
	(3.504)	(1.762)	(0.765)	(0.022)	(0.002)	(0.005)
KP F-stat	7.823	7.823	24.50	24.50	24.50	24.50
AP(Blacks)	7.260	7.260	17.85	17.85	17.85	17.85
AP(Interaction)	18.41	18.41	15.78	15.78	15.78	15.78
Mean dep var	1,308	860.1	82.25	3.389	0.375	0.420
Observations	126	126	88	88	88	88

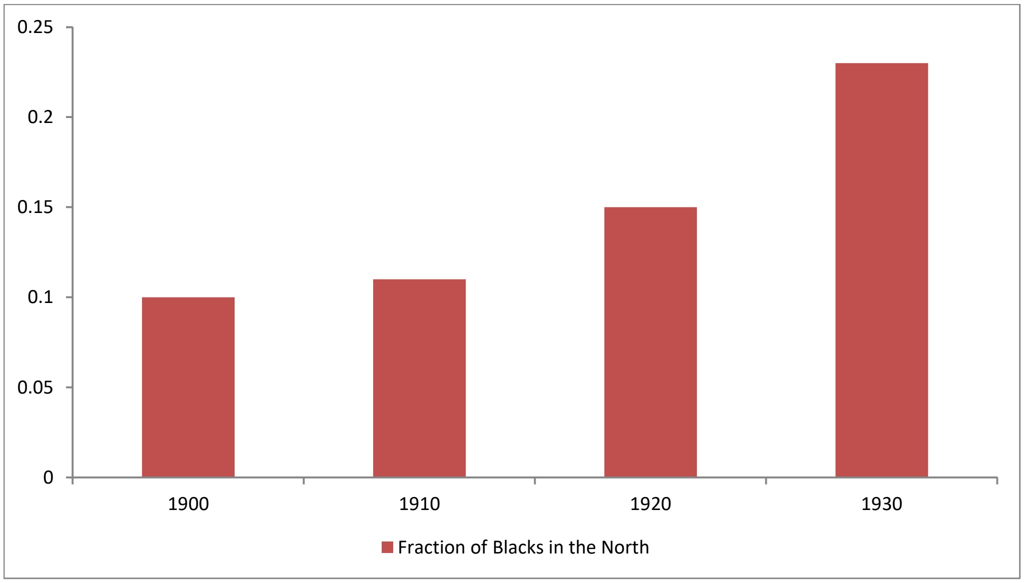
Notes: the sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The table reports 2SLS results where black population is instrumented with the shift-share instrumented constructed in Section 5. The interaction between black population and the high growth dummy is instrumented with the interaction between the instrument and the high growth dummy. In columns 3 to 6, the dependent variables is the frequency of the term at the top of each column relative to the number of times the word "And" appeared in local newspapers of a given city during the decade (data downloaded from Newspapers.com; see D'Amico and Tabellini, 2018, for more details). This variable is multiplied by 100 to ease the interpretation of coefficients. AP (Blacks) and AP (Interaction) refer to the partial F-stats for joint significance of the instruments in the two separate first-stage regressions. KP F-stat is the Kleibergen-Paap F stat for weak instruments. All columns report the mean of the dependent variable at baseline. All regressions control for MSA population, city and year by region fixed effects, and include interactions between year dummies and dummies for: i) 1900 fraction of blacks; and ii) latitude and longitude. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Figure 1. Number of Black Migrants, by Decade



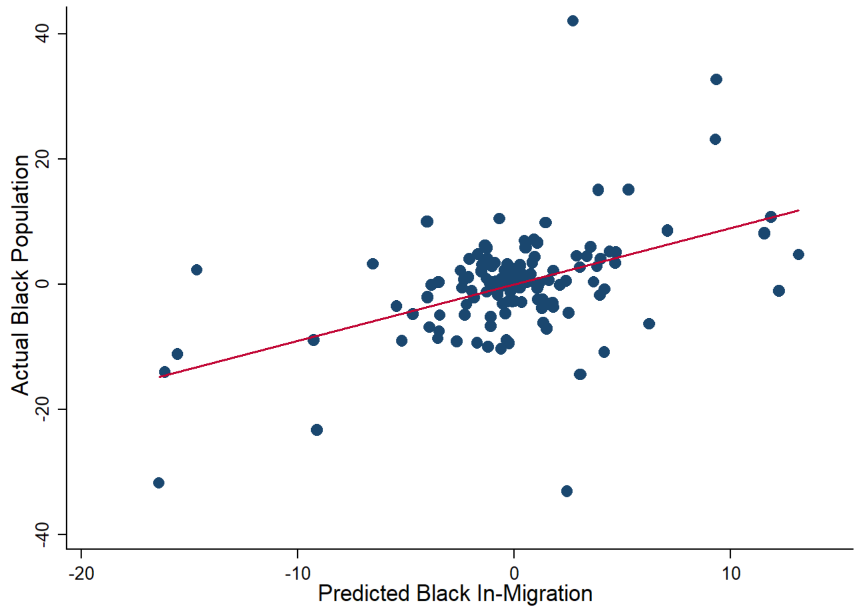
Note: Author's calculations using Census of Population data from IPUMS 1% samples for years 1900 to 1930. The number of net migrants from US Southern states is estimated using the forward survival method as in Gregory (2005). First, mortality rates are estimated by age-sex-race groups using national data from US Census of Population (1900-1930). Then, net migration for each Southern state is computed by adjusting changes in population (for each age-sex-race group) for estimated mortality rates. Finally, net migration for each southern state is aggregated for the South as a whole.

Figure 2. Fraction of African Americans Living in the North, by Decade



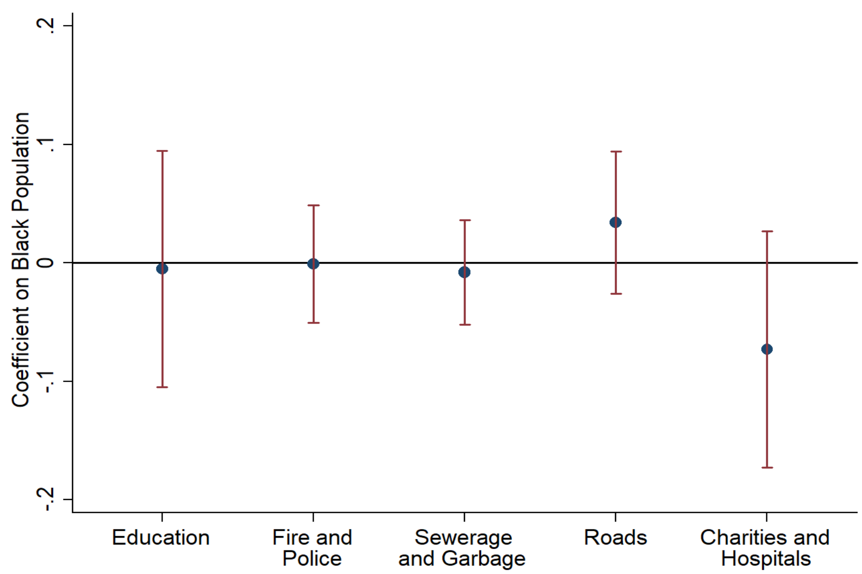
Note: The Figure plots the fraction of African Americans living in the North of the United States by decade. Author's calculations from US Census of Population (1900-1930).

Figure 3. First Stage: Actual vs Predicted Black Population



Note: the figure plots the graphical analogue of column 5 in Table 3. The y-axis reports the actual number of blacks in northern cities in each decade between 1910 and 1930, and the x-axis shows the predicted number of black migrants, constructed as described in the text (Section 5.2). Each point in the diagram represents the residual change in a city's actual and predicted number of blacks after partialling out MSA population and interactions between year dummies and: i) region dummies; ii) the 1900 fraction of blacks; and iii) city coordinates.

Figure 4. Black Population and Spending Shares (2SLS)



Note: the figure reports 2SLS coefficients (with corresponding 95% confidence intervals) for the effects of black population on the spending share in each of the categories labelled on the x-axis. All regressions control for contemporaneous MSA population and for city and year by region fixed effects, and include interactions between year dummies and: i) the 1900 black share; ii) city coordinates. Table A8 presents both OLS and 2SLS results associated with coefficients plotted in this figure.

Appendix A. Supplementary Tables and Figures

Table A1. List of Southern States

Alabama	North Carolina
Arkansas	Oklahoma
Florida	South Carolina
Georgia	Tennessee
Kentucky	Texas
Louisiana	Virginia
Mississippi	West Virginia

Note: The table reports the southern states used to construct the instrument for black population. As in Boustan (2010), I exclude Maryland, since Baltimore received large inflows of blacks during this period. For the same reason, I do not include the state of Delaware, since the city of Wilmington – its main central city – received a net inflow of African Americans during the first wave of the Great Migration.

Table A2. List of Cities

Albany, NY	Evansville, IN	Providence, RI
Baltimore, MD	Hartford, CT	Rochester, NY
Boston, MA	Indianapolis, IN	St. Louis, MO
Bridgeport, CT	Kansas City, MO	Salt Lake City, UT
Buffalo, NY	Los Angeles, CA	San Diego, CA
Chicago, IL	Milwaukee, WI	San Francisco, CA
Cincinnati, OH	Minneapolis, MN	Scranton, PA
Cleveland, OH	New Haven, CT	Seattle, WA
Columbus, OH	New York, NY	Springfield, MA
Dayton, OH	Omaha, NE	Tacoma, WA
Denver, CO	Peoria, IL	Trenton, NJ
Des Moines, IA	Philadelphia, PA	Washington, DC
Detroit, MI	Pittsburgh, PA	Wichita, KS
Duluth, MN	Portland, OR	Youngstown, OH

Note: The sample includes the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration, as discussed in the main text.

Table A3. City Demographic Characteristics, by Decade

	Mean	Median	St. Deviation	Min	Max
Panel A. 1910					
Total population	427,125	215,700	792,830	39,500	4,766,800
White population	409,853	209,425	775,263	38,465	4,669,172
Black population	15,335	3,245	26,340	410	94,446
Immigrants	130,152	38,345	317,876	2,931	1,954,381
Panel B. 1920					
Total population	534,526	257,300	941,446	72,200	5,620,000
White population	507,556	250,952	909,512	68,623	5,459,463
Black population	24,861	5,583	39,768	495	152,467
Immigrants	138,972	42,067	332,963	3,107	2,049,446
Panel C. 1930					
Total population	651,896	296,150	1,163,806	101,400	6,930,400
White population	601,612	284,577	1,094,918	95,714	6,587,225
Black population	42,415	7,779	72,262	416	327,706
Immigrants	151,924	38,048	388,399	2,134	2,408,069

Note: the Table reports summary statistics for the population of the 42 cities in my sample, separately for each of the three decades. Source: author's calculations from IPUMS data (Ruggles et al., 2015).

Table A4. City Finances, by Decade

	Mean	Median	St. Deviation	Min	Max
Panel A. 1910					
Tax Revenues PC	15.63	15.02	5.142	7.416	34.70
Property Taxes PC	15.15	14.55	4.727	7.232	31.30
Tax Rate	23.12	19.97	11.92	10.70	66.23
Spending PC	15.21	14.82	4.243	8.101	27.00
Panel B. 1920					
Tax Revenues PC	13.79	13.81	4.206	7.091	26.86
Property Taxes PC	12.48	12.25	3.553	6.215	20.21
Tax Rate	30.41	23.89	19.15	10.39	100.7
Spending PC	12.01	12.24	2.963	6.640	19.82
Panel C. 1930					
Tax Revenues PC	30.01	28.81	8.615	15.94	53.98
Property Taxes PC	27.81	28.30	7.148	15.07	44.70
Tax Rate	35.83	31.67	16.38	13.43	86.49
Spending PC	26.41	25.67	6.927	14.75	43.64

Note: the Table reports summary statistics for the key public finance variables of the 42 cities in my sample, separately for each of the three decades. Source: author's calculations from the Financial Statistics of Cities.

Table A5. City Finances, by City Size and by Decade

	Bottom 25th pctile	25th-50th pctile	50th-75th pctile	Top 75th pctile
Panel A. 1910				
Tax Revenues PC	12.96	13.71	16.29	19.76
Property Taxes PC	12.63	13.20	15.99	18.96
Tax Rate	25.48	23.84	20.65	22.53
Spending PC	12.52	12.98	16.89	18.57
Panel B. 1920				
Tax Revenues PC	11.86	11.47	15.38	16.52
Property Taxes PC	10.89	10.39	14.00	14.67
Tax Rate	39.51	27.14	28.19	26.12
Spending PC	10.24	10.33	13.72	13.75
Panel C. 1930				
Tax Revenues PC	23.39	27.84	33.77	35.32
Property Taxes PC	22.59	25.49	30.90	32.50
Tax Rate	46.22	27.91	36.59	30.85
Spending PC	20.59	23.98	29.98	31.30

Note: the Table reports summary statistics for the key public finance variables of the 42 cities in my sample, separately for each of the three decades, and by population quartile. Source: author's calculations from the Financial Statistics of Cities.

Table A6. Black In-Migration and Property Tax Revenues per Capita

	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
Panel A. Property Tax Revenues per Capita (1910 mean: 15.16)				
Black population	-0.077*	-0.117**	-0.129***	-0.169**
	(0.038)	(0.052)	(0.049)	(0.068)
Panel B. Tax Revenues per Capita (1910 mean:15.63)				
Black population	-0.098**	-0.113**	-0.121**	-0.154**
	(0.039)	(0.056)	(0.053)	(0.076)
F-stat		9.590	10.94	9.347
1900 black share			X	X
Coordinates				X
Observations	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The dependent variable is property tax revenues per capita (resp. tax revenues per capita) in Panel A (resp. Panel B). OLS (resp. 2SLS) estimates for the effects of 1,000 more blacks in the central city are reported in column 1 (resp. columns 2 to 4). Regressions in columns 1 and 2 control for MSA population and for city and year by region fixed effects. Columns 3 and 4 further include interactions between year dummies and, respectively, the 1900 black share and city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A7. Log Spending and Revenues

	(1) OLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
Panel A. Log(Public Spending)				
Black population	-0.005**	-0.016***	-0.016***	-0.016**
	(0.003)	(0.005)	(0.004)	(0.007)
Panel B. Log(Tax Revenues)				
Black population	-0.007**	-0.015***	-0.016***	-0.017***
	(0.003)	(0.005)	(0.004)	(0.006)
F-stat		9.590	10.94	9.347
1900 black share			X	X
Coordinates				X
Observations	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The dependent variable is the log of public spending (resp. tax revenues) in Panel A (resp. Panel B). OLS (resp. 2SLS) estimates for the effects of 1,000 more blacks in the central city are reported in column 1 (resp. columns 2 to 4). Regressions in columns 1 and 2 control for MSA population and for city and year by region fixed effects. Columns 3 and 4 further include interactions between year dummies and, respectively, the 1900 black share and city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A8. Black In-Migration and Spending Shares

Spending category:	Education (1)	Fire and police (2)	Sewerage and garbage collection (3)	Roads (4)	Charities and hospitals (5)
Panel A. 2SLS					
Black population	-0.005	-0.001	-0.008	0.034	-0.073
	(0.050)	(0.025)	(0.022)	(0.030)	(0.050)
F-stat	9.347	9.347	9.347	9.347	11.99
Panel B. OLS					
Black population	-0.009	0.022*	0.000	0.011	-0.033***
	(0.016)	(0.012)	(0.008)	(0.019)	(0.012)
1910 dep. variable	31.87	24.09	6.919	12.29	4.795
Observations	126	126	126	126	121

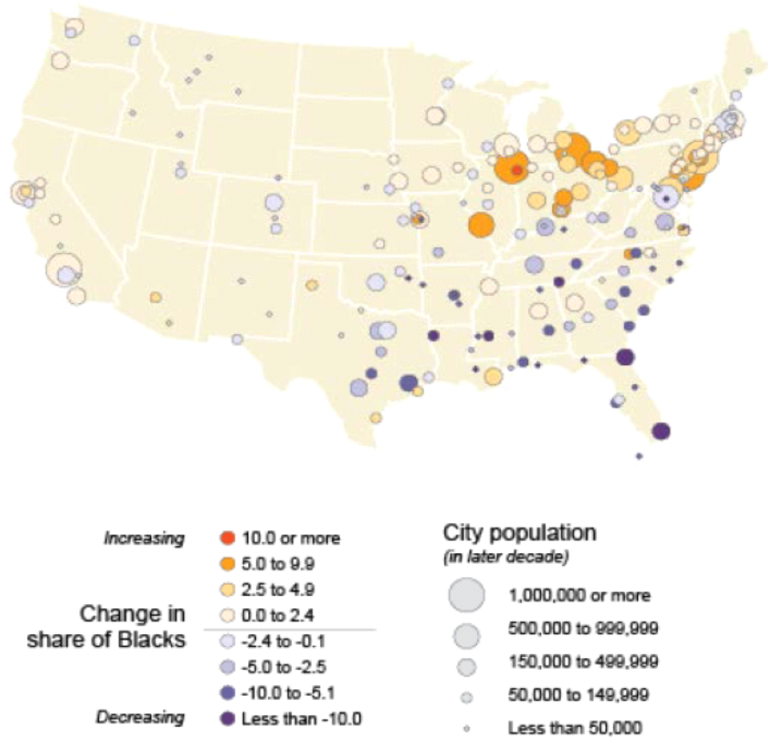
Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The dependent variable is the spending share in each of the categories reported at the top of the table. Panel A (resp. Panel B) presents 2SLS (resp. OLS) results. The coefficient should be interpreted as the effects of 1,000 more blacks in the central city. Data on spending on charities and hospital are missing for San Diego (CA) in 1910, for Scranton (PA) in 1920 and 1930, and for Peoria (IL) in 1930. All regression control for MSA population, for city and year by region fixed effects, and for interactions between year dummies and i) the 1900 black share; and ii) city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table A9. Additional Evidence on Whites' Demand for Suburbanization

	City growth		Change in constructed rays		Change in local jurisdictions	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable:	Housing units	City area	Highway rays (1950-2000)	Highway rays (1950-2000)	Special districts (1940-1970)	Municipalities (1970-1940)
Panel A. 2SLS						
Black population	-13.26***	-5.102***	0.056**	0.049*	1.712**	0.441*
	(3.435)	(1.347)	(0.026)	(0.026)	(0.788)	(0.240)
F-stat	11.54	10.93	4.696	4.291	4.677	4.677
Panel B. OLS						
Black population	-4.314	-1.833*	0.025***	0.017**	0.921**	0.062
	(2.765)	(0.951)	(0.009)	(0.008)	(0.363)	(0.048)
Mean dep var	268.5	122.9	0.146	0.146	33.72	41.52
Observations	125	125	41	41	42	42

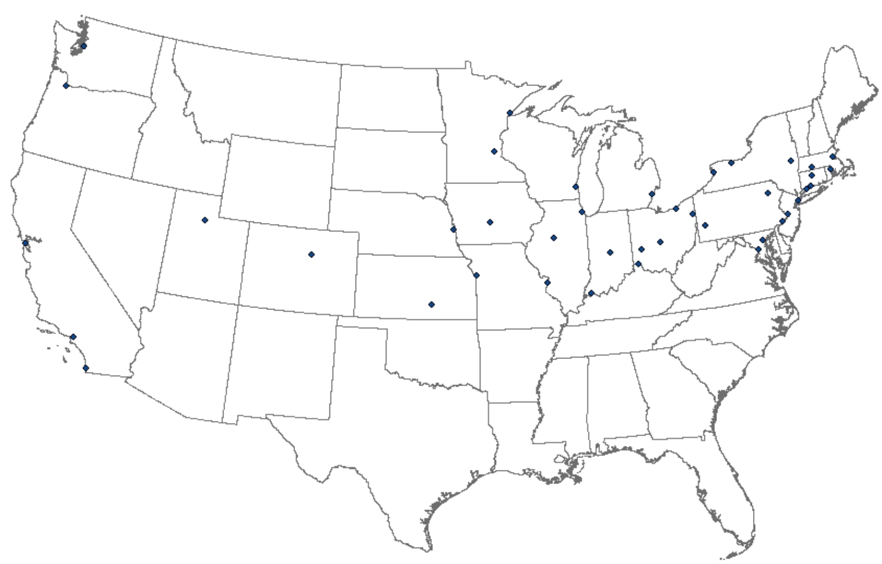
Notes: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The dependent variable is: the number of housing units per 1,000 residents in 1900 (column 1); city area in square kilometers (column 2); the change in highway rays constructed between 1950 and 2000 and passing through the city (columns 3 and 4); the change in the number of special districts and municipalities per 100,000 residents in 1940 (columns 5 and 6). Panels A and B report, respectively, 2SLS and OLS results. Columns 1 and 2 estimate the baseline equation (1) controlling for contemporaneous MSA population, city and region by year fixed effects, and interactions between year dummies and the 1900 black share and city coordinates. Columns 3 to 6 estimate long difference regressions where the main regressor of interest is the 1910-1930 change in black population in the central city. These regressions also control for the 1910-1930 change in MSA population, for region dummies, for the 1900 black share, and for city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Figure A1. The First Wave of the Great Migration



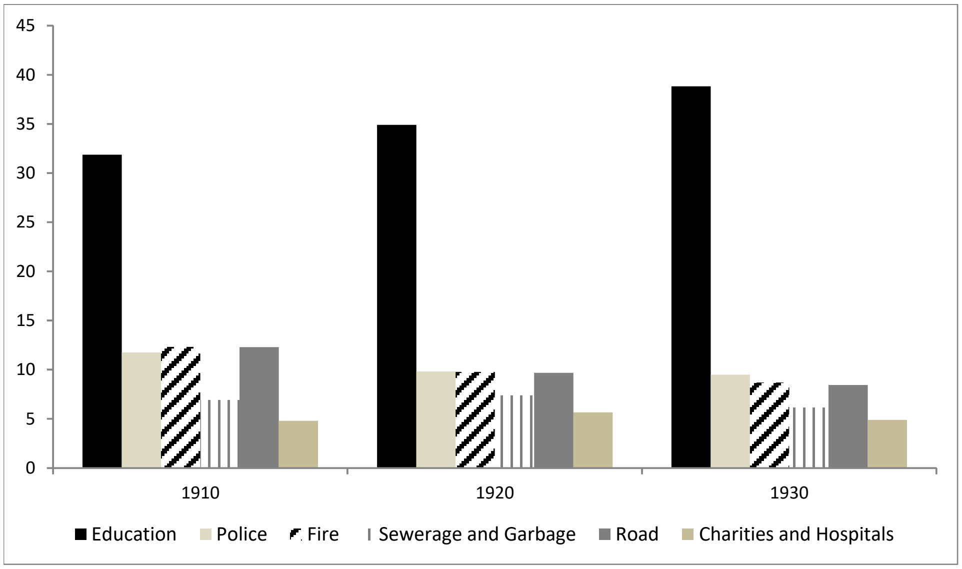
Note: The change of the share of Blacks in cities is based on the percentage point difference in the percent of the population that was black in 1940, relative to 1910. The Figure comes from the US Census Bureau.

Figure A2. Map of Cities



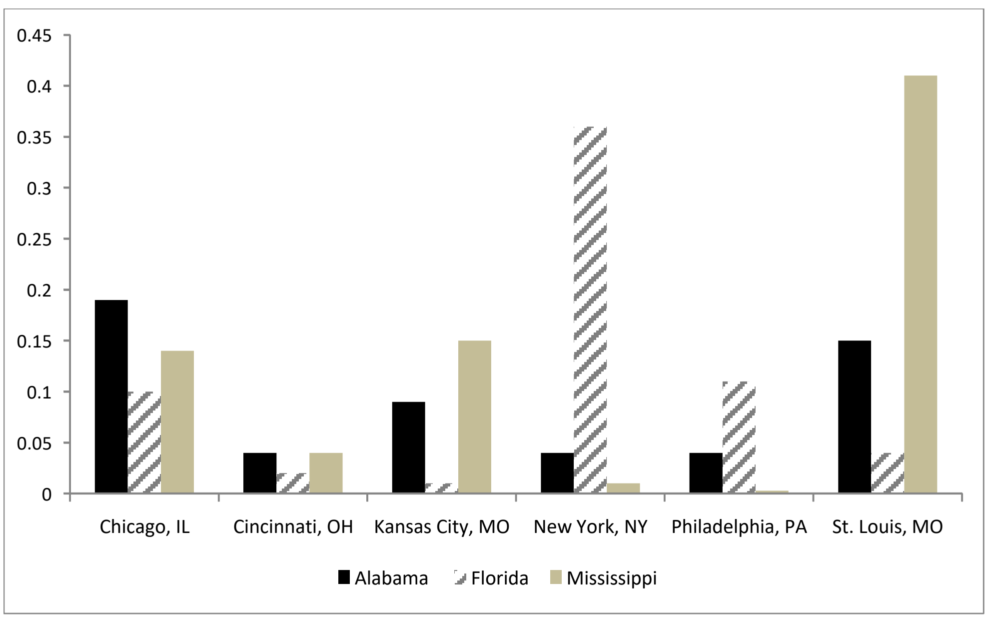
Note: the map plots the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration.

Figure A3. Share of Spending Across Categories



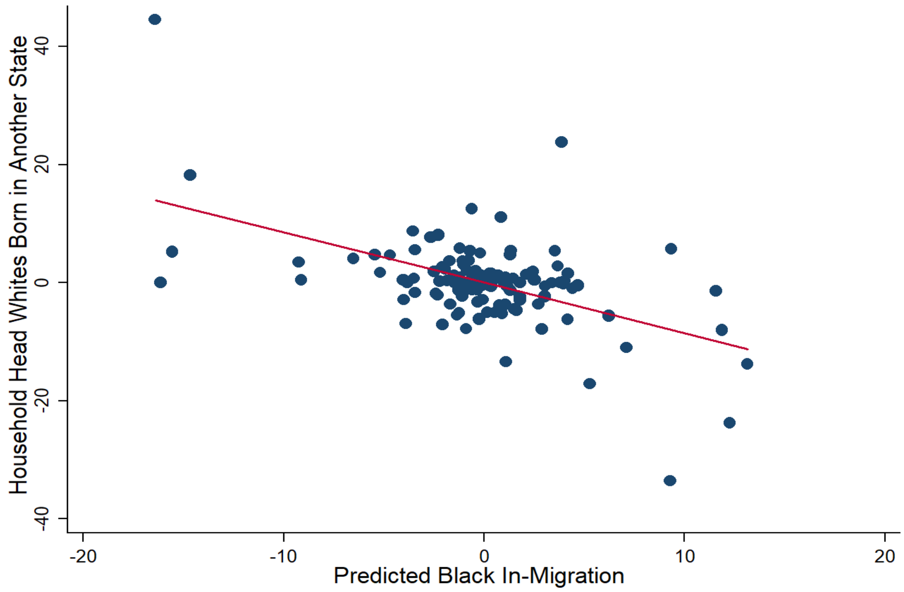
Note: this Figure plots the share of each spending category over total public expenses for the 42 cities in my sample, for 1910, 1920, and 1930. Source: Author's calculation from the Financial Statistics of Cities.

Figure A4. Share of Blacks from Southern States in Northern Cities, 1900



Note: The Figure shows the fraction of southern born blacks from a given state residing in the North living in one of the selected northern cities in 1900. Author's calculation from the 1900 US Census of Population (Ruggles et al., 2015).

Figure A5. Predicted Black Inflows and Whites' Internal Migration



Notes: the x-axis reports the predicted number of blacks in northern cities in each decade between 1910 and 1930, and the y-axis shows the number of native white household heads who were born in another state. Each point in the bin-scatter diagram represents the residual change of these variables after partialling out total MSA population, year by region fixed effects, and interactions between year dummies and: the fraction of blacks in 1900; and, latitude and longitude. The relationship displayed in the figure is statistically significant at the 1% level, and the regression coefficient is -0.852 with standard errors (clustered at the MSA level) equal to 0.327.

Appendix B. Instrument for White Flight

B1. Constructing the Instrument

To estimate equation (3) in the main text, it is not enough to have an instrument for black in-migration, since whites often reacted to the inflow of African Americans by leaving central cities and relocating to the suburbs (Boustan, 2010; Shertzer and Walsh, 2019). To account for white flight, I construct a second instrument by interacting predicted black inflows, Z_{crt}, with geographic characteristics of the area surrounding central cities that arguably increased the costs faced by whites when moving to the suburbs and commuting back and forth from the suburbs to the city.[34]

The intuition behind my strategy is that whites were induced to leave the central city by black arrivals (Boustan, 2010), but their ability to do so depended on MSA or city characteristics, like availability of land. In places with less available land (e.g. due to water, mountains, etc.), moving out was more expensive, because of higher rents and house prices

[34] Before the 1960s, most jobs remained concentrated in central cities, and so suburban residents had to commute to the inner city for work every day (Jackson, 1985).

(Saiz, 2010), or higher commuting costs. For this reason, one would expect white flight to be lower in places surrounded by less friendly geography, other things being equal.

Specifically, I consider the fraction of the area around central cities: *i*) with slope above 15% (to proxy for hills, as in Saiz, 2010); *ii*) occupied by lakes and oceans; and *iii*) occupied by rivers and streams. Data used to compute these measures were taken from USGS and from Saiz (2010).[35] Following Saiz (2010), each variable was constructed using the area of a circle drawn around the central city with a 50 km radius. As a robustness check, I experimented with radii of different size, and results always remained similar.

To reduce concerns that geography can have a direct effect on city-level outcomes, when constructing geographic variables in *i* to *iii*, I exclude the area corresponding to the central city. This should also increase the confidence that I only exploit variation in the cost of suburbanization induced by suburban (rather than urban) geography.[36] Formally, collecting the aforementioned geographic features in a vector, R_{cr}, the instrument for white population in equation (3) in the main text is given by the interaction $(Z_{crt} \times R_{cr})$, and the two first stage equations, for B_{crt} and W_{crt}, are

$$B_{crt} = \alpha_c + \delta_{rt} + X_{crt} + \gamma_1^b Z_{crt} + \gamma_2^b (Z_{crt} \times R_{cr}) + u_{crt}^b \tag{4}$$

$$W_{crt} = \alpha_c + \delta_{rt} + X_{crt} + \gamma_1^w Z_{crt} + \gamma_2^w (Z_{crt} \times R_{cr}) + u_{crt}^w \tag{5}$$

B2. Validity of the Instrument

The main concern on the validity of the instrument just described is that geography may have direct effects on house prices, or on blacks' settlement patterns. For instance, in more hilly MSAs, house prices are likely to be higher (Saiz, 2010). This, in turn, may affect both the location decision of black migrants and government finances. As shown in (5), however, white flight is identified only out of the interaction term between (predicted) black in-migration and geography. Hence, any direct effect of geography on either second stage outcomes or settlement patterns is controlled for by the inclusion of fixed effects, as long as this is constant over time.

One possible remaining concern is that geography may have a time varying, city-specific, effect on outcomes. In particular, by limiting land available for the construction of new buildings, hills and water bodies will mechanically increase house prices as cities receive more

[35] For elevation, I used Digital Elevation Model (DEM) at 90-square meter cell grids (available at http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1). Data on rivers and streams were collected from http://water.usgs.gov/GIS/dsdl/ds240/, while Albert Saiz kindly shared with me data on oceans and lakes.

[36] Results are equivalent when using 1910 or 1930 city area.

migrants. This is because, with immigration, cities surrounded by geographic obstacles tend to become more densely populated, thereby increasing house prices. Another possible story is that, over time, mountains and oceans become valuable amenities, in turn affecting the trend in house values of different cities differently. To deal with these and similar concerns, in Appendix C, I document that results are unchanged when including in the vector of controls X_{crt} a full set of interactions between year dummies and dummies indicating the presence of hills, oceans, or lakes above different thresholds.[37]

B3. First Stage

Table B1 presents first stage results obtained when jointly estimating equations (4) and (5) above. Columns 1 to 4 (resp. 5 to 8) consider the black (resp. white) population in the central city. Both are regressed against predicted black migration, Z_{crt}, and its interaction with geography, $Z_{crt} \times R_{cr}$. Columns 1 and 5 only control for city and year fixed effects, while columns 2 and 6 also include interactions between year dummies and region dummies. Two results stand out. First, as in Table 3 in the main text, black population is positively correlated with the instrument, and this relationship becomes more precise when region by year fixed effects are included. Second, predicted black in-migration is negatively related to white population, even though this relationship is not statistically significant; moreover, the interaction between MSA geography and Z_{crt} is positively and (except for rivers) significantly correlated with white population in the central city. Reassuringly, columns 3-4 and 7-8 document that first stage results are unchanged when adding interactions between year dummies and the 1900 black share and city coordinates.

Notably, even if the KP F-stat for weak instrument is fairly low in columns 1-5, it increases above 10 in column 2-6, and remains close to this value also in columns 3-7 and 4-8. More importantly, the partial AP F-stats for the joint significance of instruments in each first stage are above conventional levels. Also, the sign of coefficients for white population is consistent with the idea that black in-migration had a smaller effect on white flight in cities where, other things being equal, MSA geography was less friendly. Furthermore, even though in some cases the interaction between Z_{crt} and geography is statistically significant also in the regression for black population, the pattern is not very stable, and coefficients are an order of magnitude smaller than for white population. This suggests that each instrument loads

[37] In my baseline specification, I define the threshold at 5%, but I experimented with higher or lower values to check the robustness of my results, which always remained very similar. The distribution of these geographic characteristics is highly skewed. For instance, 22 of the 42 cities in my sample are not surrounded by hills or oceans (implying that the median is 0), but the 75th percentile of the distribution of e.g. the lakes and oceans share of suburban area is as high as 20%. There are 15 (resp. 19) cities where the share of the suburban area with slope above 15% (resp. occupied by lakes or oceans) is higher than five percent.

onto the "correct" endogenous regressor.

Table B2 replicates the specification reported in columns 4 and 8 of Table B1 by dropping cities with each of the three geographic variables (oceans and lakes; hills; rivers) above the 95^{th} percentile. This is done to check that results reported in Table B1 are not driven by cities with extreme values of geography. Reassuringly, coefficients and the various F-statistics for the significance of instruments remain similar to those in the baseline specification.

Overall, this section documented that both the instrument for black population and that for white flight – obtained by interacting predicted black inflows with geography – are strongly correlated with the corresponding endogenous regressors, and this relationship appears to be robust to different specifications.

Table B1. First Stage for Multiple Endogenous Regressors

	Black population				White Population			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Z	1.416**	1.552***	1.683***	1.752**	-1.829	-1.875	-0.782	-0.810
	(0.602)	(0.556)	(0.571)	(0.671)	(1.645)	(1.796)	(1.655)	(2.052)
Z_water	0.051***	0.047***	0.039**	0.037*	0.504***	0.471***	0.411***	0.408***
	(0.012)	(0.012)	(0.016)	(0.019)	(0.028)	(0.034)	(0.076)	(0.080)
Z_hills	-0.054*	-0.037	-0.034	-0.040	0.402***	0.483***	0.513***	0.469**
	(0.028)	(0.031)	(0.032)	(0.041)	(0.129)	(0.141)	(0.158)	(0.183)
Z_rivers	-0.259**	-0.340***	-0.285*	-0.272*	0.001	0.501	0.873	0.991
	(0.103)	(0.115)	(0.142)	(0.136)	(0.394)	(0.671)	(1.006)	(0.990)
KP F-stat	5.802	13.39	9.114	8.809	5.802	13.39	9.114	8.809
AP F-stat	370.1	189.9	222.5	263.9	416.4	606.4	930.1	806.9
Region by year		X	X	X		X	X	X
1900 black share			X	X			X	X
Coordinates				X				X
Cities	42	42	42	42	42	42	42	42
Observations	126	126	126	126	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. In columns 1 to 4 (resp. 5 to 8), the dependent variable is the number of blacks (resp. whites) in the central city. The regressors of interest are predicted black immigration (*Z*) and its interaction with the share of the area around the central city: i) occupied by lakes and oceans (*Z_water*); ii) with slope above 15% (*Z_hills*); iii) occupied by rivers and streams (*Z_rivers*). Columns 1 and 5 only control for city and year fixed effects; columns 2 and 6 add year by region fixed effects; columns 3 and 7 further interact year dummies with 1900 black share; and, columns 4 and 8 include also interactions between year dummies and city coordinates. AP F-stat refers to the partial F-stat for joint significance of the instruments in the two separate first-stage regressions. KP F-stat is the Kleibergen-Paap F stat for joint significance of instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table B2. Excluding Cities with Extreme Geography

	Black population			White Population		
	(1)	(2)	(3)	(4)	(5)	(6)
Z	1.749***	1.842**	1.737**	-1.437	0.595	-0.693
	(0.629)	(0.695)	(0.652)	(2.164)	(1.517)	(1.927)
Z_water	0.033*	0.034*	0.036*	0.410***	0.367***	0.409***
	(0.019)	(0.020)	(0.019)	(0.107)	(0.075)	(0.081)
Z_hills	-0.047	-0.081	-0.043	0.356	0.053	0.478**
	(0.059)	(0.101)	(0.045)	(0.279)	(0.180)	(0.193)
Z_rivers	-0.211	-0.224	-0.240*	1.356	1.500	0.882
	(0.138)	(0.151)	(0.122)	(1.101)	(1.057)	(0.834)
KP F-stat	8.396	14.12	11.61	8.396	14.12	11.61
AP F-stat	344.8	238.9	214.6	573.7	1,041	694.4
Drop 95 pct	Water	Hills	Rivers	Water	Hills	Rivers
Cities	39	39	39	39	39	39
Observations	117	117	117	117	117	117

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. In columns 1 to 3 (resp. 4 to 6), the dependent variable is the number of blacks (resp. whites) in the central city. The regressors of interest are predicted black immigration (*Z*) and its interaction with the share of the area around the central city: i) occupied by lakes and oceans (*Z_water*); ii) with slope above 15% (*Z_hills*); iii) occupied by rivers and streams (*Z_rivers*). Columns 1 and 4, 2 and 5, and 3 and 6 exclude cities with, respectively, the share of lakes and oceans, land with slope above 15%, and rivers and stream above the 95th percentile. All regressions control for city and year by region fixed effects, and interact year dummies with: i) the 1900 black share; and ii) city coordinates. AP F-stat refers to the partial F-stat for joint significance of the instruments in the two separate first-stage regressions. KP F-stat is the Kleibergen-Paap F stat for joint significance of instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Appendix C. Robustness Checks

In this section, I conduct a number of robustness checks. Section C1 tests for pre-trends, and documents that the instrument for black population is uncorrelated with pre-1910 changes in: *i*) the main outcomes of interest; *ii*) a number of proxies for economic activity; and *iii*) European immigration. It also verifies that there is no correlation between the change in black population predicted by the instrument and the local impact of the quotas introduced with the Immigration Acts of 1921 and 1924. Section C2 tests that results are robust to including interactions between year dummies and several 1900 city characteristics, allowing cities to be on differential trends. Section C3 presents the push factors version of the instrument, and documents that results are unchanged when replacing the baseline shift-share instrument with this alternative instrument. Section C4 shows that results are robust to: *i*) dropping the largest cities in my sample; *ii*) excluding potential outliers; and *iii*) replicating the analysis instrumenting for white flight while also controlling for interactions between year dummies and geography.

C1. Testing for Pre-Trends and Placebo Checks

As discussed in Section 5 of the paper, the identification strategy rests on the assumption that the "mix" of 1900 black settlements is uncorrelated with the characteristics of northern cities that vary within regions and might be correlated with the evolution of city finances after 1910. If this was not the case, and if southern emigration pre and post 1900 displayed a high serial correlation, then the instrument would not be valid. I tackle this first concern by testing whether the 1900-1910 change in the main outcomes of interest – public spending and tax revenues per capita – is correlated with black in-migration across northern cities after 1910, predicted by the instrument.

Table C1 below performs a formal test for pre-trends. To ease comparisons, columns 1 and 2 report the baseline 2SLS specification displayed in column 4 of Table 4 in the main text. Columns 3 and 4, instead, regress the 1910-1906 change in, respectively, public spending and tax revenues per capita against the instrumented 1930-1910 change in black population.[38] To replicate the baseline specification as accurately as possible, columns 3 and 4 also include the change in MSA population, Census region dummies, the 1900 black share, and city coordinates. Reassuringly, both coefficients in columns 3 and 4 are close to zero and not statistically significant. This test reduces concerns that the instrument is spuriously

[38] 1906 is used as "pre-period" year, because this is the first year in which the Financial Statistics of Cities collected data in a way that is comparable to subsequent years. Data for San Diego (CA) are not available for 1906: for this reason there are 41 cities in columns 3 and 4.

correlated with the pre-1910 change in city finances.

Next, columns 1 to 3 of Table C2 replicate the same exercise performed in Table C1 focusing on three proxies for economic activity: the log of value added per establishment in manufacturing; the log of average manufacturing wages; the share of workers in manufacturing.[39] This test is conducted to check whether 1900 black settlements were correlated with the growth in manufacturing – the sector that attracted the majority of black migrants in the first part of the twentieth century (Boustan, 2016). As for Table C1, also in this case, there is no statistically significant relationship between the pre-1910 change in outcomes and the subsequent instrumented change in black population.

One remaining concern is that the instrument might be correlated with the differential impact of the 1921 and 1924 Immigration Acts across cities. Even though the immigration quotas were set at the national level, since the pre-1920 immigrant composition of cities varied, and because new immigrants tend to cluster where their ethnic community is larger (Card, 2001), quotas likely had different effects across cities (Ager and Hansen, 2018).[40] If the 1900 settlements of southern-born blacks were correlated with enclaves of specific groups of European immigrants, then, the instrument might be incorrectly attributing to black in-migration the effects that the reduction in European immigration might have had on city finances. As in Fouka et al. (2018), I deal with this concern in two ways.

First, in column 4 of Table C2, I regress the 1910-1900 change in European immigration against the subsequent instrumented change in black population.[41] Reassuringly, there is no statistically significant relationship between the pre-Great Migration change in the number of immigrants and the post-1910 change in black inflows across cities. Also, the point estimate is very close to zero. This suggests that 1900 black settlements are unlikely to be correlated with either the level of or the change in European immigrants before 1910. Second, following Ager and Hansen (2018), I construct a measure of "quota exposure" that captures the extent to which any given city was affected by the Immigration Acts. I define

$$Quota\_Shock_c = \frac{1}{Pop_{c,1920}} \sum_{i \in Europe} \lambda_{ci} \left(\hat{M}_{i,22-30} - Q_{i,22-30} \right) \tag{6}$$

the number of "missing" immigrants in city c between 1922 and 1930 due to the quotas, rel-

[39] The data were collected and digitized from the quinquennial Census of Manufactures for years 1904 and 1909. Data for Washington DC were missing in columns 1 to 3.

[40] The 1921 Emergency Quota Act temporarily limited the number of immigrants from any given European country that could enter the United States to 3% of the 1910 population of each ethnic group. With the 1924 National Origins Act, which made the 1921 Immigration Act permanent, the ceiling was lowered to 2% and the "base" year was moved to 1890 (Goldin, 1994).

[41] As in the other columns of Table C2, I partial out the change in MSA population, Census region dummies, the 1900 black share, and city coordinates.

ative to city population in 1920. Specifically, $\hat{M}_{i,22-30}$ is the predicted number of immigrants from country i that would have entered the US, had the quota system not been introduced. As in Ager and Hansen (2018), $\hat{M}_{i,22-30}$ is constructed by first estimating a regression of the form: $M_{it} = \beta_1^M \ln(t) + \beta_2^M \ln(t^2) + \varepsilon_{it}$, where M_{it} is the actual number of immigrants from country i in each year t between 1900 and 1914.[42] $Q_{i,22-30}$ is the total number of immigrants from country i that were allowed to enter the US according to the yearly quotas. Whenever the difference between $\hat{M}_{i,22-30}$ and $Q_{i,22-30}$ in (6) is negative, i.e. whenever the quotas were not binding, I set it to zero.[43] As it appears from (6), "missing" immigrants from each sending country are apportioned across cities proportionally, according to the share of immigrants from i living in city c in 1900, relative to all immigrants from i in the US in that year, i.e. $\lambda_{ci} \equiv \frac{Imm_{ci}^{900}}{Imm_i^{900}}$. Finally, for each city, I sum over all immigrant groups to obtain the total number of missing immigrants in city c between 1922 and 1930, and then scale it by 1920 city population.

With this variable at hand, I proceed to check that the 1920-1930 change in predicted black in-migration, is uncorrelated with the 1920-1930 quota exposure across cities. Results for this exercise are reported in Figure C1, where I plot the residual scatterplot for a regression of the quota shock against the predicted change in black population, after partialling out the change in MSA population, Census region dummies, the 1900 black share, and city coordinates. Reassuringly, there is no correlation between the predicted change in black population (x-axis) and the quota shock (y-axis).[44] This result strongly suggests that the impact of black inflows on city finances estimated in my paper is not driven by the differential effect that the quota system might have had across cities.

[42] Data were taken from Ferenczi and Willcox (1929); see footnote 29 in Ager and Hansen (2018) for a detailed description of this dataset.

[43] Results are unchanged when I allow $\left(\hat{M}_{i,22-30} - Q_{i,22-30}\right)$ to be negative.

[44] Notably, while Figure C1 defines the "quota shock" relative to 1920 city population, results are identical when not scaling the number of missing immigrants by 1920 population.

Table C1. Testing for Pre-Trends

Dep. Variable:	*Baseline Specification*		*Dep. Variable is 1910-1906 change*	
	(1)	(2)	(3)	(4)
	Public spending per capita	Tax revenues per capita	Public spending per capita	Tax revenues per capita
Black population	-0.131**	-0.154**	-0.037	0.007
	(0.064)	(0.076)	(0.044)	(0.026)
1910 dependent variable	15.21	15.63	15.21	15.63
F-stat	9.347	9.347	5.833	5.833
Cities	42	42	41	41

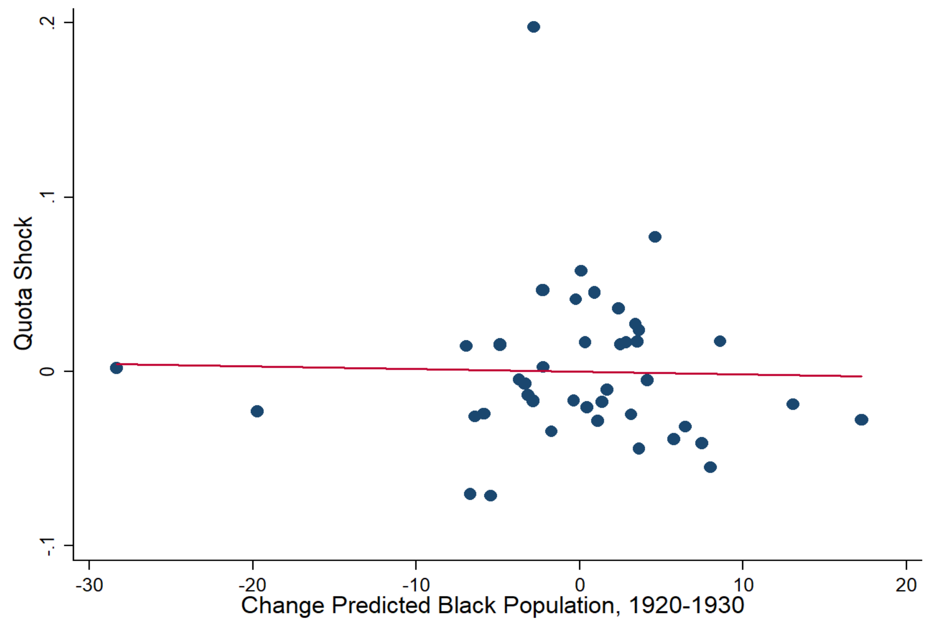
Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. 1906 data for the city of San Diego (CA) are missing, and for this reason only 41 cities can be included in columns 3-4. Columns 1-2 replicate the baseline 2SLS specification reported in column 4 of Table 4 in the main text. Columns 3-4 report 2SLS estimates for a regression of the 1910-1906 change in, respectively, public spending and tax revenues per capita against the (instrumented) 1930-1910 change in black population. To replicate the baseline specification, columns 3 and 4 include the change in MSA population, region dummies, the 1900 black share, and city coordinates. F-stat is the Kleibergen-Paap F stat for joint significance of instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table C2. Additional Test for Pre-Trends

	Dependent variable: 1910-1900 change in			
	(1)	(2)	(3)	(4)
	Log value added per establishment	Log average wages per worker (manufacturing)	Share of manufacturing workers	Fraction of immigrants
1930-1910 change in black population	-0.389	-0.026	-0.013	-0.045
	(0.306)	(0.048)	(0.024)	(0.032)
F-stat	4.450	4.450	4.373	4.607
Observations	41	41	41	42

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. Due to data availability, results in columns 1 to 3 do not include Washington DC. The dependent variable is the 1900-1910 change in outcome reported at the top of each column. Variables in Cols 1, 2 and 3 are expressed in 1910 dollars. The regressor of interest is the 1910-1930 change in black population in the central cities, instrumented with the shift-share instrument constructed in Section 5 in the main text. F-stat is the Kleibergen-Paap F stat for joint significance of instruments. All regressions partial out the change in MSA population and trends for: region; 1900 fraction of immigrants; and city coordinates. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Figure C1. Predicted Black In-Migration and the Quota Shock



Note: The figure reports the residual scatterplot for a regression of the "quota shock", as specified in Ager and Hansen (2018) and described in the text (y-axis) against the 1920 to 1930 change in predicted black in-migration (x-axis), after partialling out region dummies, 1920-1930 change in total MSA population, the 1900 black share, and city coordinates.

C2. 1900 City Characteristics and Differential Trends

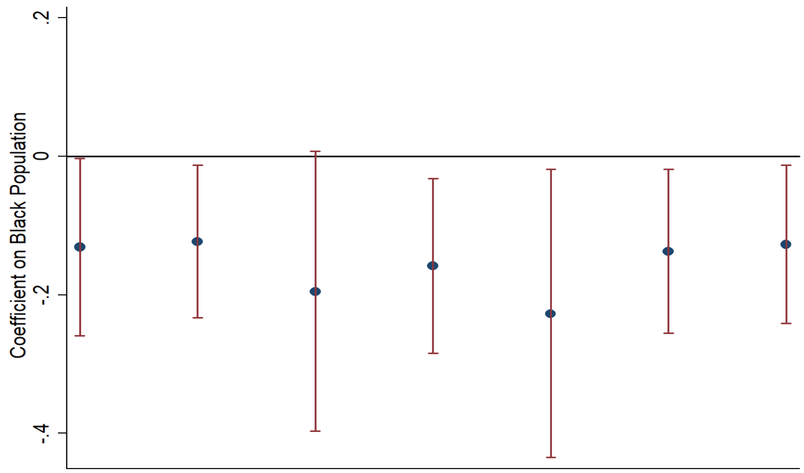
In this section I check that the characteristics of cities that might have attracted more black migrants before 1900 from specific southern states (that kept sending migrants to the North also after 1900) are not spuriously correlated with changes in public spending and tax revenues after 1910. That is, I allow cities to be on differential trends by interacting such characteristics with year dummies. I plot results from this exercise in Figures C2 and C3 where I present 2SLS coefficients (with corresponding 95% confidence intervals) for the effect of black population on public spending and tax revenues per capita, respectively.

The first dot starting from the left reports the baseline point estimate displayed in column 4 of Table 4 (Panels A and B). This specification already controls for MSA population, for city and year by region fixed effects, and for interactions between year dummies and both the 1900 black share and city coordinates. Next, in the second dot, I replace city coordinates with distance from the South, which was constructed by computing the distance between a city and the capital city of the southern state that sent more migrants to that city up to 1900. The third dot replaces the interaction between the 1900 black share and the 1900 log of total and black population. This check is particularly important, since I am estimating a specification in levels, and one may be concerned that larger cities both attracted more blacks (before and after 1900) and were on differential trends for the evolution of local finances. Reassuringly, even though results become slightly less precise and somewhat larger in magnitude, they remain close to the baseline specification, suggesting that my baseline 2SLS results are not affected by differential trends specific to large cities.

Next, the subsequent dots replicate the baseline regression by also including interactions between year dummies and, respectively: *i*) the 1900 fraction of European immigrants; *ii*) the 1900 ratio of (white) high to low skilled workers, constructed using the classification from Katz and Margo (2014); *iii*) the 1904 share in manufacturing; and *iv*) the 1904 log of value added per establishment.[45] Also in this case, results always remain close to those estimated in my baseline specification. Moreover, all estimated coefficients from the fourth plotted point estimate onwards are statistically significant at the 5% level. Taken together, Figures C2 and C3 suggest that my baseline results are not biased due to the spurious correlation between the 1900 characteristics of cities that might have attracted more blacks before the onset of the Great Migration and the evolution of city finances after 1910.

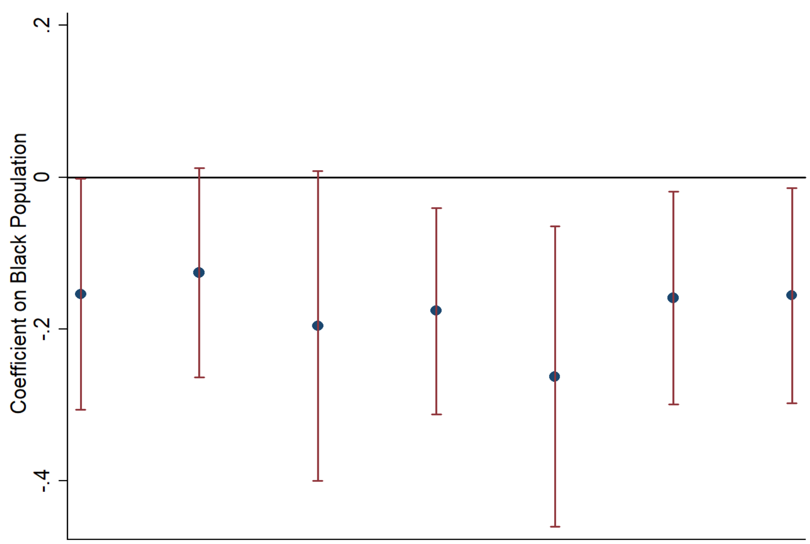
[45] The last two controls were collected and digitized from the Census of Manufactures, and were not available for the city of Washington DC.

Figure C2. Testing for Differential Trends: Public Spending



Note: the figure reports 2SLS coefficients (with corresponding 95% confidence intervals) for the effect of black population on public spending per capita. The first dot from the left replicates the baseline specification reported in column 4 of Table 4 (Panel A), which controls for city and year by region fixed effects, for MSA population, and for interactions between year dummies and the 1900 black share and city coordinates. Subsequent point estimates report results when: i) city coordinates are replaced with distance from the South, constructed as the distance between a city and the capital city of the state that had sent more blacks to that city before 1900; ii) 1900 black share is replaced with log of 1900 total and black population; and when including interactions between year dummies and: iii) 1900 fraction of immigrants; iv) 1900 ratio of high to low skilled (white) workers, constructed using the classification from Katz and Margo (2014); v) 1904 share in manufacturing; and vi) 1904 value added per establishment.

Figure C3. Testing for Differential Trends: Tax Revenues



Note: the figure reports 2SLS coefficients (with corresponding 95% confidence intervals) for the effect of black population on total tax revenues per capita. The first dot from the left replicates the baseline specification reported in column 4 of Table 4 (Panel B), which controls for city and year by region fixed effects, for MSA population, and for interactions between year dummies and the 1900 black share and city coordinates. Subsequent point estimates report results when: i) city coordinates are replaced with distance from the South, constructed as the distance between a city and the capital city of the state that had sent more blacks to that city before 1900; ii) 1900 black share is replaced with log of 1900 total and black population; and when including interactions between year dummies and: iii) 1900 fraction of immigrants; iv) 1900 ratio of high to low skilled (white) workers, constructed using the classification from Katz and Margo (2014); v) 1904 share in manufacturing; and vi) 1904 value added per establishment.

C3. Predicting Black Outflows with Push Factors

Even if early settlements were as good as randomly assigned, one remaining concern is that black outflows from each southern state, O_{jt}, might have been differentially affected by specific, time-varying shocks in northern destinations (see also Borusyak et al., 2018). To deal with this potential threat, as in Boustan (2010), I construct a modified version of the instrument in (2) by replacing O_{jt} with predicted outmigration. Specifically, in a "zeroth stage", I start by estimating:

$$mig_{sjt} = \alpha + \gamma Push_{sjt-10} + e_{sjt} \tag{7}$$

where mig_{sjt} is the net black migration rate from county s in southern state j between t and $t-10$. Since contemporaneous county characteristics might be themselves affected by migration occurring during a decade, I use beginning of decade county "push factors", $Push_{sjt-10}$. The vector $Push_{sjt-10}$ includes the following variables: the black share of the population; the share of the population living in rural areas; the share of land cultivated in cotton; and an indicator for the arrival of the boll weevil in the previous decade. Table C3 presents results for equation (7).

Consistent with the historical evidence (e.g. Boustan, 2016), a higher black share and a higher fraction of the population living in rural areas are associated with larger black departures during the subsequent decade. Table C3 also shows that counties with a larger share of land cultivated in cotton were more likely to attract blacks between 1900 and 1920, but this pattern was reversed during the 1920-1930 decade. Indeed, after 1920, cotton mechanization began to spread around the South, reducing demand for black labor in agriculture and increasing incentives to migrate northward (Wright, 1986). Finally, in line with findings in Collins and Wanamaker (2015), the arrival of the boll weevil is significantly associated with black outflows only for the 1920-1930 decade.[46]

After estimating (7), I compute predicted migration flows from each county by multiplying the fitted values from (7) with the county initial black population. Finally, I aggregate these flows to the state level to obtain the predicted number of blacks leaving each southern state j in each decade, $\hat{O}_{jt}$. I then replace O_{jt} with $\hat{O}_{jt}$ in (2) to derive the (push-factors induced) predicted number of blacks moving to city c in year t. By construction, this (predicted) measure of black outmigration from the South is orthogonal to any specific shock occurring in the North. Moreover, by exploiting southern shocks to agricultural conditions, this instrument is less likely to suffer from the problem of high serial correlation in migration patterns between sending and receiving areas - a possible concern for standard shift-share instruments (Jaeger et al., 2018).

[46]Results are very similar when including only a subset of the push factors used in (7), or when adding additional controls such as the share of a county cultivated with tobacco, the presence of railroads, or average farm values. Coefficients in Table C3 also remain very similar when estimating (7) including (southern) state fixed effects.

Table C4 replicates Table 3 in the main text, replacing the baseline shift-share instrument with the push-factor version just described. Both the magnitude and the precision of the estimated coefficient become somewhat lower. Also, the F-stat for weak instrument in the most conservative specification that includes city and year by region fixed effects, and interactions between year dummies and the 1900 black share and city coordinates (column 5) falls below the threshold value of 10. However, and reassuringly, predicted black in-migration is always highly statistically significant, and quantitatively large. According to the push factor version of the instrument, 10 more predicted black migrants are associated with 6 more black individuals. Overall, Table C4 verifies that also the push factor version of the instrument for black population is strongly correlated with the corresponding regressor of interest.

Finally, Table C5 replicates the main results reported in Table 4 in the main text, where I study the effects of black in-migration on public spending (Panel A) and tax revenues (Panel B) per capita, replacing the standard shift-share instrument with its push factors version. Column 1 reports the same 2SLS specification (with full controls) from Table 4, whereas columns 2 to 4 replicate the corresponding columns of Table 4 using the push factors version of the instrument. Column 2 only includes MSA population and year by region and city fixed effects; column 3 adds interactions between year dummies and the 1900 black share; and, column 4 further includes interactions between city coordinates and year dummies. Reassuringly, in all cases, results are negative, statistically significant, and quantitatively similar (if anything larger in absolute values) to those reported in Table 4.

Table C3. Push Factors Instrument: Zeroth Stage

Dep. Variable:	*Black Net Migration Rate*		
	(1)	(2)	(3)
Share Blacks	-0.170***	-0.041	-0.215***
	(0.048)	(0.045)	(0.052)
Rural Share	-0.257***	-0.163***	-0.333***
	(0.064)	(0.045)	(0.052)
Share Cultivated Cotton	0.292***	0.295***	-0.105
	(0.105)	(0.100)	(0.085)
1[Boll Weevil]	-0.034	0.030	-0.052**
	(0.051)	(0.019)	(0.020)
Observations	1,002	989	937
Decade	1900-1910	1910-1920	1920-1930

Note: the dependent variable is the black net migration rate for counties in each of the Southern states listed in Table A1. The regressors refer to beginning of decade variables. The boll weevil dummy is equal to 1 if the county was hit by the cotton pest in the previous decade (i.e. if a county was hit by the boll weevil between 1890 and 1900, the boll weevil dummy is equal to one for the 1900-1910 decade). Robust standard errors, clustered at the county level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table C4. Push Factor Instrument: First Stage

	Dep. Variable: *Black Population*				
	(1)	(2)	(3)	(4)	(5)
Predicted black population	1.338***	1.294***	0.498***	0.609***	0.600**
(Push factors)	(0.445)	(0.380)	(0.184)	(0.225)	(0.240)
Region by Year FEs		X	X	X	X
MSA population			X	X	X
1900 black share				X	X
Latitude and longitude					X
F-stat	9.107	11.70	7.298	7.385	6.325
Observations	126	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The table replicates the first stage results reported in Table 3 in the main text using the version of the instrument constructed with southern push factors to predict black out-migration from the South. Column 1 only includes city and year fixed effects. Columns 2 and 3 add, respectively, interactions between year dummies and region dummies, and contemporaneous MSA population. Columns 4 and 5 further augment the specification in column 3 by interacting year dummies with, respectively, the 1900 fraction of blacks and city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table C5. 2SLS Results Using Push-Factor Instrument

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS
Panel A. Public Spending per Capita (1910 mean: 15.21)				
Black population	-0.131**	-0.142***	-0.137***	-0.177**
	(0.064)	(0.054)	(0.050)	(0.077)
Panel B. Tax Revenues per Capita (1910 mean:15.63)				
Black population	-0.154**	-0.179***	-0.191***	-0.261***
	(0.076)	(0.054)	(0.050)	(0.061)
1900 black share	X		X	X
Coordinates	X			X
F-stat	9.347	7.298	7.385	6.325
Instrument	Baseline	Push	Push	Push
Observations	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The dependent variable is public spending per capita (resp. tax revenues per capita) in Panel A (resp. Panel B). Column 1 reports 2SLS results from Table 4, column 4, in the main text. Columns 2 to 4 replicate the corresponding columns in Table 4 using the instrument constructed by predicting southern black emigration using local push factors. Regression in column 2 controls for MSA population and for city and year by region fixed effects. Column 3 augments the specification in column 2 by interacting year dummies with 1900 black share. Columns 1 and 4 also include the interaction between year dummies and city coordinates. F-stat is the Kleibergen-Paap F stat for weak instruments. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

C4. Dropping Potential Outliers and Additional Checks

One potential remaining concern is that the specification in levels used in my paper, as well as in most other works on the Great Migration (Boustan, 2010; Fouka et al., 2018; Shertzer and Walsh, 2019), implicitly weighs larger cities more. One may also be worried that cities with very large black populations are driving my results. Appendix C2 (Figures C2 and C3) already documented that results are robust to controlling for possibly differential trends in public spending and tax revenues depending on black and total population. However, here I further explore the robustness of my estimates. First, following Shertzer and Walsh (2019), I repeat the analysis by trimming the sample at the 1^{st} and 99^{th} and the 5^{th} and 95^{th} percentiles of black population. Second, I drop, in turn, each of the five largest cities in my sample.[47]

Figures C4 and C5 report results from this exercise plotting the 2SLS coefficient (with corresponding 95% confidence intervals) for the effects of black population on, respectively, public spending and tax revenues per capita. Reassuringly, in all cases, results are in line with those from the baseline specification (displayed in the first dot from the left in both figures). In both Figures C4 and C5, standard errors become somewhat larger when dropping Chicago (fifth dot from the left), but they nonetheless remain statistically significant at the

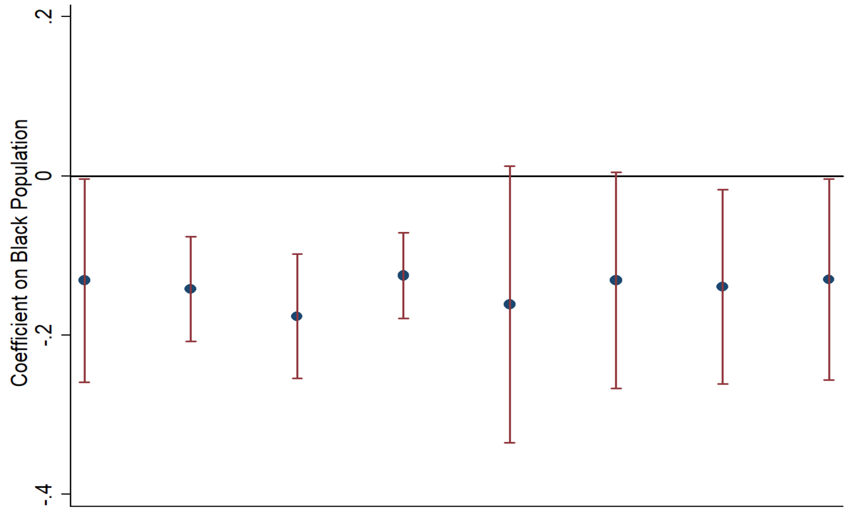
[47] Trimming the sample at the 1^{st} and 99^{th} (resp. 5^{th} and 95^{th}) percentiles of the black population leads to the exclusion of New York City and Duluth (resp. New York City, Philadelphia, Washington D.C., Duluth, San Diego, and Scranton). The five largest cities (according to 1910 population) are New York City, Chicago, Philadelphia, Boston, and St. Louis.

10% level and quantitatively close to those from the baseline specification. Overall, the pattern emerging from Figures C4 and C5 is reassuring, and suggests that results are unlikely to be driven by the largest cities in my sample.

Finally, I present evidence that results obtained when controlling for the instrumented white population in central cities (Table 6) are robust to controlling for interactions between year dummies and a set of dummies indicating the presence of hills, oceans, or lakes above different thresholds. Specifically, I report results obtained when defining the threshold at 5%, but I experimented with higher or lower values to check the robustness of my estimates, which always remained very similar.[48] Panel A of Table C6 reports the baseline specification estimated in Table 6 (Panel B), while Panel B presents results obtained when including the interactions between year dummies and geography. Reassuringly, both the magnitude and the precision of coefficients is not significantly affected, and results remain similar to those from the baseline specification. This pattern suggests that direct and time-varying effects of geography on public spending, tax revenues, and property values are unlikely to drive results shown in Table 6 (Panel B).

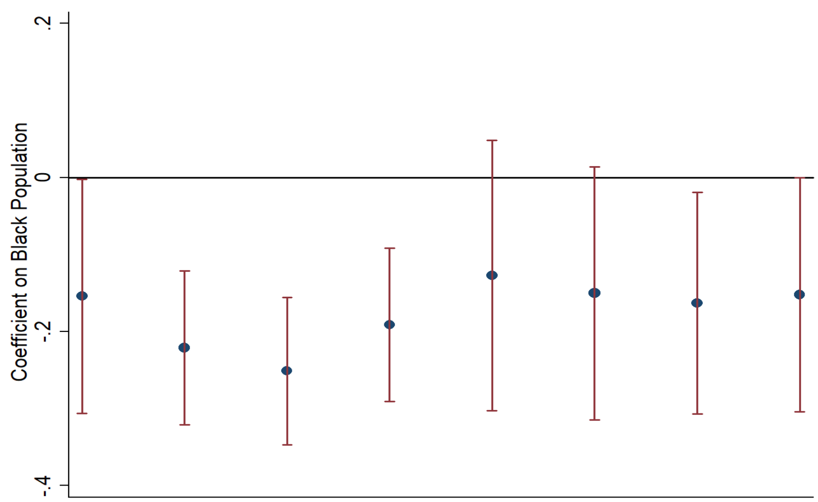
[48] The distribution of these geographic characteristics is highly skewed. For instance, 22 of the 42 cities in my sample are not surrounded by hills or oceans (implying that the median is 0), but the 75^{th} percentile of the distribution of e.g. the lakes and oceans share of suburban area is as high as 20%. There are 15 (resp. 19) cities where the share of the suburban area with slope above 15% (resp. occupied by lakes or oceans) is higher than 5%.

Figure C4. Drop Large Cities and Potential Outliers: Public Spending



Note: the figure reports 2SLS coefficients (with corresponding 95% confidence intervals) for the effect of black population on public spending per capita. The first dot from the left replicates the baseline specification reported in column 4 of Table 4 (Panel A), which controls for city and year by region fixed effects, for MSA population, and for interactions between year dummies and the 1900 black share and city coordinates. Subsequent point estimates report results when dropping cities: i) in the top 99th (New York City) and bottom 1st (Duluth) percentile of the black population; and ii) in the top 95th (New York City, Philadelphia, Washington D.C) and bottom 5th (Duluth, San Diego, Scranton) percentile of the black population. The remaining five point estimates refer to specification obtained when dropping, respectively, each of the five largest cities in my sample (New York City, Chicago, Philadelphia, Boston, St. Louis).

Figure C5. Drop Large Cities and Potential Outliers: Tax Revenues



Note: the figure reports 2SLS coefficients (with corresponding 95% confidence intervals) for the effect of black population on tax revenues per capita. The first dot from the left replicates the baseline specification reported in column 4 of Table 4 (Panel B), which controls for city and year by region fixed effects, for MSA population, and for interactions between year dummies and the 1900 black share and city coordinates. Subsequent point estimates report results when dropping cities: i) in the top 99th (New York City) and bottom 1st (Duluth) percentile of the black population; and ii) in the top 95th (New York City, Philadelphia, Washington D.C) and bottom 5th (Duluth, San Diego, Scranton) percentile of the black population. The remaining five point estimates refer to specification obtained when dropping, respectively, each of the five largest cities in my sample (New York City, Chicago, Philadelphia, Boston, St. Louis).

Table C6. Instrumenting for White Flight: Controlling for Geography

VARIABLES	(1) Public spending per capita	(2) Tax revenues per capita	(3) Property tax rate	(4) Property values over 1900 population
Panel A. Baseline specification				
Black population	-0.044*	-0.109***	0.066	-18.73**
	(0.026)	(0.038)	(0.076)	(9.391)
AP F-stat black population	263.9	263.9	263.9	263.9
AP F-stat white population	806.8	806.8	806.8	806.8
KP F-stat	8.809	8.809	8.809	8.809
Panel B. Controlling for geography				
Black population	-0.041*	-0.111***	0.098	-18.12**
	(0.024)	(0.041)	(0.067)	(8.738)
AP F-stat black population	104.5	104.5	104.5	104.5
AP F-stat white population	254.9	254.9	254.9	254.9
KP F-stat	11.44	11.44	11.44	11.44
Observations	126	126	126	126

Note: The sample includes, for Census years 1910, 1920, and 1930, the 42 largest central cities that were anchored to a MSA and had at least 100,000 residents in 1930, and for which it was possible to construct the instrument for black migration. The table reports 2SLS estimates of equation (3) in the main text, which includes both black and white (instrumented) city population. Panel A presents the same results displayed in Table 6, Panel B, in the main text. Regressions include city and region by year fixed effects and interactions between year dummies and both the 1900 black share and city coordinates. Panel B also includes interactions between year dummies and dummies equal to 1 if a city is surrounded by geographic features with values above the threshold of 5% (see the discussion in Appendix C4). KP F-stat is the Kleibergen-Paap F stat for weak instruments, whereas AP F-stat refers to the partial F-stat for joint significance of the instruments in the two separate first-stage regressions. Robust standard errors, clustered at the MSA level, in parentheses; *** p<0.01, ** p<0.05, * p<0.1.