

Market Access and Migration: Evidence from the Panama Canal Opening during the First Great Migration*

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Abstract

This paper examines the influence of transportation infrastructure on migration decisions in the context of the Great Migration in the United States. Focusing on the opening of the Panama Canal in 1920, we isolate the effect of improved economic opportunities from reduced migration costs. Using full-count Census data, we find that Southern-born African American migrants preferred areas with enhanced market access, leading to higher inflows after 1920. The study highlights the interplay between migrant networks and labor markets in shaping migration patterns. Our findings underscore the significance of local market conditions induced by improvements in local market access in influencing migration decisions during the Great Migration.

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1 Introduction

Transportation infrastructure plays a crucial role in influencing migration, impacting it through two primary channels: reductions in migration costs and improvements in economic opportunities for migrants. Distinguishing these channels is important for understanding migration decisions and observed migration patterns (Sjaastad, 1962). Nonetheless, untangling the effects of each channel poses a significant challenge for several reasons. First, both channels often occur simultaneously, making it difficult to discern their individual impacts. Second, migration patterns can influence access to both domestic and international markets through enhancements in the trade network (Parsons and Vézina, 2018; Herander and Saavedra, 2005) and overall economic activity by fostering new skills, innovation, and productivity (Borjas, 1987; Bahar and Rapoport, 2018; Ortega and Peri, 2014). In this paper, we address this challenge by isolating the economic opportunities channel from the migration costs channel. We achieve this by leveraging a historical coincidence, which not only enables us to distinguish between the two channels but also allows us to circumvent the potential problem of simultaneity.

In 1920, the Panama Canal commenced its operations. This event had notable implications for exposed counties, particularly in the West, and the tradable goods industries, as already highlighted in contemporary newspaper articles (e.g., *The Economist*, 1921; *The New York Times*, 1923¹). Additionally, Maurer and Rauch (2020) demonstrated that the Canal contributed to increased employment and wages in exposed counties within the United States.² We use the Panama Canal to measure Market Access shocks to counties labor markets.

Between 1900 and 1939, approximately 1.5 million African Americans from Southern states moved to the West and North in the first wave of what became known as the Great Migration (Wilkerson, 2020). This movement out of the South was driven by various factors, including depressed labor markets, impoverished living conditions, disenfranchisement, and violence. As a result, these migrants faced a critical decision when choosing their new locations. As the Canal opened with the Great Migration underway, we use the changes in Market Access to explore the effect of labor market opportunities to the location decisions of Southern black migrants.

¹“Steady Growth Marks Oregon’s Development,” *The New York Times*. Dec 9, 1923.

²Recent literature emphasizes the positive effect of transportation infrastructure on economic activity and productivity at the local level. See work on the impact of highways (Jaworski and Kitchens, 2019; Asher and Novosad, 2020), railroads (Atack et al., 2010; Donaldson and Hornbeck, 2016; Donaldson, 2018; Hornbeck and Rotemberg, 2024), and canals (Galiani et al., 2025).

There are two relevant features from this setting. First, “push factors” for Southern black migrants are unrelated to the consequences of the Panama Canal. Figure 1a shows that the Southern black population living in the South decreased steadily from 1900 to 1930, with a lower rate of reduction from 1930 to 1940. This feature prevents us from the biases present in traditional estimates of labor market shocks to migration highlighted by Borusyak et al. (2022). We study migrants’ location decisions into potentially stronger labor markets, assuming that the shock we study is not related to the decision to migrate, and only related to the decision of where to locate after migrating. As a consequence, we are interested in Southern-born African American migrants locating outside of the South.

Second, in historical and popular accounts of the Great Migration, the railroad network is commonly identified as the primary means of transportation for Southerners during their journey.³ Consequently, the Panama Canal shock should only affect Southerner’s migration decisions through its effect on local labor markets, unlike the case of other transportation infrastructure that also reduces migration costs (Morten and Oliveira, 2016).

Our research reveals a systematic pattern among Southern African American migrants in selecting areas with improved access to both domestic and international markets. We propose that the reduction in transportation costs, due to increased exposure, stimulated labor markets, leading to a greater influx of Black migrants from the South. More precisely, we demonstrate a disproportionately higher migration of Southern-born African Americans to locations that experienced relatively more gains in exposure to global markets from the opening of the Panama Canal. The unique timing of the Canal’s opening during the ongoing Great Migration enables us to compare areas that eventually had varying degrees of market exposure gains since the opening of the canal.

For each county, we compute the exposure to consumers and producers elsewhere through the transportation network available in 1920. In practice, we calculate Market Access, a trade cost-weighted average of the size of the markets to which a place might have had access in 1920. We do so under two alternative scenarios: one where the Panama Canal is open and one where it is closed.⁴ The difference between these two measures indicates the gains in Market Access attributed to the construction of the Panama Canal.

It is important to note that by assessing Market Access gains in this manner, we aim to isolate the specific benefits derived from the Canal’s construction, ensuring that any other changes in the transportation network, which may be complementary to the Canal

³For instance, Wilkerson’s Pulitzer award winner book or Jacob Lawrence’s 1940 painting series.

⁴This definition follows the economic geography literature, e.g. Redding and Venables (2004); Donaldson and Hornbeck (2016); Hornbeck and Rotemberg (2024).

and could also influence internal migration, are properly accounted for. However, road length did increase after 1920 in places more exposed to the Canal. We account for this fact directly by controlling for the change in road density after 1920. The Panama Canal had a direct effect on migration decisions of Southern migrants even for counties with low road construction after 1920.

We show that counties with higher Market Access due to the Panama Canal received an influx of Southern-born African Americans in the 1920s and 1930s but not before the Canal was fully operational. These estimates come from a difference in differences strategy where we allow the treatment—changes in Market Access to have a differential effect by decade. Our empirical setting uses full-count Census of Population data between 1900 and 1940, aggregated to the county level. Our sample consists of all the counties outside the South. For defining the South, we follow the criteria used by Bazzi et al. (2021), which encompasses all states that seceded from the Union before the Civil War, as well as Oklahoma. We estimate how increases in economic opportunities via increased Market Access affect location decisions. Moving from the 25th to the 75th percentile in the Market Access gains distribution led to a 15.8% increase in the share of African Americans born in the South relative to the average county in our sample in 1920.

At the same time that the Panama Canal was opening, the US established strict international immigration quotas. These restrictions could be a source of labor market shocks that might interact with the effects from the Panama Canal. For instance, Abramitzky et al. (2023) show that the quota system provided opportunities to replace immigrant labor with internal migrants. Moreover, Collins and Wanamaker (2015) hypothesize that the restrictions may have been a determinant in Southern black migration patterns. We show first that the benefits counties reaped from the Canal are not correlated with their share of restricted migrants in 1900 or 1910. Second, we show that counties with more exposure to the migration quotas received a higher influx of Southern-born African Americans, confirming the results in Abramitzky et al. (2023). However, we find that counties benefiting more from the increased market access from the Canal received considerable Southern migration even after accounting for the quota system's impact.

Another potential concern in our study is the possibility that Market Access gains resulting from the Panama Canal might be correlated with pre-existing networks of Southern-born African Americans (Stuart and Taylor, 2021). This could happen if factors such as geography or internal transportation networks influenced initial settlements. To address this concern, first, we show that there is no correlation between the proportion of Southern-

born African Americans living outside the South in 1900, 1910, and 1920, and the changes in Market Access attributed to the Canal. Additionally, we observed that Market Access gains were not correlated with the pre-Canal labor market structure, urban population, or literacy rates. Second, we estimate the decade-to-decade predicted flows of the Great Migration relying on a shift-share approach, following a methodology similar to Bazzi et al. (2021). Importantly, our results on the effect of Market Access changes on the Great Migration remained robust even after controlling for predicted migration during the period studied. In other words, we find that the changes in Market Access due to the Panama Canal resulted in increased African American migration beyond what would have been predicted based solely on initial migrant networks. This suggests that the impact of the Canal went beyond the influence of pre-existing migration networks.

We also find that the existing migrant networks played a crucial role in facilitating the transformation of the Canal-induced benefits into higher migration flows. To examine this, we interacted our measure of Market Access gains with the proportion of Southern-born African Americans already settled in each non-Southern county in 1900. Notably, only counties with a positive share of pre-1910 migrants experienced increased migration as a result of the changes in economic activity brought about by the Canal.

Recent empirical evidence (Stuart and Taylor, 2021) supports the notion that migrants tended to move to places where they had established social networks. Historical accounts highlight the significance of labor agents who recruited early migrants and the dissemination of information through Northern newspapers distributed in the South (Gottlieb, 1997; Grossman, 2011; Wilkerson, 2020). These networks, agents, and newspapers played vital roles not only in reducing migration costs but also in diminishing uncertainty and disseminating information about labor market conditions in potential destinations (Carrington et al., 1996). Moreover, the works of Collins (1997) and Boustan (2016) emphasize the role that stronger labor markets outside the South played in motivating migration decisions. In this paper, we make a contribution to the literature on location decisions during the Great Migration by demonstrating the complementarity between migrant networks and improved labor markets. Our findings underscore the interplay between these two factors in influencing migration patterns during that pivotal period.

We proceed to test our hypothesis that the Panama Canal shock increased migration through its impact on labor markets. First, we discover that the gains in Market Access resulted in higher inflows during the initial wave of the Great Migration in counties with more robust labor markets. Specifically, our findings are concentrated in places with low

unemployment rates in 1900 and 1910. Given the documented barriers that Southern black migrants faced when attempting to enter Northern and Western labor markets (Boustan and Tabellini, 2018; Derenoncourt, 2022), the opportunities created by the Panama Canal were more effective in attracting migrants to areas where there was a relative shortage of local workers.

Furthermore, we observe that the effect of Market Access on migration was particularly pronounced in more urban counties and those that had advanced further in the process of structural transformation. We find a similar pattern for one of the industries that notably benefited from the reductions in transportation costs brought about by the Canal: lumbering (Rockwell, 1971). Counties with a higher share of their labor force involved in the lumber trade exhibited a greater impact of Market Access gains on migration compared to areas with a less established lumber sector. Our findings align with anecdotal evidence from family histories of black, Southern loggers moving West (Marsh, 2015; Crawford, 2008). It is worth noting that after agriculture in the American South, lumbering stood as the second largest employer of black workers (Wright, 1986). This particular result emphasizes the significant role of labor markets as pull factors in influencing migration location decisions.

Focusing on the Great Migration is of particular significance because during this period, Southern black migrants were already moving out of the South, driven by challenging economic and political conditions. Our study highlights that their location decisions were strongly influenced by the opportunities arising from local increased access to markets. Those opportunities were potentially not exclusive for black workers, however. This is relevant since African Americans were not the only group leaving the South. Bazzi et al. (2021) and Collins and Wanamaker (2015) document substantial outflows of Southern whites directed towards the North and West. We conducted similar analyses for Southern whites and found that they, too, exhibited differential migration patterns, favoring counties with improved Market Access after 1920. Moreover, the estimated coefficients are of similar magnitude than our estimates for black migrants.⁵

In our study, we contribute to the literature that examines the impact of transportation infrastructure on migration. The construction of railroads, roads, and canals has a dual influence on migration due to the reduction of transportation costs. First, transportation infrastructure reduces the direct costs of migration. In other words, migrants use the existing

⁵Additionally, we investigated whether international migrants were also selecting localities benefiting from the Canal. Migrants from countries not restricted by immigration quotas responded more and earlier to the Panama Canal shock than migrants from restricted countries.

transportation network to move from one place to another. Second, transportation infrastructure shapes the composition of economic activity and labor demand (Krugman, 1991; Glaeser and Kohlhase, 2004; Michaels, 2008; Duranton et al., 2014). Morten and Oliveira (2016) rely on a trade model to disentangle between both. They find a positive effect of increased trade opportunities on migration when studying highway construction in Brazil. Our paper's unique setting lies in the fact that the Panama Canal generated substantial variation in trade opportunities without directly reducing migration costs for Southern-born African American migrants. These migrants predominantly relied on the internal transportation network rather than oceanic transportation (Wilkerson, 2020). This context allows us to examine the specific influence of trade opportunities on migration decisions, separate from direct transportation cost considerations.

More generally, our paper also contributes to the economic history of the Great Migration. Some studies have focused on individual migrants to understand selection into migration and the individual-level effects of migration and segregation on both migrants and their descendants (Margo, 1990; Cutler and Glaeser, 1997; Cutler et al., 1999; Collins and Wanamaker, 2014; Black et al., 2015; Eriksson and Niemesh, 2016; Eriksson, 2019; Baran et al., 2022; Derenoncourt, 2022). Others have examined how migration impacted the receiving localities across various economic, social, and political dimensions (Boustan, 2010, 2009, 2016; Boustan and Tabellini, 2018; Muller, 2012; Calderon et al., 2022; Tabellini, 2019; Shertzer and Walsh, 2019; Bazzi et al., 2021). Our contribution lies in studying how migrants' individual decisions are influenced by the trade opportunities brought about by the Panama Canal.

Moreover, our work aligns with recent literature that explores how various factors in potential destinations affect migration location decisions. These factors can be economic, social, or political in nature (Grogger and Hanson, 2011; Campo et al., 2022; Parsons et al., 2020; Bracco et al., 2018; Khanna et al., 2021). We demonstrate how access to international and domestic markets played a crucial role in influencing the migration decisions of individuals during one of the most significant migration waves in American history—the Great Migration.

Overall, our study contributes valuable insights into the complex dynamics of migration decision-making and the impact of trade opportunities on migration patterns during a critical period in the United States' history.

2 Historical Context

The First Wave of the Great Migration At the turn of the twentieth century, the South was still home to the vast majority of African Americans. In 1900, Black residents made up 37.4% of the southern population. Outside the South, they represented only 2.7%. Over the next four decades, both the nation's and the South's populations continued to grow, but African American's rate of growth diverged sharply depending on their region. While the overall population rose at an average rate of 1.4% per year, the Black population in the South grew by a modest 0.6% per year. Outside the South, however, Black communities grew at a rapid 2.3% yearly rate. By 1940, the share of Black residents in the South had fallen to 26.4%, whereas in the rest of the country it had risen from 2.7% to 3.9% (Figure 1b).

Behind these population shifts lay millions of individual migration decisions. In 1900, there were just over 1 million southern-born African Americans living outside their native states; only 30.4% of them had ventured beyond the South. Between 1900 and 1940, however, Southern Black migration accelerated, resulting in nearly 2.6 million people living outside the states of their birth. By 1940, 60.4% of Southern-born black migrants resided in Non-Southern states—a near (Figure 1c).

White southerners also migrated, often in search of similar opportunities, but their shift out of the region was less dramatic. In 1900, there were 2.2 million white migrants born in the South. However, their overall move outside the South did not surge as sharply. While 35% of these Southern-born white migrants lived beyond the region in 1900, only 45% resided elsewhere by 1940; an increase, but not on the scale of Black southerners (Figure 1d).

The Panama Canal and US Migration Transportation infrastructure shapes local economic activity by bringing input and output markets closer. The construction of roads, railroads, and canals all over the world dynamized employment and led to higher productivity through the reallocation of factors of production to places that were previously isolated (Asher and Novosad, 2020; Donaldson and Hornbeck, 2016; Donaldson, 2018; Hornbeck and Rotemberg, 2024). The Panama Canal was not an exception. Galiani et al. (2025) find that Canadian counties that benefited from greater Market Access had higher manufacturing production, used more inputs, and improved their productivity. For the United States, Maurer and Rauch (2020) show that improvements in Market Access due to the Panama Canal translated into faster population growth, more employment, and

higher wages.

Built with geopolitical goals in mind, the Canal effectively reduced the physical and economic distance between US shores and trade partners. Before 1920, when the Canal fully started operations, shipments between both coasts had to go either through the North American transportation network, railroads in Mexico or Panama, or around the continent's southernmost tip. Maurer and Yu (2008) estimate that the distances between the US West and East coasts fell by about 51%, between the US East coast and Asia decreased by 32%, and between the US West coast and Europe fell by 43%. Alongside sizeable differences in rates between overland and waterborne transportation, the reduction in distance implied a sharp decrease in transportation costs in the context of increased protectionism (Williamson, 2013).

For illustration, take the lumber industry. Rockwell (1971) documents that the average shipping rate for one ton from Portland, Oregon to New York City via the railroad network was \$18.49 (\$13.66) over the 1920s (1930s).⁶ The rate using the Panama Canal was \$9.69 (\$6.23). These figures imply cost savings of circa 50%. By 1923, the New York Times recognized that the change in transportation costs brought "great export opportunities" for Oregon and other Western states. The newspaper emphasized that it was possible for "products originating in Oregon for export via the Columbia River and passing through the [Panama] Canal to compete for Atlantic seaboard trade with the Mississippi Valley." (The New York Times, 1923). This development in the lumber sector coincides with the migration movement of African Americans out of the South, already underway from the mid-1910s.

The lumber industry case is representative of how new opportunities brought about by the Canal attracted black migrants from the South. One of those migrants was Amos Marsh, Sr., an African American log cutter from Jackson Parish, Louisiana. Motivated by the dire economic conditions, overt discrimination, and political violence, he moved with his family to Wallowa County, Oregon, in 1939.⁷

His story, compiled by Marsh (2015), illustrates three essential facts of the Great Migration. First, the move to Oregon answered to better economic opportunities in the West. As Marsh puts it, "that was where the work was." Furthermore, the racial wage gap was not nearly as large as the one in the South.⁸ Second, companies in the West used family

⁶Constant 1925 US Dollars.

⁷"If the South had worked for us farming and the [Ku Klux] Klan hadn't been ridin', I never would have left Louisiana." (Marsh, 2015).

⁸Another case study of the Quincy Mill in Northern California finds that the company "gave equal pay to its white and black employees and many African American men worked in skilled positions nearly im-

networks of the original workers to recruit new workers in the South. Such was the case of the Bowman-Hicks Lumber Company, where Marsh worked as a head logger. Third, Oregon’s white population reacted negatively to the arrival of these migrants. For instance, in 1924, the State’s Labor Commissioner received a petition to stop the Bowman-Hicks Company from recruiting African American workers.

Beyond this anecdotal evidence, we systematically document how places that benefited from more exposure to markets attracted African American migrants from the South. As Collins and Wanamaker (2014, 2015) find, the first generation of migrants improved their economic standing. Those migrants, as in Marsh’s journey, helped recruit or provided information through family and social networks, which consolidated the migration movement (Stuart and Taylor, 2021). Unfortunately, the Great Migration prompted white-flight, urban segregation, and lower fiscal revenues (Boustan, 2010; Tabellini, 2019; Shertzer and Walsh, 2019). Moreover, these responses translated into lower provision of public goods and increased policing, which severely curtailed social mobility and reduced the potential of the descendants of the migrants (Derenoncourt, 2022).

3 Estimating the Effect of the Panama Canal on Migration Location Decisions

3.1 Data

This paper draws data from two different sources. First, we use GIS data on the transportation network available in 1920 and transportation costs estimates by mode to estimate Market Access changes due to the Panama Canal. Second, we use data from 5 full count Census of Population from IPUMS 1900 to 1940 (Ruggeles et al., 2021) to measure the magnitude of the first wave of the Great Migration. Our area of interest is US counties located outside the South. We define the South as all states that seceded from the Union before the Civil War, plus Oklahoma (Bazzi et al., 2021). Our main sample includes 1,752 counties. Since we use the full count Census of Population between 1900 and 1940, we end up with 8,760 observations.

possible to gain the southern mills.” (Crawford, 2008).

Market Access

We follow the economic geography literature to measure how much each county benefited from the Panama Canal through changes in Market Access. We define it as the trade-cost weighted average of the income-adjusted population of all possible destinations d that trade with county c .

$$MA_c = \sum_{d \neq c} \tau_{cd}^{-\theta} L_d Y_{cd} \quad (1)$$

Where τ_{cd} is the iceberg trade cost between county c and destination d , L_d is destination d population, Y_{cd} is the GDP per capita of the country where d is located relative to the US's GDP per Capita, and θ is the elasticity of trade to trade-costs. The trade cost τ is computed as:

$$\tau_{cd} = 1 + \frac{t_{cd}}{\bar{P}} \quad (2)$$

Where t_{cd} is the cost of moving one ton of products from county c to destination d and \bar{P} is the average transportation cost per ton. Therefore, estimating each county's market access requires a definition of the possible set of destinations D and estimations of t_{cd} , \bar{P} , and θ .

We assume each county has access to all other counties in the US and Canada, plus countries in the rest of the world. We use data from 63 countries outside North America whose GDP and population data is available for (circa) 1920. The destinations in our sample account for 86% of the global population in 1920.

Access to those locations is given by a transportation network that includes (i) the railroads, canals, waterways, and wagon routes in the United States and Canada by 1920 and (ii) ocean liners between North American ports and ports in our set of destinations. Here we complement the work of Atack et al. (2010) and Donaldson and Hornbeck (2016) by including Canadian transportation infrastructure and allowing for the connection of ports through the oceans. We do so by using the information on actual distances between ports and key global chokepoints, including the Panama Canal, from the United States Navy (1911, 1917, 1920, 1931, 1943).⁹ We allow direct routes between ports – whenever possible– or routes passing through these chokepoints. We limit the Panama Canal routes to ports for which The Panama Canal Records report some shipping activity up to 1939.

⁹These chokepoints are the Panama Canal, Suez Canal, Cape Horn, Cape of Good Hope, Singapore, the Strait of Gibraltar, and Bishop Rock.

For each mode of transportation in the network, we build estimates of rates using wheat as a reference, collecting data from historical sources (Department of Agriculture, 1906; Interstate Commission, 1913; Georgian Bay Canal Commission, 1916; Fogel, 1964). In the case of the United States, we compute average rates of 0.626 cents per ton-mile for railways, 0.260 cents per ton-mile for waterway transportation, 22.639 cents for wagon routes, and 0.052 cents per ton-mile for ocean liners. Routes using the Suez Canal and the Panama Canal paid, respectively, a flat toll fee of \$1.48 and \$0.95 per ton (The Panama Canal Company, 1971). All rates are in constant, 1910 United States dollars.

We use Dijkstra’s algorithm (Dijkstra, 1959) to compute the transportation costs, t_{cd} , between each county and each destination. These use the transportation network and the rates described above. We follow Hornbeck and Rotemberg (2024), who estimate the county-level changes in Market Access due to railroad construction, and set $\bar{P} = 35.7$ and $\theta = 2.79$. A more detailed description of our Market Access computation is given in Galiani et al. (2025).

We measure the Market Access gains due to the Panama Canal by comparing our Market Access estimates using the transportation network in 1920 and MA estimates using a counterfactual network in 1920 that does not include routes through the isthmus. Notice that the only difference between both estimates is the possibility of shipping goods through the Canal. All other features of the network remain fixed. This is not an unreasonable assumption since the railroad network was already developed by the 1920s.

$$\Delta \ln(MA_c) = \ln(MA_c|Canal) - \ln(MA_c|NoCanal) \quad (3)$$

Where $\ln(MA_c|Canal)$ is the natural logarithm of Market Access of county c in 1920 with the transportation network that includes the Panama Canal and $\ln(MA_c|NoCanal)$ is its equivalent without the Panama Canal. Figure 2a shows the variation in our covariate of interest.

Road construction after 1920 In order to measure the development of internal infrastructure after the Canal opens, we use historical road data from Burghardt et al. (2022). After 1920, most of the development of internal infrastructure was driven by road construction, as railroad construction peaked during the 1910s and was taken over by the rise of cars and trucks. The road data is given for 4 periods: 1810-1900, 1880-1920, 1900-1940, and 1920-1960. We measure road density as total kilometers of roads in a period, normalized by either population or area. Places more exposed to the Canal shock are not different

in their level of road density in 1810-1900, but there is a positive correlation with the level in the other periods. Moreover, exposure to the Canal is correlated with the change in road density between all the possible period differences. We expand our main results by controlling for the change in road kms per capita between the periods of 1920-1960 and 1880-1920. With this measure we capture the change in road construction before and after the Canal opened.

Measuring the Great Migration

Sample and variable of interest Our primary variable of interest is the number of Black people born in the South in each Census year as a share of the total county population in 1900. We measure it using data from five full-count Census of Population, from 1900 to 1940 (Ruggeles et al., 2021). To ensure that county boundaries are consistent over time, we use 1890 county boundaries and match counties on subsequent censuses using the Eckert et al. (2020) method that assumes the population is uniformly distributed over space. We focus on 1,758 counties located outside the South.

Predicted migration To measure potential migration by decade, we follow Bazzi et al. (2021) and estimate the predicted rate of migration flows to each non-Southern county as share of total 1900 population as follows:

$$p_{ct} = \frac{1}{T_{c,1900}} \sum_j \frac{B_{c,1900}^j}{B_{1900}^j} D_t^j \quad (4)$$

Where $B_{c,1900}^j$ is the number of black people born in Southern state j that lived in non-Southern county c in 1900, B_{1900}^j is the number of blacks born in Southern state j that lived outside the South in 1900. D_t^j is the decade-to-decade change in the number of black people born in Southern state j that live outside the South, so $D_t^j = B_t^j - B_{t-1}^j$. Finally, we scale this prediction by $T_{c,1900}$: county c 's total 1900 population.

Immigration restriction during the 1920s We follow Abramitzky et al. (2023) to measure the county level exposure to the border closure after 1920. Counties with higher share of the population who migrated from quota-restricted countries are more exposed to the immigration restriction. From Abramitzky et al. (2023), Table A1, we classify countries into restricted or not restricted by the quota system. The county-level measure of exposure is the sum of the population share of migrants from each of the restricted countries.

We refer to migrants from quota-exposed countries as “Restricted migrants” and other international migrants as “Not Restricted migrants.”

Labor market outcomes We complement our analysis by measuring the literacy rate of people older than ten, labor force participation, the share of workers employed in agriculture, manufacturing, and services, and the urban population also using data from the Census. Given the anecdotal evidence about the impetus the Panama Canal gave to lumber industries, we measure the share of the labor force in each county that works in the wood and lumber industries. Figure A.1 summarizes the variation in economic structure and development in 1910, right around the time the Great Migration was starting and before the Panama Canal began operations.

3.2 Empirical Framework

In our main empirical specification, the total black population born in the South living on county c on Census year t , as a share of the total county population in 1900, y_{ct} , is regressed on the change in Market Access due to the Canal interacted with decade dummies, d_j below, for 1900, 1910, 1930, and 1940:

$$y_{ct} = \sum_{j=1900}^{1940} \beta_j d_j \times \Delta \text{Ln}(MA_c) + \sum_{j=1900}^{1940} \gamma_j X_c \times d_j + \delta_t + \delta_c + \epsilon_{ct} \quad (5)$$

We control for county and year fixed effects, δ_c, δ_t respectively, in our preferred specification. All specifications also control for total county population in 1900, total black population in 1900, and share of urban population in 1900 (X_c) interacted with Census year dummies. In other specifications, we also control for predicted migration at the county level, which varies by decade from 1910 to 1940. Notice that by construction, the predicted migration is only correlated with the share of African Americans born in the South living in non-Southern states in 1900. Changes in predicted migration depend on the State mix of Southern migrants and push factors from Southern states. As we discuss below, neither component is correlated to the gains in Market Access due to the Panama Canal at the county level.

The identification assumption is that, in the absence of the Canal, counties that benefited more from the Panama Canal would have received the same average influx of Southern-born African American migrants than counties which did not benefit from the Canal. We

cluster standard errors at the county level.¹⁰

4 Results: Market Access and the Great Migration

Market Access Gains We measure counties' exposure to the Panama Canal as the difference in Market Access in 1920 between a world where trade through the Canal is possible and a world where it is not. This is a continuous measure that we normalize in terms of changes in the Interquartile Range for ease of interpretation. Which counties benefit from the Canal is a function of the transportation network and the distribution of economic activity across space. Our empirical strategy relies in comparing the paths of migration in more and less exposed counties, before and after the Canal. However, it is also useful for our estimation to show that the MA shock is not correlated with counties characteristics that may drive immigration over time. Table 1 shows the correlation between the MA shock and counties characteristics in 1900, 1910, and 1920. There are no systematic correlates of our shock measure that may confuse our results. Importantly, we show no correlation between the share of the black or southern-born black population and MA gains from the Canal.

Main results Table 2 reports the differences in the share of the black population born in the South by the gains in Market Access due to the Panama Canal. We find that counties that benefited more from the Panama Canal increased their Southern black population relative to counties that benefited less from the Canal, only after 1920. In this setting, the treatment happens simultaneously for all counties, after 1920, but the treatment effect is allowed to be different for different decades. In other words, our empirical specification resembles a difference-in-differences with continuous treatment (Callaway et al., 2024).

While our coefficients come from a continuous variable that measures the exposure to the Panama Canal, we standardize the coefficients to interpret them as the effect of moving one county from the 25th to the 75th percentile in the distribution of gains in Market Access from the Canal. For instance, from Column (1), increasing the Market Access gains from the Canal from the 25th to the 75th would increase the number of Southern blacks as a share of the population by 0.032 percentage points in 1930, 10 years after the Canal started operations. That is equivalent to an increase of 7.9% relative to the average non-Southern county in 1920. The effect is persistent for 1940. Each coefficient is interpreted as

¹⁰Our results are also robust to clustering the standard errors using 300km-by-300km squares from an arbitrary grid to account for spatial correlation.

the difference between the outcome relative to the difference in 1920. The coefficients are then interpreted as being the cumulative rate of growth of Southern black migration. Subtracting the coefficient from 1940 to that of 1930 would yield the growth in Southern-born African-American migrants in the decade between 1930 and 1940.

The Online Appendix shows that our results are robust to different specifications. In particular, it might be the case that our MA gains measure is correlated with the level of Market Access before the Canal was open. Therefore, location fundamentals might explain our results and not the gains in MA due to the Canal. In Table A.1 we show that our results are robust to controlling for MA level in 1910, interacted with year dummies. Moreover, our results are similar when we control for a polynomial in longitude and latitude (interacted with year dummies) to account for location fundamentals that might be correlated with the gains in Market Access due to the Panama Canal. To account for other economic shocks at the state level, we show our results are robust to including state by year fixed effects, similar to the empirical framework in Hornbeck and Naidu (2014).

As explained in Section 3.1, our Market Access gains estimates use specific values for two important parameters, $\bar{P} = 35.7$ and $\theta = 2.79$. Our preferred MA gains measure also uses 1920 population data. Table A.2 shows that our results are also robust to estimating MA gains with extreme values for \bar{P} (17.5 or 71) and θ (1 or 9). We also report that the main results remain robust to estimating Market Access gains using 1910 population levels instead of 1920. Finally, Figure A.4 shows that our main results do not change when dropping one state at a time.

Consistent with the identification assumption, we do not find any difference between counties that gained more and counties that gained less exposure to markets from the Panama Canal before it opened. Coefficients from 1900 and 1910 are small and not statistically different from 0. These coefficients imply that the growth in the number of Southern blacks was not different by the level of Market Access gains between 1900 and 1920 or between 1910 and 1920. This is important since the Great Migration was underway during the 1910s. In other words, the number of Southern-born African Americans living outside the South evolved similarly in counties that would eventually benefit from the Canal and in counties that would not benefit from it until the Canal started operations.

One concern is that places that benefited more from the Canal had a different initial mix of migrant networks that would lead them to receive a higher influx of Southern-born African Americans over time. Beyond the fact that coefficients from 1900 and 1910 are close to 0, Table 2, Column (2) reports that the main estimates do not change considerably when

controlling for our shift-share estimate of potential migration rate.¹¹ The Market Access gains effect on migration goes beyond what traditional migrant networks could predict.

Immigration restrictions in the 1920s During the 1920s, the US implemented strict immigration restrictions to several Southern and Eastern European countries. Abramitzky et al. (2023) show that the quota system led to replacement of foreign migrant labor for internal migrants, specially in urban areas. These restrictions may have affected the first wave of the Great Migration through higher labor demand in counties exposed to the immigration quotas. We can explore how the opening of the Panama Canal interacted with the migration restrictions by controlling for a dynamic effect of the policy. Table 2 Column (3) expands our main specification by controlling for the share of restricted migrants living in a county in 1900 (we follow Abramitzky et al. (2023) and denote this share as QE1). The immigration quota had a positive and significant effect on Southern-born African American migration. Places more exposed to the quota increased their share of southern-born African American population by 1940. However, we do not find a cross effect of the restriction. We do not see differences from the double interaction between our MA shock measure and QE1.

Road construction after 1920 We interpret the results so far as being driven by labor market demand, brought about by the increased ability to trade goods through the Panama Canal and not from reduced migration costs. However, counties exposed to the Canal may have built internal transportation infrastructure as a consequence of the shock. Improved internal infrastructure may be behind part of the results we find. In order to explore this idea more closely, Column (4) expands our main specification by controlling for the interaction between the MA shock and the change in road density (measured as kilometers per capita) after the Canal opened. Our results show that the increase in migration is large and significant even in places with low road construction after 1920. Moreover, the effect is in fact stronger for counties that built mode roads as a consequence of the increased Market Access: the coefficients on the interaction are positive and significant after 1920.

¹¹Our results are robust to controlling for log predicted migration flows instead of predicted migration rates.

4.1 Market Access and Economic Opportunities

We showed that Southern black migrants chose places that benefited more from the increase in Market Access due to the Panama Canal over places that benefited less. We argue that places that benefited from the Canal had more attractive labor markets for migrants than other places (See Section 2). In the United States, improvements in Market Access led to higher land values in agriculture (Donaldson and Hornbeck, 2016) and higher levels of manufacturing activity (Hornbeck and Rotemberg, 2024). Moreover, Maurer and Rauch (2020) show that improvements in Market Access due to the Panama Canal improved the manufacturing and services sector more than agriculture. Are migration patterns during the first half of the 20th century consistent with the economic geography findings?

Table 3 reports differences in estimated effects by groups formed according to the 1910 county-level economic structure. Panel A focuses on labor market outcomes, while Panel B focuses on economic structure. Even columns reproduce our preferred empirical strategy for places above the median county in 1910 in terms of specific characteristics. Odd columns restrict the analysis to places below the median. For instance, Panel A Column (5) shows the effect for places where black workers had lower than median unemployment rate. Panel B Column (1) shows the effect for places with lower than median urban share of the population.

Panel A provides more evidence of our hypothesized mechanism. We show the effect of Market Access gains on migration was concentrated in places with low labor force participation and low unemployment rate for black workers at the beginning of the 20th century. In other words, only places with tight labor markets for African American workers at the beginning of the 20th century, that could accommodate an influx of workers easier, attracted more migrants from the Great Migration.

Panel B shows that the effects of Market Access on the migration of Southern-born African Americans are concentrated in more urban places with more developed manufacturing and services sector. Overall, the effect of increased Market Access on migration is most present in places ahead in the process of structural transformation: places with lower participation in agriculture and higher participation in manufacturing and services. There can be two interpretations of this finding. First, Collins and Wanamaker (2014) show that Southern black migrants are disproportionately drawn from manufacturing and services industries and that people living on farms are considerably less likely to migrate. Since the pool of migrants is biased toward the secondary and tertiary sectors, they might choose places where those sectors are more developed. In other words, migrants can be select-

ing themselves to areas that are both more developed and benefited more from the Canal. Another interpretation is that places further ahead in the structural transformation process benefited more from the increase in Market Access than places more specialized in agriculture. Therefore, those places are the ones to draw migrants. Our approach cannot disentangle between them, but both likely play a role in migration location decisions.

How did migrants learn about the increases in economic opportunities brought about by the Canal? Mr. Marsh' story from Section 2 illustrates some of the dynamics of the Great Migration. He ended up settling in Wallowa County, OR, where there was already a base of Southern Black loggers who helped recruit other workers from the South. Potentially, the Panama Canal shock increased first the economic opportunities of local workers, who might have used their networks to recruit labor with the promise of good employment and income.

Table 4 illustrates how the Market Access shock interacts with local settlements of Southern Blacks. Column (1) reproduces our main results from Table 2. In Column (2), we include the triple interaction between year dummies (excluding 1920), our gains in MA measure, and a dummy equal to one for counties with existing settlements of Southern-born African Americans in 1900. Similarly, Column (3) shows results using a continuous measure of those settlements: the share of Southern-born African Americans with respect to the total population in 1900. Both results suggest that the effects of the Panama Canal shock were propagated in places that had already existing networks migrants could take advantage of.

4.2 Beyond the Great Migration

We have focused so far in the migration location decisions of Southern-born African Americans. They were already exiting the South in large numbers before the Canal opened, motivated by poor economic conditions and violent political repression. Our result suggests that they located in places that benefitted from the Panama Canal because those places provided better economic opportunities.

However, those economic opportunities were potentially not limited to black workers. Therefore, if Market Access serves as a pull factor for migration decisions, we should also see other groups of migrants being attracted to counties with improved economic conditions after 1920. Column (1) reproduces our main result. Columns (2)-(5) of Table 5 perform the same analysis for different groups of migrants. In particular, Column (2) reports that the effects of the increase in Market Access due to the Panama Canal are also

experienced by Southern White migrants, part of the simultaneous “other Great Migration” (Bazzi et al., 2021). Column (3) focuses on international migration from countries not exposed to the migration restrictions. Column (4) does an analogous exercise for restricted migrants and Column (5) shows European migration, regardless of their 1920s migration law status. We see that the effect of the Panama Canal translates into more migration overall, specially from not restricted countries.

5 Conclusion

The Great Migration significantly changed American demography. Previous contributions highlighted that migrants and receiving localities were affected. The results from this episode in American history have considerable implications for how we understand current racial gaps in economic and political outcomes. We contribute to these lines of research by highlighting how migrants chose where to move. Specifically, we focus on how exposure to markets, by dynamizing labor markets, served as a pull factor during the Great Migration. We exploit the Panama Canal opening as a historical coincidence. With the migration wave already under way, we ask whether places that benefitted more from the Canal received a systematically higher influx of migrants.

We find that changes in Market Access due to the Panama Canal increased the migration of African Americans during the first wave of the Great Migration out of the American South. These effects go beyond what pre-existing migrant networks would predict. Our findings are stronger for counties that were ahead in the process of structural transformation and for those that specialized more in lumber industry, which was the second largest employer of Southern-born African Americans. Moreover, the Panama Canal shock had stronger effects in counties with tight labor markets, which could receive more workers. Taken together, our results suggest that the opening of the Panama Canal had a relevant role in shaping the location of the African American population in the United States over the twentieth century by changing the distribution of labor market opportunities.

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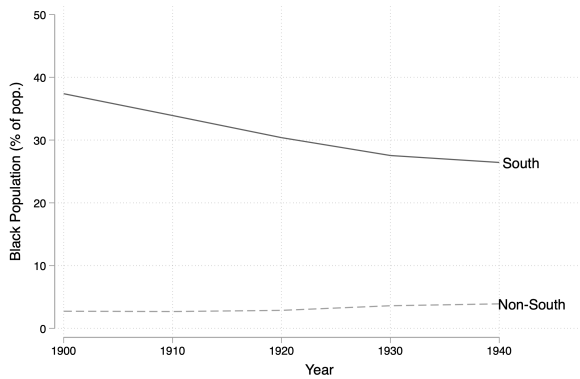
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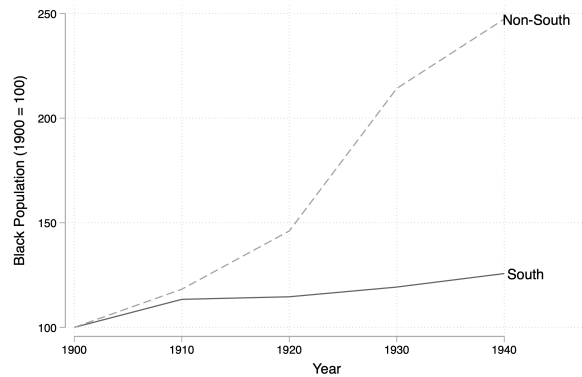
Figures and Tables

Figure 1: The First Wave of the Great Migration

(a) Black population by region (% of total pop.)



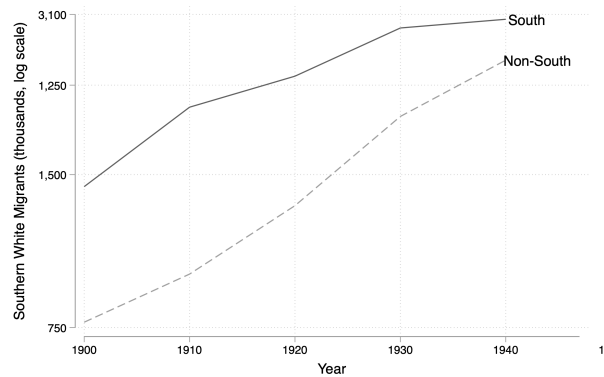
(b) Growth in black population by region (1900 = 100)



(c) Southern-born Black Migrants (000s, log scale)



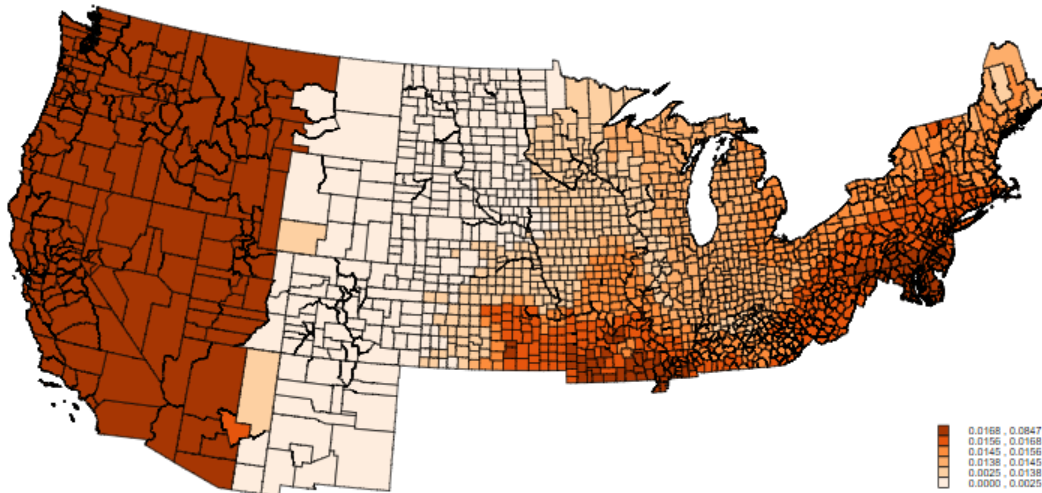
(d) Southern-born White Migrants (000s, log scale)



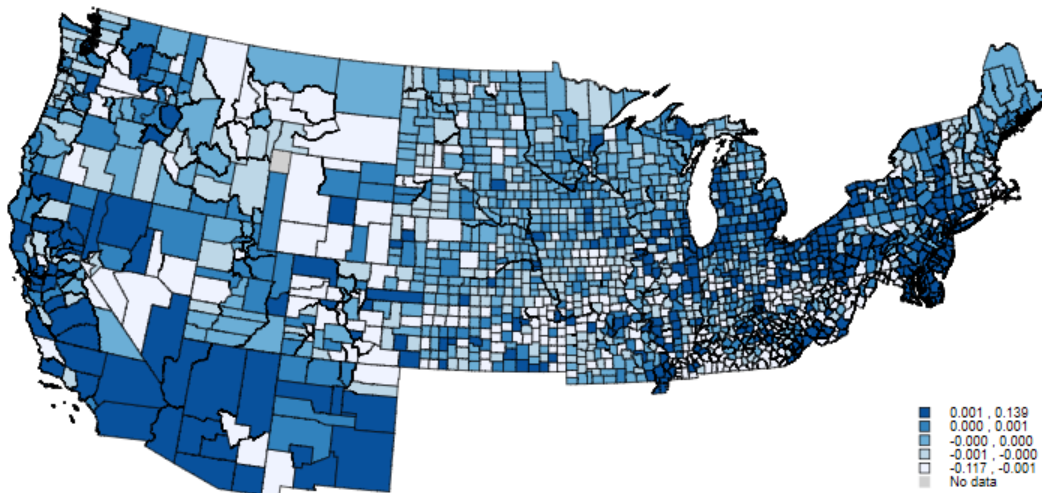
Note: We divide states between the Southern (solid line) and Non-Southern (dashed line) region. Southern states are all the states that seceded from the Union during the Civil War plus Oklahoma. Figure (a) shows the black population as a percentage of the total population by region. Figure (b) shows the regional growth rate of the black population, by normalizing the level on each region to 100 in 1900. Figures (c) and (d) show the (log) number of Southern black migrants (c) and Southern white migrants (d) living in Southern and Non-Southern states. We identify migrants in the Census as individuals living in a different state than their birthplace. Source: IPUMS Decennial Census, 1900-1940.

Figure 2: Market Access due to the Panama Canal and First Great Migration

(a) Change in Market Access due to the Panama Canal



(b) Δ African Americans Born in Southern States Share of Total Pop., 1940-1910



Note: Figure (a) shows the variation in Market Access gains in 1920 due to the Panama Canal opening. Gains in Market Access in 1920 are the difference between actual Market Access and counterfactual Market Access if trade routes through the Panama Canal did not exist in 1920. For more details see Section 3.1. Figure (b) shows the 1910 to 1940 change in the African American population born in Southern States living in non-Southern counties.

Table 1: Correlation between Panama Canal Gains ($\Delta \ln(MA_{1920})$) and 1900, 1910, 1920 Characteristics

Year	(1)	(2)	(3)	(4)	(5)	(6)
State FE	1900	X	1910	X	1920	X
	$\Delta \ln(MA_{1920})$ Coefficient					
Dependent Var.						
% Black	-0.046	0.103	-0.082	-1.023*	-0.024	0.003
Mean	(0.094)	(0.144)	(0.087)	(0.583)	(0.075)	(0.100)
		2.341		2.568		2.484
% Southern Black	-0.001	-0.009	-0.007	-0.001	-0.006	0.044
Mean	(0.011)	(0.066)	(0.008)	(0.037)	(0.010)	(0.034)
		0.309		0.310		0.347
% Southern White	0.044	0.049	0.223**	0.234	0.150*	-0.039
Mean	(0.054)	(0.237)	(0.107)	(0.221)	(0.078)	(0.132)
		2.034		2.076		2.132
% "Restricted" Migrants	0.147	-0.129	0.341*	-0.176	0.224	-0.417**
Mean	(0.254)	(0.131)	(0.175)	(0.111)	(0.172)	(0.168)
		2.194		3.220		3.105
% European Migrants	-0.132	0.004	0.084	-0.423	0.140	-0.372
Mean	(0.391)	(0.456)	(0.344)	(0.331)	(0.293)	(0.321)
		11.383		10.592		8.328
Labor Force Part. Rate	0.006***	-0.014***	0.007***	-0.008*	0.007***	-0.003
Mean	(0.002)	(0.004)	(0.002)	(0.005)	(0.001)	(0.002)
		0.571		0.587		0.564
Unemployment Rate			0.003***	0.002		
Mean			(0.001)	(0.002)		
			0.051	0.051		
Urban Share	0.002	0.002	0.006**	0.010	0.006**	0.012
Mean	(0.003)	(0.011)	(0.003)	(0.010)	(0.002)	(0.011)
		0.170		0.206		0.233
Agriculture Labor Share	-0.011***	0.001	-0.015***	-0.014*	-0.010***	-0.014
Mean	(0.003)	(0.010)	(0.003)	(0.008)	(0.002)	(0.008)
		0.570		0.529		0.505
Manufacturing Labor Share	0.002	-0.009	0.006*	0.003	0.007***	0.004
Mean	(0.001)	(0.007)	(0.003)	(0.004)	(0.002)	(0.006)
		0.114		0.164		0.172
Services Labor Share	0.002	-0.002	0.006***	0.012**	0.002	0.008*
Mean	(0.002)	(0.005)	(0.002)	(0.004)	(0.001)	(0.004)
		0.189		0.241		0.258
Lumber Labor Share	0.002	0.002	0.005*	0.004	0.007***	0.003
Mean	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)	(0.003)
		0.016		0.026		0.024

Note: Table shows coefficients from regressing the variables in rows on our measure of MA gains from the Panama Canal. Columns (1) and (2) use outcomes from 1900; (3) and (4) from 1910; and (5) and (6) from 1920. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. Specifications in even columns include State fixed effects. All specifications control for log population. Standard errors clustered at the State level are shown in parentheses. The sample in all regressions is the 1,756 Non-Southern counties * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Panama Canal and Migration of Southern Born African Americans

Dependent Variable:	African Americans Born in the South % of 1900 Pop.			
	(1)	(2)	(3)	(4)
1900 $\times \Delta \ln(MA_{1920})$	-0.004 (0.010)		-0.010 (0.013)	-0.000 (0.009)
1910 $\times \Delta \ln(MA_{1920})$	-0.000 (0.009)	-0.000 (0.009)	-0.003 (0.013)	0.003 (0.008)
1930 $\times \Delta \ln(MA_{1920})$	0.032** (0.015)	0.032** (0.015)	0.036* (0.018)	0.029** (0.012)
1940 $\times \Delta \ln(MA_{1920})$	0.079*** (0.026)	0.079*** (0.026)	0.076** (0.032)	0.068*** (0.022)
Restricted Migrants 1900 pop. share (QE1) $\times \dots$				
... 1900 $\times \Delta \ln(MA_{1920})$			0.001 (0.001)	
... 1910 $\times \Delta \ln(MA_{1920})$			0.001 (0.001)	
... 1930 $\times \Delta \ln(MA_{1920})$			-0.001 (0.001)	
... 1940 $\times \Delta \ln(MA_{1920})$			0.000 (0.002)	
1900 \times QE1			0.001 (0.004)	
1910 \times QE1			-0.001 (0.003)	
1930 \times QE1			0.007 (0.004)	
1940 \times QE1			0.011** (0.005)	
Δ Road KM per cap. (1920-1960) - (1880-1920) $\times \dots$				
... 1900 $\times \Delta \ln(MA_{1920})$				-0.010 (0.010)
... 1910 $\times \Delta \ln(MA_{1920})$				-0.005 (0.009)
... 1930 $\times \Delta \ln(MA_{1920})$				0.031** (0.014)
... 1940 $\times \Delta \ln(MA_{1920})$				0.064*** (0.024)
N	8,745	6,996	8,745	8,115
Mean Dep. Var.	0.353	0.411	0.353	0.374
Predicted Mig.		X		
r2	0.739	0.826	0.739	0.740

Note: Dependent variable for all specifications is the number of African Americans born in the South living on each non-Southern county for each decade between 1900 and 1940 divided by total population in 1900. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. Column (2) controls for Predicted Migration, estimated using the 1900 share of African Americans born in each Southern state and the change in Southern born African Americans living outside the South between Census. Column (3) controls for the exposure to the 1920 immigration quotas. Column (4) controls for the change in road density, measured as road length per capita in the period 1920-1960 minus road km per capita in the period 1880-1920. All specifications include county and year fixed effects and control for total population, total southern black population, and the share of urban population in 1900, each interacted with year dummies. Standard errors clustered at county level in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Heterogeneity by 1900 Characteristics

Dep. Variable:	African Americans Born in Southern States as % of Population							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: Labor Markets</i>								
Sample 1910:	All Workers				African American Workers			
	Unemployment		LF Part. Rate		Unemployment		LF Part. Rate	
Below or Above Median?	Below	Above	Below	Above	Below	Above	Below	Above
1900 $\times \Delta Ln(MA_{1920})$	0.008 (0.010)	-0.008 (0.015)	-0.009 (0.014)	0.001 (0.013)	-0.023 (0.023)	-0.049 (0.037)	-0.040 (0.042)	-0.025 (0.020)
1910 $\times \Delta Ln(MA_{1920})$	0.010 (0.014)	-0.003 (0.013)	-0.009 (0.013)	0.004 (0.012)	-0.000 (0.027)	-0.022 (0.022)	-0.014 (0.028)	-0.022 (0.018)
1930 $\times \Delta Ln(MA_{1920})$	0.029 (0.022)	0.040* (0.021)	0.019* (0.010)	0.031 (0.019)	0.071* (0.037)	0.066 (0.070)	0.204** (0.082)	-0.001 (0.021)
1940 $\times \Delta Ln(MA_{1920})$	0.067* (0.040)	0.091** (0.036)	0.019 (0.012)	0.092*** (0.034)	0.134** (0.065)	0.167 (0.139)	0.407*** (0.157)	0.020 (0.028)
<i>N</i>	4,355	4,390	4,360	4,385	2,250	1,705	1,655	2,000
Mean Dep. Var.	0.324	0.381	0.262	0.443	0.639	0.777	0.861	0.604
r2	0.779	0.685	0.684	0.767	0.752	0.806	0.855	0.711
<i>Panel B: Sectors</i>								
Sample 1910:	Urban Pop.		Agric. Workers		Manuf. Workers		Service Workers	
Below or Above Median?	Below	Above	Below	Above	Below	Above	Below	Above
1900 $\times \Delta Ln(MA_{1920})$	0.011 (0.010)	-0.021 (0.017)	-0.010 (0.015)	0.010 (0.009)	-0.015 (0.015)	0.003 (0.016)	0.005 (0.008)	-0.004 (0.014)
1910 $\times \Delta Ln(MA_{1920})$	-0.002 (0.008)	-0.002 (0.016)	0.001 (0.014)	-0.003 (0.006)	-0.008 (0.018)	0.005 (0.011)	-0.007 (0.005)	0.004 (0.013)
1930 $\times \Delta Ln(MA_{1920})$	0.011 (0.010)	0.060** (0.027)	0.042* (0.023)	0.018** (0.009)	0.018 (0.013)	0.045* (0.026)	0.018** (0.009)	0.039* (0.021)
1940 $\times \Delta Ln(MA_{1920})$	0.029** (0.011)	0.141*** (0.050)	0.107*** (0.040)	0.034** (0.015)	0.041** (0.018)	0.117** (0.047)	0.035** (0.016)	0.099*** (0.037)
<i>N</i>	4,345	4,400	4,360	4,385	4,350	4,395	4,375	4,370
Mean Dep. Var.	0.222	0.482	0.446	0.259	0.236	0.468	0.280	0.425
r2	0.789	0.691	0.699	0.795	0.681	0.756	0.799	0.695

Note: Dependent variable for all specifications is the number of African Americans born in the South living on each non-Southern county for each decade between 1900 and 1940 divided by total population in 1900. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. Columns vary by the sample of counties they include. Columns divide counties in groups above and below the median value in 1910 of counties' characteristics. Panel A focuses on dividing samples according to labor market outcomes for all workers (Columns (1)-(4)) and only for African American workers (Columns (5)-(8)). For instance, Panel A - Column (2) focuses on counties with unemployment rate above the 1910 median. All specifications include county and year fixed effects and control for 1900 total and black population, both interacted with year dummies. Standard errors clustered at county level in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Role of Existing Networks For MA Shock

Dependent Variable:	African Americans Born in the South % of 1900 Pop.		
	(1)	(2)	(3)
1900 $\times \Delta \ln(MA_{1920})$	-0.004 (0.010)	-0.007 (0.009)	0.002 (0.012)
1910 $\times \Delta \ln(MA_{1920})$	-0.000 (0.009)	-0.007 (0.010)	0.011 (0.008)
1930 $\times \Delta \ln(MA_{1920})$	0.032** (0.015)	-0.004 (0.010)	-0.030** (0.013)
1940 $\times \Delta \ln(MA_{1920})$	0.079*** (0.026)	0.017** (0.008)	-0.041 (0.026)
Southern Black 1900 > 0 $\times \dots$			
... 1900 $\times \Delta \ln(MA_{1920})$		0.002 (0.016)	
... 1910 $\times \Delta \ln(MA_{1920})$		0.007 (0.015)	
... 1930 $\times \Delta \ln(MA_{1920})$		0.051** (0.022)	
... 1940 $\times \Delta \ln(MA_{1920})$		0.084** (0.036)	
% Southern Black 1900 $\times \dots$			
... 1900 $\times \Delta \ln(MA_{1920})$			-0.103 (0.120)
... 1910 $\times \Delta \ln(MA_{1920})$			-0.104 (0.099)
... 1930 $\times \Delta \ln(MA_{1920})$			0.506*** (0.134)
... 1940 $\times \Delta \ln(MA_{1920})$			0.927*** (0.265)
<i>N</i>	8,745	8,745	8,735
Mean Dep. Var.	0.353	0.353	0.347
r ²	0.739	0.729	0.763

Note: Dependent variable for all specifications is the number of African Americans born in the South living on each non-Southern county for each decade between 1900 and 1940 divided by total population in 1900. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. Column (1) reproduces main results from Table 2-Column (3). Column (2) includes interactions between MA, year dummies, and a dummy equal to one for counties with a positive number of Southern African Americans in 1900. Column (3) includes interactions between MA, year dummies, and the percentage of Southern African Americans in 1900. All specifications include county and year fixed effects and control for total population, total southern black population, and the share of urban population in 1900, each interacted with year dummies. Standard errors clustered at county level in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Panama Canal and Migration By Group

Dep. Var:	South Black (1)	South White (2)	Not Restricted (3)	Restricted (4)	European (5)
$1900 \times \Delta Ln(MA_{1920})$	-0.004 (0.010)	-0.221** (0.112)	-0.320 (0.265)	-0.041 (0.162)	0.050 (0.292)
$1910 \times \Delta Ln(MA_{1920})$	-0.000 (0.009)	0.100 (0.113)	-0.296 (0.205)	0.437 (0.273)	0.157 (0.283)
$1930 \times \Delta Ln(MA_{1920})$	0.032** (0.015)	0.500*** (0.178)	0.374* (0.200)	0.091 (0.109)	0.213 (0.165)
$1940 \times \Delta Ln(MA_{1920})$	0.079*** (0.026)	1.382*** (0.291)	0.449** (0.184)	0.200* (0.113)	0.628*** (0.187)
N	8,745	8,745	8,745	8,745	8,745
Mean Dep. Var.	0.353	2.635	13.016	3.867	14.197
r^2	0.739	0.580	0.691	0.690	0.720

Note: All specifications include year and county fixed effects and control for total population in 1900 and the share of urban population in 1900, interacted with year dummies. Dependent variables are the number of migrants as a share of the 1900 population. In order: (1) Southern Blacks, (2) Southern Whites, Migrants from countries (3) not exposed and (4) exposed to the 1920s immigration quotas, and (5) European migrants. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. Standard errors clustered at county level in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Online Appendix

Appendix A Supporting Figures and Tables

Table A.1: Main Results: Robustness to Different Specifications

Dependent Variable:	African Americans Born in the South as Share of 1900 Tot. Population						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$1900 \times \Delta \ln(MA_{1920})$	-0.004 (0.010)	-0.003 (0.010)		0.037 (0.030)		0.066 (0.076)	
$1910 \times \Delta \ln(MA_{1920})$	-0.000 (0.009)	0.002 (0.010)	-0.000 (0.009)	0.031 (0.029)	0.032 (0.029)	0.029 (0.067)	0.029 (0.067)
$1930 \times \Delta \ln(MA_{1920})$	0.032** (0.015)	0.039*** (0.015)	0.032** (0.015)	0.094** (0.041)	0.093** (0.041)	0.078 (0.078)	0.078 (0.078)
$1940 \times \Delta \ln(MA_{1920})$	0.079*** (0.026)	0.083*** (0.026)	0.079*** (0.026)	0.146*** (0.055)	0.146*** (0.055)	0.227** (0.116)	0.227* (0.116)
N	8,745	8,745	6,996	8,745	6,996	8,740	6,992
Mean Dep. Var.	0.353	0.353	0.411	0.353	0.411	0.346	0.404
$1910 MA \times d_t$		X					
Year FE	X	X	X	X	X		
County FE	X	X	X	X	X	X	X
State x Year FE						X	X
Predicted Mig.			X		X		X
Coord. Poly.				X	X		
r2	0.740	0.741	0.827	0.748	0.831	0.751	0.833

Note: Dependent variable for all specifications is the number of African Americans born in the South living on each non-Southern county for each decade between 1900 and 1940. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. Column (2) controls for the level of Market Access in 1910, interacted with year dummies. Columns (4) and (5) control for a second order polynomial on latitude and longitude, interacted with year dummies. Predicted Migration is estimated using the 1900 share of African Americans born in each Southern state and the change in Southern born African Americans living outside the South between Census. All specifications control for total population, total black population, and the share of urban population in 1900, each interacted with year dummies. Standard errors clustered at county level in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

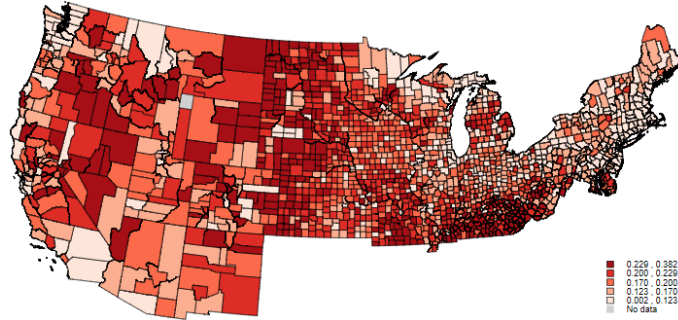
Table A.2: Robustness Check: Different Estimates of MA

Dependent Variable:	African Americans Born in the South as Share of 1900 Tot. Population					
MA Estimate	(1) Main	(2) Fixed Pop. 1910	(3) $\bar{P} = 35.7$ $\theta = 1$	(4) $\theta = 9$	(5) $\theta = 2.79$ $\bar{P} = 17.5$	(6) $\bar{P} = 71$
$1900 \times \Delta \ln(MA_{1920})$	-0.004 (0.010)	-0.005 (0.008)	-0.004 (0.011)	-0.005 (0.008)	-0.004 (0.011)	-0.005 (0.009)
$1910 \times \Delta \ln(MA_{1920})$	-0.000 (0.009)	-0.001 (0.007)	0.000 (0.011)	-0.001 (0.007)	-0.000 (0.010)	-0.000 (0.008)
$1930 \times \Delta \ln(MA_{1920})$	0.032** (0.015)	0.025** (0.012)	0.037** (0.017)	0.024** (0.011)	0.033** (0.015)	0.029** (0.013)
$1940 \times \Delta \ln(MA_{1920})$	0.079*** (0.026)	0.063*** (0.021)	0.089*** (0.030)	0.061*** (0.020)	0.081*** (0.027)	0.072*** (0.024)
N	8,745	8,745	8,745	8,745	8,745	8,745
Mean Dep. Var.	0.353	0.353	0.353	0.353	0.353	0.353
r2	0.74	0.74	0.74	0.74	0.74	0.74

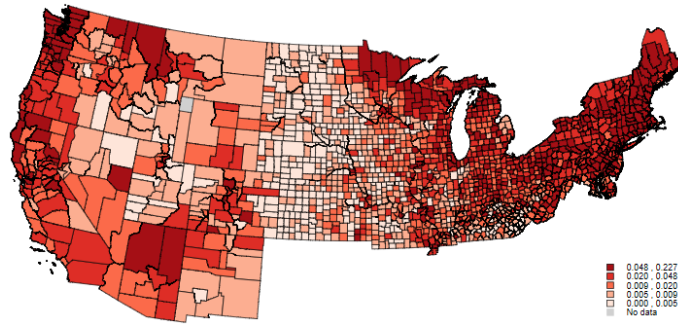
Note: Dependent variable for all specifications is the number of African Americans born in the South living on each non-Southern county for each decade between 1900 and 1940 divided by total population in 1900. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. All specifications include county and state by year fixed effects. Column (1) reproduces main results from Table 2-Column (3). Column (2) uses a measure of changes in MA driven by the canal that fixes population at 1910 (pre canal) levels. Columns (3) and (4) use extreme parameters of θ , while leaving \bar{P} fixed at the same value than Column (1). Columns (5) and (6) fix θ at the same value of Column (1) and show results for extreme values of \bar{P} . Standard errors clustered at 300km x 300km cells from an arbitrary grid in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Figure A.1: County-level Economic Structure, 1910

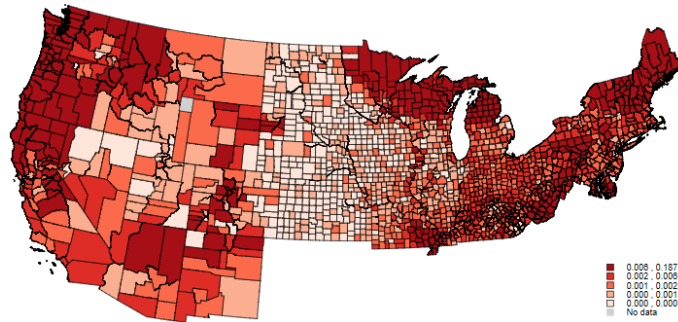
(a) Agricultural Workers (Share of Population)



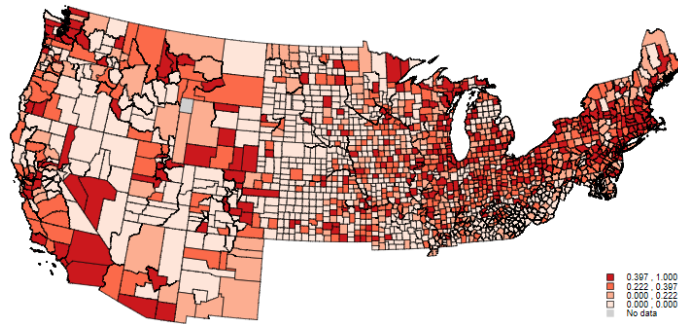
(b) Manufacturing Workers (Share of Population)



(c) Lumber and Wood Products Workers (Share of Population)



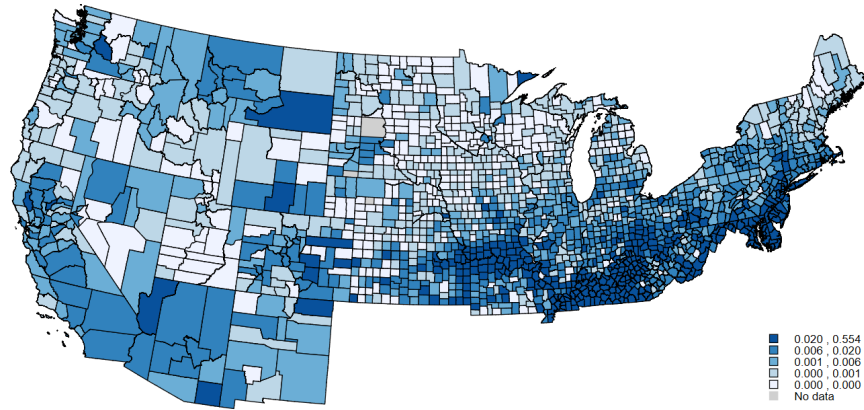
(d) Urban Population (Share of Population)



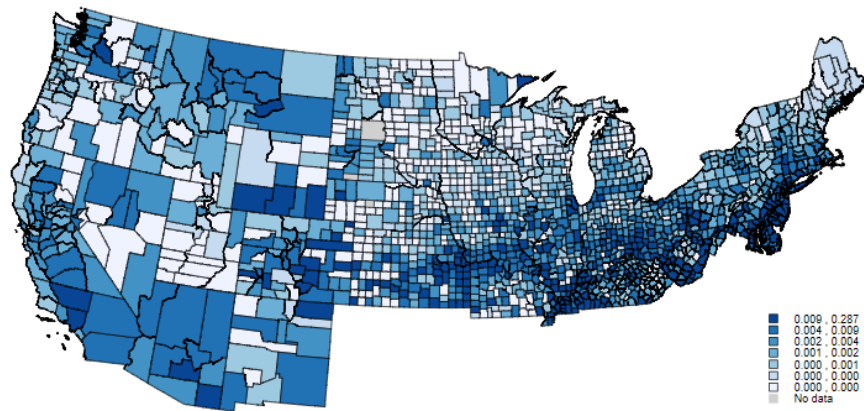
Note: All figures come from 1910 Census of Population. Notice color categories vary by subfigure.

Figure A.2: African American Population in 1900

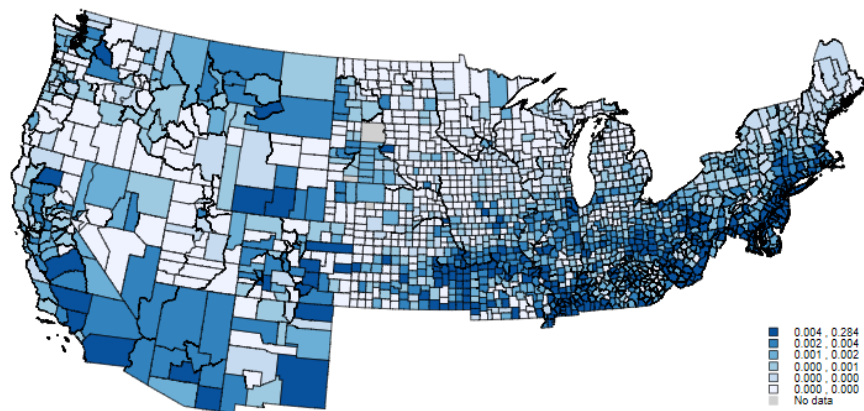
(a) African Americans (Share of Total Population)



(b) African Americans Born out of State (Share of Total Population)



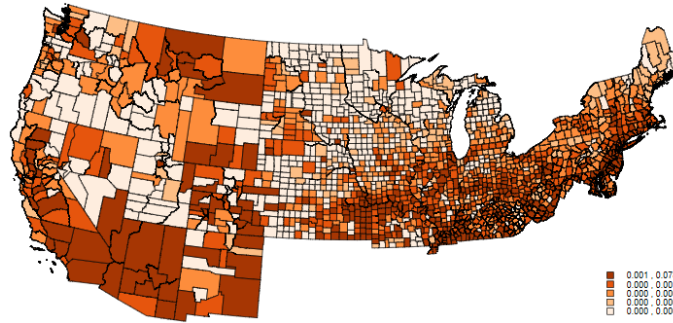
(c) African Americans Born in Southern States (Share of Total Population)



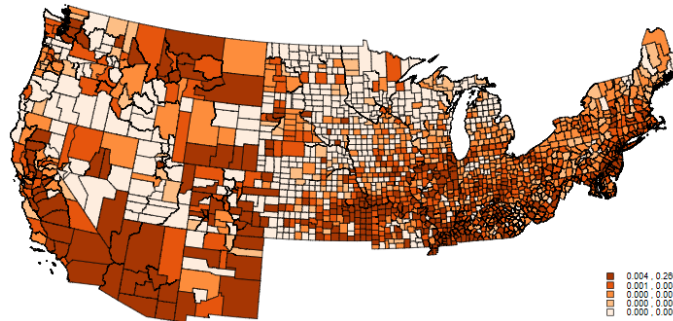
Note: All sub-figures are from the 1900 full-count census data. Notice the color categories are not uniform between the sub-figures.

Figure A.3: Predicted Migration of Southern-born African-Americans by Decade

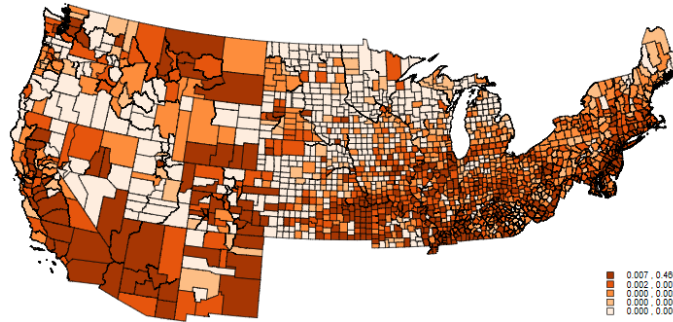
(a) 1910-1900



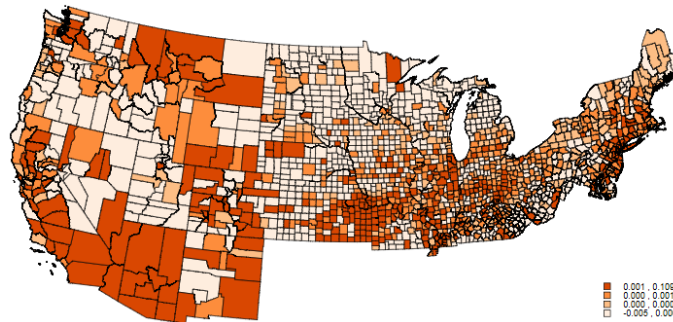
(b) 1920-1910



(c) 1930-1920

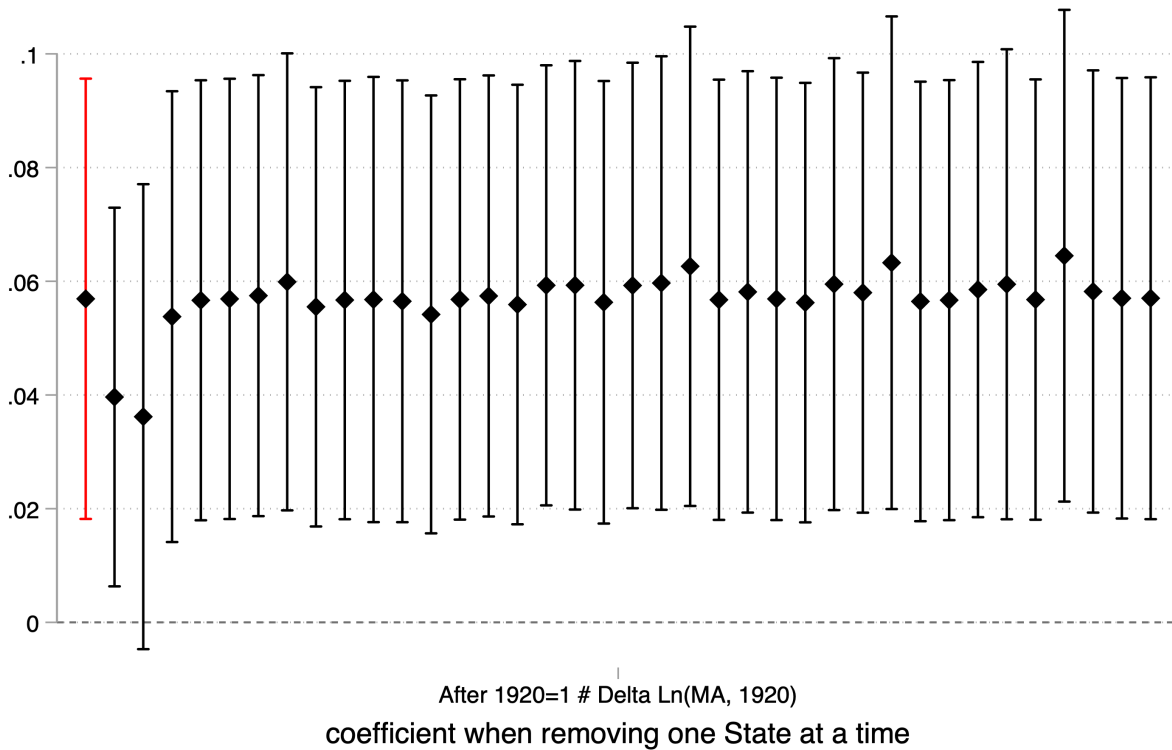


(d) 1940-1930



Note: Predicted migration to county c is given by the sum over all Southern states of the share of African Americans born in State j in 1900 multiplied by each decade's change in African Americans born in Southern State j living outside the South. Notice the color categories are not uniform between the sub-figures.

Figure A.4: Main Result: Robustness to Removing One State at a Time



Note: Figure shows the coefficients and 90% confidence intervals from regressions of the percentage of Southern born African Americans $After_{1920} \times \Delta Ln(MA_{1920})$ controlling for county and year fixed effects. Coefficients vary in the underlying sample. First one from left to right (in red) comes from Table 2, Panel B, Column (1). The rest of the coefficients come from regressions where one State is left out. From left to right: Arizona, California, Colorado, Connecticut, Delaware, DC, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, West Virginia, Wisconsin, Wyoming.