Maroon Communities: Cultural Transmission and Local Development in Brazil

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Abstract

This paper investigates the causal impact of maroon communities (*quilombos*)—kinship networks that transmit cultural identities across generations—on local development in Brazil. I compile a novel geo-coded dataset of over 8,000 quilombo communities and construct a "Quilombo Access" measure that uses local variation in least-cost walking paths from quilombos to urban centers. To solve the historical selection problem, I exploit plausibly exogenous variation in post-1950s paved road construction to build a formula-based instrument. Increased access to quilombos significantly raises rates of Black and Afro-Brazilian religious homogamous marriages, the prevalence of quilombo-related cultural socialization, and African-based skilled occupations. Access to quilombos boosts education, population density, and local productivity, especially among Black residents. Moreover, it enhances Black political participation, with more Black politicians and municipal cultural policies and funding. These findings are consistent with a cultural-heterogeneity equilibrium and a quilombo-driven spatial equilibrium, offering new insights into how minority cultural traits can lead to tangible economic advantages and the possibility of local co-evolution of culture and institutions.

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Brazilians undoubtedly owe something to their slaves, with whom they mix so often, and who may have taught them the farming system they adopt and how to extract gold from the rivers. Moreover, the slaves were their dance masters.

Auguste de Saint-Hilaire, 1847.[1]

1 Introduction

Slave resistance, both violent and non-violent, was intrinsic to the slavery institution. Historically, resistance led to the formation of ethnic territories of fugitive and liberated slaves, which became known as maroon communities, or *quilombos* in Brazil, derived from the Angolan Bantu language of Kimbundu meaning "settlement." Today, there are more than 1.3 million quilombo descendants in over eight thousand communities—every one hundred and fifty households have at least one descendant (IBGE, 2024). The quilombo descendant population may seem small in relation to a national population of around two hundred million, but it is equivalent, for example, to ten percent of the population of Portugal, of which Brazil gained independence in 1822, and they exert an outsized historical and cultural influence among the whole Brazilian population and the African Diaspora.

Maroon communities and quilombos, in particular, have been extensively studied, mainly by historians, but also by anthropologists, geographers, and sociologists.[2] Economists have overlooked this part of history. Recent historiography has shown that quilombos were historically culturally and economically integrated into the society, and not hidden away relying on self-sufficiency as affirmed by the "old view" in history (Gomes, 2005, 2006; Gomes & Reis, 2016). Historians and economic historians have also shown that most New World endeavors were entirely dependent on the skills of enslaved Africans, such as blacksmithing, metalworks, artisan crafts, and skilled carpentry and masonry (Russell-Wood, 1977; Schwartz, 1978; Versiani, 2000; Klein & Vinson, 2007). While other social scientists have shown that quilombos historically act as a *kinship network* that serves as a repository of ancestral culture, religion, skills, and knowledge (Sweet, 2003; Anjos, 2009). The quilombo kinship networks are not determined by biology, but by the relationships and common identity forged in the shared struggle of their ancestors against slavery (Sahlins, 2013).

[1] Quoted in Versiani (2000).

[2] See, for example, the classic studies by Schwartz (1970) and Price (1973).

One might suspect that maroon communities, formed under severe adversity in the shadow of slavery, would be associated with current disadvantages. Yet, in this paper, I document that quilombos are positively associated with higher levels of local development. As suggested by the literature above, I propose a framework where the *distinct cultural identity* cultivated by intergenerational transmission within the quilombo kinship network sustains a cultural heterogeneity equilibrium *à la* Bisin-Verdier (Bisin & Verdier, 2000, 2001; Bisin et al., 2004). Furthermore, quilombo cultural traits are related to a local concentration of African-based human capital, as measured by skills and education. In turn, this leads to a quilombo-related spatial equilibrium (e.g. Glaeser & Maré, 2001; Glaeser & Resseger, 2010) with cities with higher population density and higher levels of local productivity, particularly of the Black population.[3]

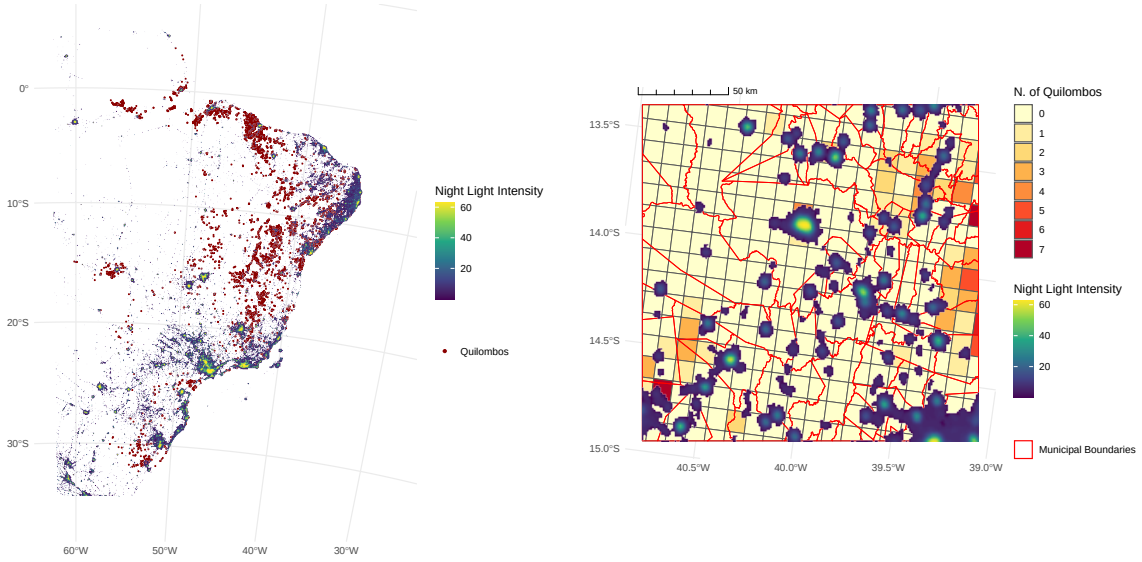
The regions with higher quilombo presence show a higher pursuit of quilombo-related skilled occupations and formal education, both of the Black and the general populations, potentially echoing the type of human capital externalities shown by Wantchekon et al. (2015). As a result, the Black population in these locations pursues more political participation: More Blacks run for mayor and the municipal council and have successful candidacies, and more municipal cultural policies and finance funds are created, showing a form of local co-evolution of culture and institutions (Acemoglu & Robinson, 2021; Bisin & Verdier, 2024).

To motivate the empirical strategy, Figure 1 shows two maps of the Brazilian territory overlaid with all geo-located quilombos (N = 8,441) and nighttime lights satellite data, excluding the core Amazon states.[4] Panel (a) gives a general overview of the country, and Panel (b) shows a random zoom at the local level with the quilombos assigned to 0.1-degree grid cells, pixel-level night light intensity, and municipal boundaries. Grid-cell level regressions (N = 54,156), controlling for municipality fixed effects, reveal an approximately one-to-one correlation between the number of quilombos and the sum of night light intensity in 2010. When additionally controlling for population at the grid-cell level, the coefficient on number of quilombos is cut in half, but remains remarkably strong. The correlation remains stable as far back as

[3]In the Brazilian context, the possibility of the existence of city-level agglomeration externalities was shown, for example, in Chauvin et al. (2017), Ehrl and Monasterio (2021), and Baerlocher et al. (2023).

[4]Throughout the paper, I always exclude Amazônia, Roraima, Acre, and Rondônia that are mostly forest covered and have been occupied only more recently in the twentieth century.

1992—the first year with available night lights data—and is robust to "turning off" the quilombo pixels.[5] We can learn three facts from this simple exercise.



(a) Brazil at the pixel level (b) Random zoom at the grid-cell level

Figure 1: Quilombos and Nighttime Light Intensity in 2010

Notes: Data for the quilombos comes from the IGBE 2022 census and nightlights is from the Version 4 DMSP-OLS Time Series. See Appendix A for the complete description of the variables and geodata, and Appendix B for the grid-cell analysis.

Fact 1. At the national level, quilombos are not randomly distributed across space; they present pockets of agglomeration. In fact, the literature in Section 2 shows that these agglomerations are the product of the historical interaction of slavery and state repression, colonial commodity cycles, and domestic production, with individual and group episodes of resistance, and land occupation in the few decades surrounding abolition in 1888. Thus, we need to find an exogenous variation correlated with the quilombos at the *local* level that we can explore.

Fact 2. The correlation between quilombos and night lights is not "just population," it appears to also translate into income. But to identify a *causal effect* of quilombos, we have to be careful to find a variation that is independent of historical population density. Historical selection can presumably go both ways. Negative selection is

[5]See Appendix B for details on the analysis.

likely because the quilombo communities were actively hunted by slave catchers; thus, liberated and runaway slaves could not just pick the best locations to settle. However, positive selection is also likely since already more dense and rich areas could have locally attracted the maroons, and both communities and income persisted.

Fact 3. The correlation between quilombos and night lights is not likely to be a product of recent institutional development. The correlation is stable since 1992, and formal land titling via the federal *Instituto Nacional de Colonização e Reforma Agrária* or state-level land agencies was instituted only in 1995. Formal titling requires a lengthy, bureaucratic multi-year process; as a result, to date, only 495 communities have their territory officially delimited, and 295 territories are formally titled, most after 2006. While community certification via *Fundação Palmares*, which is a self-declaratory document that certifies "African ancestry related to a history of resistance to historical oppression," was instituted only in 2003.

In light of these facts, I propose a *Quilombo Access* (QA) measure that uses the fine, local variation given by least-cost paths over rugged terrain connecting the municipality's urban center to each neighboring quilombo. To build this measure, I follow conventional market access measures and for each municipality, I sum over all neighboring quilombos, weighted by the inverse of the least-cost distances. This QA measure explores local variation given by the differences in exogenous topography between municipalities and the historical randomness of the exact historical placement of each quilombo. While this measure can give a reasonable first approximation in ordinary least squares regressions, it is confounded with the problem of historical selection that may generate density clusters of cities and quilombos.

To solve the selection problem, I build a formula-based instrument that combines pre-determined exposure with exogenous shocks (Borusyak et al., 2025). In our case, the formula instrument combines the municipal location relative to the quilombos with plausibly exogenous shocks arising from the historically recent construction of federal and state paved roads. Since the construction of these roads is decided above the municipal level, and certainly above the quilombo level, the paved roads are exogenous to the quilombo communities. If a quilombo gets a paved road passing by their land it is merely a matter of luck, as is with which nearby municipality the transportation connection will be improved, i.e. a quilombo can be physically closer to the urban center of municipality A but a road is built that passes by the quilombo

and goes to the urban center of municipality B, thus improving the connection with B and not A.

This strategy, however, creates exogenous variation in the transport costs of the quilombo community conditional on controlling for the predetermined geography that creates the shock assignment process. Since practically all paved roads were constructed after the 1950s, we can control for historical population density, for instance, in 1920, when the post-emancipation movements of land occupation of the Black population had already taken shape, and when the clusters of population that would determine the road construction plans already existed. The intuition is that local population density in 1920 "summarizes" the diverse economic geography forces that might influence later road placement, such as the level of local development and trade. I then document the following set of results.

Marriages and socialization. I show that Quilombo Access has a large, positive effect on socialization and intergenerational cultural transmission of quilombo traits, consistent with the existence of a cultural heterogeneity equilibrium. The level of QA is associated with substantially more homogamous marriages between Blacks and between followers of Afro-Brazilian religions, which are historically connected to the quilombos. There are also more municipal-level quilombo cultural initiatives and Afro-Brazilian religion cultural initiatives, and more cultural groups connected to traditional populations and *capoeira*—a combination of dancing and martial arts historically connected to resistance. For robustness, I run some placebo exercises showing that Quilombo Access is not related to handicraft activities and cultural groups that are not historically related to the quilombos.

Human capital. Consistent with the cultural transmission of quilombo traits, I find a high concentration of African-related human capital. There are more individuals who have occupations that require high ability skills connected to African slavery, such as blacksmithing, metalwork, artisan crafts, and skilled carpentry and masonry. In addition, I find more handicraft *artesanato* activities connected to metal and clay. Consistent with a concentration of high-level skills leading to education being more valuable, and with the documented history of the demand for education of resistance-related individuals (e.g. Lambais et al., 2023), I find that there are higher levels of literacy and educational attainment, controlling for parents' education and historical

municipal-level literacy, which holds across the general and Black populations, but higher school attendance only for Black children. This result shows a connection between quilombo-related skills and education and city-level human capital with the possible existence of human capital externalities.

Density and productivity. Further, I find that places with Quilombo Access have higher population density and productivity, consistent with a quilombo-related spatial equilibrium. In the canonical spatial equilibrium framework, the concentration of human capital—skills and/or education—can serve as a population attractor, leading to the existence of regions with more population density, which creates agglomeration externalities, leading these regions to have higher productivity. As predicted, I find a strong, positive effect of Quilombo Access on population density and a positive effect on local productivity measured by individual-level hourly wages, particularly of the Black population.

Political participation and municipal policies. As suggested by Wantchekon et al. (2015), a higher level of human capital and human capital externalities can lead to more political participation. Indeed, Quilombo Access has a strong, positive effect on the number of running Black candidates and successful Black candidacies in the 2016 municipal elections. I find that better political representation leads to more culture-related municipal policies and municipally-backed culture financing. This result can be seen as initial empirical evidence on a form of local-level co-evolution of culture and institutions.

This paper contributes new evidence to a few strands of literature. First, it enters the debate on intergenerational transmission of cultural traits (Bisin & Verdier, 2001), showing how marginalized populations can maintain distinctive occupational, religious, and communal traits that result in tangible economic advantages. Complementarily to Botticini and Eckstein (2007) and Valencia Caicedo (2019), for example, which analyze the Jewish population and the Jesuit influence in South America, I show that better occupational, human capital, and income outcomes can be sustained by a cultural heterogeneity equilibrium that includes Afro-Brazilian religions. Second, this paper speaks to research on spatial equilibrium and agglomeration (e.g. Glaeser & Gottlieb, 2009), pointing to new historical origins for local density and productivity that revolve around the cultural identity of historically marginalized communities.

I contribute to the literature on the historical legacy of slavery and the slave trade (e.g. Nunn, 2008; Nunn & Wantchekon, 2011; Acemoglu et al., 2012) by demonstrating how communities that descended from slavery *resistance* shape local development in Brazil today. I also relate to the growing literature on self-liberation, which has focused mainly on the United States (Allen, 2015; Ramos-Toro, 2025), with the first quantitative analysis of the communities descended from fugitive and liberated slaves in Brazil. Finally, I contribute to what Robinson (2025) calls "paths to the periphery," documenting how quilombo communities, by altering both power structures and normative orders, were able to alter local development paths. This finding is also related to how quilombos can possibly generate local co-evolution of institutions and culture, contributing with some suggestive empirical evidence to this emerging literature (Mueller & Ayello Leite, 2020; Acemoglu & Robinson, 2021; Bisin & Verdier, 2024).

The remainder of the paper is structured as follows. Section 2 provides historical context on what exactly are the quilombos, their historical formation, survival, and cultural identity. Section 3 describes the municipal-level and individual-level outcomes, the geo-coded quilombo locations, how we build our Quilombo Access measure and the instrumental variable. Section 4 lays out the empirical strategy, illustrating the construction of QA and the IV, and discusses how I address endogeneity concerns with a distance-based formula instrument. Section 5 documents the findings. Section 6 concludes.

2 Historical context

The Portuguese-Brazilian slave trade was responsible for approximately half of all slaves transported across the Atlantic in the 350 years between 1500 and 1850.[6] A great concentration of slaves invariably led to a large number of them escaping and forming community-based ethnic territories, since the first quilombo was reported in 1575.[7] As Anjos (2009) has pointed out, quilombos were the most expressive territorial factor of colonial Brazil. In addition to runaways, quilombos attracted recently

[6]From a total of 12.5 million slaves that embarked in Africa, 5.5 million were headed to Brazil. In comparison, 472 thousand embarked for Mainland North America. See Lambais and Palma (2023) for the effects of this trade and slavery on Brazil's development path.

[7]See Appendix C for an illustration of a typical quilombo in 1796. Note that the edification indicated with the number one is a blacksmith's house.

liberated slaves who were able to purchase their own manumission or be granted manumission by their slaveowners—high levels of manumission were a defining feature of Brazilian slavery (Graham, 2016). In the first few decades after abolition in 1888, quilombo communities continued to attract the now free Black population, who were devoid of a post-emancipation agrarian reform or any state support. Geographically, the distribution of quilombos followed the territorial occupation by the main commodity cycles, such as sugar, gold, tobacco, cotton, and coffee, and also by the production for domestic markets, such as cassava, cattle, and firewood. Repression by slave catchers—the infamous bush captains (*capitães-do-mato*)—was widespread pre-abolition. Thus, a complex interaction between national and international market forces, episodes of individual and group resistance, and state capacity for repression took place to exactly determine the formation and survival of quilombo communities (Mahony, 1997; Anjos, 2009; Gomes, 2005; Gomes & Reis, 2016).

In practice, quilombo communities were structured around kinship networks based on elective, rather than purely biological ties, such as those from traditional lineage boundaries in Africa, which were often intentionally suppressed (Sweet, 2003). Quilombos represented a reconstruction of African identities and normative orders, Africanizing Brazilian society just as much as the Africans were creolized in Brazil (Reis & Gomes, 2010). For many ethnic groups traveling across the Atlantic, the middle passage meant going from a nation-state in Africa to a religious nation overseas (Anjos, 2009).[8] Running away from slavery meant more than just an act of rebellion, notably in urban and suburban environments; it provided the foundation of evolving cultural and ethnic identities. Running away also meant more than just severing ties with the world of slavery, it meant that the boundaries of the institution of slavery itself could be reinvented (Gomes, 2010). As such, quilombos acted as the locus of African identity and cultural expressions that were outlawed and repressed by colonial and state authorities, even well into the Republic, such as capoeira groups and Candomblé, and gatherings at taverns, for example.[9]

[8]Dancing and other rituals had most of the time a religious meaning. The Ogun deity worked as the unifying Orisha for a number of African traditions that were adapted in the New World (Barnes, 1997). Candomblé, Macumba, and Umbanda are the three most well-known traditions that flourished in Brazil. Others less known include Tambor de Mina, Xangô, Quimbanda, and Cabula. See Appendix C for some illustrations, including the direct connection between Ogun and blacksmithing and ironworks.

[9]Capoeira and Afro-Brazilian religions were persecuted throughout the whole colonial period (Chvaicer, 2002; Reis, 2011). Afro-Brazilian religious persecution is even more persistent, as it is

Reis (2011) shows the deep connection between Afro-Brazilian religion and slave resistance: Candomblé helped slaves to endure and even overcome slavery and became an effective tool of negotiation for gaining cultural and social space for Africans. Most of the time, these were not grandiose acts but day-to-day acts of resistance. Today, the proliferation of cultural identities, however, need not be confined within the physical boundaries of the quilombo, which contributes to the intergenerational transmission of beliefs and values in the proximity of quilombos. This proliferation further reinforces the formation of kinship networks, promoting socialization within the Creole descent (Parés, 2013).

Quilombos have a distinctive feature from all other maroon communities in the Americas. In Brazil, these ethnic territories proliferated more than anywhere else, mostly because of their capacity for integration with the local economy of the regions where they were present. They were never isolated—the most effective way of protecting themselves was not to hide away but to make economic alliances with broad segments of the society. They developed trade in taverns, markets, fairs, and trading posts, interwoven with networks of merchants, fishermen, farmers, miners, peasants, indigenous natives, and urban dwellers, free or enslaved.[10]

The quilombos have this ability because enslaved Africans showed a wide array of skills. Reinforcing the connection specifically between African skills and quilombos, there is recent evidence that runaway and manumitted slaves were disproportionately skilled in relation to the rest of the population, possessing skills such as blacksmithing, metalworks, artisan crafts, and skilled carpentry and masonry. Skills made the slaves more valuable, which then facilitated and incentivized escape and manumission (Klein, 2012; Colistete, 2021). This pool of skills existed in the first place because the slave trade was directed in Africa to areas where the population had these skills due to the demand in Brazil. These skills were then further developed

perpetuated until today, despite not being formally prohibited anymore. In the Republic, capoeira and Candomblé endured a prohibition that lasted from 1890 to around 1935–1940. Capoeira was prohibited by a vagrancy law, and Candomblé under a law of crimes against public health. Gomes (2005) details how taverns and other points of commerce were actively persecuted for even minor gatherings of Black slaves, legislation often included incentives for the population to turn against each other. One of such rulings took the form: "...the salesman or saleswoman that consent gambling and gatherings of Black slaves will be sentenced in the first time to five thousand réis and after that in double and in such rulings half will be collected by the soldiers and other half will be given for the informer" (Office of the Governor Sebastião de Castro, 1695).

[10] Appendix C shows an illustration of products from quilombos arriving at the Court market in Rio de Janeiro around 1825.

under enslavement. Many times the slave trade was directed at regions in conflict, also capturing skilled warriors and officials (Klein & Vinson, 2007). Russell-Wood (1977) argues that in the history of African contributions to the New World, the transfer of such technical skills was a major legacy. Freyre (1986) and Baer (1969) consider African iron technology as a fundamental shaper of iron mining and ironworks in Brazil.[11] Schwartz (1978) documents that the transition from indigenous to African slave labor in sugar production was, among other factors, a matter of superior productivity and skills of African workers. The skills required in a sugar mill range from the sugar master, who was usually a free worker, to the skimmer, kettleman, mill tender, presser, carpenter, and blacksmith that were occupations delegated to enslaved Africans.

The historical evidence also suggests that the resistance-connected African Diaspora always had a strong demand for formal education, while the supply was historically severely restricted (Lambais et al., 2023). This restriction has recently been alleviated with institutional development derived from the new 1988 Constitution, which means that younger generations are finally able to accumulate formal schooling.[12]

3 Data

In this section, I describe how I build Quilombo Access, the outcomes, and the main controls. I relegate the details to Appendix A—instead of summary statistics, since there are many possible outcomes and sample restrictions, I always show the mean of the dependent variable in the regression tables. The main sources are the official censuses, surveys, and shapefiles by the *Instituto Brasileiro de Geografia e Estatística*

[11] For example, Russell-Wood (1977) details the case for gold metalworks: "The characterization of the average Portuguese migrant to Minas Gerais as a person who stopped in a port city only long enough to buy a horse contained more than an element of truth. For the most part, European migrants did not have any prior experience of gold mining. This was reflected in the absence of technical innovation in Minas Gerais and was especially serious insofar as the miners were unable to exploit the veins fully. In contrast, some "Mina" slaves had prior knowledge not only of gold mining, but of metallurgy." The *cadinho* (crucible) technique, an African iron technology introduced in the sixteenth century in Brazil, is still used today for iron smelting in small quantities. See, for example, Libby (1993) for a review of African iron technology and some evidence for its introduction across the Americas, including North America.

[12] See, for example, the story of Givânia Maria da Silva, 56, that became the first woman in her community to achieve a college degree in Ramón and Balcazar (2022).

(IBGE) between 2010 and 2022 and, in addition, 1920 for the historical controls. However, from the 2022 census, I only use the location of the quilombo communities because the individual-level data is not yet available. To this, I add the 2016 municipal elections data from the *Tribunal Superior Eleitoral*, which was the first election to make available the declared race of the candidates, and geography data from various sources to build the least-cost paths and municipal-level controls.

Quilombo communities. The geo-coded location of the quilombo communities is from the 2022 census, which for the first time has officially mapped the communities. The census followed a procedure where being a quilombo "member" was self-declaratory, and the communities with at least fifteen people were identified and given coordinates of the location following the process described in Appendix A. The census builds the communities by surveying the quilombo population in contiguous buffers, thus if the settlement of a quilombo community is not contiguous, in the sense there is some distance in between, it could be counted as two or more quilombo locations, even if the people say they belong to the same quilombo community. This method makes sense as it sees the quilombo locations as self-contained villages or neighborhoods, which had already been shown to be the case in the pioneering mapping done in Anjos (2009). The quilombo communities can be both urban and rural. If more urban, they effectively act as a neighborhood of the city. If more away from the urban center, they take the form of a rural village that can be connected to multiple neighboring municipalities. In the Appendix A, I show some examples of different types of quilombos using Google Earth. Excluding the communities in the four core Amazon forest states, I work with 8,364 geo-located communities out of a total of 8,441.

Least-cost paths. To build the least-cost paths (LCPs), I use elevation satellite data and apply the Dijkstra algorithm to find the shortest paths minimizing terrain costs between each urban center and all quilombos within the geodesic distance of 30 kilometers (18.5 miles). I apply a 30-kilometer cutoff because communities further away are unlikely to have a significant city presence, and including all quilombos for each municipality would make this exercise computationally unfeasible. Excluding the four Amazon states, we are left with 5,416 municipalities out of 5,565. Of these, 2,830 municipalities have at least one quilombo community within the cutoff distance.

Quilombo Access. For each municipality's urban center i, I build

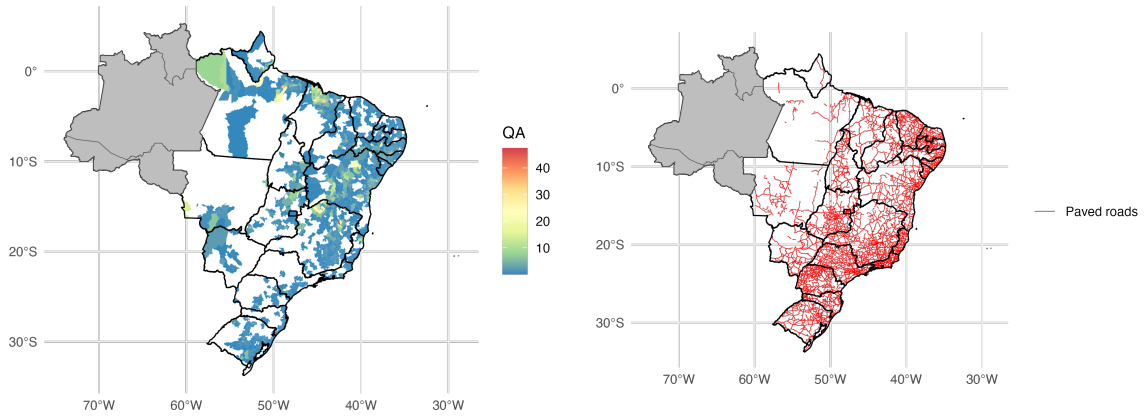
$$\text{QA}_i = \sum_j \frac{1}{\text{walkLCPdist}_{ij}}, \tag{1}$$

where the sum is taken over all j neighboring quilombo communities, weighted by the inverse of the least-cost distance. I call this the "walking" LCP distance, because it is the natural path someone would take walking from the quilombo to the urban center in the absence of any modern transportation, thus it represents the historical access a municipality has to their neighboring quilombos before any roads were constructed. The average municipal QA, considering only the municipalities with positive QA, is 1.12, and the maximum QA is 47.44.

Roads network and formula instruments. I use the latest shapefile available from IBGE to select paved federal and state roads. While the date of construction of each road is not available, Baerlocher et al. (2023) shows that paved road construction only started nationally in the 1950s. Thus, we can be certain that practically all roads used in the analysis were built and paved after this date, and more likely even later. To build the IV, I recalculate the LCPs with the road network, for which I assign a cost always lower than regular terrain; if there is a road present, the shortest-path algorithm always uses it. This generates variation in the walking LCPs, and the final output is a walking LCP and a road LCP for each municipality–quilombo pair. The municipal average sum of all walking LCPs, considering only municipalities with positive LCP, is 343 kilometers. With the introduction of paved roads, the average sum of walking LCPs decreases to 105 kilometers. The IV is then the difference of the walking LCP before and after the introduction of the roads. I illustrate this process in the next section. Figure 2 plots the Quilombo Access measure at the municipal level and the paved roads network.

Individual-level outcomes. I use the 2010 census microdata to build the main outcomes and controls. I build the following outcomes. Indicators for homogamous marriages among Blacks and followers of Afro-Brazilian religion by pairing the individuals using the household identifiers.[13] Skilled occupations indicators for "crafts and

[13]Unfortunately, due to limitations in the census data, it is not possible to capture the full spectrum of the rich syncretic religious practices that exist among the African Diaspora and the quilombo



(a) Quilombo Access (b) Paved Road Network

Figure 2: Municipal-level access to quilombo communities and the road network used to build the IV

Notes: Panel (a) plots the Quilombo Access measure built at the municipality level. Panel (b) plots the network of all paved federal and state roads. The states are shaped by black borders. The states filled in gray are excluded from the analysis.

trades," "metal and blacksmith," and "skilled carpentry and masonry" by aggregating occupation codes using the International Standard Classification of Occupations. For education, I build indicators for literacy, school attendance, and educational attainment. In this case, I also build the households to recover the parents' education. Finally, I build hourly wages for 25 to 65-year-old individuals as a proxy for local productivity, as in Bleakley and Lin (2012).

Municipal-level outcomes. For the population density of each municipality, I use both the 2010 and 1920 censuses. From the 1920 census, which is only available at the municipal level, I also recover the share of literate individuals in each municipality to proxy for historical human capital. For the indicators about cultural initiatives, cultural groups, handicraft activities, and municipal policies for culture support and culture financing, I use the 2014 municipal survey.

communities, which have many variations that mix traditional Catholicism with African traditions. Some of these people would likely answer in the census that they are Catholics, thus I select only those that answer that are practitioners of Afro-Brazilian religions, which include Candomblé, Umbanda, and declarations of other Afro-Brazilian religiosities, including the combination with other religions, which captures at least a part of the syncretism mentioned above. See, for example, Parés (2022).

Election outcomes. I use data from the 2016 municipal elections that, for the first time, made available the declared race of the candidates. I build an indicator if the individual is a Black candidate for mayor or for the municipal council, and an indicator if the candidate was elected.

4 Empirical Strategy

The primary estimating equation at the individual (or municipal) level i is:

$$Y_i = \alpha + \beta \, \text{QA}_i + \gamma X_i + \varepsilon_i, \tag{2}$$

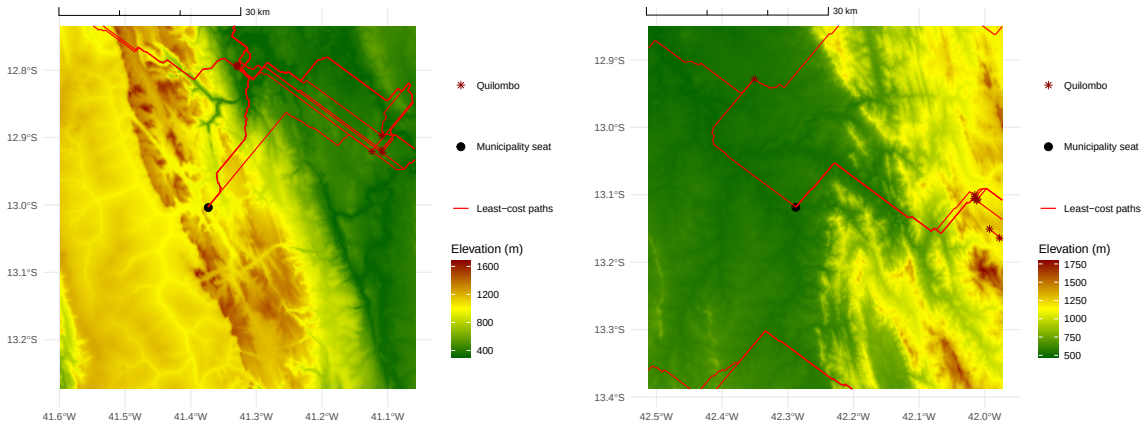
where Y_i is the outcome of interest (e.g., a homogamous marriage indicator, log population density, etc), QA_i is the Quilombo Access measure (transformed by the inverse hyperbolic sine) for the municipality which is assigned also at the individual level, and X_i includes controls. For individual-level regressions, I include various individual and family controls, depending on the outcome. For municipal-level regressions, I include geographic controls (elevation, temperature, precipitation, and ruggedness). The regressions always include state fixed effects and latitude and longitude controls. I always present three sets of standard errors: robust, clustered at the municipality level, and 50-kilometer Conley standard errors.

To illustrate the method for the construction of QA and the source of variation, Figure 3 shows two municipalities picked at random, where the urban center is represented by the centralized black dot in each panel, the quilombos are represented by maroon-colored stars, and the LCPs are the red lines. The QA measure for the municipality is constructed using the LCP length for each municipality–quilombo pair. For municipality A, the sum of the LCP distances is 120 kilometers, and the resulting QA equals 0.13. For municipality B, the sum of the LCPs is 147 kilometers, and the QA equals 0.11.

To address endogeneity in quilombo placement, I propose the formula instrument expressed in Equation (3) for each municipality i summed across the relevant quilombos j:

$$\text{IV}_i = \sum_j \text{walkLCPdist}_{ij}^{(\text{roads})} - \sum_j \text{walkLCPdist}_{ij}^{(\text{no roads})}. \tag{3}$$

It combines the pre-determined municipal location relative to the quilombo communi-



(a) Municipality A (b) Municipality B

Figure 3

Notes: This figure shows the urban center of two municipalities and their adjacent quilombo communities. The LCPs are constructed minimizing terrain costs, which gives a natural "walking LCP." In municipality A, the sum of the walking LCP equals 120 km, which translates to the Quilombo Access equal to 0.13. In municipality B, the sum of the walking LCP is equal to 147 km, and Quilombo Access is equal to 0.11, similar to municipality A.

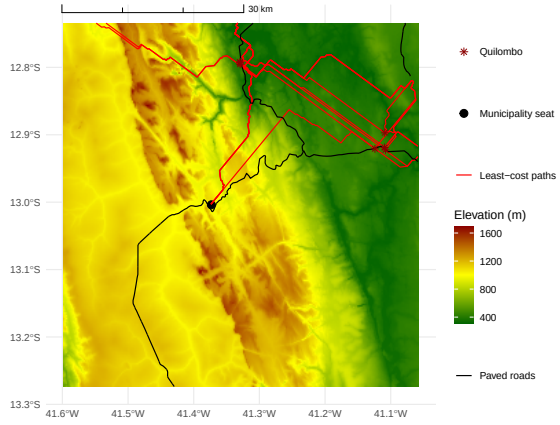
ties with plausibly exogenous shocks in transportation costs arising from the construction of paved roads at the state and federal levels. The idea is that the plans for these roads are decided at a higher level than the municipality and certainly above the level of the quilombo community, which were often marginalized in spaces of power and state decision-making. However, road plans are affected by the pre-existing configuration of cities, and specifically the population density of the locations—places with more density might get prioritized. To control for the economic geography before the roads were built, which determines the shock assignment process, I include the population density of the municipalities in 1920, which is post-emancipation but before the roads were constructed. The intuition, based on the economic geography literature, is that most forces will be summarized into population density, including income, trade, and other confounding factors that may have previously fixed population settlements.

The first-stage equation in a two-stage least squares (2SLS) regression becomes

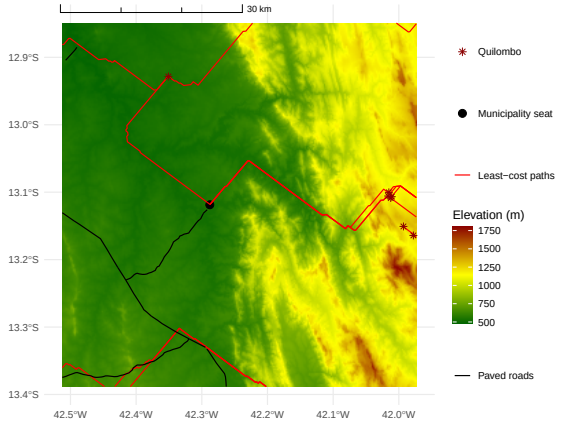
$$\text{QA}_i \;=\; \delta\,\text{IV}_i \;+\; \theta\,ln(\text{popdens}_{i,1920}) \;+\; \zeta\,X_i \;+\; \nu_i, \tag{4}$$

and the second stage recovers the local average treatment effect of QA on Y_i in places where the construction of roads shifted the transportation costs for neighboring quilombos. Thus, even if we expect positive historical selection, which would typically bias OLS estimates upward and IV estimates downward, the IV specifically shifts municipalities whose accessibility to quilombo communities improved significantly due to road construction. These municipalities may experience disproportionately large returns, potentially resulting in IV estimates larger than the OLS estimates despite the correction for positive selection. The net effect, however, depends on the strength of the historical selection bias.

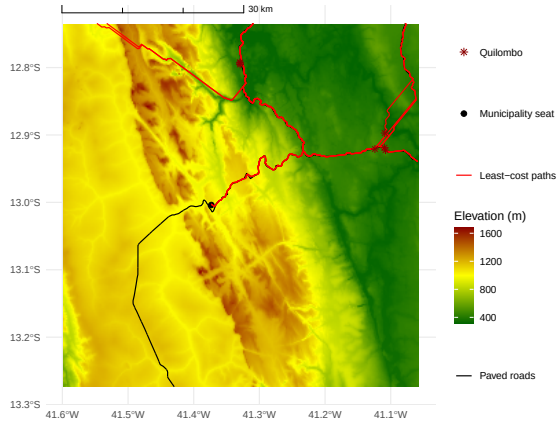
To illustrate the construction of the IV, Figure 4 continues with the example of municipalities A and B. Panels (a) and (b) show where the paved roads were placed, and panels (c) and (d) show the new LCPs accounting for the roads. These two municipalities show opposing cases where in municipality A the roads helped substantially to increase access to the neighboring quilombos—the sum of the walking LCPs is reduced to only 2 kilometers, thus the IV is equal to -118. Whereas in the case of municipality B, the roads were placed on the opposite side of the quilombo communities, and the walking LCPs are practically unchanged.



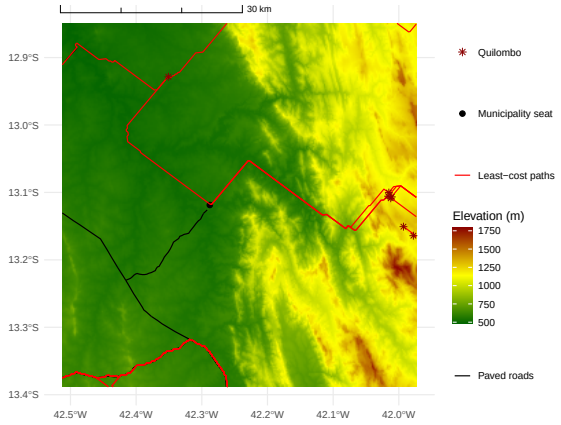
(a) Municipality A and paved roads



(b) Municipality B and paved roads



(c) Municipality A and the new LCPs



(d) Municipality B and the new LCPs

Figure 4

Notes: This figure shows how the introduction of the paved road network changes the LCPs for the municipalities. Panels (a) and (b) show the walking LCPs and the road network, while panels (c) and (d) recompute the walking LCPs taking into account the road network. In municipality A, the sum of the walking LCPs with the road network is equal to 2 km, thus the IV equals -118. In municipality B, the sum of the walking LCPs with the road network is equal to 149 km, thus the IV equals 2, which shows a case where the QA is similar, but the IV is widely different.

5 Results

In this section, I document a series of empirical findings. First, I present evidence supporting a cultural heterogeneity equilibrium. Second, I explore effects on human capital accumulation. Third, I present evidence that supports a quilombo-related spatial equilibrium. Finally, I examine political participation and municipal policy outcomes. The IV estimates are larger than the OLS estimates for most of the regressions, consistent with a decrease in transport costs facilitating the interaction within the municipality. On the other hand, the IV estimates are slightly lower than the OLS estimates for hourly wages, possibly indicating the purge of historical selection bias in this case. Throughout the analysis, I focus on the description of the IV results. The Kleinbergen-Paap first-stage F, which is always calculated for the most conservative standard error, is always around 200 or above, supporting the idea that we have credible inference in the 2SLS regressions.

Marriages and socialization. Table 1 shows the effect of QA on homogamous marriages. In columns (1) and (2), the outcome is an indicator for marriages between Blacks, and in columns (3) and (4), the outcome is an indicator for marriages between followers of Afro-Brazilian religions. The estimates have strong statistical and economic significance. Doubling QA is associated with a 1.5 percentage point increase in Black marriages and a 0.18 percentage point increase in Afro-Brazilian religious marriages. The relative increase is substantial in both cases. Relative to a mean of 3.2%, doubling QA increases Black marriages by 47%, and increases Afro-Brazilian religious marriages by 112% relative to the mean of 0.16%.

Tables 2 and 3 show the results of the effect of QA on socialization, proxied by the existence of cultural initiatives and cultural groups historically related to the quilombos. Table 2 shows that doubling QA increases the existence of quilombo-related cultural initiatives in 22 p.p. and Afro-Brazilian religious initiatives in 8.8 p.p., respectively a 250% and 68% relative increase in relation to the baseline. While Table 3 shows that a doubling of QA increases the existence of capoeira groups by 8.9 p.p., a 14.4% relative increase, and the existence of traditional population groups by 9 p.p., a 12.5% relative increase. In Table D.1 of the Appendix D, I run a placebo exercise where the outcome is the existence of European foreign ancestry cultural groups; as expected, there is no association with quilombos.

Table 1: The Effect of Quilombo Access on Homogamous Marriages

	Dep. var.: 1(Blacks)		Dep. var.: 1(Afro-Br. Relig.)	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.014	0.015	0.0011	0.0018
Robust SE	(0.0002)	(0.0003)	(0.0000)	(0.0001)
Cluster SE	[0.0019]	[0.0015]	[0.0003]	[0.0004]
Conley SE	{0.0026}	{0.0028}	{0.0005}	{0.0008}
Observations	4,304,498	4,304,300	4,132,710	4,132,521
Adj. R2	0.018	0.018	0.0033	0.0033
Kleibergen-Paap F		204.53		204.89
Dep. var. mean	0.032	0.032	0.0016	0.0016
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on homogamous marriages: Between blacks in columns (1) and (2) and between followers of Afro-Brazilian religions in columns (3) and (4). QA is transformed by the inverse hyperbolic sine and the dependent variables is equal to one if the couple in the 2010 census has the corresponding marriage and zero otherwise. Columns (1) and (3) are estimated by OLS. Colmuns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for age, age squared, and educational attainment for both persons, and longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

These results imply that increased access to quilombos helps cities sustain a distinct cultural identity, consistent with a cultural-transmission equilibrium in which quilombo-related homogamous couples and cultural initiatives and groups are more likely to form and remain near quilombos.

Human capital. In Table 4, I show that QA is connected to a series of skills historically related to enslaved Africans. Blacksmithing and ironworking are additionally connected to quilombo groups via the Ogun belief system, as described in Section 2. Panel A shows that a doubling of QA increases crafts and trades employment by 1.5 p.p., a 14% relative increase. As expected, Panel B shows a larger effect for

Table 2: The Effect of Quilombo Access on Cultural Initiatives

	Dep. var.: 1(Quilombos)		Dep. var.: 1(Afro-Br. Relig.)	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.22	0.25	0.053	0.088
Robust SE	(0.011)	(0.015)	(0.0096)	(0.017)
Cluster SE	[0.011]	[0.015]	[0.0096]	[0.017]
Conley SE	{0.012}	{0.018}	{0.010}	{0.023}
Observations	5,414	5,413	5,414	5,413
Adj. R2	0.21	0.21	0.064	0.065
Kleibergen-Paap F		238.33		238.33
Dep. var. mean	0.10	0.10	0.13	0.13
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on culutural initiatives: Quilombo related in columns (1) and (2) and Afro-Brazilian religion related in columns (3) and (4). QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the municipality reported having the cultural activities, and zero otherwise. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for elevation, temperature, precipitation, ruggedness, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

metalworks and blacksmiths, especially for the Black population: Doubling QA is associated with a 0.31 p.p. increase or 22% in relative terms. Panel C shows results for skilled carpentry and masonry, which are more aligned with Panel A: Doubling of QA results in a 0.14 p.p. increase in this type of employment, a 13% relative increase. Table 5 complements these results by showing that QA is also related to the existence of metal- and clay-related handicraft activities, which are historically connected to the African Diaspora. Doubling QA increases the probability of municipalities reporting metal-related handicraft by about 121% relative to the baseline mean—a substantial effect—while clay-related handicraft activities increase by about 48% relative to baseline. Table D.2 runs a placebo exercise showing that quilombos

Table 3: The Effect of Quilombo Access on Cultural Groups

	Dep. var.: 1(Capoeira)		Dep. var.: 1(Traditional Pop.)	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.047	0.089	0.028	0.090
Robust SE	(0.010)	(0.022)	(0.0089)	(0.020)
Cluster SE	[0.010]	[0.022]	[0.0089]	[0.020]
Conley SE	{0.011}	{0.025}	{0.010}	{0.024}
Observations	5,414	5,413	5,414	5,413
Adj. R2	0.12	0.12	0.099	0.093
Kleibergen-Paap F		238.33		238.33
Dep. var. mean	0.62	0.62	0.72	0.72
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on culutural groups: Capoeira related in columns (1) and (2) and traditional population related in columns (3) and (4). QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the municipality reported having the cultural groups, and zero otherwise. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for elevation, temperature, precipitation, ruggedness, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

are not related to embroidery-related handicraft, historically related to the Jesuit missions as shown in Valencia Caicedo (2019), or to fiber-related handicraft, which are historically connected to the indigenous population.

In Tables 6 and 7, I show that QA is connected to more modest, but still significant gains in formal education. Panel A of Table 6 shows that doubling QA is associated with a 1.6% increase relative to the baseline in adult literacy for the general population and a larger relative increase of 3.7% for the Black population, which has a lower baseline than the general population. Panel B shows that doubling QA has a slightly higher effect on educational attainment, with an increase of 3.9% relative to the mean for the full sample and a 5.7% increase for the Black population. In the Appendix

Table 4: The Effect of Quilombo Access on Skills

	Full sample		Blacks	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Panel A. Dep. var.: 1(Crafts and Trades)				
Quilombo Access	0.0020	0.015	0.0030	0.014
Robust SE	(0.0002)	(0.0004)	(0.0005)	(0.0011)
Cluster SE	[0.0016]	[0.0031]	[0.0022]	[0.0037]
Conley SE	{0.0021}	{0.0047}	{0.0030}	{0.0060}
Observations	8,894,762	8,894,214	678,139	678,070
Adj. R2	0.063	0.062	0.072	0.071
Kleibergen-Paap F		193.35		202.63
Dep. var. mean	0.11	0.11	0.13	0.13
Panel B. Dep. var.: 1(Metalworks and Blacksmiths)				
Quilombo Access	0.0002	0.0018	0.0005	0.0031
Robust SE	(0.0001)	(0.0001)	(0.0002)	(0.0004)
Cluster SE	[0.0003]	[0.0009]	[0.0004]	[0.0010]
Conley SE	{0.0004}	{0.0014}	{0.0004}	{0.0016}
Observations	8,894,762	8,894,214	678,139	678,070
Adj. R2	0.0099	0.0098	0.011	0.01
Kleibergen-Paap F		193.35		202.63
Dep. var. mean	0.011	0.011	0.014	0.014
Panel C. Dep. var.: 1(Skilled Carpenters and Masons)				
Quilombo Access	0.0004	0.0014	0.0002	0.0011
Robust SE	(0.0001)	(0.0001)	(0.0002)	(0.0004)
Cluster SE	[0.0002]	[0.0004]	[0.0004]	[0.0005]
Conley SE	{0.0003}	{0.0006}	{0.0004}	{0.0006}
Observations	8,894,762	8,894,214	678,139	678,070
Adj. R2	0.0059	0.0058	0.0056	0.0056
Kleibergen-Paap F		193.35		202.63
Dep. var. mean	0.011	0.011	0.011	0.011
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of quilombo access on skills: Crafts and trades (Panel A), metalworks and blacksmiths (Panel B), and skilled carpenter and masons (Panel C). QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the individual in the 2010 census has the corresponding occupation, and zero otherwise. Only 25 to 65 year-old individuals are included. Columns (1) and (2) include the full sample of individuals and columns (3) and (4) include only black individuals in the 2010 census. Columns (1) and (3) are estimated by OLS and columns (2) and (4) are estimated by 2SLS. All estimates include controls for age, age squared, sex, marital status, educational attainment, longitude, latitude, and state fixed effects.

Table 5: The Effect of Quilombo Access on Handicraft Activities

	Dep. var.: 1(Metal)		Dep. var.: 1(Clay)	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.0047	0.017	0.044	0.087
Robust SE	(0.0033)	(0.0062)	(0.011)	(0.020)
Cluster SE	[0.0033]	[0.0062]	[0.011]	[0.020]
Conley SE	{0.0036}	{0.0067}	{0.014}	{0.024}
Observations	5,414	5,413	5,414	5,413
Adj. R2	0.00034	-0.0025	0.084	0.081
Kleibergen-Paap F		238.33		238.33
Dep. var. mean	0.014	0.014	0.18	0.18
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on handicraft activities: Metal related in columns (1) and (2) and clay related in columns (3) and (4). QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the municipality reported having metal or clay handicraft activities, and zero otherwise. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for elevation, temperature, precipitation, ruggedness, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

Table D.3, I show that these results are robust to controlling for parents' education, which changes the sample because I can only use individuals that live with at least one parent in the same household. In Table 7, I show that a doubling of the QA is associated with more school attendance only for Black children, with an effect of 0.6% relative to an already high mean.

Taken together, the results on skills and formal education are consistent with a story where, in places with more access to quilombos, the Black population has a higher level of human capital, and this creates positive human capital externalities at the city level for the broad population, similar to Wantchekon et al. (2015).

Table 6: The Effect of Quilombo Access on Adult Education

	Full sample		Blacks	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Panel A. Dep. var.: 1(Literate)				
Quilombo Access	0.019	0.014	0.030	0.030
Robust SE	(0.0002)	(0.0004)	(0.0007)	(0.0012)
Cluster SE	[0.0052]	[0.0053]	[0.0081]	[0.0064]
Conley SE	{0.0071}	{0.0074}	{0.0098}	{0.0092}
Observations	10,045,515	10,044,973	788,483	788,416
Adj. R2	0.12	0.13	0.15	0.16
Kleibergen-Paap F		199.02		198.14
Dep. var. mean	0.88	0.88	0.82	0.82
Panel B. Dep. var.: Educational Attainment				
Quilombo Access	0.10	0.074	0.097	0.097
Robust SE	(0.0005)	(0.0011)	(0.0015)	(0.0028)
Cluster SE	[0.025]	[0.024]	[0.022]	[0.016]
Conley SE	{0.028}	{0.025}	{0.026}	{0.023}
Observations	10,023,771	10,023,235	786,577	786,510
Adj. R2	0.11	0.13	0.12	0.14
Kleibergen-Paap F		199.2		198.23
Dep. var. mean	1.91	1.91	1.70	1.70
State FE	Yes	Yes	Yes	Yes
Hist. dens. and educ.	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on adult education: Literacy (Panel A) and educattion attainment (Panel B). Only 25 to 65 year-old individuals are included. QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the individual in the 2010 census is literate and zero otherwise, and is equal to 1 (incomplete basic edution) to 4 (superior edution). Columns (1) and (2) include the full sample of individuals and columns (3) and (4) include only black individuals in the 2010 census. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where quilombo access is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include pre-determined historical controls for population density and education at the municipal level in 1920. All estimates include controls for age, age squared, sex, marital status, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

Table 7: The Effect of Quilombo Access on School Attendance

	Dep. Var.: 1(School Attendance)			
	Full sample		Blacks	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.0006	0.0005	0.0012	0.0055
Robust SE	(0.0002)	(0.0004)	(0.0007)	(0.0014)
Cluster SE	[0.0006]	[0.0009]	[0.0012]	[0.0020]
Conley SE	{0.0008}	{0.0012}	{0.0014}	{0.0022}
Observations	3,399,007	3,398,898	203,052	203,046
Adj. R2	0.077	0.077	0.079	0.079
Kleibergen-Paap F		211.86		198.28
Dep. var. mean	0.94	0.94	0.93	0.93
State FE	Yes	Yes	Yes	Yes
Hist. dens. and educ.	No	Yes	No	Yes
Parents' educ.	Yes	Yes	Yes	Yes

Notes: Estimates of the effect of quilombo access on school attendance controlling for parents' education. Quilombo access is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the child in the 2010 census is attending school and zero otherwise. Columns (1) and (2) include the full sample of individuals and columns (3) and (4) include only black children in the 2010 census. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where quilombo access is instrumented by the difference in quilombo access before and after the construction of federal and state paved roads. The instrumented regressions include pre-determined historical controls for population density and education at the municipal level in 1920. All estimates include controls for age, age squared, sex, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F is shown for the 2SLS regressions.

Density and productivity. Table 8 examines the municipal population density impacts of QA. The estimates are strongly statistically and economically significant. Doubling QA increases total population density by 51%, and Black population density by 75%. This result suggests substantial spatial agglomeration caused by improved access to quilombos, enhancing local attractiveness especially for Black populations, potentially leading to agglomeration spillovers and the reinforcement of human capital accumulation. Table 9 reports hourly wage effects as a proxy for city productivity. It shows that productivity is improved, but not dramatically: Doubling QA raises wages by around 4%, for both the overall and the Black population, while the statistical

Table 8: The Effect of Quilombo Access on Population Density

	Dep. var.: Pop. Density		Dep. var.: Black Pop. Density	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.13	0.51	0.33	0.75
Robust SE	(0.026)	(0.054)	(0.027)	(0.062)
Cluster SE	[0.026]	[0.054]	[0.027]	[0.062]
Conley SE	{0.048}	{0.13}	{0.053}	{0.15}
Observations	5,413	5,412	5,412	5,411
Adj. R2	0.47	0.51	0.45	0.47
Kleibergen-Paap F		238.38		238.38
Dep. var. mean	110.99	110.98	8.56	8.56
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on population density at the municipal level: Full population density in columns (1) and (2) and black population density in columns (3) and (4). QA is tranformed by the inverse hyperbolic sine and population density is the natural logarithm. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for elevation, temperature, precipitation, ruggedness, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

significance in the IV regression is retained only for Blacks.

Political participation and municipal policies. Table 10 presents the impact of QA on political participation, as measured by the representation of Black politicians in the 2016 municipal elections. Doubling QA has a significant impact on the probability of running Black candidates for mayor and municipal council, increasing the number of Black candidates 25-35% in relation to the baseline. In addition, QA has a positive impact on the electoral success of Black candidates, increasing the number of Black politicians elected in 11-20% although we cannot rule out null effects because the baseline is very small—only 0.64% of the politicians elected are Black, which makes the QA coefficient hard to detected, but statistical significance is

Table 9: The Effect of Quilombo Access on Productivity

	Dep. var.: Hourly Wage			
	Full sample		Blacks	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.041	0.039	0.043	0.038
Robust SE	(0.0006)	(0.0012)	(0.0019)	(0.0034)
Cluster SE	[0.016]	[0.018]	[0.016]	[0.016]
Conley SE	{0.020}	{0.031}	{0.020}	{0.029}
Observations	6,311,155	6,310,702	491,983	491,922
Adj. R2	0.31	0.32	0.23	0.24
Kleibergen-Paap F		177.35		186.19
Dep. var. mean	9.09	9.09	6.64	6.64
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of quilombo access on hourly wage. QA is tranformed by the inverse hyperbolic sine and the hourly wage is the natural logarithm. Only 25 to 65 year-old individuals are included. Columns (1) and (2) include the full sample of individuals and columns (3) and (4) include only black individuals in the 2010 census. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for age, age squared, sex, marital status, educational attainment, longitude, latitude, and state fixed effects. All estimates show corresponding robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

retained in the OLS regression. Thus, the QA impact represents an important boost to Black political representation in an environment where, until today, the baseline is very low. Table 11 shows that more Black political participation translates into more cultural policies related to their population—doubling QA increases 5.3% the number of cultural policies relative to the mean—and more municipal-backed financing funds for culture—doubling QA increases 25% the number of available funds. Together, these findings illustrate that increased QA not only fosters Black political empowerment but also directly shapes municipal policy agendas and resource allocation, which is consistent with a local co-evolution of cultural identities and institutional

Table 10: The Effect of Quilombo Access on Political Participation

	Dep. var.: 1(Black Candidate)		Dep. var.: 1(Black Elected)	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.022	0.031	0.0013	0.0007
Robust SE	(0.0008)	(0.0014)	(0.0003)	(0.0004)
Cluster SE	[0.0022]	[0.0031]	[0.0003]	[0.0005]
Conley SE	{0.0033}	{0.0052}	{0.0004}	{0.0005}
Observations	476,372	476,372	476,372	476,372
Adj. R2	0.026	0.026	0.0072	0.0072
Kleibergen-Paap F		230.22		230.22
Dep. var. mean	0.088	0.088	0.0064	0.0064
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on political participation: Black candidates (Panel A) and black candidates elected (Panel B). QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the individual in the 2016 election is a black candidate or a black candidate elected, and zero otherwise, considering elections for mayor and municipal council in all municipalities. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include pre-determined historical controls for population density at the municipal level in 1920. All estimates include controls for age, age squared, sex, educational attainment, occupation, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

development.

6 Conclusion

In this paper, I documented that maroon communities are causally connected to higher levels of local development in Brazil, understood as a combination of a distinct cultural identity, African-based human capital, population density and productivity, and political participation. Together, these findings provide the first systematic evidence that a minority's intergenerational cultural transmission can generate higher levels of local development and spatial equilibria, and that cultural identity and local

Table 11: The Effect of Quilombo Access on Cultural Policies and Financing

	Dep. var.: Policies		Dep. var.: Financing Funds	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	0.086	0.21	0.078	0.19
Robust SE	(0.039)	(0.078)	(0.045)	(0.089)
Cluster SE	[0.039]	[0.078]	[0.045]	[0.089]
Conley SE	{0.040}	{0.081}	{0.046}	{0.098}
Observations	5,414	5,413	5,414	5,413
Adj. R2	0.042	0.04	0.073	0.072
Kleibergen-Paap F		238.33		238.33
Dep. var. mean	1.63	1.63	0.77	0.77
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on culutural policies and government cultural financing funds: Policies in columns (1) and (2) and financing in columns (3) and (4). QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to the number of cultural policies and cultural financing funds reported by the municipality, and zero otherwise. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for elevation, temperature, precipitation, ruggedness, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

institutions can co-evolve in ways that benefit both the marginalized group and the broader community.

A policy implication that deserves better attention in future research is those related to land rights and land policies, since the positive effect on local economies comes from the integration of quilombo ethnic territories with urban centers. I leave other specific policy implications for future research—policies that seem beneficial in principle can backfire since much of the quilombo history is based on resistance against the state. Beyond the Brazilian case, these insights speak to the broader role of minority enclaves and culturally distinct groups in shaping development paths. More generally, the interplay of cultural identity, spatial agglomeration, and political

participation may recur in other historical and geographic contexts.

Potential paths for future research suggested by the empirical findings in this paper include the role of maroon communities in helping to close the wage, wealth, and human capital White–Black gap caused by slavery. The role of different cultural and ethnic origins of enslaved Africans and of the syncretic evolution of culture in shaping development paths. There is also scope for better investigating the empirical dynamics of local co-evolution of quilombo-based cultural identity and municipal institutional development. Integrating cultural transmission models with the spatial equilibrium framework is a promising path forward for a channel of how cultural equilibria impact economic outcomes.

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Online Appendix

A Data description

Grid-cell data. The nighttime lights for 2010 and 1992 are from the Version 4 DMSP-OLS Time Series. To generate the outcome variable, I sum the intensity over the grid cell area. The population data in 2010 is from the Gridded Population of the World v4 population count data, which I sum over the grid cell area. The 1992 population data is from the Global Population Density Grid Time Series Estimates in 1990, transformed to population count data conditional on the size of the grid cell area, and then summed over the grid cell area. All grid-cell data is at a 30-second resolution. Municipal indicators for the fixed effects are assigned to each grid cell based on the intersection of the municipal boundaries with each grid cell.

Marriages. The homogamous marriages outcomes I build from the 2010 micro-level official census data from IBGE. I pair individuals using the household identifier, which makes possible to find all married couples that live together. I then build indicators if the couples are both Black or both follow any of the Afro-Brazilian religions. Afro-Brazilian religion joins the following codes: 620 Umbanda, 629 Outras umbandas, 630 Candomblé, 639 Outros candomblés, 640 Religiosidades afro-brasileiras, 641 Declaração múltipla de religiosidade afro com outras religiosidades, 649 Outras declarações de religiosidade afro-brasileira, 894 Declaração múltipla de religiosidade católica/umbanda, and 895 Declaração múltipla de religiosidade católica/candomblé.

Cultural initiatives and groups. The cultural initiatives and groups I build using the 2014 municipal survey by IBGE. This survey asks municipal officials a series of questions. I then code indicators if the municipalities answered positively to the category in question, such as if there are any cultural initiatives or groups related to quilombos or Afro-Brazilian religions. The outcomes are equal to one if the municipality answered that it has any cultural initiatives related to (1) quilombos or (2) Afro-Brazilian religions, or equal to one if the municipality answered positively that it has the presence of (1) capoeira groups or (2) traditional population groups. The placebo exercise uses the answer that municipalities responded positively to having foreign ancestry groups related to Europeans.

Occupational skills. The skills indicators are built by joining various categories in the 2010 micro-level census based on the International Standard Classification of

Occupations (ISCO) for individuals aged 25 to 65 years old. The crafts and trades category is the same as OCCISCO category 7 used in IPUMS, joining the following codes: 7111, 7112, 7113, 7114, 7115, 7119, 7121, 7122, 7123, 7124, 7125, 7126, 7127, 7131, 7132, 7211, 7212, 7213, 7214, 7215, 7221, 7222, 7223, 7224, 7231, 7232, 7233, 7234, 7311, 7312, 7313, 7314, 7315, 7316, 7317, 7318, 7319, 7321, 7322, 7323, 7411, 7412, 7413, 7421, 7422, 7511, 7512, 7513, 7514, 7515, 7516, 7521, 7522, 7523, 7531, 7532, 7533, 7534, 7535, 7536, 7541, 7542, 7543, 7544, and 7549. Blacksmithing and metalworks join 7211, 7212, 7213, 7214, 7221, 7222, 7223, and 7224. Skilled carpentry and masonry join 7111, 7113, 7115, 7317, 7522, and 7523.

Handicraft activities (*artesanato*). For handicraft activities I use the 2014 municipal survey from IBGE. The outcomes for metal, clay, and the placebo outcomes embroidery and fibers follow the same procedure as cultural initiatives and groups, assigning one if the municipality answered positively to having any of these activities.

Education. The formal education variables I build first are literacy and educational attainment for adults, that is, individuals 25 to 65 years old, to match the age in the occupational skills variables. Literacy is equal to one if the individual answered they are literate in the 2010 census. Educational attainment is assigned one to four: One is incomplete education, and four is at least a college education. For the school attendance outcome, I restrict the sample to 7 to 17-year-old individuals and assign one if the individual answers that they attend school. Since this outcome is for children, I also build the household to be able to build the parents' education, which I assign the maximum value for educational attainment between the father and the mother. For the robustness results, I build literacy and educational attainment for individuals who live with their parents, so I can recover the parents' education variable assigned as the maximum value for educational attainment between the father and the mother.

Population density. This variable is built at the municipal level in 2010 and 1920 dividing the total population or Black population by the municipality area, based on the official IBGE censuses.

Productivity. City productivity is proxied by individual-level hourly wage. I use the 2010 census microdata and restrict the individuals between 25 to 65 years old. I then divide the reported total income by the reported total hours worked.

Politicians. I use the 2016 official municipal elections data. The candidate's variable is simply one if the politician running for mayor or municipal council is Black, and the elected candidate variable is one if the Black candidate was elected.

Municipal policies. I use the 2014 municipal survey data to build the municipal culture policy variable which is the number of policies present in the municipality between: A76 Make culture one of the fundamental components of the population's quality of life; A77 Increase the level of social participation in cultural projects; A79 Integrate culture into local development; A80 Preserve historical, artistic, and cultural heritage; A82 Ensure the survival of local cultural traditions; A83 Democratize cultural management. The municipal financing variable aggregates: A384 Foster local cultural production; A388 Fund the municipality's traditional festivals; A390 Finance popular (folk) celebrations; A391 Maintain (preserve) cultural heritage; A393 Fund the upkeep of traditional cultural groups; A394 Enable the circulation of artistic works; A396 Ensure the maintenance of cultural venues and spaces.

Roads network. I use the 2022 IBGE shapefiles and select for built paved roads under gubernatorial and federal administration only.

Geography. For geography data, I use a series of raster data. The elevation data is the 250-meter-resolution USGS/NASA SRTM elevation raster. The temperature and precipitation data are from BIOCLIM 30s-resolution raster. The ruggedness data is from Nunn and Puga (2012). The longitude, latitude, and municipal boundaries are from Geobr.

Quilombo communities. The quilombo communities were, for the first time, mapped in the 2022 census by IBGE. The agency's procedure was based on identifying quilombola descendants and then building 100-meter buffers around the self-identified households of the same quilombo community. Then the census joined all contiguous intersecting buffers and assigned the coordinate randomly in the area with

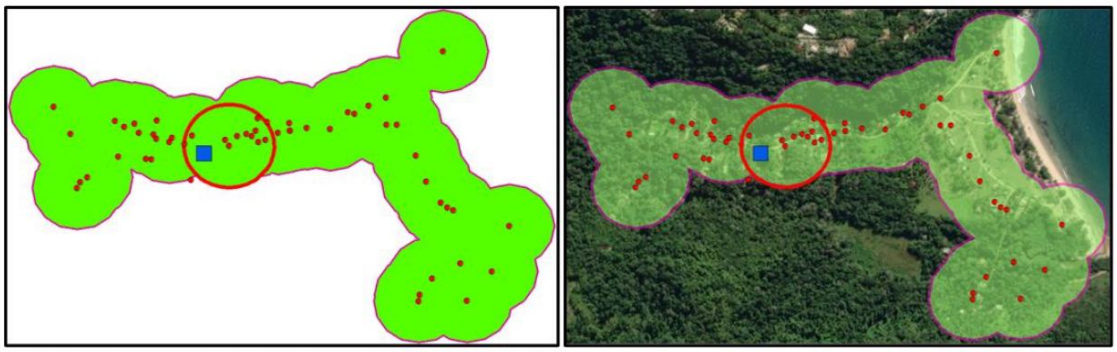


Figure A.1: Quilombo coordinate assignment in the 2022 census

Notes: The red dots are the quilombo households and the blue square is the coordinate assigned to this quilombo community. Source: IBGE (2024).

more households, as shown in Figure A.1. The census did this for communities with at least fifteen people to comply with privacy laws, but have not made available the exact number of residents in each community yet.

There are many types of quilombos, ranging from totally urban to totally rural. Figures A.2 and A.3 below illustrate two examples: The first figure is a typical rural quilombo (note the paved road that goes by it), and the second figure is a more urban example, with an urban center with five quilombo neighborhood communities.

Figure A.2: Typical rural quilombo

Figure A.3: Typical urban quilombo

B Grid-cell analysis

Table B.1 presents the grid-cell regressions in 2010 and 1992. For this analysis, I divide the Brazilian territory, excluding the core Amazon states, into 0.1-degree grid cells, resulting in 54,156 cells. I then assign each geo-located quilombo community to the grid cells and count the number of quilombos in each cell. In columns (3) and (4), I "turn off" the quilombo pixels, that is, I assign a 500-meter buffer for each quilombo coordinate and exclude the night light pixels (and population) pixels within the buffers. Panel A regresses the number of quilombos on the sum of night light intensity in 2010 over the grid cell, which goes from 0 to 63 in each pixel within the cells. Panel B regresses the number of quilombos on the sum of night light intensity in 1992. Both regressions include municipality fixed effects (I assign each municipality to the cell if the cell is within the municipality boundary) and controls for the sum of the population in each cell in columns (2) and (4).

Table B.1: Quilombos, night lights, and population

	Full pixel sample		Turn off quilombo pixels	
	(1)	(2)	(3)	(4)
Panel A. Dep. var.: Sum of night light intensity in 2010				
N. of Quilombos	1.03	0.40	0.94	0.31
Robust SE	(0.064)	(0.053)	(0.063)	(0.051)
Cluster SE	[0.064]	[0.067]	[0.063]	[0.066]
Conley SE	{0.084}	{0.074}	{0.082}	{0.072}
Observations	54,156	54,156	54,156	54,156
Adj. R2	0.64	0.74	0.64	0.74
Dep. var. mean	233.84	233.84	230.62	230.62
Panel B. Dep. var.: Sum of night light intensity in 1992				
N. of Quilombos	0.66	0.42	0.59	0.36
Robust SE	(0.056)	(0.047)	(0.053)	(0.045)
Cluster SE	[0.052]	[0.048]	[0.049]	[0.045]
Conley SE	{0.067}	{0.059}	{0.063}	{0.055}
Observations	54,156	54,156	54,156	54,156
Adj. R2	0.67	0.73	0.67	0.73
Dep. var. mean	85.24	85.24	83.98	83.98
Controls for population	No	Yes	No	Yes
Municipal FE	Yes	Yes	Yes	Yes

Notes: Grid-cell level regressions of the number of quilombos on the sum of pixel-level night light intensity in 2010 (Panel A) and 1992 (Panel B) at the 0.1 degree resolution. Number of quilombos, night light intensity, and population are transformed by the inverse hyperbolic sine. Columns (1) and (2) include the full pixel sample and columns (3) and (4) "turn off" the pixels in a 500 meters buffer from each quilombo centroid. All estimates include controls for municipality fixed effects and show corresponding robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets.

C Historical context illustrations

In this section, I show some illustrations to complement the Historical Context section. In addition, I recommend the excellent Brazilian movie *Açúcar* (Renata Pinheiro and Sérgio Oliveira, 2017) that shows the "modern" dynamics of power and economic and cultural relations (such that involving Afro-Brazilian religion rituals) between a decadent sugar family in Northeastern Brazil and the descendants of their former slaves which formed a quilombo in their land. The movie shows clearly what Harding argues by Candomblé meaning a reversal of the power structure: "the use of ritual, magico-phamacopoeic means to alter the extreme inequalities of power in colonial and slave-based societies must be understood as a principal form of Black resistance to slavery in Brazil" (Harding, 2000). See also the very interesting documentary *Metal na Bahia* (Marcelo Gomes, 2013), for examples of entire cities devoted to metalworks related to Candomblé and the quilombos, and how these skills passes on by intergenerational transmission.

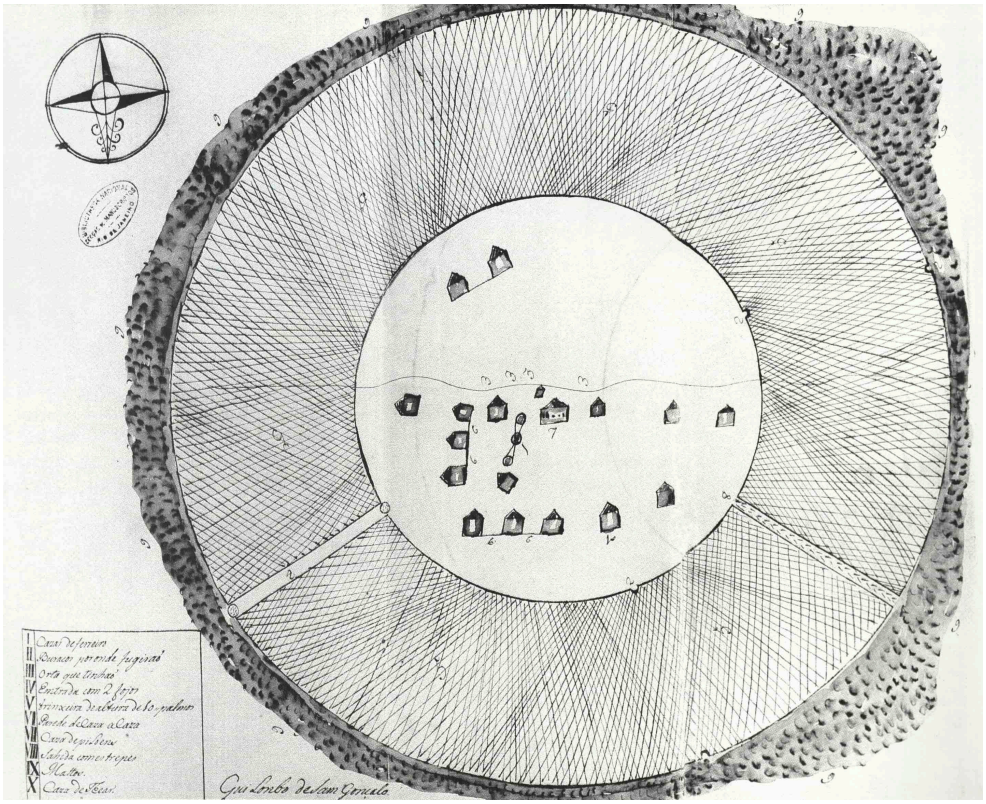
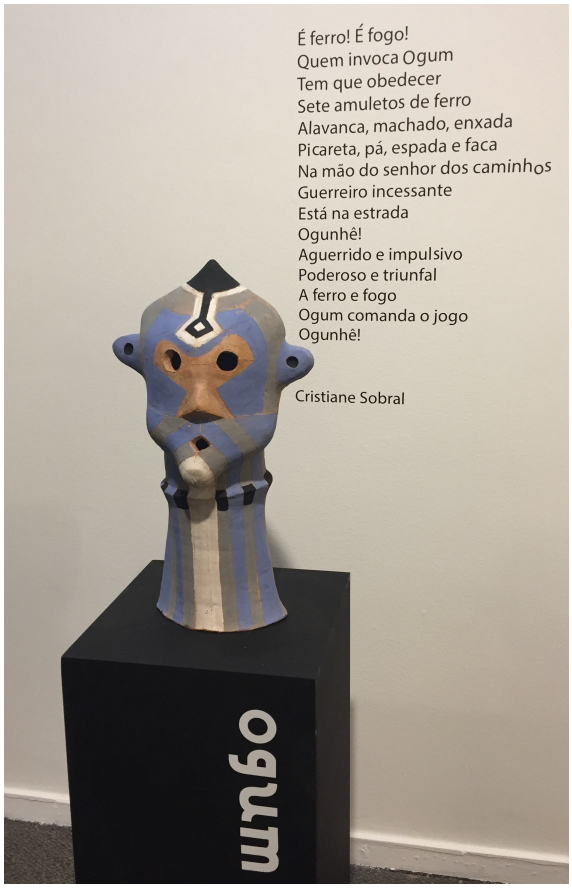


Figure C.1: Quilombo São Gonçalo, 1796 (Anais da Biblioteca Nacional).

Notes: Legend: 1 - blacksmith's house, 2 - escape holes, 3 - vegetable garden, 4 - entrance, 5 - trench, 6 - wall, 7 - pestle house, 8 - exit, 9 - woods, 10 - loom house. Cartographic documentation of the expedition by Captain Antônio Francisco França, part of the manuscripts section of the Brazilian National Library, shown in Anjos (2009).

Figure C.2: "Jogar Capoeira," M. Rugendas, 1835, showing the practice of the dancing martial art *capoeira*.

Figure C.3: "Negros Dançando," Z. Wagner, 1634, showing an Afro-Brazilian religious ritual.



(a) "Ogun," J. Neves and C. Sobral, Museu Nacional, 2020.

(b) "Ogun Tools," M. Edwards, Museu Nacional, 2020.

Figure C.4: Ogun and Skills

Notes: These pictures were taken by the author at the National Museum in Brasília, Brazil, in March 2020.

Figure C.5: Quilombo products arrive at the Court market in Rio de Janeiro, c. 1825, "Rue Droite à Rio de Janeiro," M. Rugendas, 1835, shown in Gomes and Reis (2016).

D Robustness results

Table D.1: The Effect of Quilombo Access on Placebo Cultural Groups

	Dep. var: 1(Foreign Ancestry)	
	(1) QA OLS	(2) Roads IV
Quilombo Access	0.0011	0.0044
Robust SE	(0.0032)	(0.010)
Cluster SE	[0.0032]	[0.010]
Conley SE	{0.0034}	{0.0092}
Observations	5,414	5,413
Adj. R2	0.061	0.064
Kleibergen-Paap F		238.33
Dep. var. mean	0.054	0.054
State FE	Yes	Yes
Hist. density	Yes	Yes

Notes: Estimates of the effect of Quilombo Access on foreign ancestry cultural groups related to European populations. QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the municipality reported having the cultural groups, and zero otherwise. Column (1) is estimated by OLS and columns (2) is estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for elevation, temperature, precipitation, ruggedness, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

Table D.2: The Effect of Quilombo Access on Placebo Handicraft Activities

	Dep. var.: 1(Embroidery)		Dep. var.: 1(Fibers)	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Quilombo Access	-0.0074	-0.021	0.021	0.0024
Robust SE	(0.011)	(0.021)	(0.0094)	(0.017)
Cluster SE	[0.011]	[0.021]	[0.0094]	[0.017]
Conley SE	{0.015}	{0.024}	{0.010}	{0.021}
Observations	5,414	5,413	5,414	5,413
Adj. R2	0.037	0.036	0.04	0.039
Kleibergen-Paap F		238.33		238.33
Dep. var. mean	0.77	0.77	0.12	0.12
State FE	Yes	Yes	Yes	Yes
Hist. density	No	Yes	No	Yes

Notes: Estimates of the effect of Quilombo Access on placebo handicraft activities: Embroidery related in columns (1) and (2) and fiber related in columns (3) and (4). QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the municipality reported having the handicraft activities, and zero otherwise. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where QA is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include a pre-determined historical control for population density at the municipal level in 1920. All estimates include controls for elevation, temperature, precipitation, ruggedness, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.

Table D.3: The effect of Quilombo Access on adult education controlling for parents' education

	Full sample		Blacks	
	(1) QA OLS	(2) Roads IV	(3) QA OLS	(4) Roads IV
Panel A. Dep. var.: 1(Literate)				
Quilombo Access	0.011	0.0077	0.017	0.012
Robust SE	(0.0005)	(0.0008)	(0.0016)	(0.0029)
Cluster SE	[0.0032]	[0.0042]	[0.0053]	[0.0059]
Conley SE	{0.0044}	{0.0056}	{0.0065}	{0.0075}
Observations	1,389,165	1,389,110	101,050	101,044
Adj. R2	0.084	0.09	0.11	0.12
Kleibergen-Paap F		196.45		184.78
Dep. var. mean	0.91	0.91	0.88	0.88
Panel B. Dep. var.: 1(Educational Attainment)				
Quilombo Access	0.049	0.025	0.061	0.061
Robust SE	(0.0013)	(0.0027)	(0.0041)	(0.0078)
Cluster SE	[0.013]	[0.014]	[0.016]	[0.016]
Conley SE	{0.016}	{0.016}	{0.019}	{0.023}
Observations	1,384,309	1,384,257	100,604	100,598
Adj. R2	0.29	0.29	0.23	0.24
Kleibergen-Paap F		196.6		184.8
Dep. var. mean	2.23	2.23	1.99	1.99
State FE	Yes	Yes	Yes	Yes
Hist. dens. and educ.	No	Yes	No	Yes
Parents' educ.	Yes	Yes	Yes	Yes

Notes: Estimates of the effect of Quilombo Access on adult education controlling for parents' education: Literacy (Panel A) and educattion attainment (Panel B). Only 25 to 65 year-old individuals are included. QA is tranformed by the inverse hyperbolic sine and the dependent variable is equal to one if the individual in the 2010 census is literate and zero otherwise, and is equal to 1 (incomplete basic edution) to 4 (superior edution). Columns (1) and (2) include the full sample of individuals and columns (3) and (4) include only black individuals in the 2010 census. Columns (1) and (3) are estimated by OLS. Columns (2) and (4) are estimated by 2SLS where quilombo access is instrumented by the difference in the walking LCPs before and after the construction of federal and state paved roads. The instrumented regressions include pre-determined historical controls for population density and education at the municipal level in 1920. All estimates include controls for age, age squared, sex, longitude, latitude, and state fixed effects. All estimates show robust standard errors in parentesis, municipality-level clustered standard errors in brackets, and 50 km Conley standard errors in curly brackets. The Kleinberg-Paap first-stage F based on the Conley SE is shown for the 2SLS regressions.