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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 African American migrants preferred areas with enhanced market access, leading to higher inflows after 1920. The study highlights the inter- play 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. Understanding the distinction between these channels is of theoretical importance for comprehending 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.

Between 1910 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 primarily 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. Coincidentally, in 1920, around the same time as the initial wave of the Great Migration, 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, 1923). Additionally, Maurer and Rauch (2020) demonstrated that the Canal contributed to increased employment and wages in exposed counties within the United States.[1] 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.[2] Consequently, the Panama Canal shock should only

[1] Recent 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, 2021), and canals (Galiani et al., 2022).

[2] For instance, Wilkerson's Pulitzer award winner book or Jacob Lawrence's 1940 painting series.

affect Southerner's migration decisions through its effect on local labor markets, unlike the case of other transportation infrastructure (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.[3] 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 and could also influence internal migration, are properly accounted for.

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 11.8% increase in the share of African Americans born in the South relative to the average county in our sample in 1920.

[3]This definition follows the economic geography literature, e.g. Redding and Venables (2004); Donaldson and Hornbeck (2016); Hornbeck and Rotemberg (2021).

One 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 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 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 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[4]

[4]Additionally, we investigated whether European migrants were also selecting localities benefiting from the Canal, but we did not find evidence indicating that Market Access gains influenced their location deci-

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 transportation network to move from one place to another. Second, transportation infrastructure increases economic activity and labor demand (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 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 on both migrants and their descendants (Margo, 1990; 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

sions. This result might be explained by the lack of relationship by the lack of a pre-existing relationship between the share of a county's European migrants in 1900 and Market Access gains due to the Panama Canal. However, we approach the interpretation of the (lack of) results for European migrants with caution, as there were restrictions on international migration that coincided with the opening of the Canal (Collins, 1997; Abramitzky et al., 2019).

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

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, 2021). The Panama Canal was not an exception. Galiani et al. (2022) 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).[5] 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

[5]Constant 1925 US Dollars.

"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.[6]

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.[7] Second, companies in the West used family 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).

[6] "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).

[7] Another 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 impossible to gain the southern mills." (Crawford, 2008).

# 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.

### 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 $c$.

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

Where $\tau_{cd}$ 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 $\theta$ is the elasticity of trade to trade-costs. The trade cost $\tau$ is computed as:

$$\tau_{cd} = 1 + \frac{t_{cd}}{\bar{P}} \tag{2}$$

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 $\theta$.

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 (Maddison project). 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).[8] 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.

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, $t_c d$, between each county and each destination. These use the transportation network and the rates described above. We follow Hornbeck and Rotemberg (2021), 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. (2022).

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.

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

$$\Delta ln(MA_c) = ln(MA_c|Canal) - ln(MA_c|NoCanal) \tag{3}$$

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 1a shows the variation in our covariate of interest.

**Measuring the Great Migration**

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. Since the Great Migration relied heavily on migrant networks, we zoom in to the 1,225 counties with at least one black person born in the South by 1900. Our sample includes 89.8% of the US population and 99.7% of the Black population living outside the South in 1900. Similarly, we can measure the number of Southern-born whites and European immigrants living in each non-Southern county over time.

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:

$$p_{ct} = \frac{1}{T_{c,1900}} \sum_j \frac{B^j_{c,1900}}{B^j_{1900}} D^j_t \tag{4}$$

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

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:

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

We control for county and year fixed effects, $\delta_c, \delta_t$ 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 African American migrants than counties which did not benefit from the Canal. We cluster standard errors at the county level.[9]

## 4 Results: Market Access and the Great Migration

Table 1 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

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

from the Panama Canal increased their Southern black population relative to counties that benefited less from the Canal, only after 1920. Specifications in Panel A allow the treatment effect from the Canal to vary by decade, while specifications in Panel B group years in two periods: before and after 1920. While coefficients in Panel B allow us to summarize the results over time, we prefer specifications in Panel A since they provide information about the time-varying effect of our causing variable. In this setting, the treatment happens simultaneously for all counties, after 1920, but the treatment effect is allowed to be different for different decades.

We standardize 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) Panel A, 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 0.024 percentage points in 1930, 10 years after the Canal started operations. That is equivalent to an increase of 6.9% relative to the average non-Southern county in 1920. The effect is persistent for 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 $\theta$ (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 very 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 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 African Americans over time. Beyond the fact that coefficients from 1900 and 1910 are close to 0, Table 1 reports that the main estimates do not change considerably when controlling for our shift-share estimate of potential migration rate in Columns (2) and (4).[10] The Market Access gains effect on migration goes beyond what traditional migrant networks could predict.

Additionally, in Table 2, we report that changes in Market Access in 1920 are not correlated with county characteristics in 1900, 1910, or 1920. Related to our predicted migration control, we show no within-state correlation between the share of the Black or southern-born Black population and MA gains from the Canal. Columns (5) to (10) show that counties that benefited from the Canal were not systematically different in 1900, 1910, or 1920 in their urban status or economic structure.

## 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, 2021). 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?

We show that the effects of Market Access on the migration of Southern African Amer-

[10] Our results are robust to controlling for log predicted migration flows instead of predicted migration rates.

icans are concentrated in places with more developed manufacturing and services sector. Table 3 reports differences in estimated effects by groups formed according to the 1900 county-level economic structure. Even columns reproduce our preferred empirical strategy for places below the median county in 1900 in terms of specific characteristics. Odd columns restrict the analysis to places above the median. For instance, Column (2) focuses on counties where the share of the population working in agriculture in 1900 is higher than for the median county. Overall, the effect of increased Market Access on migration is only 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 disproportionally 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 selecting 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.

Additionally, we show that migration was concentrated in places specialized in lumber and wood products. This result is interesting since, anecdotally, one of the sectors that took advantage of lower transportation costs due to the Panama Canal was precisely lumber (Rockwell, 1971). Moreover, (Wright, 1986, p. 203) identifies the lumber industry as the second most important employer of black workers after agriculture. Columns (7) and (8) show that precisely the effects of increased Market Access on migration were higher in places where the lumber industry employed more workers than the median in 1900.

Finally, Columns (11) and (12) provide more evidence of our hypothesized mechanism. We show the effect of Market Access gains on migration was concentrated in places with lower unemployment rate at the beginning of the 20th century. In other words, only places with tight labor markets at the beginning of the 20th century, that could accommodate an influx of workers easier, attracted more migrants from the Great Migration.

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 1. 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 African Americans in 1900. Similarly, Column (3) shows results using a continuous measure of those settlements: the share of Southern 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 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. In particular, Table 5 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). Columns (1) and (2) of Table 5 reproduce Columns (1) and (3) of Table 1, while Columns (3) and (4) perform an analogous empirical analysis changing our focus to the county-level share of Southern whites. Measuring the presence of Southern Whites in both logs and shares of 1900 population, we see that the effect of the Panama Canal translates into more Southern white migration as well. Curiously, our estimated coefficients are relatively similar in magnitude for both groups of migrants[11]

[11]However, these results are not as robust as our results for Black migrants when controling for location fundamentals (Table A.3).

Finally, Columns (5) and (6) repeat the exercise for European born population, both as share of 1900 county population and in levels. These results are much noisier and we cannot rule out that the evolution of European born migrants was the same in counties that benefitted from the Canal than in those that did not benefit, before 1920. We show these results for completeness, but the dynamics of European migration around this time are more complex. While there might be some relocation of European born population to places that benefitted from the Canal, the US restricted international migration in the 1920s (Abramitzky et al., 2019; Collins, 1997), making the results not comparable to our cleaner exercises for local migrants.

# 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 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.

# References


R. Abramitzky, P. Ager, L. P. Boustan, E. Cohen, and C. W. Hansen. The Effects of Immigration on the Economy: Lessons from the 1920s Border Closure, Dec. 2019. URL https://www.nber.org/papers/w26536.

S. Asher and P. Novosad. Rural Roads and Local Economic Development. *American Economic Review*, 110(3):797–823, Mar. 2020. ISSN 0002-8282. doi: 10.1257/aer.20180268. URL https://www.aeaweb.org/articles?id=10.1257/aer.20180268.

J. Atack, F. Bateman, M. Haines, and R. A. Margo. Did Railroads Induce or Follow Economic Growth?: Urbanization and Population Growth in the American Midwest, 1850–1860. *Social Science History*, 34(2):171–197, 2010. ISSN 0145-5532, 1527-8034. doi: 10.1017/S0145553200011202. URL https://www.cambridge.org/core/journals/social-science-history/article/abs/did-railroads-induce-or-follow-economic-growth/B0F5CCC58BAB342D67AC660434C3ABD2. Publisher: Cambridge University Press.

D. Bahar and H. Rapoport. Migration, Knowledge Diffusion and the Comparative Advantage of Nations. *The Economic Journal*, 128(612):F273–F305, 2018. ISSN 1468-0297. doi: 10.1111/ecoj.12450. URL https://onlinelibrary.wiley.com/doi/abs/10.1111/ecoj.12450.

C. Baran, E. Chyn, and B. A. Stuart. The Great Migration and Educational Opportunity. *Philadelphia FED WP 22-04*, page 89, 2022.

S. Bazzi, A. Ferrara, M. Fiszbein, T. P. Pearson, and P. A. Testa. The Other Great Migration: Southern Whites and the New Right, Nov. 2021. URL https://www.nber.org/papers/w29506.

D. A. Black, S. G. Sanders, E. J. Taylor, and L. J. Taylor. The Impact of the Great Migration on Mortality of African Americans: Evidence from the Deep South. *The American Economic Review*, 105(2):477–503, Feb. 2015. ISSN 00028282. URL https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip&db=edsjsr&AN=edsjsr.43495390&lang=es&site=eds-live&scope=site.

G. J. Borjas. Self-Selection and the Earnings of Immigrants. *The American Economic Review*, 77(4):531–553, 1987. ISSN 0002-8282. URL https://www.jstor.org/stable/1814529.

L. Boustan and M. Tabellini. Black Out-Migration and Southern Political Realignment. *Working Paper, Harvard Business School*, 2018.

L. P. Boustan. Competition in the Promised Land: Black Migration and Racial Wage Convergence in the North, 1940-1970. *The Journal of Economic History*, 69(3):755–782, 2009. ISSN 0022-0507. URL http://www.jstor.org/stable/40263942. Publisher: [Economic History Association, Cambridge University Press].

L. P. Boustan. Was Postwar Suburbanization "White Flight"? Evidence from the Black Migration. *The Quarterly Journal of Economics*, 125(1):417–443, Feb. 2010. ISSN 00335533. URL http://ez.urosario.edu.co/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.40506285&lang=es&site=eds-live&scope=site. Publisher: MIT Press.

L. P. Boustan. *Competition in the Promised Land: Black Migrants in Northern Cities and Labor Markets*. Princeton University Press, Oct. 2016. ISBN 9781400882977. Google-Books-ID: yjEeDAAAQBAJ.

E. Bracco, M. De Paola, C. P. Green, and V. Scoppa. The effect of far right parties on the location choice of immigrants: Evidence from Lega Nord Mayors. *Journal of Public Economics*, 166:12–26, Oct. 2018. ISSN 0047-2727. doi: 10.1016/j.jpubeco.2018.07.012. URL https://www.sciencedirect.com/science/article/pii/S0047272718301373.

A. Calderon, V. Fouka, and M. Tabellini. Racial Diversity and Racial Policy Preferences: The Great Migration and Civil Rights. *Review of Economic Studies*, page 55, 2022.

F. Campo, M. Mendola, A. Morrison, and G. Ottaviano. Talents and Cultures: Immigrant Inventors and Ethnic Diversity in the Age of Mass Migration. *Journal of the European Economic Association*, 20(5):1971–2012, Oct. 2022. ISSN 1542-4766. doi: 10.1093/jeea/jvac021. URL https://doi.org/10.1093/jeea/jvac021.

W. J. Carrington, E. Detragiache, and T. Vishwanath. Migration with Endogenous Moving Costs. *The American Economic Review*, 86(4):909–930, Sept. 1996. ISSN 00028282. URL https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip&db=edsjsr&AN=edsjsr.2118311&lang=es&site=eds-live&scope=site.

W. J. Collins. When the Tide Turned: Immigration and the Delay of the Great Black Migration. *The Journal of Economic History*, 57(3):607–632, 1997. ISSN 0022-0507. URL http://www.jstor.org/stable/2951192. Publisher: Cambridge University Press.

W. J. Collins and M. H. Wanamaker. Selection and Economic Gains in the Great Migration of African Americans: New Evidence from Linked Census Data. *American Economic Journal: Applied Economics*, 6(1):220–252, Jan. 2014. ISSN 1945-7782. doi: 10.1257/app.6.1.220. URL https://www.aeaweb.org/articles?id=10.1257/app.6.1.220.

W. J. Collins and M. H. Wanamaker. The Great Migration in Black and White: New Evidence on the Selection and Sorting of Southern Migrants. *The Journal of Economic History*, 75(4):947–992, Dec. 2015. ISSN 0022-0507, 1471-6372. doi: 10.1017/S0022050715001527. URL https://www.cambridge.org/core/journals/journal-of-economic-history/article/great-migration-in-black-and-white-new-evidence-on-the-selection-and-sorting-of-south 1725369E2AD75284E86A238EED110C70. Publisher: Cambridge University Press.

J. Crawford. Working the Quincy Mill: African American lumber mill workers in Northern California, 1926-1955, 2008. URL https://www.blackpast.org/african-american-history/working-quincy-mill-african-american-lumber-mill-workers-northern-california-1926-195

E. Derenoncourt. Can You Move to Opportunity? Evidence from the Great Migration. *American Economic Review*, 112(2):369–408, Feb. 2022. ISSN 0002-8282. doi: 10.1257/aer.20200002. URL https://www.aeaweb.org/articles?id=10.1257/aer.20200002.

D. Donaldson. Railroads of the Raj: Estimating the Impact of Transportation Infrastructure. *American Economic Review*, 108(4-5):899–934, Apr. 2018. ISSN 0002-8282. doi: 10.1257/aer.20101199. URL https://www.aeaweb.org/articles?id=10.1257/aer.20101199.

D. Donaldson and R. Hornbeck. Railroads and American Economic Growth: A "Market Access" Approach. *The Quarterly Journal of Economics*, 131(2):799–858, May 2016. ISSN 0033-5533. doi: 10.1093/qje/qjw002. URL https://doi.org/10.1093/qje/qjw002.

G. Duranton, P. M. Morrow, and M. A. Turner. Roads and Trade: Evidence from the US. *The Review of Economic Studies*, 81(2):681–724, Apr. 2014. ISSN 0034-6527. doi: 10.1093/restud/rdt039. URL https://doi.org/10.1093/restud/rdt039.

F. Eckert, A. Gvirtz, J. Liang, and M. Peters. A method to construct geographical crosswalks with an application to us counties since 1790. Technical report, National Bureau of Economic Research, 2020.

K. Eriksson. Moving North and into jail? The great migration and black incarceration. *Journal of Economic Behavior & Organization*, 159:526–538, Mar. 2019. ISSN 0167-2681. doi: 10.1016/j.jebo.2018.04.024. URL https://www.sciencedirect.com/science/article/pii/S016726811830132X.

K. Eriksson and G. Niemesh. Death in the Promised Land: The Great Migration and Black Infant Mortality. *SSRN Electronic Journal*, 2016. ISSN 1556-5068. doi: 10.2139/ssrn.3071053. URL https://www.ssrn.com/abstract=3071053.

S. Galiani, L. F. Jaramillo, and M. Uribe-Castro. Free-Riding Yankees: Canada and the Panama Canal, Aug. 2022. URL https://www.nber.org/papers/w30402.

P. Gottlieb. *Making Their Own Way: Southern Blacks' Migration to Pittsburgh, 1916-30*. University of Illinois Press, 1997. ISBN 978-0-252-06617-7. Google-Books-ID: YiY-hdTtCINsC.

J. Grogger and G. H. Hanson. Income maximization and the selection and sorting of international migrants. *Journal of Development Economics*, 95(1):42–57, May 2011. ISSN 0304-3878. doi: 10.1016/j.jdeveco.2010.06.003. URL https://www.sciencedirect.com/science/article/pii/S0304387810000647.

J. R. Grossman. *Land of Hope: Chicago, Black Southerners, and the Great Migration*. University of Chicago Press, Mar. 2011. ISBN 978-0-226-30996-5. Google-Books-ID: UuZaEAAAQBAJ.

M. G. Herander and L. A. Saavedra. Exports and the Structure of Immigrant-Based Networks: The Role of Geographic Proximity. *The Review of Economics and Statistics*, 87(2):323–335, May 2005. ISSN 0034-6535. doi: 10.1162/0034653053970311. URL https://doi.org/10.1162/0034653053970311.

R. Hornbeck and S. Naidu. When the Levee Breaks: Black Migration and Economic Development in the American South. *The American Economic Review*, 104(3):963–990, Mar. 2014. ISSN 00028282. doi: 10.1257/aer.104.3.963. URL https://search.ebscohost.com/login.aspx?direct=true&AuthType=ip&db=edsjsr&AN=edsjsr.42920725&lang=es&site=eds-live&scope=site.

R. Hornbeck and M. Rotemberg. Railroads, Reallocation, and the Rise of American Manufacturing. Working Paper 26594, National Bureau of Economic Research, 2021. URL https://www.nber.org/papers/w26594. Series: Working Paper Series.

T. Jaworski and C. T. Kitchens. National Policy for Regional Development: Historical Evidence from Appalachian Highways. *The Review of Economics and Statistics*, 101(5):777–790, Dec. 2019. ISSN 0034-6535. doi: 10.1162/rest_a_00808. URL https://doi.org/10.1162/rest_a_00808.

G. Khanna, W. Liang, A. M. Mobarak, and R. Song. The Productivity Consequences of Pollution-Induced Migration in China, Jan. 2021. URL https://www.nber.org/papers/w28401.

R. A. Margo. "To the Promised Land": Education and the Black Exodus. In *Race and Schooling in the South, 1880-1950: An Economic History*, pages 109–128. University of Chicago Press, Jan. 1990. URL https://www.nber.org/books-and-chapters/race-and-schooling-south-1880-1950-economic-history/promised-land-education-and-black-exodus.

P. A. Marsh. A Black Logger's Journey: Jackson Parish, Louisiana, to Wallowa County, Oregon. *Oregon Historical Quarterly*, 116(4):500–521, 2015. ISSN 0030-4727. doi: 10.5403/oregonhistq.116.4.0500. URL https://www.jstor.org/stable/10.5403/oregonhistq.116.4.0500.

N. Maurer and C. Yu. What T. R. Took: The Economic Impact of the Panama Canal, 1903–1937. *The Journal of Economic History*, 68(3):686–721, Sept. 2008. ISSN 0022-0507, 1471-6372. doi: 10.1017/S0022050708000612. URL https://www.cambridge.org/core/product/identifier/S0022050708000612/type/journal_article.

S. Maurer and F. Rauch. Economic Geography Aspects of the Panama Canal. 2020.

G. Michaels. The Effect of Trade on the Demand for Skill: Evidence from the Interstate Highway System. *The Review of Economics and Statistics*, 90(4):683–701, Nov. 2008. ISSN 0034-6535. doi: 10.1162/rest.90.4.683. URL https://doi.org/10.1162/rest.90.4.683.

M. Morten and J. Oliveira. The Effects of Roads on Trade and Migration: Evidence from a Planned Capital City, 2016.

C. Muller. Northward Migration and the Rise of Racial Disparity in American Incarceration, 1880–1950. *American Journal of Sociology*, 118(2):281–326, Sept. 2012. ISSN 0002-9602. doi: 10.1086/666384. URL https://www.journals.uchicago.edu/doi/full/10.1086/666384.

F. Ortega and G. Peri. Openness and income: The roles of trade and migration. *Journal of International Economics*, 92(2):231–251, Mar. 2014. ISSN 0022-1996. doi: 10.1016/j.jinteco.2013.11.008. URL https://www.sciencedirect.com/science/article/pii/S0022199613001268.

C. Parsons and P. Vézina. Migrant Networks and Trade: The Vietnamese Boat People as a Natural Experiment. *The Economic Journal*, 128(612):F210–F234, July 2018. ISSN 0013-0133. doi: 10.1111/ecoj.12457. URL https://doi.org/10.1111/ecoj.12457.

C. R. Parsons, T. Reysenbach, and J. Wahba. Network Sorting and Labor Market Outcomes: Evidence from the Chaotic Dispersal of the Viet Kieu, Dec. 2020. URL https://papers.ssrn.com/abstract=3751845.

S. Redding and A. J. Venables. Economic geography and international inequality. *Journal of International Economics*, 62(1):53–82, Jan. 2004. ISSN 0022-1996. doi: 10.1016/j.jinteco.2003.07.001. URL https://www.sciencedirect.com/science/article/pii/S0022199603000965.

A. E. Rockwell. The Lumber Trade and the Panama Canal, 1921-1940. *The Economic History Review*, 24(3):445–462, 1971. ISSN 0013-0117. doi: 10.2307/2594054. URL https://www.jstor.org/stable/2594054. Publisher: [Economic History Society, Wiley].

A. Shertzer and R. P. Walsh. Racial Sorting and the Emergence of Segregation in American Cities. *The Review of Economics and Statistics*, 101(3):415–427, July 2019. ISSN 0034-6535. doi: 10.1162/rest_a_00786. URL https://doi.org/10.1162/rest_a_00786.

L. A. Sjaastad. The Costs and Returns of Human Migration. *Journal of Political Economy*, 70 (5, Part 2):80–93, Oct. 1962. ISSN 0022-3808. doi: 10.1086/258726. URL https://www.journals.uchicago.edu/doi/abs/10.1086/258726.

B. A. Stuart and E. J. Taylor. Migration Networks and Location Decisions: Evidence from US Mass Migration. *American Economic Journal: Applied Economics*, 13(3):134–175, July 2021. ISSN 1945-7782. doi: 10.1257/app.20180294. URL https://www.aeaweb.org/articles?id=10.1257/app.20180294.

M. Tabellini. Racial Heterogeneity and Local Government Finances: Evidence from the Great Migration. *SSRN Electronic Journal*, 2019. ISSN 1556-5068. doi: 10.2139/ssrn.3220439. URL https://www.ssrn.com/abstract=3220439.

I. Wilkerson. *The Warmth of Other Suns: The Epic Story of America's Great Migration*. Penguin UK, Aug. 2020. ISBN 9780141995168. Google-Books-ID: 7ozlDwAAQBAJ.

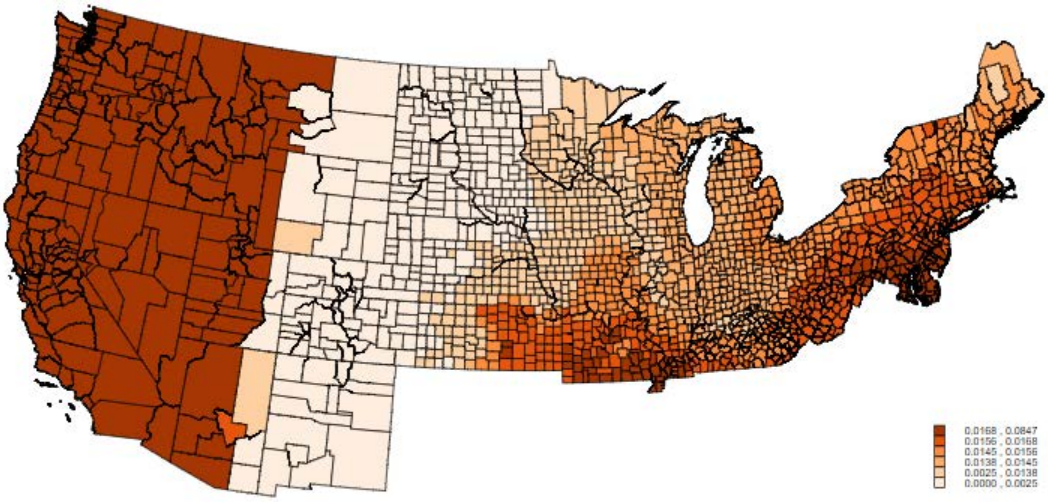
J. G. Williamson. *Trade and Poverty: When the Third World Fell Behind*. MIT Press, Jan. 2013. ISBN 9780262518598. Google-Books-ID: E3ISEAAAQBAJ.

G. Wright. *Old South, New South: Revolutions In The Southern Economy Since The Civil War*. Basic Books, Jan. 1986. ISBN 0465051936. URL https://works.swarthmore.edu/alum-books/4630.

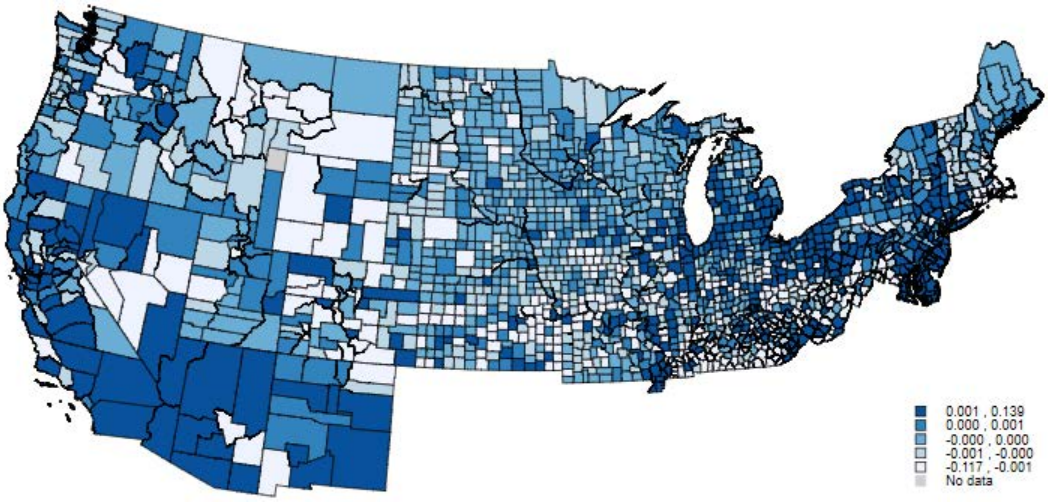
# Figures and Tables

Figure 1: 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: Panama Canal and Migration of Southern Born African Americans

| Dependent Variable: | African Americans Born in the South | | | |
|---|---|---|---|---|
| | % of 1900 Pop. | | Log | |
| | (1) | (2) | (3) | (4) |
| **Panel A: Year Dummies $\times \Delta Ln(MA_{1920})$** | | | | |
| 1900 $\times \Delta Ln(MA_{1920})$ | -0.008 | | -0.011 | |
| | (0.006) | | (0.007) | |
| 1910 $\times \Delta Ln(MA_{1920})$ | -0.003 | -0.003 | 0.001 | 0.001 |
| | (0.005) | (0.005) | (0.005) | (0.005) |
| 1930 $\times \Delta Ln(MA_{1920})$ | 0.024*** | 0.023*** | 0.025*** | 0.025*** |
| | (0.009) | (0.009) | (0.005) | (0.005) |
| 1940 $\times \Delta Ln(MA_{1920})$ | 0.050*** | 0.050*** | 0.044*** | 0.044*** |
| | (0.015) | (0.015) | (0.006) | (0.006) |
| $N$ | 8,760 | 7,008 | 8,760 | 7,008 |
| Mean Dep. Var. | 0.347 | 0.404 | 2.410 | 2.472 |
| Predicted Mig. | | X | | X |
| r2 | 0.740 | 0.827 | 0.907 | 0.928 |
| **Panel B: After 1920 Dummy $\times \Delta Ln(MA_{1920})$** | | | | |
| $\text{After}_{1920} \times \Delta Ln(MA_{1920})$ | 0.040*** | 0.038*** | 0.038*** | 0.034*** |
| | (0.014) | (0.013) | (0.006) | (0.005) |
| $N$ | 8,760 | 7,008 | 8,760 | 7,008 |
| Mean Dep. Var. | 0.347 | 0.404 | 2.410 | 2.472 |
| Predicted Mig. | | X | | X |
| r2 | 0.740 | 0.826 | 0.907 | 0.928 |

Note: Dependent variable for specifications in columns (1) and (2) 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. In columns (3) and (4) is the log of the number of African Americans born in the South living on each non-Southern county for each decade between 1900 and 1940 (plus 1). Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. 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 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. In Panel B, $\text{After}_{1920}$ is a dummy variable equal to one from 1920 onwards. Standard errors clustered at county level in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Gains from Panama Canal Are Not Related to 1900, 1910, 1920 Characteristics

| Dep. Var: | (1) % Black | (2) % Southern Black | (3) % Southern White | (4) % European | (5) Urban Share | (6) Literacy Rate | (7) Share of Labor Force in... Agric. | (8) Manuf. | (9) Serv. | (10) Lumber |
|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A: 1900 Census** | | | | | | | | | | |
| $\Delta Ln(MA_{1920})$ | 0.090 | 0.037 | 0.026 | -0.068 | 0.006 | 0.003 | -0.001 | -0.000 | -0.001 | 0.000 |
| | (0.083) | (0.036) | (0.158) | (0.189) | (0.006) | (0.002) | (0.001) | (0.001) | (0.001) | (0.000) |
| $N$ | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 |
| Mean Dep. Var. | 3.086 | 0.407 | 2.163 | 9.427 | 0.220 | 0.919 | 0.169 | 0.024 | 0.086 | 0.004 |
| r2 | 0.507 | 0.086 | 0.344 | 0.610 | 0.548 | 0.586 | 0.590 | 0.581 | 0.554 | 0.287 |
| **Panel B: 1910 Census** | | | | | | | | | | |
| $\Delta Ln(MA_{1920})$ | -0.065 | 0.007 | 0.055 | -0.183 | 0.007 | 0.003 | -0.021** | -0.001 | -0.007 | 0.000 |
| | (0.109) | (0.042) | (0.106) | (0.202) | (0.006) | (0.002) | (0.008) | (0.001) | (0.004) | (0.000) |
| $N$ | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 |
| Mean Dep. Var. | 2.960 | 0.402 | 2.101 | 9.220 | 0.265 | 0.943 | 0.166 | 0.033 | 0.101 | 0.006 |
| r2 | 0.496 | 0.111 | 0.358 | 0.592 | 0.626 | 0.550 | 0.619 | 0.540 | 0.542 | 0.325 |
| **Panel C: 1920 Census** | | | | | | | | | | |
| $\Delta Ln(MA_{1920})$ | -0.034 | -0.002 | 0.214** | -0.090 | 0.010 | 0.002 | -0.029 | -0.002 | -0.011 | 0.000 |
| | (0.091) | (0.042) | (0.095) | (0.154) | (0.008) | (0.001) | (0.023) | (0.002) | (0.008) | (0.000) |
| $N$ | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 | 1,224 |
| Mean Dep. Var. | 3.372 | 0.836 | 2.284 | 7.517 | 0.296 | 0.960 | 0.228 | 0.053 | 0.139 | 0.005 |
| r2 | 0.406 | 0.153 | 0.401 | 0.603 | 0.640 | 0.571 | 0.223 | 0.397 | 0.351 | 0.397 |

Note: 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 State fixed effects and control for log population and log urban population. Specifications in Panel A, B and C are identical except for that they use data from 1900, 1910, and 1920, respectively. Standard errors clustered at the State level are shown in parentheses. $^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

## 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) | (9) | (10) | (11) | (12) |
| Sample 1900: | Agric. Workers | | Manuf. Workers | | Service Workers | | Lumber Workers | | Urban Pop. | | Unemployment | |
| Below or Above Median? | Below | Above | Below | Above | Below | Above | Below | Above | Below | Above | Below | Above |
| 1900 $\times \Delta Ln(MA_{1920})$ | -0.006 | 0.027 | 0.028* | -0.048 | 0.016 | 0.017 | 0.002 | -0.042 | 0.021 | 0.101 | -0.018 | -0.007 |
| | (0.067) | (0.017) | (0.016) | (0.085) | (0.020) | (0.068) | (0.024) | (0.078) | (0.055) | (0.104) | (0.060) | (0.012) |
| 1910 $\times \Delta Ln(MA_{1920})$ | -0.011 | -0.009 | 0.011 | -0.059 | 0.015 | -0.009 | -0.018 | -0.047 | -0.010 | 0.144 | -0.025 | -0.009 |
| | (0.061) | (0.014) | (0.013) | (0.074) | (0.015) | (0.062) | (0.019) | (0.069) | (0.049) | (0.098) | (0.052) | (0.011) |
| 1930 $\times \Delta Ln(MA_{1920})$ | 0.189** | -0.008 | -0.018 | 0.236** | 0.038 | 0.132* | 0.003 | 0.207** | 0.037 | 0.326** | 0.146** | 0.000 |
| | (0.077) | (0.034) | (0.023) | (0.104) | (0.042) | (0.067) | (0.039) | (0.094) | (0.035) | (0.161) | (0.067) | (0.009) |
| 1940 $\times \Delta Ln(MA_{1920})$ | 0.317** | 0.036 | 0.012 | 0.400** | 0.073** | 0.253** | 0.058 | 0.339** | 0.082** | 0.529** | 0.260** | -0.004 |
| | (0.129) | (0.042) | (0.016) | (0.180) | (0.035) | (0.110) | (0.053) | (0.161) | (0.038) | (0.259) | (0.107) | (0.008) |
| $N$ | 4,370 | 4,380 | 4,370 | 4,375 | 4,365 | 4,375 | 4,370 | 4,380 | 4,550 | 4,200 | 4,375 | 4,365 |
| Mean Dep. Var. | 0.408 | 0.273 | 0.187 | 0.495 | 0.298 | 0.384 | 0.242 | 0.440 | 0.246 | 0.444 | 0.496 | 0.186 |
| r2 | 0.691 | 0.800 | 0.659 | 0.780 | 0.764 | 0.711 | 0.641 | 0.789 | 0.755 | 0.728 | 0.771 | 0.689 |

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 1900 of counties' characteristics given in Row 3. For instance, Column (2) focuses on counties with agricultural share of the labor force below the 1900 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 $\times \Delta Ln(MA_{1920})$ | -0.008 | -0.008* | -0.011 |
| | (0.006) | (0.005) | (0.009) |
| 1910 $\times \Delta Ln(MA_{1920})$ | -0.003 | -0.000 | -0.002 |
| | (0.005) | (0.006) | (0.005) |
| 1920 $\times \Delta Ln(MA_{1920})$ | 0.024*** | 0.005 | 0.000 |
| | (0.009) | (0.005) | (0.008) |
| 1940 $\times \Delta Ln(MA_{1920})$ | 0.050*** | 0.014*** | 0.005 |
| | (0.015) | (0.005) | (0.014) |
| Southern Black 1900 $> 0 \times \ldots$ | | | |
| $\ldots$ 1900 $\times \Delta Ln(MA_{1920})$ | | 0.000 | |
| | | (0.010) | |
| $\ldots$ 1910 $\times \Delta Ln(MA_{1920})$ | | -0.005 | |
| | | (0.009) | |
| $\ldots$ 1930 $\times \Delta Ln(MA_{1920})$ | | 0.028** | |
| | | (0.014) | |
| $\ldots$ 1940 $\times \Delta Ln(MA_{1920})$ | | 0.057** | |
| | | (0.023) | |
| % Southern Black 1900 $\times \ldots$ | | | |
| $\ldots$ 1900 $\times \Delta Ln(MA_{1920})$ | | | 0.033 |
| | | | (0.085) |
| $\ldots$ 1910 $\times \Delta Ln(MA_{1920})$ | | | -0.010 |
| | | | (0.046) |
| $\ldots$ 1930 $\times \Delta Ln(MA_{1920})$ | | | 0.217** |
| | | | (0.101) |
| $\ldots$ 1940 $\times \Delta Ln(MA_{1920})$ | | | 0.424** |
| | | | (0.181) |
| $N$ | 8,760 | 8,760 | 8,760 |
| Mean Dep. Var. | 0.347 | 0.347 | 0.347 |
| r2 | 0.740 | 0.741 | 0.743 |

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 1-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: | Southern Black | | Southern White | | European | |
|---|---|---|---|---|---|---|
| | % | Logs | % | Logs | % | Logs |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1900 $\times \Delta Ln(MA_{1920})$ | -0.008 | -0.011 | -0.085 | -0.001 | -0.189*** | -0.016*** |
| | (0.006) | (0.007) | (0.126) | (0.008) | (0.023) | (0.004) |
| 1910 $\times \Delta Ln(MA_{1920})$ | -0.003 | 0.001 | -0.025 | 0.008 | -0.052*** | -0.006*** |
| | (0.005) | (0.005) | (0.089) | (0.005) | (0.015) | (0.002) |
| 1930 $\times \Delta Ln(MA_{1920})$ | 0.024*** | 0.025*** | 0.205 | 0.017* | 0.004 | 0.009*** |
| | (0.009) | (0.005) | (0.126) | (0.009) | (0.011) | (0.002) |
| 1940 $\times \Delta Ln(MA_{1920})$ | 0.050*** | 0.044*** | 0.878*** | 0.049*** | -0.032* | 0.018*** |
| | (0.015) | (0.006) | (0.307) | (0.015) | (0.018) | (0.002) |
| $N$ | 8,760 | 8,760 | 8,760 | 8,760 | 8,760 | 8,760 |
| Mean Dep. Var. | 0.347 | 2.410 | 2.490 | 5.007 | 13.835 | 13.835 |
| r2 | 0.740 | 0.907 | 0.691 | 0.922 | 0.781 | 0.956 |

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. All specifications also include the number of southern Blacks in 1900 (columns 1 and 2), southern Whites in 1900 (columns 3 and 4), and Europeans (columns 5 and 6), in all cases interacted with year dummies. 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 $\times \Delta Ln(MA_{1920})$ | -0.008 | -0.009 | | 0.023 | | 0.021 | |
| | (0.006) | (0.006) | | (0.015) | | (0.043) | |
| 1910 $\times \Delta Ln(MA_{1920})$ | -0.003 | -0.005 | -0.003 | 0.013 | 0.013 | 0.005 | 0.007 |
| | (0.005) | (0.005) | (0.005) | (0.014) | (0.014) | (0.038) | (0.037) |
| 1930 $\times \Delta Ln(MA_{1920})$ | 0.024*** | 0.029*** | 0.023*** | 0.055** | 0.055** | 0.076 | 0.074 |
| | (0.009) | (0.009) | (0.009) | (0.022) | (0.022) | (0.047) | (0.047) |
| 1940 $\times \Delta Ln(MA_{1920})$ | 0.050*** | 0.055*** | 0.050*** | 0.097*** | 0.098*** | 0.159** | 0.161** |
| | (0.015) | (0.015) | (0.015) | (0.030) | (0.030) | (0.074) | (0.074) |
| $N$ | 8,760 | 8,760 | 7,008 | 8,760 | 7,008 | 8,755 | 7,004 |
| Mean Dep. Var. | 0.347 | 0.347 | 0.404 | 0.347 | 0.404 | 0.341 | 0.397 |
| 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 | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| MA Estimate | Main | Fixed Pop. 1910 | $\bar{P} = 35.7$ $\theta = 1$ | $\bar{P} = 35.7$ $\theta = 9$ | $\theta = 2.79$ $\bar{P} = 17.5$ | $\theta = 2.79$ $\bar{P} = 71$ |
| 1900 $\times \Delta Ln(MA_{1920})$ | -0.008 | -0.006 | -0.008 | -0.007 | -0.007 | -0.008 |
| | (0.006) | (0.005) | (0.005) | (0.006) | (0.005) | (0.007) |
| 1910 $\times \Delta Ln(MA_{1920})$ | -0.003 | -0.002 | -0.004 | -0.002 | -0.003 | -0.003 |
| | (0.005) | (0.004) | (0.005) | (0.006) | (0.005) | (0.006) |
| 1930 $\times \Delta Ln(MA_{1920})$ | 0.024*** | 0.017** | 0.023*** | 0.022** | 0.021*** | 0.025** |
| | (0.009) | (0.007) | (0.008) | (0.010) | (0.008) | (0.010) |
| 1940 $\times \Delta Ln(MA_{1920})$ | 0.050*** | 0.039*** | 0.047*** | 0.054*** | 0.044*** | 0.057*** |
| | (0.015) | (0.013) | (0.014) | (0.018) | (0.013) | (0.018) |
| $N$ | 8,760 | 8,760 | 8,760 | 8,760 | 8,760 | 8,760 |
| Mean Dep. Var. | 0.347 | 0.347 | 0.347 | 0.347 | 0.347 | 0.347 |
| r2 | 0.740 | 0.740 | 0.740 | 0.740 | 0.740 | 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. All specifications include county and state by year fixed effects. Column (1) reproduces main results from Table 1-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 $\theta$, while leaving $\bar{P}$ fixed at the same value than Column (1). Columns (5) and (6) fix $\theta$ 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

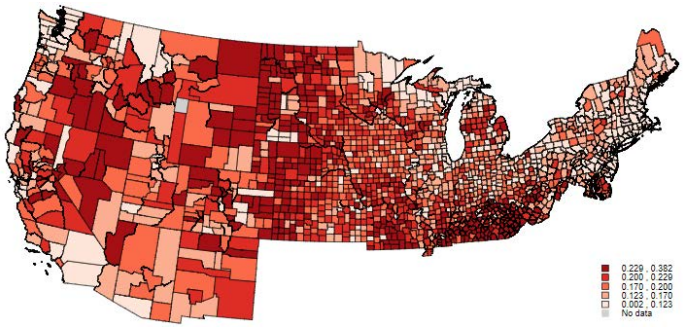
## Table A.3: Southern Whites: Robustness to Different Specifications

| Dependent Variable: | Whites Born in the South as Share of 1900 Tot. Population | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1900 $\times \Delta Ln(MA_{1920})$ | -0.085 | | 0.692*** | | 0.353 | |
| | (0.126) | | (0.178) | | (0.379) | |
| 1910 $\times \Delta Ln(MA_{1920})$ | -0.025 | -0.010 | 0.325** | 0.300** | -0.084 | -0.109 |
| | (0.089) | (0.051) | (0.142) | (0.144) | (0.276) | (0.277) |
| 1930 $\times \Delta Ln(MA_{1920})$ | 0.205 | 0.175*** | 0.073 | 0.123 | 0.133 | 0.208 |
| | (0.126) | (0.057) | (0.105) | (0.097) | (0.285) | (0.289) |
| 1940 $\times \Delta Ln(MA_{1920})$ | 0.878*** | 0.867*** | 0.720*** | 0.818*** | 1.273*** | 1.400*** |
| | (0.307) | (0.144) | (0.223) | (0.204) | (0.483) | (0.497) |
| $N$ | 8,760 | 7,008 | 8,760 | 7,008 | 8,755 | 7,004 |
| Mean Dep. Var. | 2.490 | 3.019 | 2.490 | 3.019 | 2.486 | 3.014 |
| Year FE | X | X | X | X | | |
| County FE | X | X | X | X | X | X |
| State x Year FE | | | | | X | X |
| Predicted Mig. | | X | | X | | X |
| Coord. Poly. | | | X | X | | |
| r2 | 0.691 | 0.816 | 0.740 | 0.831 | 0.743 | 0.837 |

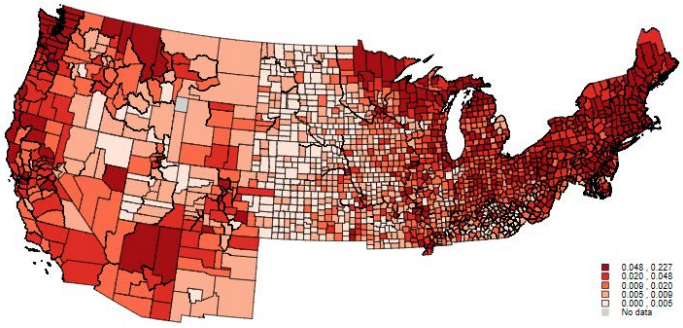
Note: Dependent variable for all specifications is the number of Whites born in the South living on each non-Southern county for each decade between 1900 and 1940. Coefficients are standardized for moving from the 25th to the 75th percentiles in the distribution of gains in market access in 1920. Columns (3) and (4) control for a second order polynomial on latitude and longitude, interacted with year dummies. Predicted Migration is estimated using the 1900 share of whites born in each Southern state and the change in Southern born whites living outside the South between Census. All specifications control for total population, total white population, and the share of urban population in 1900, each interacted with year dummies. Standard errors clustered at county level in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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

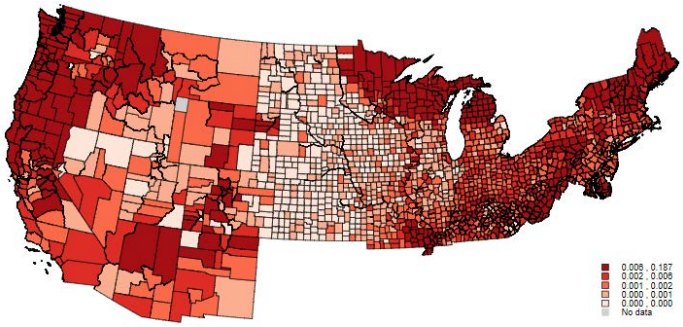
(a) Agricultural Workers (Share of Population)



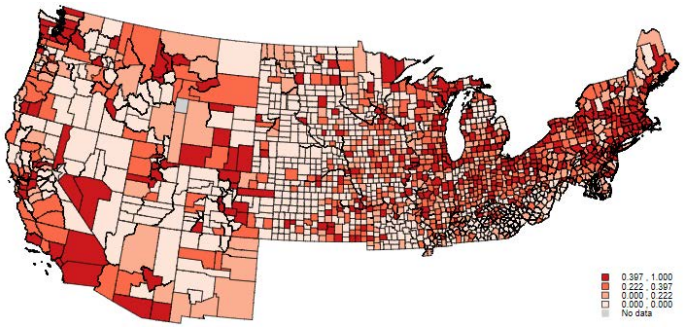

(b) Manufacturing Workers (Share of Population)




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



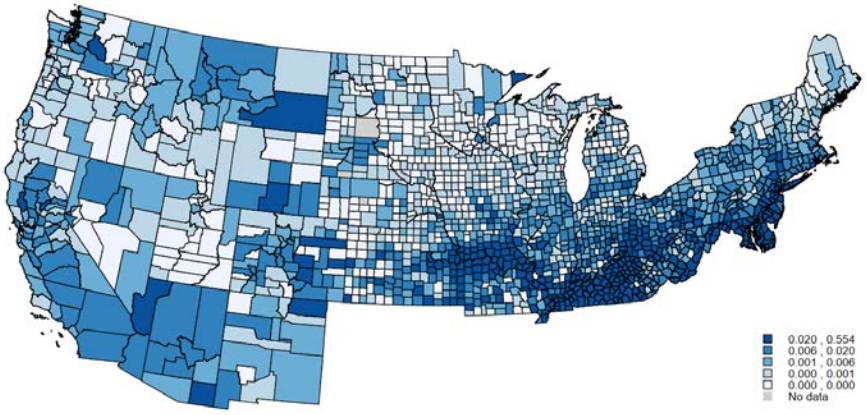

(d) Urban Population (Share of Population)



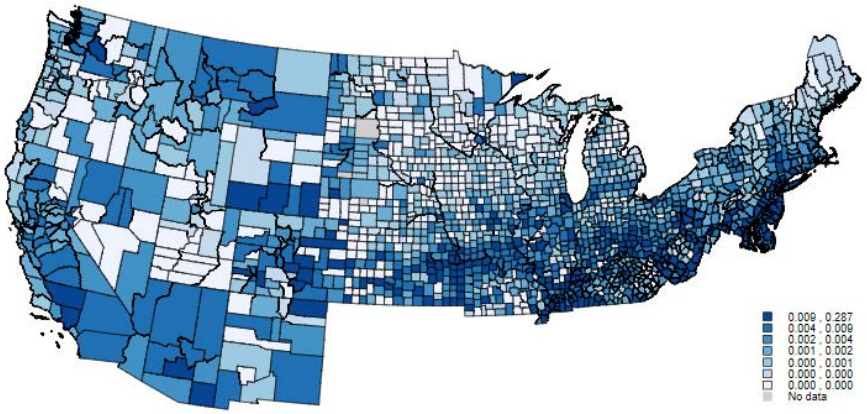

Note: All figures come from 1910 Census of Population. Notice color categories vary by subfigure.

Figure A.2: African American Population in 1900

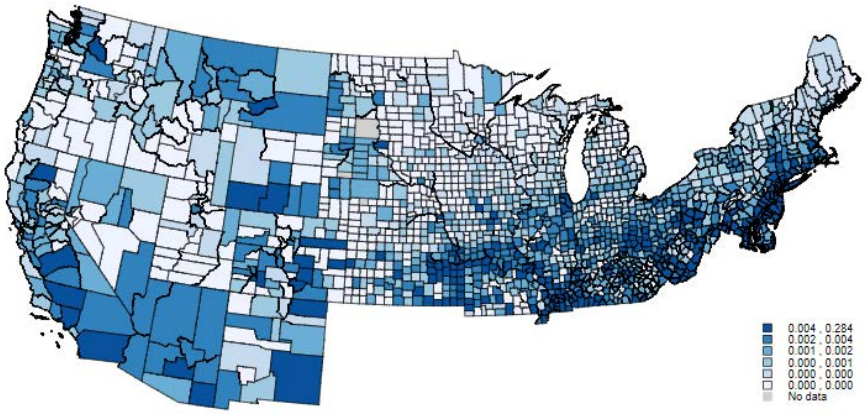
(a) African Americans (Share of Total Population)




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



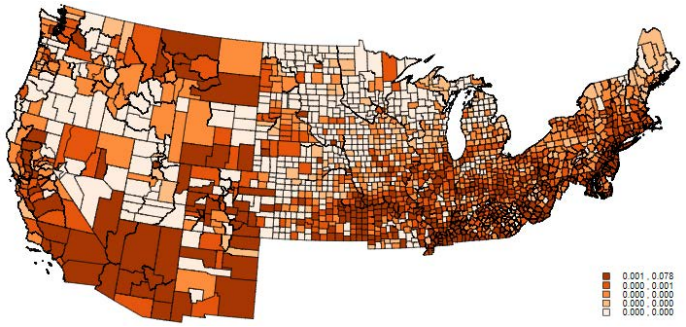

(c) African Americans Born in Southern States (Share of Total Population)



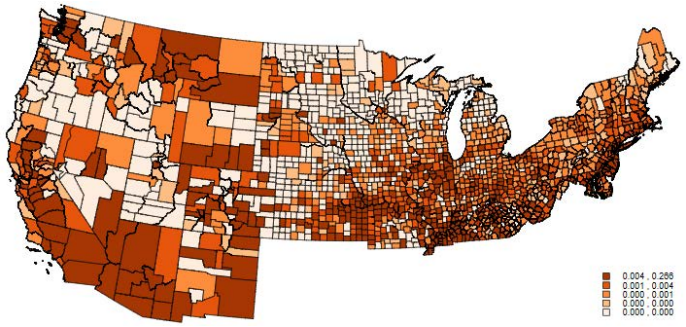

Note: All sub-figures are from the 1900 full-count census data. Notice the color categories are not uniform between the sub-figures.

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

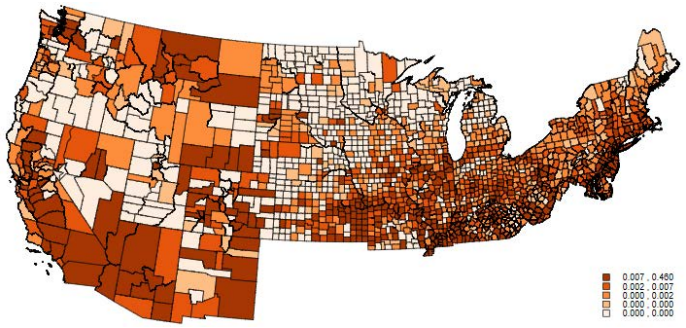
(a) 1910-1900



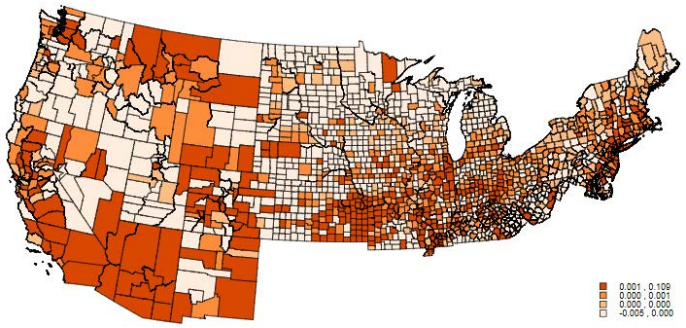

(b) 1920-1910




(c) 1930-1920

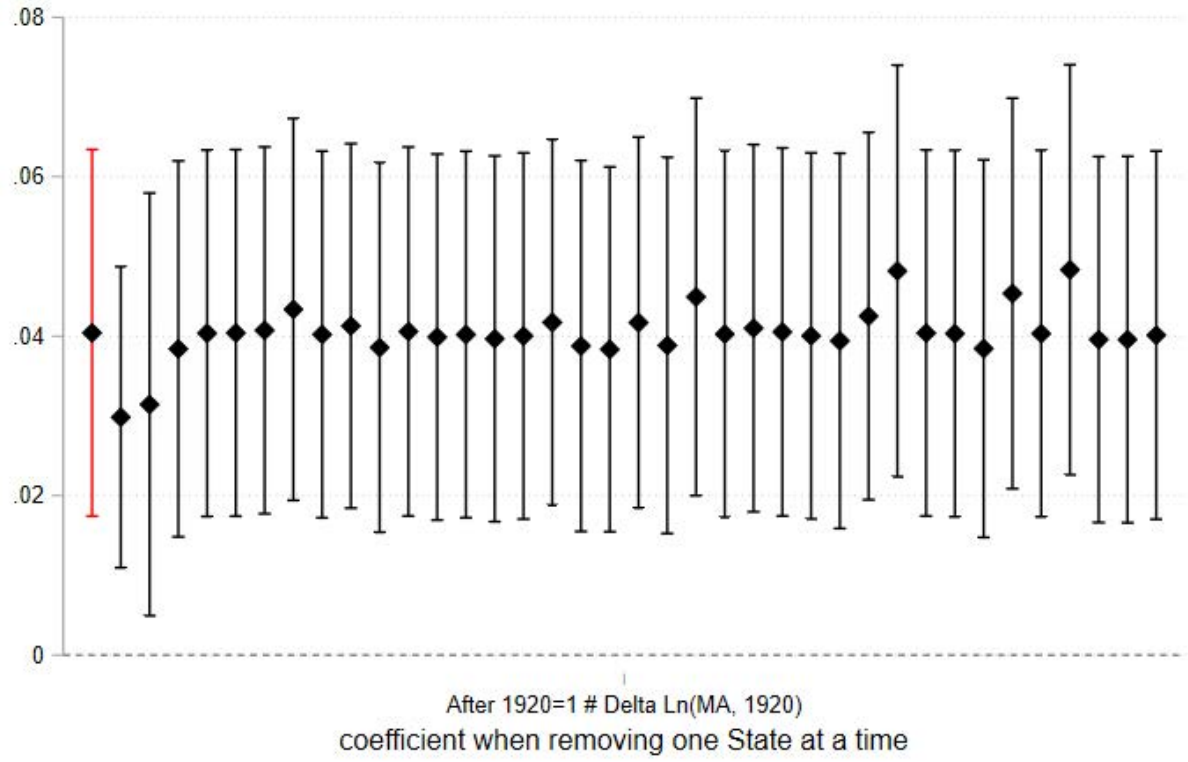



(d) 1940-1930




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 $\text{After}_{1920} \times \Delta Ln(MA_{1920})$ controlling for county and year fixed effects. Coefficients vary in the underlying sample. First one from left to right (in red) comes from Table 1, 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.