EUI WORKING PAPERS

Slaves, Migrants and Development in Brazil, 1872-1923

Andrea Papadia

European University Institute

Max Weber Programme

Slaves, Migrants and Development in Brazil, 1872-1923

Andrea Papadia

Abstract
Brazil was the largest importer of slaves during the Atlantic slave trade. Yet, the lack of disaggregated data able to capture the intensity of slavery across time and space means that researchers have struggled to identify an economic legacy of the institution. I propose to measure slavery using the presence of communities descended from those founded by runaway slaves: the Quilombos. Combining this measure with municipal level data, I illustrate the adverse impact of slavery on a broad range of indicators of economic development, both while slavery still existed and more than 30 years after its abolition. Additionally, I exploit the creation of communities set up to host newly arrived migrants from Europe to show that European immigration taking place while slavery existed led to better developmental outcomes. This complements the previous finding by indicating that exiting a slave-based economy earlier thanks to an influx of free workers was beneficial for economic development.

Keywords
Slavery, Immigration, Economic Development, State Capacity

JEL
J15, N36, O12, O43

Andrea Papadia
Max Weber Fellow, 2017-2018 and 2018-2019

1   Introduction

This paper studies the effect of slavery on economic development in Brazil. While evidence of the detrimental legacy of the institution is abundant for other parts of the world – including several Latin American countries – researchers have struggled to identify one in Brazil, despite the country being the largest importer of slaves during the Atlantic slave trade. Two main challenges explain this. First, slaves did not distribute themselves randomly, but tended to be located in areas experiencing commodity booms or, more generally, growing rapidly. Unsurprisingly, these same areas tended to score relatively better on developmental indicators. The second, and perhaps bigger, challenge is the scarcity of disaggregated data on the distribution of slaves across Brazil. The only detailed information available to us comes from the 1872 census, the sole one carried out while slavery existed. While the census is an excellent source of information, it captures a snapshot of slavery in its latter phases and after the momentous changes brought about by the commodity cycles of the preceeding four centuries. Thus, the census provides an extremely partial picture of the incidence of slavery across time and space.

In order to tackle the issue of measurement, I propose a proxy for the intensity of slavery, which aims at capturing its long-term intensity and is thus complementary to the census. This is the presence of communities descended from runaway slaves – the Quilombos – in modern day Brazil. The hypothesis is that these communities, officially recognized by the Brazilian state since 1988, are more abundant in areas where large-scale slavery was more prevalent and long-lived. Therefore, conditional on accounting for their probability of survival until today, Quilombos should provide a measure of slavery in the past. I offer empirical evidence that this is indeed the case.

Using this alternative data source is also helpful to deal with the first challenge. This is because the spatial distribution of runaway slave communities is largely tied to economic activities that had lost economic relevance by the second half of the 19th century and are thus unlikely to have been affecting economic development directly by the time I observe the outcomes. Nonetheless, to further deal with potential endogeneity, I also directly control for the incidence of the commodity booms and employ a propensity score matching strategy to account for further differences between Quilombo and non-Quilombo municipalities, which may bias the results.

I study a variety of indicators to capture the heterogenous nature of development, including: human capital, population density, wages, fiscal and state capacity. In terms of geography, I focus on the epicenter of the changes in Brazil's economy in the 19th and early 20th century: the provinces/states of Minas Gerais, Rio de Janeiro and São Paulo. Using the methods described and this alternative measure of slavery, I show that municipalities with a higher intensity of slavery had worse developmental outcomes both while slavery still existed and decades after its abolition. The results are strongest and most robust for literacy, public employment and public expenditure. Moreover, I also show that the post-Abolition outcomes are not fully explained by differences, arising while slavery still existed. This suggests that the legacy of slavery continued to damage local economic development long after Abolition, presumably by

1

hindering the development of new forms of economic activity.

As a final step, I highlight a new channel through which slavery affected development. I show that municipalities containing colonies founded to house European immigrants had better developmental outcomes than municipalities devoid of them. Crucially, this is only the case for immigrant colonies created while slavery existed, while no recognizable differences exist for communities founded after the abolition of slavery in 1888. Using placebo tests, I demonstrate that the relationship is causal. Additionally, I provide narrative evidence supporting the hypothesis that differential developmental paths can be traced back to the contrast between free and slave labour and the associated institutional developments.

The rest of the paper is organized as follows. I discuss literature related to the paper in Section 2 and provide an overview of key events in Brazilian history in Section 3. Section 4 outlines the empirical strategy employed in the paper, Section 5 illustrates the data, and Section 6 presents the results of the analysis. Section 7 digs deeper into the possible channels of the effects found, while Section 8 concludes.

2 Related literature

This paper is linked to four main strands of literature, making it of interest to those concerned with both Brazil's economic history and economic development more generally. First, Brazil represents an ideal testing ground to improve our understanding of the effect of slavery on economic and institutional development. Economic historians and other social scientists have long postulated a relationship between slavery and economic underdevelopment. Stanley Engerman and Kenneth Sokolof, for example, famously argued that parts of the Americas employing large scale slavery had an adverse institutional evolution and relatively worse economic development compared to other parts of the continent (Engerman and Sokoloff, 1997, 2012). The hypothesis has obtained only partial empirical confirmation (Nunn, 2008; Bruhn and Gallego, 2012),[1] but a growing body of work – for example Dell (2010), Acemoglu, García-Jimeno, and Robinson (2012), Markevich and Zhuravskaya (2018) and Buggle and Nafziger (2018) – has convincingly demonstrated the existence of a negative relationship between various forms of coerced labour and economic development in a number of countries.

The story is different for Brazil. As already mentioned, while the country was the largest importer of slaves during the Atlantic slave trade, with nearly 5 million Africans forcefully transported across the ocean between the 16th and 19th century (Klein and Luna, 2010), the economic and institutional legacies of slavery in the country have not been firmly established. Although a number of studies have attempted to investigate the link between slavery and long-term development, their findings are largely inconclusive in this respect (Summerhill, 2010; de Carvalho Filho and Colistete, 2010; Reis, 2017). Some studies offer indirect evidence of the

---

[1]Nunn finds a negative relationship between slavery and development, but not through the channel of large scale plantation agriculture posited by Engerman and Sokoloff. Moreover, he finds no support for inequality being the channel of persistence. Bruhn and Gallego find a link between colonial activities involving increasing returns to scale and worse economic outcomes today through the channel of less representative political institutions, but find no link between the exploitation of forced labour and development.

impact of slavery and of extractive colonial activities more generally (Naritomi, Soares, and Assunção, 2012; Musacchio, Martínez Fritscher, and Viarengo, 2014; de Carvalho, 2015), but the only paper showing evidence of a direct legacy of slavery in Brazil is Fujiwara et al's work on the link between slavery and contemporary inequality (Fujiwara, Laudares, and Valencia Caceido, 2017). Therefore, this paper offers prima facie evidence on the negative impact of slavery on economic development in Brazil.

Second, despite significant improvements in recent decades, Brazil today is still characterized by widespread poverty and illiteracy, massive regional and interpersonal inequality and an overall weak institutional environment. Brazil is, furthermore, plagued by corruption and tax evasion, as well as inefficient and wasteful public spending, features strongly connected with institutional weakness.[2] These features have deep roots.

For example, Brazil's woes with the poor fiscal resources commanded by all levels of government – national, provincial/state and municipal – and the connected deficient provision of public goods were a topic of discussion amongst policymakers and commentators already in the 19th century (Nunes Leal, 1977).[3] There is also modern evidence that low public spending acted as a constraint for growth due to the suboptimal provision of infrastructure and education in the mid and late 1800s (Leff, 1997; Summerhill, 2005). The inadequate financing of local governments has been an issue of particular importance, both in the 19th and 20th century. The paltry resources commanded by municipalities played an important role in the low provision of public goods, particularly primary education, in this latter period (Kang, 2017), for example.[4] I show that slavery played a role in these outcomes.

Third, this paper also contributes to the growing literature on state capacity and development along two dimensions. To begin with, little is still known about the formation of fiscal and state capacity outside of Europe, particularly at the sub-national level (Hoffman, 2015; Nafziger, 2016; Johnson and Koyama, 2017). This is despite the fact that understanding the processes through which polities acquire the capacity to tax and perform the basic tasks of modern states is of fundamental importance in order to shed light on the ways in which public institutions can support or stifle economic growth and development.[5] By studying the relationship between slavery and fiscal/state capacity at the municipal level in Brazil, this paper adds a piece to the puzzle.

Additionally, a good portion of the debate on long-term development has focused on identifying the ultimate cause of why some countries are rich and some are poor, with institutions and

---

[2]See Shleifer and Vishny (1993) on the ties between state weakness and corruption. See Reis (2017) for a historical perspective on spatial income inequality in Brazil and Alston, Melo, Mueller, and Pereira (2016) for an overview of the progress made by Brazil in some of these areas in the last two decades.

[3]See also Abreu and do Lago (2001) for a survey of Brazilian fiscal history since colonization and Summerhill (2015) for an excellent account of public finances and borrowing at the national level in Imperial Brazil.

[4]Up to this day, the fiscal capacity of local governments matters for the provision of public services. Gadenne (2017) finds that Brazilian municipalities that expand their revenue through taxation, as opposed to grants from the federal government, over which they have the same level of discretion, are more likely to spend them on productive public goods.

[5]Some recent contributions outlining this point are Acemoglu (2005); Besley and Persson (2014); Hoffman (2015); Dincecco and Katz (2016); Bardhan (2016); Johnson and Koyama (2017).

3

geography normally being on either side of the debate.[6] However, it is becoming increasingly clear that both institutions and geography matter, that they can influence each other, and that each can matter more or less given a myriad of other circumstances. The findings of this paper are very much in line with these ideas. Geography clearly mattered since, in addition to any direct effects of endowments on development, the distribution of slaves was determined at least in part by geographical features. At the same time, the salience of geographical characteristics changed over time because of the gradual decline and eventual abolition of slavery over the course of the 19th century.[7] The result of this is that frontier areas involved in the latter part of the coffee boom in Brazil relied less and for a shorter time-span on slave labour compared to areas experiencing earlier commodity cycles. In turn, these developments helped to shape local institutions. This supports the idea that, as argued by North, Summerhill, and Weingast (2000) and Nugent and Robinson (2010), endowments transform themselves into political and economic outcomes through complex and non-linear mechanisms and that similar endowments need not yield the same outcomes.

Fourth, this paper speaks to the literature on the economic effects of immigration in Brazil. In terms of findings, it shares similarities with de Carvalho Filho and Monasteiro (2012) and Rocha, Ferraz, and Soares (2017), who show that the creation of foreign migrant communities in the the late 19th and early 20th century – in São Paulo and Rio Grande do Sul respectively – led to a persistent increase in economic development.[8] However, my work draws a crucial distinction between the various phases of immigrant settlement, finding the first wave, – which took place while slavery still existed – to be the key one. Furthermore, it offers a fully-fledged identification strategy to deal with the potentially non-random location of the settler colonies.

3 Historical background

3.1 Structural change and slavery

Brazil's economy in the 19th century experienced deep and long-lived structural changes. The key development of this period was a permanent shift in the center of gravity of the Brazilian economy from the Northeastern sugar-producing regions to the Southeastern coffee-growing provinces. Although the process possibly began earlier with the discovery of gold in Minas Gerais, the coffee boom was instrumental in bringing it to fruition (Klein and Luna, 2010).[9]

The Southeastern provinces of Minas Gerais, Rio de Janeiro and São Paulo benefitted hugely from these developments. São Paulo, in particular, became an economic powerhouse thanks to

---

[6]See Nunn (2009) for a discussion.

[7]The delayed settlement of some areas of the country was furthermore attributable to the late and slow diffusion of railways in Brazil, which, in turn, was mainly due to financial and political factors.

[8]On the positive effects of immigrant settlement in Brazil, see also Stolz, Baten, and Botelho (2013) and Witzel de Souza (2016).

[9]Rough estimates indicate that per capita income in the Northeast fell by 30% between 1822 and 1913. The disastrous performance of the region was driven by the poor performance of the region's two main exports: cotton and sugar. While in 1822 sugar represented 49% of Brazil's exports and coffee 19%, by 1913 cotton and sugar combined were only 3% of Brazil's exports while coffee accounted for 60% (Leff, 1997).

the coffee boom. By the late 19th century, it had come to dominate coffee production in Brazil, and Brazil dominated coffee production in the world. Around the same time, other forms of economic activity started to flourish as well, with new domestically financed and owned industries taking root precisely in the regions that benefitted the most from growing exports and foreign capital inflows in the late 19th and early 20th century (Haber, 1997). By 1940 the state was the country's most important industrial and financial centre. Today, the Southeast is still the richest region in Brazil, while the Northeastearn sugar regions remain relatively poor. There are indications that path dependency also worked at a more micro level. Monasteiro (2010) finds almost no instances of "reversal of fortunes" in the income per capita of Brazilian municipalities between 1872 and 2000.

Changes in the economy were mirrored by changes in the structure of the population. After Independence in 1822, slaves were concentrated in the province of Rio de Janeiro, in the sugar-growing regions of the Northeast and in the gold-mining areas of Minas Gerais. However, as coffee production spread across the Southeast, areas suitable for coffee production started to acquire slaves in substantial amounts (Leff, 1997; da Costa, 2000). As shown in Figure 1, slave arrivals were at an all-time high in the 19th century – more than one third of all slaves having entered Brazil did so between 1811 and 1856 (Slenes, 2010) – and, already by 1820, most slaves disembarked in Southeastern ports.
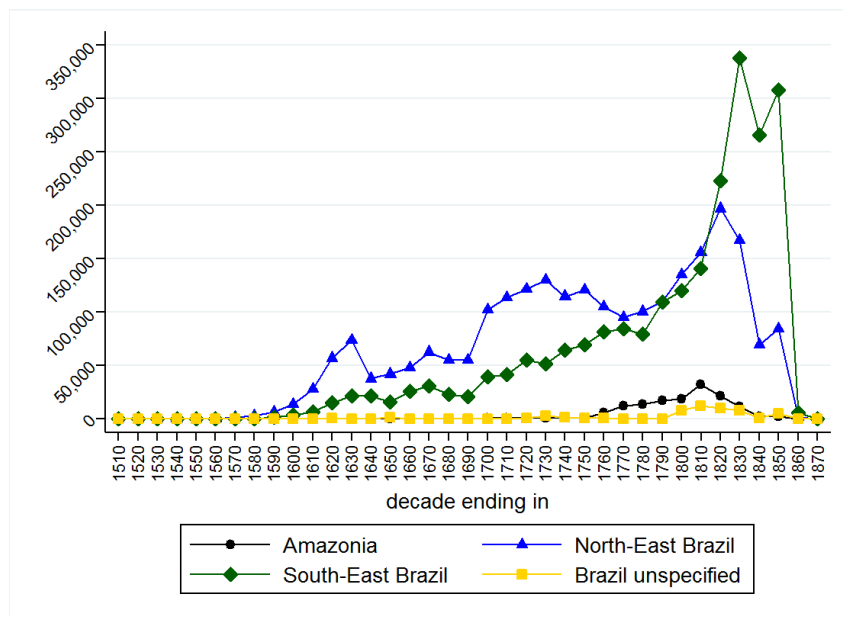
Figure 1: Number of slaves disembarked in Brazil per decade and area of arrival, 1510-1870
Source: Voyages Database: The Trans Atlantic Slave Trade Database (2009)

At the same time, as the 19th century progressed, mounting pressure from Britain made the continuation of slavery increasingly difficult. The slave trade to British colonies was abolished in 1807 and in 1815 it became illegal north of the equator. In 1831, British insistence led to the adoption of a first law abolishing the slave trade in Brazil. This, however, had little practical consequence on the actual inflow of slaves due to the lack of a real political desire

to end slavery and to the inability of the government to impose its will on the oligarchs that dominated the provinces both politically and administratively. So, the slave trade continued practically unabated and actually grew in numbers as coffee plantations boosted demand for labour (da Costa, 2000). In 1850, however, the international slave trade was finally de facto abolished through the implementation of severe and effective measures against smuggling, which continued at a drastically reduced rate for a number of years before disappearing altogether. Once again British influence was decisive for this outcome (Fausto, 1999).

Despite these developments, coffee growing continued to rely heavily on slave labour after its initial expansion in the 1830s. The main production centre in this early phase, which reached its peak around 1850, was the Paraíba Valley, located across the border of São Paulo and Rio de Janeiro (Fausto, 1999). Over time, the heartland of coffee production shifted dramatically away from the Paraíba Valley towards the north and west of São Paulo and towards Minas Gerais (Klein and Luna, 2010).

Slave imports from abroad were complemented and eventually substituted by the internal reallocation of slaves to the coffee-growing regions. This remained important from 1850 until the abolition of the transfer of slaves across provinces in the late 1870s. Thus, while in 1823 Minas Gerais, Rio de Janeiro, and São Paulo held around 386,000 slaves and the Northeastern provinces of Bahia, Pernambuco and Maranhão held around 484,000, in 1872 the traditional sugar-growing regions held 346,000 slaves and the coffee regions approximately 800,000 (Slenes, 1975; Klein, 1978). Even with slave numbers in sharp decline, the slave population in the fast growing West of São Paulo grew by 15% between 1874 and 1883, while decreasing in absolute numbers in older coffee-growing regions (Klein and Luna, 2010). The expansion of coffee production also had consequences beyond areas where the plantations could be found. Minas's economy, for example, continued to employ large numbers of slaves throughout the 19th century outside the export sector. These were mostly employed in the production of foodstuffs and textiles for the rapidly growing coffee regions (Slenes, 2010).

Notwithstanding this large internal reallocation of slaves, the huge expansion in coffee production, the high mortality rates of the slaves and the abolition of slave imports meant that coerced labour became increasingly inadequate to satisfy the labour demand of the Southeast. Moreover, the *Lei do Ventre Libre* (Law of the Free Womb) of 1871 marked the beginning of a strong abolitionist movement within Brazil. Although the law had a small direct impact, since most children technically born free were forced to remain with their masters until they turned 21, there were substantial indirect effects. Self purchase by the slaves increased, third party interventions to free slaves became more common, and active legal actions by the slaves to obtain freedom were more likely to be successful. The rapid increase in abolitionist sentiment, combined with increasing slave revolts and successful escapes, eventually culminated in the abolition of slavery in 1888 (Klein and Luna, 2010).

3.2 The Quilombos

3.2.1 A proxy for the long-term incidence of slavery

One of the most widespread and visible forms of resistance to slavery – common throughout South America and the Caribbean – was the formation of permanent settlements by runaway slaves. These are known as Quilombos in Brazil.[10]

With the democratic constitution of 1988, exactly 100 years after the abolition of slavery, the Brazilian government started the process of formally recognizing these communities – formally knows as *comunidades remanescentes de Quilombo* (remaining Quilombo communities) – in association with the granting of some land rights. Only recently, the government has also enacted programs to provide economic support to these often relatively poor communities.

Nearly 440 Quilombos have been certified so far by the Fundação Cultural Palmares in Minas Gerais, Rio de Janeiro and São Paulo. It should be noted that while all these communities have been linked to resistance to slavery and are made up of the descendants of African slaves, not all might be the direct offspring of communities formed by runaway slaves while slavery still existed. Some were probably formed by marginalized freedmen or ex-slaves pre and post-Abolition (Mattos, 2005-06; Programa Brasil Quilombola, 2013). For an analytical discussion and history of the process through which Quilombo communities are certified, see Farfán-Santos (2015).

Given the absence of systematic information on the distribution of slaves in earlier periods or on escaped slave communities while slavery still existed, I propose using the presence of certified Quilombo communities in modern-day Brazil as a proxy for the spatial distribution of slaves over the long-run. The question remains of whether the location of communities descending from Quilombos contains information regarding the spatial distribution of slavery in the past. While it appears fairly non-controversial that the presence of large-scale slavery made the emergence of Quilombos more likely, there are three main potential issues. First, if runaway slaves traveled far enough to cross municipal borders, this would reduce the strength of the relationship between the incidence of slavery and the presence of Quilombos, rendering the latter a weak proxy. More worryingly, if runaway slaves actively sought out areas with a low incidence of slavery (or with other specific characteristics related to both slavery and economic development), the use of Quilombos as a proxy for slavery would actually lead to bias. Finally, the survival of Quilombo communities until today may have been affected by some factors related to economic development other than the incidence of slavery. This would, once again, lead to bias in the results.

Three main elements help dispel worries and indicate that the presence of Quilombo descendants does, in fact, carry useful information. The first is that geographical reach of runaway slaves was limited. The vast geographical expanse of Brazil reduced the possibility that slaves

---

[10] Alternatively as Mocambos; Maroons in English. It should be noted that not all slave escapes shared the same objectives. A clear distinction can be drawn between what is known as *Petit Marronage* – temporary escapes to obtain something in return from an owner (the vast majority) – and *Grand Marronage* – permanent escapes with the objective of forming or joining a Quilombo, entering society as an alleged freedman (*Forro*), or taking a ship back to Africa (Flory, 1979; Florentino and Amantino, 2012).

on the run could go far enough to cross municipal borders. On some occasions, runaway slaves did reach far-removed and specific locations, but this took place under particular circumstances, such as those prevailing in the 1880s when active abolitionists provided contacts and shelter along particular escapes routes (Machado, 2006). Secondly, and more importantly, as the discussion below will show, the incentive to abandon the geographical vicinity of the location of slaves' captivity was not as clear as could be imagined. Slaves faced a trade-off between running far from their masters and maintaining ties to society, particularly with other slaves from the estate or area of their captivity. These ties were often essential for the survival of Quilombos, making it costly for slaves to sever them. Moreover, distancing themselves from their masters offered no guarantee of freedom, given that the task of recapturing slaves was often given to wandering adventurers. At the same time, masters were often cautious about attempts at recapture, fearing damage to their "property" (i.e. the slaves). Thirdly, the role of confounding economic factors in determining Quilombo creation and survival, as well as economic development, can be captured effectively by controlling for the incidence of commodity cycles and other key variables.

These considerations are supported by empirical evidence, which I present in Section 6.1. I find Quilombos to be more common in areas associated with slave-intensive economic activities, such as gold-mining and the early coffee boom. Moreover, I show that Quilombo municipalities possessed large populations of free Afro-Brazilians in 1872, indicating a clear link with a past of large-scale slavery. I further show that these same features are poorly captured by information on slave numbers contained in the 1872 census. The census falls right in the middle of the deep structural changes discussed above. This means that, while an invaluable source, it does not capture the long-term presence and impact of slavery across Brazil, but rather a snapshot of an institution in transition and on the cusp of its twilight phase.

3.2.2 The functioning of Quilombos

The desire to flee amongst slaves was general and widespread, but the possibility to do so varied across space and time, with economic decline and a myriad other factors potentially playing a role (Flory, 1979). Successful escapes sometimes led to the creation of stable communities, which, in their early phase of existence, often required self-sufficiency and isolation from the rest of society for survival (Florentino and Amantino, 2012). For this reason, they were usually set-up in relatively remote areas, beyond the immediate reach of the planters and the authorities. However, Quilombos also emerged near or within densely populated urban areas, as the Quilombo of Leblon – located on the outskirts of the city of Rio de Janeiro – and the Quilombos of Jabaquara and Vila Matias – located in São Paulo's main port city of Santos – demonstrate.[11]

---

[11]For some background on the Quilombo of Jabaquara, see Machado (2006). The outskirts of Rio also housed other Quilombos, such as those located in the Tijuca forest (Amantino, 2003). Swamps and forested areas represented ideal places for Quilombos, as they guaranteed some degree of concealment and resources such as wood, hunting and fishing. Brazil's vast frontier territory offered ample opportunities for such settlements. Indigenous communities also tended to be located in these areas, which were beyond the reach of the state until, at least, the late 19th century. They represented at the same time allies and rivals for Quilombo inhabitants. Coastal areas near the location of clandestine landings after the 1831 law also saw the developments of numerous Quilombos.

While many Quilombos were extremely small – containing less than 12 fugitives – and survived for only brief periods of time, some became large and long-lasting communities. The best-known case is that of Palmares (ca. 1605-1694), which, at its height, was home to nearly 11,000 individuals (Florentino and Amantino, 2012). Many other Quilombos long outlived Palmares, eventually becoming integrated in society as neighborhoods, villages, towns and cities, while often also preserving some cultural link to their past. With time, some even became independent municipalities, like Muzambinho, in Southern Minas Gerais.

As they developed into stable communities, thanks to new arrivals and organic growth, Quilombos could not survive in isolation (Klein and Luna, 2010). In fact, it was economic and social ties with the rest of society that allowed Quilombos to survive by furnishing goods that could not be produced in these communities and by warning them of incoming attacks (Flory, 1979; Amantino, 2003). In fact, while the history of Palmares, led early historiography to generalize the Quilombo experience as one of violent resistance, isolation and self-sufficiency, more recent work indicates that most Quilombos were not located far from the rest of society and were engaged in close commercial and social exchanges with it (Flory, 1979; Schmitt, Turatti, and de Carvalho, 2002; Slenes, 2010; Farfán-Santos, 2015). Even Palmares maintained regular and important social and commercial relations with the outside world (Anderson, 1996; Funari and de Carvalho, 2005).

Moreover, while Quilombos did generally face the threat of destruction, this was less common than one would think. The fear of killing valuable slaves and the fact that Quilombos at times acted as a reservoir of labour that could not be employed at all times, thus reducing the burden of subsistence placed on the masters, are two compelling explanations of why many Quilombos were allowed to exist and persist (Flory, 1979).

Successful Quilombos also developed a considerable degree of economic complexity. As Flory (1979, page 120-121) puts it: "Some were productive enough to produce the large surpluses that decamping fugitives left behind them when threatened. Some Brazilian mocambos included machinery and possessed a division of labor based on a technology that cannot have been much less advanced than that employed in regular society. [...] Some Brazilian quilombo economies mirrored the white economies from which they sprang to such an extent that it is misleading to think of them as discrete entities rather than 'outlaw' parts of a single economy". The Quilombo do Ambrósio in 18th century Minas Gerais, for example, had sugar mills and other equipment related to the refinement of sugar, the fermentation of cane liquor and the production of manioc flour. Another Quilombo possessed more than 6,000 coffee trees, making it equivalent to a small

---

Information on runaway slaves mostly comes from post-mortem inventories and announcements in newspapers and is extremely incomplete. Nonetheless, there appears to be a correlation between the intensity of the slave trade and escapes. This is inferred by the fact that newly arrived slaves tended to figure disproportionally in reports about escaped slaves (Florentino and Amantino, 2012). There also appears to be an inverse correlation between the frequency of manumissions (*alforrias*) and the number of escaped slaves (Merrick and Graham, 1981). Those who escaped tended to be men rather than women, beyond what would be expected based solely on the gender imbalance in the slave population. They also tended to be West Africans from the areas of modern-day Congo and Angola (Florentino and Amantino, 2012). Other predominant groups of fugitives were Mozambicans and, in the case of Southeastern Brazil, Creoles originally from the Northeast and South of the country.

plantation (Flory, 1979).

Finally, while mainly composed of runaway slaves and freedmen, not all Quilombolas were necessarily slaves or even blacks. Poor whites and indigenous people were also present across these communities (Flory, 1979; Anderson, 1996; Amantino, 2003; Funari and de Carvalho, 2005).

Modern anthropological work on Quilombo descendants supports many of the conclusions drawn by historians regarding these communities and their relation to the rest of society. For example Schmitt, Turatti, and de Carvalho (2002, page 6, author's translation) state: "[...] one should not imagine that the rural black communities have resisted in their lands until today because they remained isolated, at the margin of society. On the contrary, they always had intense and asymmetric relationships with Brazilian society, resisting to various forms of violence to remain in their territories, or, at least, in part of them."

3.3 Immigration and free labour

With the decline of slavery, planters and policymakers started to look for alternatives to coerced labour. The province of São Paulo, with its rapidly expanding coffee plantations, was at the forefront of experiments with the subsidization of immigrants to form colonies. The provincial government cooperated with private individuals to promote the settling of Europeans on Paulista plantations as early as 1829, and more vigorously from the 1840s (da Costa, 2000). However, by the second half of the 1850s, discontent was being voiced by both planters and colonists. Notwithstanding high slave prices attributable to the abolition of the slave trade, planters still tended to prefer slave labour to that of free colonists.[12]

Although there were exceptions to this generally negative experience, and some continued to promote the settling of immigrants, planters seemed ill-equipped to deal with the peculiarities of free labour. A common point of contention was the tendency of settlers to refuse to work when dissatisfied. And dissatisfied they often were: with the terms of their contracts, with their living quarters, with their confinement to the plantations, and with the tasks of repairing roads and other infrastructure, which they saw as falling outside their contracts. Moreover, Catholicism was the only recognized religion in the country, while protestantism was the chief cult amongst Swiss and German colonists. This created further frictions with the planters (da Costa, 2000). Another cause of discontent, which also reveals that both planters and the authorities intended the colonists to be a direct replacement for slaves by tying them to the plantations, was the fact that immigrants who received subsidies to relocate to Brazil were barred from buying land for three years after their arrival (Fausto, 1999).[13]

Against this backdrop, settlers abandoning the plantations with unfulfilled contracts and outright revolts became frequent (da Costa, 2000). Sending countries were also worried about the conditions of migrants to Brazil, particularly those residing in colonies and working on

---

[12]Not all colonists were perceived equally. In general, Portuguese settlers appear to have been preferred for plantation work than the other two major colonist nationalities of the time: Swiss and Germans (da Costa, 2000).

[13]This provision became effective with the approval of the 1850 Law on Land.

coffee plantations. Growing concerns in Italy, for example, eventually led to the "Decreto Prinetti" of 1902, which made subsidized emigration from Italy illegal, and was targeted mainly at migration to Brazil. Prussia nominally prohibited emigration to Brazil as early as 1859, and similar measures were implemented for the whole German empire from 1871 (Fausto, 1999).
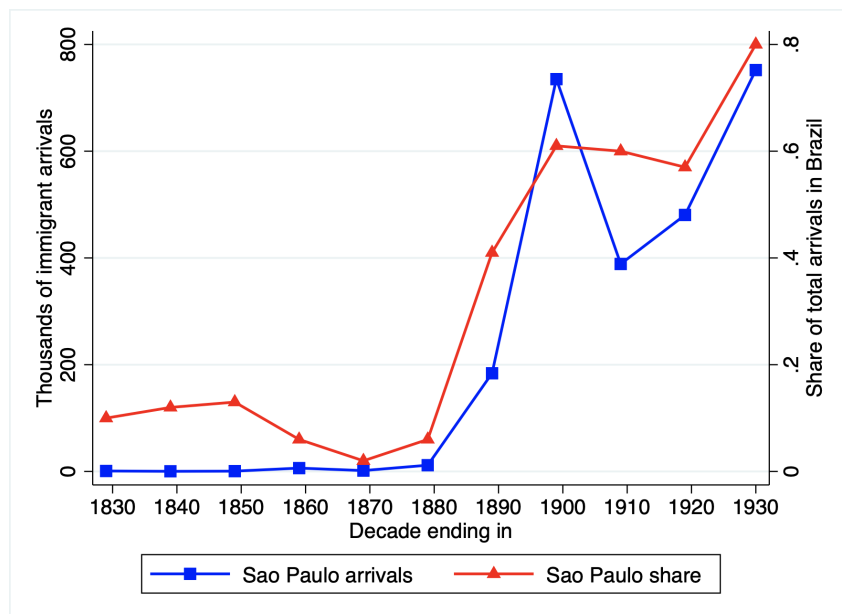

Figure 2: Immigration to São Paulo, 1830-1930

Source: Cameron (1931)

These first timid instances of large-scale European immigration were followed by much more substantial developments. The economic changes of the second half of the 1800s had a profound impact on free labour. Besides improvement in transportation, machinery started being introduced on coffee plantations and coffee prices worldwide were generally high. This shifted the balance in favor of free labour and specialization. Nonetheless, obstacles to the widespread diffusion of agricultural free labour, including traditional sharecropping arrangements, still prevailed initially. This led to both the perpetuation of slavery in traditional coffee and sugar producing regions and the reallocation of more slaves from declining areas to booming ones.

Only when the abolition of slavery was looming large, did interest in importing free labour become strong again. Between 1872 and 1885, 42,000 mostly Italian and Portuguese immigrants entered São Paulo. In 1886-87, 122,000 entered the province, and 800,000 more in the following decade (da Costa, 2000). Between 1885 and 1909, a total of around 2.8 million European migrants entered Brazil and the majority went to satisfy the demand for labour of coffee plantations, industries and other activities in the Southeast (Figure 2).[14]

Thus, eventually, the project of substituting slaves with immigrants was a success. This success was helped by heavy state intervention. Monetary incentives and propaganda both

---

[14]Most other immigrants settled in the southern provinces of Santa Catarina, Paraná and Rio Grande do Sul. There, they generally received land and set up their own communities instead of substituting slave labour on plantations (Leff, 1997).

Figure 3: First edition of the magazine *O Immigrante*, January 1908

Source: Arquivo público do estado de São Paulo

played a role. The virtues of migrating to Brazil were extolled in Europe via pamphlets and other publications exemplified by the magazine *O Immigrante* (The Immigrant) published for the first time in 1908 by the *Secretaria da Agricultura* (Department of Agriculture) of São Paulo in six languages: Portuguese, Spanish, Italian, French, German and Polish (Figure 3). Planters lobbied both the central government and the provincial government of São Paulo to subsidize immigration. This led to the government generally fronting the cost of the voyage for the immigrants. Apart from increasing the net private return of moving to Brazil, this helped to overcome credit constraints faced by potential immigrants that might otherwise have prevented them from undertaking the trip. For a limited time, the Imperial government also paid a small daily wage to colonists. However, by 1900 push factors in Europe were so strong that the majority of immigrant arrivals were unsubsidized (Cameron, 1931).

Settler colonies also continued to be created in this latter stage. Although these later communities are generally considered to have been more successful than earlier experiments, the general experience with this type of subsidized migration was not considered particularly fruitful (Cameron, 1931). I will use settler colonies in my empirical analysis below, showing that, despite the negative perceptions, the inflow of immigrants they facilitated had profound positive effects on the trajectory of municipalities containing these communities. Surprisingly, I find that the earlier, and supposedly most problematic, colonies had the largest positive effects. I link this to the fact that settler colonies led to inflows of free workers allowing an earlier exit from slave-based production. Moreover, in sharp contrast to slaves, immigrants had a political voice and could "vote with their feet". This had important repercussions on processes such as the creation of more efficient markets for free labour and the provision of public goods.

The Abolition of slavery ended the contrast between slave and free labour, while chain migration, better information and more experience on the part of the authorities made immigration from Europe a true mass-phenomenon. This all contributed to reduce the geographical constraints on the settlement of foreign migrants leading to large aggregate effects on development. However, while mass-immigration post-1888 clearly played a fundamental role in changing the face of Brazil's economy and society, it does not seem to have produced the same effects in terms of spatial inequality at the micro-municipal level that the first wave of immigration did.

4   Empirical strategy

Empirically, this paper has three goals: 1) showing that Quilombos can act as a proxy for the intensity of slavery, 2) assessing the impact of slavery on economic development both while slavery still existed – in 1872 – and after its abolition – in 1920-23; 2) evaluating the impact of immigration while slavery still existed vis-á-vis that of successive waves. For the final part of the analysis, I consider outcomes in 1908-12 alongside those of 1920-23 for reasons that will become apparent during the description of the identification strategy.

In order to capture as many facets as possible of the process of economic development, given the available data, I consider the following outcomes. For 1872, I analyze: literacy, school attendance, population density and a proxy of state capacity: the number of public employees per capita. For 1920-3, I look at: literacy, wages, population density and an indicator of fiscal/state capacity: public expenditure per capita. Due to data availability, I am only able to look at fiscal/state capacity as proxied by revenue/expenditure per capita in 1908-12.

Regarding geographical focus, I concentrate on three key provinces/states – Minas Gerais, Rio de Janeiro and São Paulo – located in the Southeastern region of the country. As discussed, these were at the center of the structural changes of the 19th century and experienced very heterogeneous historical trajectories in relation to slavery and economic development, which facilitate the investigation of the impact of slavery. They are also amongst Brazil's most populous regions both today and in the past.[15]

4.1   Identifying the impact of slavery

Besides the issue of measurement introduced above and discussed further in Section 6.1, analyzing the impact of slavery on development presents other challenges. The main one is the non-randomness of the distribution of both slaves and Quilombos. While the most plausible direction of this bias is upwards, due to booming parts of the country acquiring more slaves, there is also evidence that declining areas held on to a slave-based mode of production longer than more dynamic areas, making the overall direction of potential bias unclear a priori. With regard to the relationship between Quilombos and fiscal/state capacity, there is also the possibility that Quilombos survived in areas of the country where the control of the state was less

---

[15]Today, they are the three most populous states in Brazil. While in 1872 Minas Gerais was the most populous province, with São Paulo and Rio in 4th and 5th position respectively, after Bahia and Pernambuco.

strong, which would mean the presence of reverse causality.[16]

A straightforward solution to address these issues is to control for variables able to capture differences across municipalities related to the incidence of slave labour, the survival of Quilombos and development. In order to avoid bias, I need only account for factors that affected the explanatory variables, as well as the outcomes, up until the period in which I observe the outcomes themselves. This is because successive developments are unrelated to the outcomes and thus not a source of bias. The wide range of controls employed in the estimations is described in detail throughout the analysis in Section 6. I also employ propensity score matching as an alternative estimating strategy to standard regressions in order to draw inference based on the comparison between municipalities that are very similar in all but the presence of Quilombos.

It should be noted, however, that reverse causality between various aspects of development and the presence of Quilombos is not a major worry in this context, given the link between the presence of Quilombos and economic activities – such as gold extraction and the early coffee boom – which by the late 19th and early 20th century had lost most economic relevance. To further dispel worries, I control directly for the influence of these economic activities and, thus, their legacy. Additionally, I account for the ability of the authorities to crack down on Quilombos by proxying the coercive power of the state with the presence of soldiers and justice workers in a municipality.

Regarding the survival of Quilombos, one of the biggest – and most relevant – threats to their survival was the desire to reclaim land and labour for agricultural use, most importantly for coffee production. As Flory (1979, page 125-26) puts it: "Why were some quilombos destroyed while others were spared or even protected? One answer to the question of hostility has previously been suggested in the obverse of our generalizations about the economic bases of such communities; that is, economic rivalries or competition for resources and markets might have

---

[16]Another potentially confounding factor is the *siza* tax, which was applied to transactions of immobile goods. Its standard rate was 10%, but its extension to the internal slave trade was with a rate of 5% (*meia siza*). The tax concerned transactions of Brazilian-born slaves (but really this meant slaves not newly entered in Brazil) and was introduced alongside a number of new taxes, between 1801 and 1814. These were all applied uniformly across the country giving, for the first time, a degree of fiscal uniformity to the (then) Portuguese colony (Costa, 2005; Rodrigues, Craig, Schmidt, and Santos, 2015). Part of the reason for its introduction was paying for the arrival of the Portuguese court in Brazil in 1808 (Abreu and do Lago, 2001; Fernandes, 2005). This tax became particularly important after the abolition of the international slave trade in 1850, both as a source of revenue for provinces and for the purpose of slowing down the transfer of slaves to the booming coffee growing regions. This was important because of the belief that an excessive transfer of slaves out of the Northeast would lead to growing support in the region for the abolition of the institution. The *Ato Adicional* of 1834 had devolved the administration of the tax to provincial governments (Costa, 2005) and the large reallocation of slaves from the Northeast to the Southeast meant that the number of transactions in this latter area increased greatly. The tax was levied on the final price of slaves in the purchasing region (Klein and Luna, 2010), thus increasing the oversight of the state and of local governments, as well as their ability to tax. Additionally, from 1884 transactions involving slaves had to obligatorily go through public courts and slaves became subject to registration. These reforms were introduced in order to reduce tax evasion of both the *meia siza* and on taxes on slaves in urban areas. They appear to have been quite effective in raising fiscal revenue, but were not uniformly successful across Brazil. In Rio Grande do Sul, the changes were implemented with little resistance and further taxes on slavery were introduced, amongst other reasons, to help subsidize European immigration (Costa, 2005). In a number of states in the North, the tax was substituted with levies on slaves sold outside the provinces. Following the obligation of registration, Minas Gerais simply abolished the *meia siza*. In São Paulo, the *meia siza* was suspended for a period in 1849-50, and the registration of slaves was imperfectly implemented (Costa, 2005). For this reason, it does not represent a particular problem for the analysis in this paper.

led here, as they did elsewhere, to expropriation. Such reasoning also suggests an explanation of the timing of quilombo destruction, and ties those events to the demographic, social and economic development of the society at large". Thus, accounting for the expansion of the coffee frontier, as I do, likely accounts for a large share of the non-random survival of Quilombos. Additionally, I control for further geographical and other variables, related to the production possibilities of municipalities.

4.2 Identifying the impact of immigration

The main challenge in testing the impact of immigration is that immigrants, like slaves, were not randomly distributed across Brazil's municipalities. Endogeneity concerns are harder to dismiss compared to the case of Quilombos, given that the economic developments that attracted migrants are contemporaneous, or briefly preceded the outcomes I observe.

In order to deal with this issue, I rely on the location of settler colonies set up by the national/provincial governments of São Paulo in conjunction with private companies and planters to proxy the location of migrants. Municipalities with settler colonies were undoubtedly more likely to attract migrants both directly – the colonies were created through government-subsidized arrivals of Europeans – and indirectly – through migrant networks and family re-conjunctions – than similar municipalities without settler colonies. The problem remains that settler colonies might not have been created randomly. Although it does not appear that they were located in particularly favorable locations (Cameron, 1931), the worry remains they were placed in municipalities with more growth potential.

In order to achieve identification, I divide the colonies in three groups: 1) those created while slavery still existed (1829-89); 2) those created between the end of slavery and when I observe my outcomes (1890-1912); 3) those created after my period of observation (1913-38). The colonies are detailed in Figure 4. I pick 1908-12 as the date in which I observe my outcomes, rather than 1920-23, to ensure a meaningful number of placebo colonies exist.

Group 1 serves as my proxy for immigration while slavery still existed. Group 2 is meant to capture whether the migration wave that took place after the end of slavery had the same impact as the previous one. Finding a different effect would suggest that the contrast between slave and free immigrant labour is a crucial component of the impact of immigration on development in Brazil. Group 3 serves as a placebo: finding a positive effect of these colonies on my outcomes would be a strong signal that these were simply placed in more favorable locations, and that my identification strategy is not valid. Importantly, there is no evidence of a discontinuity in the creation of these colonies between the three periods. If anything, colonies set up in later periods were considered more successful thanks to improvements in the design of settler contracts and of conditions on plantations. This would actually bias the results against the hypothesis that the initial immigration wave was the crucial one.
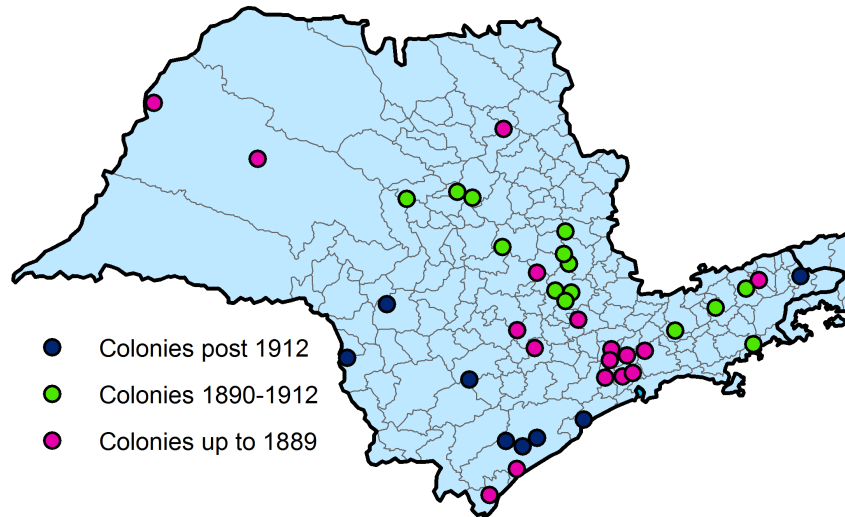
Figure 4: The location of settler colonies in São Paulo, 1829-1938

5 Data

I rely on data from three cross sections in the analysis: 1872, 1908-1912 and 1920-23. This is partly motivated by data availability. Fortunately, however, these dates also capture three fundamental junctures in Brazilian history. The 1872 data, for example, captures the peak of slave numbers in Southeastern Brazil, as well as the first phase of the deep structural changes to hit the country in the second half of the 19th century.

The 1908-12 and 1920-23 cross-sections are ideal for the analysis, for several reasons. First, they are temporally far enough from the abolition of slavery in 1888 to assess the persistence of its impact. At the same time, they are not too far removed to plausibly argue for its existence. Second, they lie at the heart of Brazil's Old Republic era (1889-1930). This was a period of relative decentralization, which means that local governments were important actors within the public sector. The early 20th century was also characterized by marked improvements and expansions in municipal public services in São Paulo (Rowe, 1908), making this period particularly meaningful. Third, the 1908-12 data encapsulates the final stage of pre-WWI mass migration from Europe to Brazil. Given the importance of migration in my story, it is crucial that my period of observation encompasses this migratory flow. Finally, coffee prices, which presumably had an important impact on development and could thus influence my results, were close to their long-run average in these periods (Figure 5).

I draw from numerous data sources. I summarize the most important here, while Appendix A provides a full description.
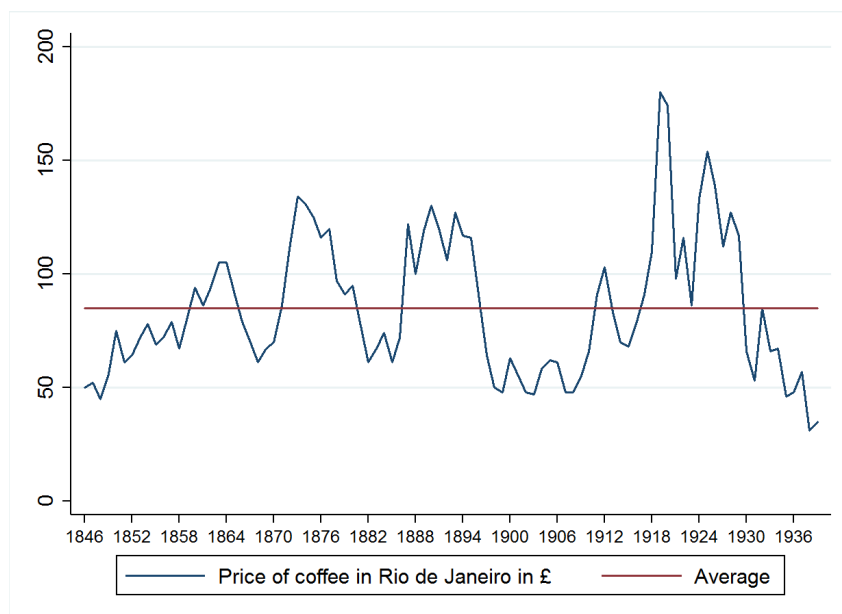
Figure 5: Coffee Prices, 1870-1939

Source: Blattman, Hwang, and Williamson (2007)

5.1 The explanatory variables: slavery and Quilombos

Figure 6 illustrates the two measures of the intensity of slavery I employ: the incidence of slaves in the total population in 1872 and the presence and number of Quilombos present in each municipality. The 1872 data comes from Brazil's first country-wide census (Brazil, 1876). Data on the location of Quilombos comes from the government agency responsible for their certification: the Fundação Cultural Palmares. The borders of the municipalities are those of 1920 (IBGE, 2011). I use these as my units of observation throughout the analysis to ensure the comparability of the results across the three time periods.

The variation across municipalities is very large: slaves made up from around 1% of the population to nearly 63%. Quilombos also offer a large degree of spatial variation. The majority of municipalities contain zero communities, while others have over 20. Unsurprisingly, given the association with colonial gold production, Minas Gerais contains the most Quilombos – 303 in total, 1.7 per municipality, on average – while Rio de Janeiro and São Paulo have 30 and 105 respectively – 0.5 per municipality on average.

5.2 The outcomes

5.2.1 Fiscal/state capacity

As discussed in the introduction of the paper, local level fiscal and state capacity have constituted an important factor in Brazil's economic history, both as indicators of development and as measures of the quality of institutions and public goods provision. During Brazil's constitutional monarchy (1822-1889), which followed independence from Portugal, municipalities –

Figure 6: Slave ratio in 1872 and Quilombos in modern-day Brazil

Sources: the slave ratio is calculated based on data from Brazil (1876), the Quilombos's location is provided by the Fundação Cultural Palmares and the 1920 boundaries are from (IBGE, 2011).

Brazil's smallest administrative units – had very little autonomy. They relied on provincial governments for the approval of municipal regulations and the 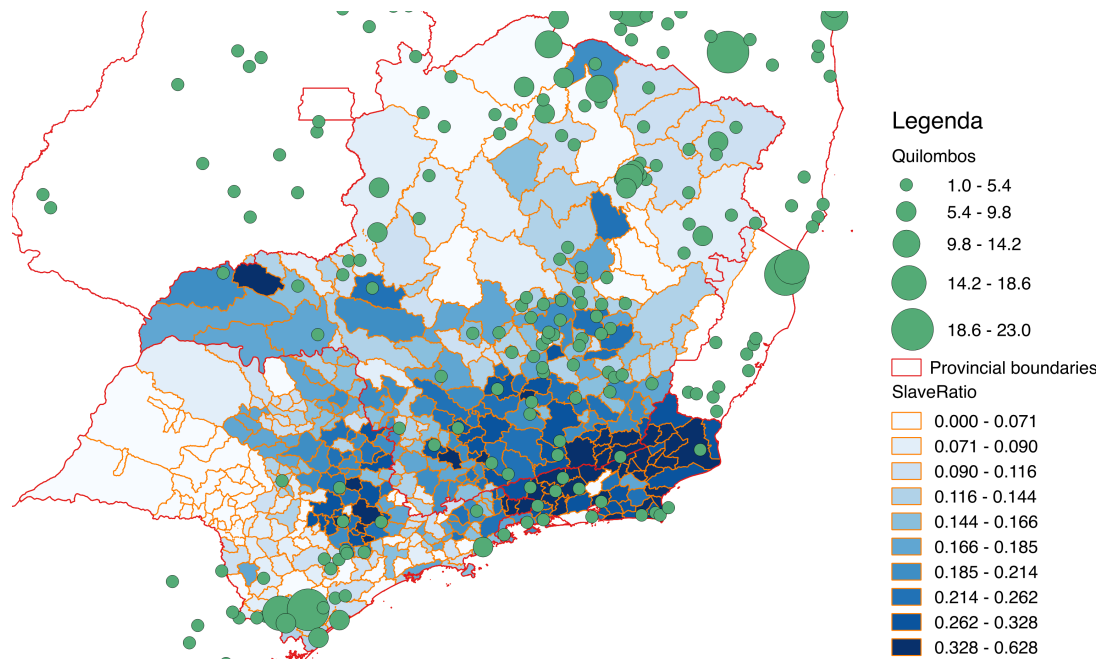appointment of local functionaries. Decisions regarding local budgets also had to be approved by the provincial assembly. Indeed, despite its size, Brazil was a very centralized country that left municipalities little power or resources of their own. On top of this, the rural oligarchies who controlled provincial and national governments, also had a strong influence on municipal affairs, a phenomenon known as *Coronelismo* (Nunes Leal, 1977).[17]

However, people were not entirely powerless, even under very adverse conditions of isolation, poverty and illiteracy. Colistete (2017) shows that, in 19th century São Paulo, citizens successfully lobbied the provincial government through municipal assemblies for the installation of primary schools, for example.

The financial and political position of Brazilian municipalities changed slowly, but steadily over time, particularly following the *Ato Adicional* (Additional Act) of 1834. This gave provinces

---

[17]The term *Coronel* (colonel) in this context is not tied to the military. It is a term used to identify influential local figures and oligarchs who traditionally bought posts in the National Guard. In the more remote areas of the country, the hold on power of the *coronels* on administrative processes and law enforcement was practically complete. The population turned to local oligarchs offering votes in exchange for aid and protection, in a classic example of clientelism and patronage. In this context, boundaries between the public and the private tended to be blurred as public funds were used for private interests and private funds used for civic improvements. Moreover, the impersonality needed for bureaucratic efficiency was rare (da Costa, 2000). The situation was only marginally different in important coastal cities and other urban centers. There, other power groups, such as merchants and professionals, exerted influence alongside traditional elites (Woodard, 2005). Interestingly, neither the oligarchs nor their clients appointed to public administration were particularly interested in expanding the revenue of the municipalities since their main interest lay in power and authority, rather than in direct embezzlement or corruption involving public funds (Graham, 1990; Abreu and do Lago, 2001).

legislative power over their own and municipal taxation and expenditure, on the condition that these did not interfere with those of the central government (Abreu and do Lago, 2001). In 1826, shortly after independence, Brazilian municipalities raised essentially no revenue of their own. By 1856, municipal revenue had reached around 3.3% of total public revenue and by 1885-86 they stood at 5.2% (Sokoloff and Zolt, 2007).[18] The end of the Monarchy in 1889 and the creation of a more federalist republic in 1891 led to municipalities gaining prominence. During what has become known as the Old Republic (1891-1930), mayors were elected rather than appointed in most states, and the new Constitution established that provincial and municipal ordinary budgets would have to fund primary education. Additionally, in booming regions of the country, municipalities increased their revenue rapidly thanks to growing intakes from taxes on coffee and on activities and professions (de Carvalho Filho and Colistete, 2010).

Even after these reforms, however, the distribution of public revenue across various levels of government and the scarce resources commanded by municipalities continued to be a prominent issue. In the late 19th and early 20th century, it was widely believed that Brazil's municipalities, particularly rural ones in the backlands, did not possess enough resources to provide basic services like healthcare and education to the population. There was, moreover, a feeling that large urban centers absorbed fiscal resources from peripheral regions and thus curbed their development (Nunes Leal, 1977).[19]

Nonetheless, within a context of overall low public revenue, municipalities had become important players in the collection of tax revenue and the provision of public goods by the beginning of the 20th century. Between 1907 and 1938, municipalities were responsible for around 15% of total public revenue and 14% of total public expenditure on average. At the state level, municipalities produced 24% and 23% of total revenue and expenditure respectively, employed around one third of all workers in civil administration, and were responsible for significant shares of expenditure in key areas. As an example, in 1919-23 close to 20% of public expenditure on education in some states and over 50% on average expenditure on public works were performed by municipalities.

I have collected a number of variables, which have been used as proxies for fiscal and state in previous research. For 1872, I use the number of public employees per 1000 citizens taken from the census. For 1908-12, I analyze revenue and expenditure per capita taken from that year's statistical yearbook (Brazil, 1908-1912), which also contains population data. The 1920-23 outcomes – public revenue and expenditure per capita – are from a special issue on public finances (Brazil, 1926), while the population data is from IBGE (2011). All these variables offer a vast degree of variation. For example, in 1923 municipal intakes and outlays ranged between less than 0.2 milreís per capita and more than 70, while public employees per 1000 citizens in 1872 varied between 0 and over 11.

---

[18]da Costa (2000) reports a lower figure, less than 3%

[19]In turn, the economic progress of the backlands came to be seen as necessary for the continued industrial development of São Paulo and Rio de Janeiro through the expansion of the domestic market, making the issue salient for both central and state governments (Nunes Leal, 1977).

5.2.2 Wages, literacy and population density

The other set of outcomes I analyze are indicators of the socio-economic conditions of the municipalities. For 1872, these are: literacy, school attendance and population density constructed using data from the census (Brazil, 1876) and IBGE's maps (IBGE, 2011). Literacy is measured as the share of the free population who could read and write. School attendance is the share of non-slave children in school age (6 to 15 year olds) who attended school. For 1920-23 outcomes – literacy, wages and population density – data comes from the 1920 census (Brazil, 1920a,b) and IBGE's maps and population data respectively. The maps are also used to measure population density in 1912, in combination with population data from Brazil (1908-1912). The variable is simply population divided by the area of the municipality. Wages refer to daily wages of carpenters, which were the most widely reported.

This data also offers a very large degree of variation. In 1872 on average, around 14% of the population of Minas Gerais, São Paulo and Rio was literate, while 16% of those of school age actually attended school. In the municipality with the lowest literacy around 2.5% of the free population could read and write, while in the one with the highest over 42% could. School attendance ranged between less than 1 and over 90% of eligible free children. Average literacy in 1920 had risen, but only to 22%, while the dispersion was even larger than in 1872 – between 1.4% and 61% – presumably because ex-slaves were now included in the statistics. A carpenter's daily wage went from 3.5 milreís to 15. Finally, some municipalities were very sparsely populated, while others had high concentrations of population.

6 Analysis

6.1 Empirical evidence on slavery and Quilombos

In order to provide empirical evidence that Quilombos can indeed provide useful information complementary to that of the census, I perform the following simple empirical exercise: I estimate the relationship between three measures of the intensity of slavery – 1) the share of slaves in the total population from the 1872 census (SlaveShare), 2) a dummy indicating the presence of a Quilombo community in a municipality (QuilTreat), 3) a variable containing the number of Quilombos in a municipality (QuilNumb) – and the presence of the three main economic activities associated with large-scale slave labour: sugar production, gold extraction and the coffee boom. Data on the historical location of the production of these commodities comes from Naritomi, Soares, and Assunção (2012). The coffee boom is included through two separate variables: one identifying its early phase (up until 1886, essentially until the end of slavery), and one capturing its full expansion up to 1935. This is done in order to distinguish the potentially different relationship between the phases of coffee boom, the use of slavery and the presence of Quilombos. I also include the share of the population constituted of free citizens of African descent in 1872 (FreeAfricanDesc), alongside further controls, to capture areas where slavery was widespread and deeply-rooted and which thus maintained large populations of Afro-Brazilians. Finally, I insert a proxy for the reach of the coercive power of the state to ensure that my results

(a) Literacy

(b) School Attendance

(c) Public Employment

(d) Population density
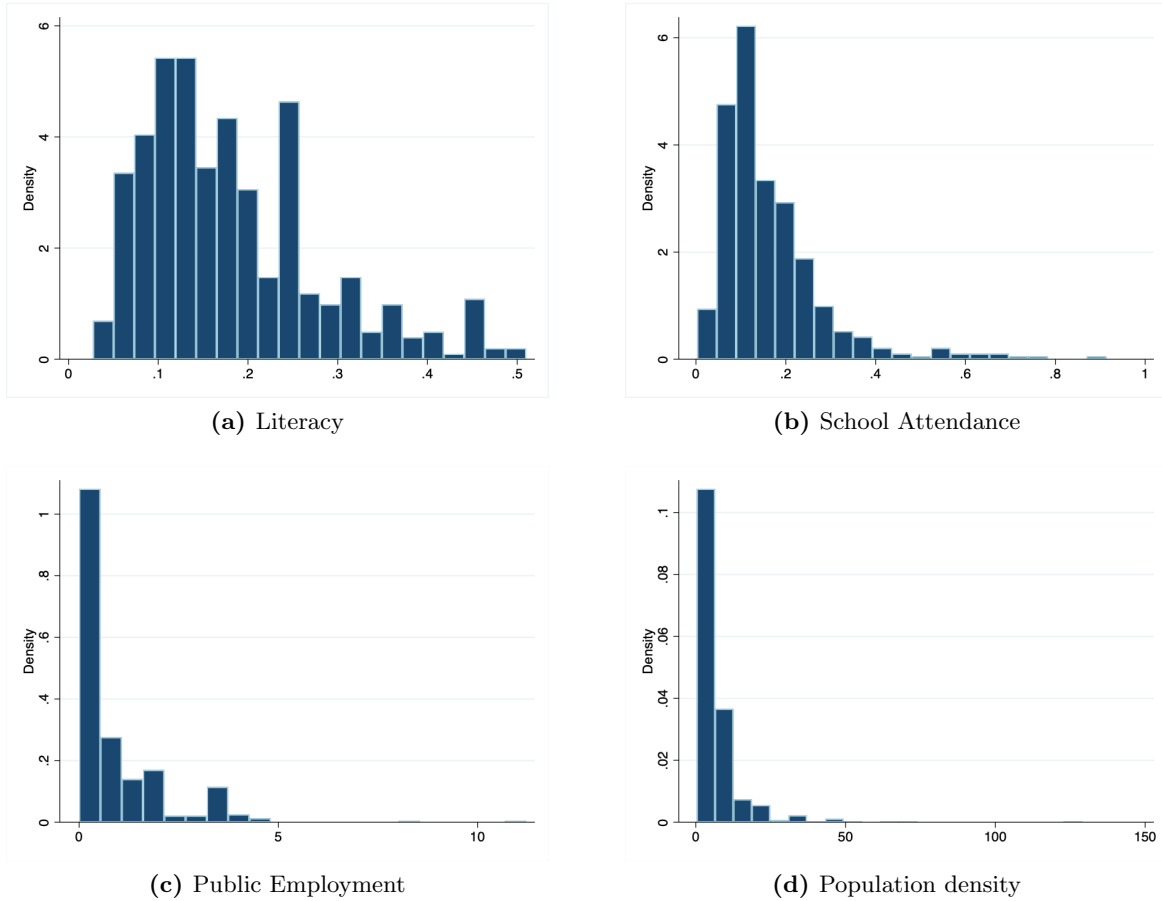
Figure 7: Outcomes distribution, 1872

Source: see text and Appendix A.

are not driven by Quilombos being simply located in remote areas with little or no control of the authorities. This is the number of soldiers living in the municipality for every 1000 citizens.

The results are presented in Table 1. They indicate that the 1872 slave ratio is positively correlated with early coffee production, which is unsurprising given the historical narrative provided thus far. Colonial gold production, instead, is negatively correlated with 1872 slavery. Again, this was expected: by the 19th century, gold extraction was an extremely marginal economic activity and gold producing municipalities experienced large outflows of slaves towards coffee and sugar producing regions, following the massive inflows of previous centuries. Sugar production is not significantly correlated with the slave share, which is explained by the fact that the commodity's colonial heyday was long past, and that, out of the three provinces, only Rio de Janeiro had ever cultivated it intensively enough to justify large-scale slavery.

The results for Quilombos are also very much in line with the historical narrative. I find that these communities are more frequently found in areas where the coffee boom took hold prior to the abolition of slavery. When the full expansion of coffee production is taken into account, instead, the relationship turns negative. This was , once again, expected: early coffee production looked similar to earlier commodity booms in its extractive nature and widespread use of slavery

21

(a) Literacy

(b) Wages

(c) Expenditure per capita

(d) Population density
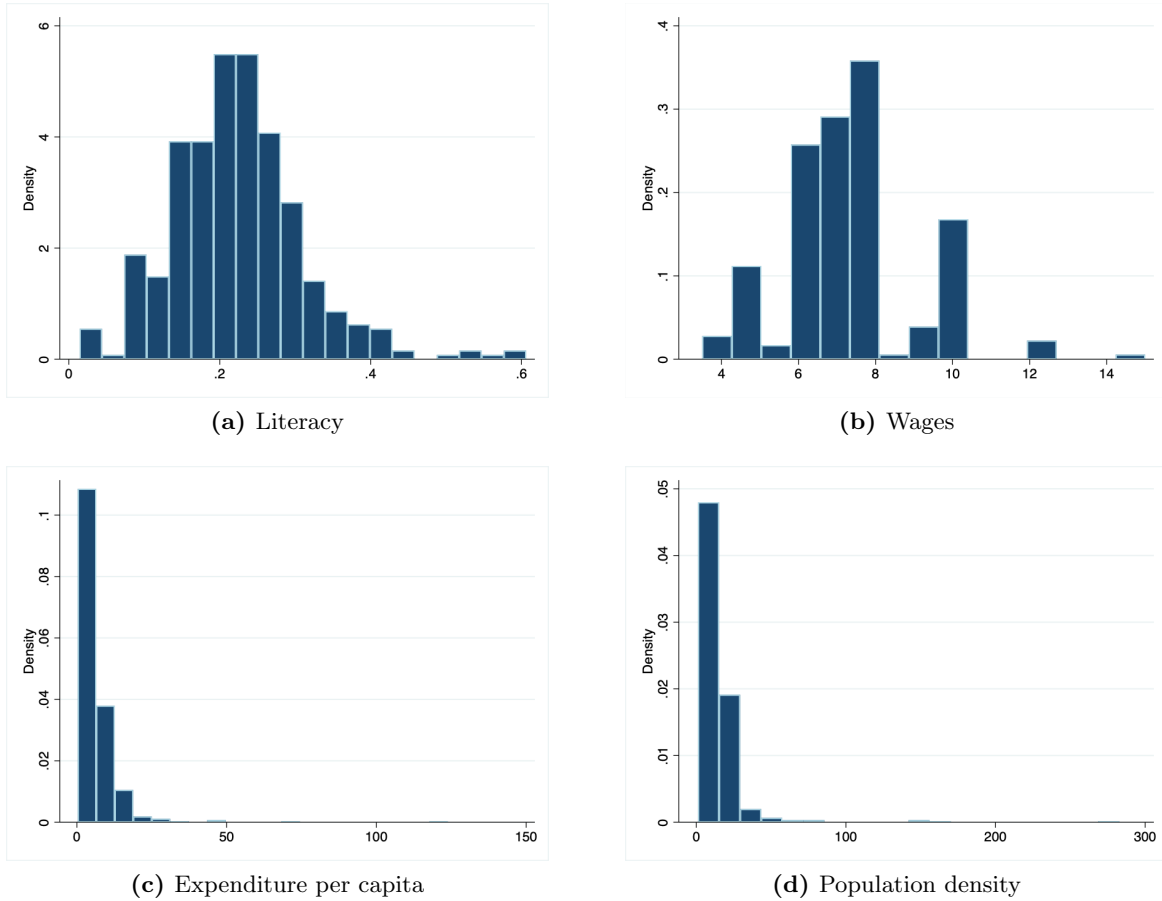
Figure 8: Outcomes distribution, 1920-23

Source: see text and Appendix A.

(Naritomi, Soares, and Assunção, 2012). When coffee production expanded to areas previously devoid of plantation agriculture or barely even inhabited, however, slavery was in rapid decline or already abolished. Thus, the use of slavery was both less intense and shorter-lived, drastically reducing the probability of leading to the creation of permanent Quilombo communities.[20]

It is also clear that, in areas suitable for coffee production, planters had a strong interest in claiming both land and slaves that could be put to work to produce this valuable cash crop. This further decreased the likelihood of successful formation and survival of runaway slave communities in newly settled and highly productive coffee areas. Interestingly, it was not only actual coffee production that is associated with a lower incidence of Quilombos, but also its potential. This is indicated by the strongly negative relationship between the presence of Quilombos and the suitability of land for coffee production. It is not difficult to imagine that slaves with experience in coffee production would have easily recognized and avoided areas suitable for the crop fearing the successive expansion of plantations.

The results for QuilTreat and QuilNumb also indicate that these communities can be found

---

[20]On top of this, land suitable for coffee production is not ideal for the production of other crops, like cereals, which would have been important for the survival of Quilombos.

Table 1: Measuring slavery

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	SlaveShare	SlaveShare	QuilTreat	QuilTreat	QuilNumb	QuilNumb
Sugar	0.0158	0.00703	0.560	0.280	1.043	0.378
	(0.0377)	(0.0381)	(0.886)	(0.903)	(0.868)	(0.884)
Gold	-0.0361***	-0.0346***	0.719**	0.728**	1.767***	1.582***
	(0.0112)	(0.0117)	(0.300)	(0.291)	(0.455)	(0.411)
CoffeEarly	0.0360**		0.530**		0.253	
	(0.0157)		(0.257)		(0.546)	
CoffeeAll		0.00725		-0.164		-1.289**
		(0.0215)		(0.302)		(0.571)
FreeAfricanDesc	-0.119***	-0.127***	2.340***	2.081***	5.606***	4.145***
	(0.0397)	(0.0412)	(0.797)	(0.737)	(1.159)	(0.982)
Soldiers	-0.00239	-0.00176	0.0376	0.0546*	0.0688	0.0824*
	(0.00164)	(0.00152)	(0.0269)	(0.0301)	(0.0455)	(0.0458)
Controls						
Constant	✓	✓	✓	✓	✓	✓
PortDistance	✓	✓	✓	✓	✓	✓
LandSuit	✓	✓	✓	✓	✓	✓
ProvinceFE	✓	✓	✓	✓	✓	✓
Observations	437	437	437	437	437	437
R^2	0.487	0.474				

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The three economic activity variables are dummies for the historical production of each commodity, see Naritomi, Soares, and Assunção (2012). It should be noted that a variable containing only the further expansion of coffee predicts perfectly the lack of Quilombo communities in a municipality. Distance from the port is to Santos or Rio de Janeiro, whichever is closer to the centroid of each municipality. The land suitability indicators refer to rain-fed, low input potential yields of coffee, sugar cane and cotton. Column 1 is estimated via OLS, column 2 via probit given that QuilTreat is binary, and column 3 using a negative binomial distribution since QuilNumb is a count variable.

in areas historically associated with Gold extraction. Gold extraction relied extensively on slave labour and, for this reason, Minas Gerais saw a massive and rapid inflow of slaves from the late 17th century. This increased the probability of the formation of Quilombos. The successive decrease in importance of gold production and low suitability of the land for the production of cash crops might have also facilitated their survival.

Quilombo municipalities also had larger populations of African descendants in 1872. This further testifies their long-history of large-scale slavery. Despite internal migration, even to this, day Afro-Brazilians can be found in greater numbers in areas where slavery was historically prevalent.

The final key result of this exercise is that Quilombos cannot be found where the presence of

the state was historically weak. Although weakly significant and small, the positive coefficients of the Soldiers variable indicate that, if anything, the state's coercive power was stronger in Quilombo municipalities.

In summary, Quilombos communities do indeed provide complementary information to the 1872 census regarding slavery's incidence across time and space. Whereas the 1872 census mainly captures the changes brought about by the coffee boom, the runaway slave communities capture the long-term incidence of the institution, closely connected to the early coffee boom and colonial gold production, in other words, activities that, by the late 19th and early 20th century, had lost their centrality in Brazil's economy, but left a legacy of stable Quilombo communities and large numbers of Afro-Brazilians.

6.2 The impact of slavery pre-Abolition

Having established the usefulness of Quilombos as a proxy for the incidence of slavery, I start my analysis of the impact of slavery in 1872 by relating the number of Quilombos, normalized by population (1000 citizens), to the four 1872 outcomes: literacy, school attendance, population density and public employment. For each dependent variable, in the first column, I simply control for province fixed effects, geographic characteristics and land suitability. In the second column, I also control for the three economic activities most closely related to large-scale slavery: colonial sugar production, colonial gold extraction and the coffee boom. This is to ensure that I am capturing the effect of slavery and not simply the impact of economic activities related to it, which might have influenced the outcomes though channels other than slavery.

In order to capture the probability of survival of Quilombo communities, which might otherwise bias my results if also related to the dependent variables, I control for the expansion of the coffee boom both before and after my period of observation. This is to ensure that the places where coffee production took hold, and Quilombos were less likely to survive, are not fundamentally different and more prone to economic development than other areas. Additionally, I also insert my proxy for the coercive power of the state – the number of soldiers per 1000 citizens – in all regressions. The inclusion of an alternative proxy – the number of justice workers per 1000 citizens – yields similar results.

For all outcomes except school attendance, I find a negative and statistically significant relationship with the presence and number of Quilombos in both specifications. This suggests that the incidence of slavery, captured by runaway slave communities, negatively affected development. The magnitude of the findings is far from negligible. In the more conservative specification, an additional Quilombo per 1000 citizens is estimated to have decreased literacy by 8% (1.5 pp), population density by 12% and the number of public employees by 32%.

In order to test the robustness of the inference, I also rely on an alternative strategy: propensity score matching. I do this to ensure that I am comparing only municipalities that are very similar in all observable characteristics, except for the presence of a Quilombo community.

The logic of applying this particular methodology in this setting is that some municipalities in Brazil had larger slave populations than others – leading to the more likely formation of a Quilombo – and that this variation is random from the vantage point of the analysis, conditional

24

Table 2: Standard regressions, 1872

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Literacy		SchoolAttendance		PopDensity		PublicEmployment	
QuilNumb/Pop	-0.0147***	-0.0149***	-0.00652	-0.00684	-1.783***	-1.165*	-0.314***	-0.294***
	(0.00512)	(0.00556)	(0.00622)	(0.00628)	(0.679)	(0.622)	(0.0973)	(0.0842)
μ DepVar	0.18		0.16		7.41		0.86	
σ DepVar	0.10		0.12		10.11		1.22	
Controls								
Constant	✓	✓	✓	✓	✓	✓	✓	✓
Soldiers	✓	✓	✓	✓	✓	✓	✓	✓
LandSuit	✓	✓	✓	✓	✓	✓	✓	✓
StateFE	✓	✓	✓	✓	✓	✓	✓	✓
GeoControls	✓	✓	✓	✓	✓	✓	✓	✓
Sugar		✓		✓		✓		✓
Gold		✓		✓		✓		✓
Coffee		✓		✓		✓		✓
Observations	437		437		437		437	
R^2	0.217	0.224	0.103	0.103	0.116	0.171	0.314	0.325

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Geographic controls include: distance from the equator, distance from the port of Santos or Rio de Janeiro (whichever is closer to the centroid of the municipality), altitude, ruggedness and surface area, except for population density for which area is excluded since it is part of the dependent variable. The regressions are run with OLS.

on the observables used in the matching. In other words, once the impact of salient geographic features – such as distance from the port – and economic characteristics – such as the history of commodity production – are accounted for, the variation in slavery and Quilombos depends on idiosyncratic factors. An example of these is different preferences for the use of slave vs free labour between planters; as discussed above, some plantation owners were, indeed, committed to using free labour for ideological more than practical reasons. Another example is the ease of access to slave labour from other parts of the country, which presumably effected the intensity of slave use, but is unrelated to other factors.

I detail the variables used in the propensity score calculations in Table 3. Before matching, municipalities featuring Quilombos exhibit substantial differences compared to those that do not. A number of variables stand out. As already discussed, Quilombo municipalities tend to be located in old gold producing areas; at the same time, they are less likely to be located in coffee municipalities. Unsurprisingly, Quilombos also tend to locate further from the port and closer to the equator. Differences also exist in the suitability of land for coffee, sugar and cereal production, as well as in surface area and ruggedness. Quilombos are also less likely to be found in São Paulo, which is unsurprising given the state's much shorter-lived history of large-scale slavery compared to Minas Gerais and Rio de Janeiro.

Table 3: Matching on observables

Variable	t-test before matching	t-test after matching
Sugar	1.09	-0.00
Gold	5.29***	-1.40
Coffee	-5.77***	-0.00
PortDist	4.56***	0.56
EquatorDist	-6.15***	-0.29
CoffeeSuit	-2.27**	-1.32
SugarSuit	-2.58**	-0.89
CottonSuit	1.14	-0.41
CerealSuit	2.52**	-0.69
Altitude	-0.35	-0.80
Area	5.11***	0.37
Ruggedness	1.84*	0.68
RJ	1.33	-0.21
SP	-5.77***	0.25
	bias before matching	bias after matching
Mean	36.7	9.2
Median	31.6	7.9

Matched to 3 nearest neighbors. Propensity score estimated via logit.

All these factors might also have affected economic performance. Geographic characteristics such as distance from the port, which affects market potential, are well-known drivers of development, for example. Moreover, the legacy of certain economic activities might affect development though channels other than the use of slave labour. For these reasons, comparing municipalities that are very similar in these characteristics, while differing in the intensity of slave labour, offers the best chance of causally estimating the impact of slavery on economic development.

I match each Quilombo municipality to the the three nearest neighbors in terms of propensity score. This specification minimizes residulal bias coming from differences between Quilombo and non-Quilombo municipalities. After matching, no variable is statistically significantly different between municipalities featuring Quilombos and those that do not. The overall mean bias due to differences in the matching variables is reduced from nearly 37% to around 9%, while the median bias is 7.9%. Ideally, the post-match bias would be somewhat smaller, below 5%, but other matching strategies were unable to further reduce this measure.

The propensity score matching analysis largely validates the results of the standard regressions (Table 4). The negative impact of slavery proxied by the presence of a Quilombo is confirmed for literacy and the number of public employees. Having a Quilombo reduces literacy by nearly 4 percentage points (22%) and the number of public employees by nearly 38%. These results are larger than those found with OLS. The main difference compared to the standard

Table 4: Matching results, 1872

| | (1) | (2) | (3) | (4) |
VARIABLES	Literacy	SchoolAtt	PopDens	PubEmpl
QuilTreat	-0.0389***	0.00415	-0.839	-0.331***
	(0.0113)	(0.0240)	(0.675)	(0.120)
μ DepVar	0.18	0.16	7.41	0.86
σ DepVar	0.10	0.12	0.01	1.22
Observations	437	437	437	437

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard errors are adjusted to account for the fact that the propensity score is estimated, see Abadie and Imbens (2016). Matching based on the propensity score calculated using the variables detailed in Table 3.

regressions, however, is that the coefficient for population density is not statistically significant at conventional levels anymore, suggesting that this result might not be robust. As before, I find no significant effect on school attendance.

In order to make the inference as robust as it can be using the present methodologies, I also present a matching specification in which I do not just employ geographical and other predetermined municipal characteristics, but also variables that, in part, might be caused by the incidence of slavery itself. I do this because these variables might affect economic outcomes through channels other than slavery. However, this also means that I am stacking the test against finding an effect of slavery.

The additional variables included in this specification are: 1) the share of free citizens of African descent, to account for the fact that worse economic outcomes might be due to discrimination against Afro-Brazilians; 2) the racial fractionalization index proposed by Alesina, Baqir, and Easterly (1999), to ensure that the effect on economic development is not due to inter-racial conflict; 3) the share of foreign citizens, to account for both immigration and production possibilities, since immigrants presumably settled in more prosperous and promising parts of the country; 4) the share of workers active in agriculture, to ensure that the results are not due to Quilombo municipalities being more agrarian; 3) the share of capitalists and industrialists in the population, to further account for differences in the economic structure of municipalities, particularly for the presence of large-scale land-holdings and industries; 5) the share of slaves imported from other states in the overall population, to further account for the fact that some areas were booming and, as a result, acquired more slaves. I do not include the number of soldiers in the specification because, while not affecting the results, the variable reduces the quality of the matching.

The extended matching is presented in Table 5. Out of the new variables, the incidence of imported slaves, the presence of capitalists, the agricultural inclination of the economy and

Table 5: Extended matching on observables

Variable	t-test before matching	t-test after matching
Sugar	1.09	0.00
Gold	5.29***	-0.72
Coffee	-5.77***	-0.25
PortDist	4.56***	1.30
EquatorDist	-6.15***	-1.01
CoffeeSuit	-2.27**	-1.17
SugarSuit	-2.58**	-1.46
CottonSuit	1.14	-0.60
CerealSuit	2.52**	-0.76
Altitude	-0.35	0.39
Area	5.11***	048
Ruggedness	1.84*	-0.43
RJ	1.33	-1.05
SP	-5.77***	-0.06
ImportedSlaves	-3.44***	-0.74
Industrialists	-0.81	-0.33
Capitalists	1.88*	-1.32
AgricShare	-3.82***	-0.49
FreeAfricDesc	6.33***	-0.12
ForShare	0.50	0.49
EthnicFract	1.51	-0.42
	bias before matching	bias after matching
Mean	34.9	10.5
Median	30.5	8.5

Matched to 3 nearest neighbors. Propensity score estimated via logit.

the share of free citizens of African descent all exhibit large and statistically significant differences between Quilombo and non-Quilombo municipalities. These are reduced to statistical insignificance through matching. The overall bias post-matching is 10.5%, which is higher than in the baseline specification, but still much lower than before matching (35%). The results of the extended matching regressions are presented in Table 6 and largely mirror those of the baseline both qualitatively and quantitatively. The one major difference is that the coefficient for population density is once again statistically significant. While this might mean that the extended matching takes care of some residual bias present in the baseline specification, the fact that the result is not consistently significant across different estimations makes it difficult to establish any definitive result.

Table 6: Extended matching results, 1872

VARIABLES	(1) Literacy	(2) SchoolAtt	(3) PopDens	(4) PubEmpl
QuilTreat	-0.0410***	-0.0104	-1.072***	-0.279***
	(0.00467)	(0.0172)	(0.392)	(0.0869)
μ DepVar	0.18	0.16	7.41	0.86
σ DepVar	0.10	0.12	0.01	1.22
Observations	437	437	437	437

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard errors are adjusted to account for the fact that the propensity score is estimated, see (Abadie and Imbens, 2016). Matching based on the propensity score calculated using the variables detailed in Table 5.

6.3 The impact of slavery post-Abolition

I continue my analysis by assessing the persistence of the impact of slavery post-Abolition, more precisely in 1920-23, over 30 years after the end of slavery. In order to do this, I relate the incidence of Quilombos per 1000 citizens in 1923 to the following development indicators: literacy, wages, population density, and public expenditure per capita[21] (Table 7). In the first column for each outcome, I run the same specification as the 1872 regressions. In the second column, I further control for the 1872 outcomes. In this way, I test whether slavery's impact consisted in putting municipalities on a lower developmental trajectory, which is captured captured by the 1872 outcomes, or whether its legacy continued to affect municipalities after Abolition by further damaging the local economy. In the latter case, a lower level of development would not be fully captured by the 1872 variables. This strategy is imperfect because I observe the exact equivalents of the 1923 outcomes in 1872 only for literacy and population density. However, developmental outcomes are normally strongly correlated. Therefore, the 1872 variables should contain useful information for the 1923 outcomes.

The 1872 variables do, indeed, captures some of the variation due to the incidence of slavery found in the 1923 outcomes. This is demonstrated by the fact that the coefficients on the Quilombo variable are smaller when these are included. However, for wages and population density, the Quilombo coefficients remain statistically significant and large. When I do not control for the 1872 outcomes, adding another Quilombo per 1000 citizens leads to a 15% decrease in wages, while the estimated effect is 12% when the 1872 variables are included. The difference is larger for population density: the effect of an additional Quilombo goes from a 74% reduction in population density to a 65% one.

For literacy and expenditure per capita, instead, the coefficients become much smaller and

---

[21]Results are very similar for revenue per capita.

Table 7: Standard regressions, 1920-23

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Literacy		Wages		PopDens		PubExpenditure	
QuilNumb/Pop	-0.118*	-0.0641	-0.165**	-0.129*	-1.155	-0.943*	-1.074*	-0.624
	(0.0700)	(0.0594)	(0.0663)	(0.0658)	(0.727)	(0.562)	(0.630)	(0.385)
Literacy1872		0.0437**		0.00512		0.0721		0.145*
		(0.0187)		(0.00854)		(0.0520)		(0.0769)
PubEmpl1872		0.0560***		0.0229*		0.0411		0.125*
		(0.0210)		(0.0121)		(0.0813)		(0.0644)
PopDens1872		0.0423***		0.0210		0.239***		0.110**
		(0.0128)		(0.0148)		(0.0401)		(0.0437)
μ DepVar	0.22		7.39		14.88		6.31	
σ DepVar	.08		1.71		20.06		8.69	
Controls								
Constant	✓		✓		✓		✓	
Sugar	✓		✓		✓		✓	
Gold	✓		✓		✓		✓	
Coffee	✓		✓		✓		✓	
LandSuit	✓		✓		✓		✓	
StateFE	✓		✓		✓		✓	
GeoControls	✓		✓		✓		✓	
Observations	428		230		428		428	
R^2	0.164	0.232	0.455	0.469	0.141	0.629	0.249	0.398

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard errors are clustered at the 1872 municipality level. The regressions are estimated using the Pseudo Poisson Maximum Likelihood, which is ideal for log-linearized spoecifications (Santos Silva and Tenreyro, 2006, PPML).

statistically insignificant when I control for the 1872 outcomes. This means that the 11% and 66% reduction in literacy and public expenditure per capita due to the presence of an additional Quilombo per 1000 citizens are mostly explained by outcomes observed while slavery still existed. All 1872 variables – literacy, population density and public employment – explain some of this variation, as evidenced by their positive and statistically significant coefficients, highlighting the usefulness of employing a broad range of developmental indicators.

In summary, the results suggest that large-scale slavery put municipalities on a lower developmental trajectory, affecting variables such as literacy, wages, population density and public resources. The effect is still visible thirty years after the abolition of slavery. However, in the case of wages and population density, differences across municipalities caused by the incidence of slavery are not completely captured by outcomes measured while slavery still existed, suggesting that the legacy of slavery continued to negatively affect economic development post-Abolition.

A plausible mechanism for this effect is that slavery thwarted the development of nascent economic activities in the late 19th and early 20th, such as industry and other non-agricultural activities. This would have been the case if slavery damaged the development of efficient markets for free labor and/or lowered the accumulation of human capital, for example. Differences in these new activities would have been minimal and/or inconsequential for overall economic development while slavery still existed, explaining why the 1872 outcomes cannot fully capture the impact of slavery.

6.4 Including slavery data from the 1872 census

As discussed throughout the paper, the 1872 slavery data is problematic for two main reasons. One is the timing: observing the spatial distribution of slaves in 1872 does not allow us to capture the long-term incidence of slavery because of the deep structural changes taking place in the economy and society in the second half of the 1800s. Even before that, the rise and fall of the gold and sugar cycles had large effects on the economic geography of Brazil. The second issue is the non-random location of slaves. For Quilombos this problem is muted because these were mostly tied to older waves of large-scale slavery and to economic activities that had lost relevance by the second half of the 19th century and for which we can, in any case, directly control. The distribution of slaves captured by the 1872 data, instead, is intimately tied to contemporaneous developments and to economic activities with direct bearing on economic development in the late 19th and early 20th century. While controlling for the influence of the coffee boom can mitigate this issue, it is difficult to imagine that all endogenity in the 1872 slave distribution can be accounted for in this way.

At the same time, I have argued that Quilombos are complementary rather than alternative to the census data because they measure different things: long-standing slave incidence vs recent changes and developments. Therefore, it is important to assess whether accounting for these recent changes in the economy and population affects my results. I do this in Table 8.

The first result of note is that the inclusion of the slave ratio does not substantially change the results for Quilombos. For 1872, for example, I still find a negative impact on literacy of around 8% of an additional Quilombo. For population density the effect is now 13% compared to the previous 12%, while for public employment it is 33% compared to the 32% found previously. For 1923, one more Quilombo per 1000 citizens decreases literacy by 11.5%, wages by 15%, population density by 69% and public expenditure by 66%. The effect is no longer statistically significant for population density because of the standard errors being larger. Condition number tests suggest that this is because of high collinearity between the 1872 slavery measure and the other variables in the regression.

The general conclusions from the previous exercises remain unaltered: the presence of Quilombos is associated with lower literacy, public employment, wages, revenue and expenditure per capita and, possibly, population density. In other words, a large array of economic development indicators were affected by the intensity of slavery proxied by runaway slave communities. This is true even after controlling for changes in the the economy and structure of the population in the second half of the 19th century, captured by the 1872 slavery data.

The results on the slave share variable in themselves are not particularly interesting because of the endogeneity problems discussed. However, they are useful in highlighting just how problematic the 1872 data is. For example, the slave share is positively associated with both literacy and school attendance in 1872. This result could mean that a larger slave population allowed free citizens to achieve higher literacy and more years of schooling because they could eschew manual and/or child labour. However, it might also simply indicate that larger slave populations could be found in wealthier municipalities, with higher levels of human capital.

Furthermore, the slave share is negatively associated with population density and public employment in 1872, although not significantly for the former. These results are even more difficult to interpret than the previous ones. Does the lower population density indicate that large swathes of land were dedicated to plantation agriculture and were thus scarcely inhabited? Or does it indicate that free citizens were unwilling to settle where slavery was more prevalent? Or could it mean that areas with large slave populations had a stunted development? Similarly, does the result for public employment suggest that plantation owners prevented the development of a strong bureaucracy, which could threaten their hold of power at the local level – a hypothesis that has a strong qualitative pedigree –, or is there another explanation, for example that slaves smuggled in after the 1831 ban of the slave trade could more easily be found in areas where the bureaucracy was less present?

Table 8: Controlling for the 1872 slave ratio

	1872				1920-23			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Literacy	SchoolAtt	PopDens	PubEmpl	Literacy	Wage	PopDens	PubExpenditure
SlaveShare72	0.183**	0.321***	-0.755	-1.950***	0.274	-0.00928	-1.574*	-0.245
	(0.0742)	(0.103)	(6.803)	(0.657)	(0.247)	(0.200)	(0.835)	(0.852)
QuilNumb/Pop72	-0.0144***	-0.00533	-0.943**	-0.279***				
	(0.00525)	(0.00566)	(0.422)	(0.0788)				
QuilNumb/Pop23					-0.122*	-0.164**	-1.162	-1.065*
					(0.0704)	(0.0663)	(0.742)	(0.632)
Controls								
Constant	✓	✓	✓	✓	✓	✓	✓	✓
Sugar	✓	✓	✓	✓	✓	✓	✓	✓
Gold	✓	✓	✓	✓	✓	✓	✓	✓
Coffee	✓	✓	✓	✓	✓	✓	✓	✓
LandSuit	✓	✓	✓	✓	✓	✓	✓	✓
StateFE	✓	✓	✓	✓	✓	✓	✓	✓
GeoControls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	437	437	437	437	428	230	428	428
R^2	0.243	0.131	0.132	0.312	0.166	0.455	0.164	0.247

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard errors are clustered at the 1872 municipality level. The 1872 regressions are run using OLS and the 1920-23 regressions are estimated using the Pseudo Poisson Maximum Likelihood, as above (Santos Silva and Tenreyro, 2006).

While these questions have, at present, no answer, they illustrate the challenges associated with studying the impact of slavery in Brazil using the 1872 census data and why its use has resulted in a number of inconclusive studies. Furthermore, they highlight the need for an alternative measure of slavery able to capture the incidence of the institution before the tumultuous and long-lasting changes of the second half of the 19th century. This paper attempts to do just that.

6.5 The impact of immigration

Table 9 illustrates the first set of results of the final empirical exercise of the paper, which links immigration – proxied by the presence of immigrant colonies – to economic development, represented by indicators of state/fiscal capacity. I run this analysis exclusively for São Paulo because the state was the only one active enough in the creation of immigrant colonies to allow for this empirical approach. Apart for the inclusion of the colonies, the econometric specification is very similar to that used in previous exercises. The only difference is that, because of the importance of the coffee boom for São Paulo specifically and its role in attracting immigrants, I not only control for the presence of coffee production in the municipalities, but also for its indirect influence, proxied by distance from production sites. This data also comes from Naritomi, Soares, and Assunção (2012). The results of the estimation confirm both the hypothesis – that immigration had a positive impact, and that this was linked to the contrast between free and slave labor – and the validity of the identification strategy laid out in Section 4.2.

To recap, colonies created to host new European immigrants by the planters in collaboration with the state between 1829 and 1939 are divided into three groups: 1) those created while slavery still existed (1829-89), which represent the treatment; 2) those created after the end of slavery, but before my period of observation (1890-1912), which are designed to asses whether different waves of migration had different impacts on economic development; 3) those created after my period of observation (1913-39), which act as placebos. The presence of a colony of each group in a municipality is introduced as a dummy in the regressions. Municipalities with no colonies are the control grouoop

If immigration did indeed have a positive effect, particularly immigration taking place during the slave era, and colonies were not simply located in the "best" municipalities from an economic development perspective, we would expect the following results: 1) a positive and statistically significant coefficient for the first group of colonies, 2) a potentially positive, but smaller and not necessarily statistically significant coefficient for the second group, 3) a coefficient statistically indistinguishable from or smaller than zero for the third group. A zero coefficient for this last group would indicate that colonies were not simply placed in better locations, while a negative coefficient would indicate that they might have actually been placed in areas that were initially relatively worse from an economic development perspective. The results are consistent with these expectations.

For revenue per capita, the coefficient of the pre-1890 colonies – those created while slavery still existed – is positive, large and highly statistically significant. For expenditure per capita,

Table 9: Immigrant colonies, 1912

VARIABLES	(1) PubRevenue	(2) PubExpenditure	(3) PubServices
Colony1829-1899	0.471**	0.314	0.825***
	(0.213)	(0.238)	(0.301)
Colony1890-1912	0.0294	0.109	-0.189
	(0.309)	(0.328)	(0.309)
Colony1913-1938	-0.797	-1.078	-0.667
	(0.903)	(0.931)	(0.467)
		Controls	
Constant	✓	✓	✓
LandSuit	✓	✓	✓
GeoControls	✓	✓	✓
Coffee	✓	✓	✓
CoffeeInfl	✓	✓	✓
Observations	163	163	153
R^2	0.539	0.563	0.108

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard errors are clustered at the 1872 municipal level. Revenue and expenditure per capita are 1908-1912 averages, public services expenditure per capita is measured in 1912. See Appendix A for details.

the coefficient is not statistically significant, but focusing on the part of public expenditure related to the provision of key public services – including infrastructure, lights, health, water, sewers and education – yields a positive and statically significant coefficient once again. More precisely, the presence of a colony increases revenue per capita by 60% and expenditure on public services per capita by nearly 130%.

The coefficients of the post-Abolition colonies, instead, are not significantly different from zero, indicating that the immigration wave, which took place when the contrast between free and slave labour had disappeared, had no discernible positive effect on indicators of state/fiscal capacity. Finally, the coefficients of the post-1912 placebo colonies are indistinguishable from zero for revenue and expenditure and negative for public services, as required by the identification strategy.

As a final exercise, I also relate the 1920-23 outcomes to the presence of immigrant colonies (Table 10). Because of the insufficient number of colonies created after 1923, rather than having a category for placebo colonies, I simply divide the colonies between those created before and after the end of slavery. Once again, if my hypothesis is true, the first group of colonies should yield positive and statistically significant coefficients. The second group of colonies combines the two purposes of the two groups of post-1889 colonies above: 1) ensuring that colonies were

34

not simply placed in better locations, 2) differentiating between the effect of different migration waves.

Table 10: Immigrant colonies, 1920-23

VARIABLES	(1) Literacy	(2) Wage	(3) PopDens	(4) PubExpenditure
Colony1829-1899	0.367***	0.0918**	0.709***	0.511***
	(0.0970)	(0.0382)	(0.214)	(0.171)
Colony1890-1938	0.0564	-0.0509	0.0150	0.0323
	(0.0849)	(0.0449)	(0.190)	(0.239)
		Controls		
Constant	✓	✓	✓	✓
LandSuit	✓	✓	✓	✓
GeoControls	✓	✓	✓	✓
Coffee	✓	✓	✓	✓
CoffeeInfl	✓	✓	✓	✓
Observations	202	148	202	202
R^2	0.301	0.431	0.381	0.507

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard errors are clustered at the 1872 municipal level. Revenue and expenditure per capita are 1908-1912 averages, public services expenditure per capita is measured in 1912. See Appendix A for details.

The results are largely in line with the previous ones. Colonies founded before the end of slavery all have large, positive and strongly statistical coefficients, while the coefficients for post 1889 colonies are small and statistically indistinguishable from zero. Quantitatively, the estimates indicate 44% higher literacy, 10% higher wages, 100% higher population density and 67% higher public expenditure in municipalities with pre-1890 colonies.

Thus, the results indicate that, despite the fact that later immigration is generally considered to have been fundamental for the overall economic development of Brazil, early immigration was crucial in shaping differential spatial developments within the country. As discussed in detail in Section 7, this is presumably because municipalities that were able to switch out of large-scale slavery earlier thanks to immigration, found themselves on a higher developmental path.

7 Potential channels and narrative evidence

There are several ways in which slavery might have influenced economic development. A widely cited hypothesis is that slavery thwarted the development of free markets for labour, affecting wages and the viability of industries other than primary commodity production (Klein and Luna, 2010).

The disjointed and uneven nature of Brazilian labour markets is reflected in this quotation from the January 1988 report to the provincial assembly by the president of São Paulo. Additionally, in it, immigration is proposed as a way of mitigating the problem:

> *It can be observed from the statistics I referred to that immigration has concentrated in the well-known areas of the West and South of the province. [...] However, the benefit should extend to all municipalities, according to their needs. The North, more precisely the Northeast of the province, needs to be part of this phenomenon. While a large number of municipalities in this area found a good substitute for slaves in the local population, and in many places this is well established, I am convinced that the inclusion of foreign workers will be very effective in stimulating new production and reviving existing establishments. Domestic work has, until now, not had an adequate legal organization. Legal conditions are so different from one municipality to the next that I do not believe it effective to introduce uniform general measures in such an important area.*[22]

Several explanations also exist linking slavery to low human capital and fiscal capacity. First, slaves were not educated. This reduced the need for public education, and for revenue to fund it. Second, a greater reliance on slave labour deprived a large share of the population of a political voice, reducing the strength of demands for the provision of public goods. At the same time, this also reduced the incentive of municipalities to attract workers or prevent them from emigrating through the quality of public services, since slaves obviously could not "vote with their feet". Thus, the availability of a large pool of slave labour reduced the strength of free citizens' demands, the accountability of local state representatives and their incentives to supply public services. Moreover, local oligarchs, most prevalent in regions with slave-based economies, had an interest in keeping taxation, public spending and education levels low and in limiting the outside options of the local population. This reduced their tax burden and ensured the availability of cheap labour, as well as the perpetuation of clientelism and patronage on which a large share of their influence depended.

There are also good reasons to believe that the impact of slavery persisted after its abolition, and that its persistence was proportional to its previous pervasiveness. In areas with a long-history of slave labour, such as the Paraíba valley and the state of Rio de Janeiro, ex-slaves often remained as artisans, workers in the growing industrial sector or as sharecroppers on coffee plantations. Slaves in frontier areas of São Paulo, instead, tended to relocate to other areas, particularly the city of São Paulo (Fausto, 1999).

We also know from the experience of the US South that landowners actively limited the outside options of ex-slaves in order to tie them to the plantations. This was achieved, for example, by successfully lobbying the Federal government to limit the growth of the welfare state, while privately supplying similar services within paternalistic and clientelistic relationships (Al-

---

[22]Author's translation from the"relatorio apresentado á Assembléa Legislativa Provincial de São Paulo pelo presidente da provincia, exm. snr. dr. Francisco de Paula Rodrigues Alves, no dia 10 de janeiro de 1888. São Paulo," page 33, Jorge Seckler & Comp.

ston and Ferrie, 1985, 1993). Different tools, such as vagrancy laws, were used in the Brazilian context, but the objectives were very similar (Huggins, 1985; Klein and Luna, 2010; Bucciferro, 2017). Ex-slaves and free citizens of African descent also continued to face discrimination and their social mobility remained limited. This phenomenon became particularly pronounced after Abolition when poor whites saw Afro-Brazilians as more concrete competition for jobs, land-owners feared their newly-found leverage and rights and the elites wished to push for racial whitening through immigration and miscegenation (da Costa, 2000; Machado, 2006; Slenes, 2010; Graham, 2016). This meant that slavery's shadow continued to affect the individual and collective economic and social status of Afro-Brazilians.

The problematic relationship between immigration and slavery has also been widely discussed. While many authors have argued that the existence of slavery discouraged mass immigration from Europe (Klein and Luna, 2010), this did eventually take place and began already before slavery was abolished. Moreover, local free labor existed before mass immigration, and the incidence of slavery was vastly different across the Brazilian territory. Therefore, slavery presumably affected the viability of free labour and immigration to a different extent in different parts of the country.

In São Paulo, the duality between slave and free labour was particularly salient, especially in the 1880s, while large scale immigration and slavery coexisted. The presence of large slave populations in a municipality likely reduced the settlements of immigrants due to both a lower demand for free labour and the extremely negative perception slavery had acquired by the late 19th century, both within and outside Brazil. Evidence of this are the pamphlets created to attract European immigrants to Brazil by the Society for the Promotion of Immigration,[23] which purposely failed to mention the existence of slavery (Fausto, 1999). It is also useful to recall that Brazil was one of the last countries to abolish the institution.

Rhetoric aside, this quotation by the president of São Paulo from a report to the provincial assembly from January 1889, merely 8 months after the abolition of slavery, illustrates the perceived impact slavery had on potential immigrants to Brazil:

> *We were not known to civilized nations. Slavery made us barbarians in the eyes of foreigners and, due to ignorance or bad faith, outside of Portugal, which as a whole could not populate just one of our provinces, the idea of migrating to Brazil for those who could, if at all there, was considered terrible. It appeared as a country not habitable by civilized people, due to endemic diseases and its climate. This false judgement is now completely undone. Thousands of letters from Italians, Belgians Germans, Spaniards and individuals from other nations cross the seas, bringing to their relatives and friends that remained behind the welcome news that immigrants found in the Paulista land an adoptive home that is free and happy, where there is room for all aspirations and for all faiths, with a governmental structure modeled in line with the most civilized in the world.*[24]

---

[23]In Portoguese: Sociedade Promotora de Imigracão. It was founded by members of the Paulista elite keen on promoting European migration to the province in 1886.

[24]Author's translation from the "relatorio apresentado á Assembléa Legislativa Provincial de São Paulo pelo

As shown, there are reasons to believe that slavery affected the spatial distribution of immigrants. But in what way could immigration have affected economic development?

The existing literature offers abundant indications that immigration played a big role in Brazilian economic development. Stolz, Baten, and Botelho (2013), for example, find that it had positive effects on human capital and income per capita in the long term. de Carvalho Filho and Monasteiro (2012) look specifically at settler colonies in the Southern state of Rio Grande do Sul and show that proximity to these is related to better economic outcomes today. Rocha, Ferraz, and Soares (2017) find similarly positive effects for São Paulo. None of these previous papers, however, provides fully fledged identification strategies to deal with the endogeneity of immigrant settlement. Moreover, they draw no distinction between migration taking place before and after the end of slavery. This paper addresses both issues and shows that the positive impact of immigration was largest and clearest for settlements created while slavery was not yet abolished, suggesting that the contrast between slave and free labour is at the heart of these results.

Through which channels did the effects of migration occur? First, immigrants probably had a higher degree of human capital compared to both the slave and free local population. Second, immigration likely had in impact on local institutions. As already suggested above, well-functioning markets for free labor were more likely to develop where large numbers of migrants settled, for example. Moreover, migrants provided a stimulus for the provision of public goods. This is because, unlike slaves, they could "vote with their feet" and, unlike the local population, they were used to higher European levels of public goods provision. Thus, competition between municipalities keen on attracting workers from abroad presumably manifested itself in the provision of education, healthcare, sewers, public lights and other services. Migrant communities also often set up their own schools, and were generally successful in obtaining at least partial public financing for their running (de Carvalho Filho and Colistete, 2010). Finally, in areas where migrants settled, the paternalism and clientelism that characterized much of Brazilian local politics were less likely to thrive, because such relationships would need to be established anew with a different class of citizens that was geographically mobile.

Thus, at least part of the effect of immigration likely worked through political representation. However, it is not the type of political representation embedded in the formal institutions emphasized by much of the literature – for example Acemoglu, Bautista, Querubín, and Robinson (2008) and Engerman and Sokoloff (2012) – and analyzed by Summerhill (2010) and Funari (2017) in the Brazilian setting. These studies have focused on the impact of the extent of the political franchise and of the right to vote. I argue that it was the migrants' geographical mobility and their ability to leverage Brazil's labour shortage that mattered. This might explain why the latter authors find no link between narrowly political representation and development.

presidente da provincia, dr. Pedro de Azevedo, no dia 11 de Janeiro de 1889," Jorge Steckler & Comp.

8   Conclusion

Slavery has long being singled out as one of the determinants of economic underperformance in both sending and receiving countries. Despite this, no conclusive empirical evidence exists on the impact of slavery in Brazil, the largest importer of slaves during the Atlantic slave trade.

Using a new measure of the intensity of slavery – the presence of communities descended from those created by escaped slaves, the Quilombos – I overcome the limitations of census-based measures used in the past, and show that slavery had a large and persistent negative effect on economic development also in Brazil. Additionally, I use the location of immigrant colonies to demonstrate that immigration taking place while slavery still existed had a positive effect on local economic development, while no comparable effect can be detected for later migration waves. This indicates that the contrast between slave and free labour is at the heart of both the negative impact of slavery and the positive impact of immigration on Brazilian economic development.

In summary, slavery likely affected economic development both directly and indirectly. On the one hand, slaves lacked the, however limited, political voice and rights that free Brazilians had, and their presence rendered the creation of efficient markets for free labour and the provision of public goods, such as education, far less pressing. On the other hand, slavery limited the settlement of foreign migrants and thus the extent to which this dynamic group of citizens was able to shape local economic and institutional developments.

References

ABADIE, A., AND G. W. IMBENS (2016): "Matching on the Estimated Propensity Score," *Econometrica*, 84(2), 781–807.

ABREU, M. D., AND L. A. C. DO LAGO (2001): "Property Rights and the Fiscal and Financial Systems in Brazil: Colonial Heritage and the Imperial Period," *in Transferring Wealth & Power from the Old to the New World, Monetary and Fiscal institutions in the 17th through the 19th Centuries, Michael D. Bordo and Roberto Cortés-Conde (eds)*, Studies in Macroeconomic History Series, Cambridge University Press.

ACEMOGLU, D. (2005): "Politics and Economics in Weak and Strong States," *Journal of Monetary Economics*, 52(7), 1199–1226.

ACEMOGLU, D., M. A. BAUTISTA, P. QUERUBÍN, AND J. A. ROBINSON (2008): "Economic and Political Inequality in Development: The Case of Cundinamarca, Colombia," *in Institutions and Economic Perfomance, Elhanan Helpman (ed)*, Harvard University Press.

ACEMOGLU, D., C. GARCÍA-JIMENO, AND J. A. ROBINSON (2012): "Finding Eldorado: Slavery and Long-Run Development in Colombia," *Journal of Comparative Economics*, 40(4), 534–564.

ALESINA, A., R. BAQIR, AND W. EASTERLY (1999): "Public Goods and Ethnic Divisions," *Quarterly Journal of Economics*, 114(4), 1243–1284.

ALSTON, L. J., AND J. P. FERRIE (1985): "Labor Costs, Paternalism, and Loyalty in Southern Agriculture: A Constraint on the Growth of the Welfare State," *Journal of Economic History*, 45(1), 95–117.

——— (1993): "Paternalism and Agricultural Labor Contracts in the U.S. South: Implications for the Growth of the Welfare State," *American Economic Review*, 83(4), 852–876.

ALSTON, L. J., M. A. MELO, B. MUELLER, AND C. PEREIRA (2016): *Brazil in Transition: Beliefs, Leadership, and Institutional Change*. Princeton University Press.

AMANTINO, M. (2003): "Sobre os Quilombos do Sudeste Brasileiro nos Séculos XVIII e XIX," *in Ensaios sobra a Escravidão (I), Manolo Florentino and Cacilda Machado (eds)*, Editoria UFMG.

ANDERSON, R. N. (1996): "The Quilombo of Palmares: A New Overview of a Maroon State in Seventeenth-Century Brazil," *Journal of Latin American Studies*, 28(3, Brazil: History and Society), 545–566.

BARDHAN, P. (2016): "State and Development: The Need for a Reappraisal of the Current Literature," *Journal of Economic Literature*, 54(3), 862–92.

BESLEY, T., AND T. PERSSON (2014): "Why do Developing Countries Tax so Little?," *Journal of Economic Perspectives*, 28(4), 99–120.

BLATTMAN, C., J. HWANG, AND J. G. WILLIAMSON (2007): "Winners and Losers in the Commodity Lottery: The Impact of Terms of Trade Growth and Volatility in the Periphery 1870-1939," *Journal of Development Economics*, 82, 156–179.

BRAZIL (1876): *Recensamento Geral do Império de 1872*. Diretoria Geral de Estatística.

——— (1908-1912): *Anuário Estatístico do Brasil 1908-1912*. Diretoria Geral de Estatística.

——— (1920a): *Recensamento do Brasil 1920*, vol. V (2a parte) Salarios. Directoria Geral de Estatística.

——— (1920b): *Recensamento do Brasil 1920*, vol. IV (4a parte) População. Directoria Geral de Estatística.

——— (1926): *Estatistica das Finanças do Brazil*. Ministerio da Agricultura, Industria e Commercio.

BRUHN, M., AND F. A. GALLEGO (2012): "Good, Bad, and Ugly Colonial Activities: Do They Matter for Economic Development?," *Review of Economics and Statistics*, 94(2), 433–461.

BUCCIFERRO, J. R. (2017): "Racial Inequality in Brazil from Independence to the Present," *in Has latin American Inequality Changed Direction? Looking over the Long Run, Luis Bértola and Jeffrey Williamson (eds)*, SpringerOpen.

BUGGLE, J. C., AND S. NAFZIGER (2018): "Long-Run Consequences of Labor Coercion: Evidence from Russian Serfdom," *mimeo*.

CAMERON, C. R. (1931): "Colonization of Immigrants in Brazil," *Monthly Labour Review*, 33(4), 36–46.

COLISTETE, R. P. (2017): "Iniciativas Educacionais e Mobilização por Escolas Primárias em São Paulo, 1830-1889," *Department of Economics, FEA/USP Working Paper Series*, 2017-04.

COSTA, W. P. (2005): "O Império do Brasil: Dimensões de um Enigma," *Almanack Braziliense*, 1, 27–43.

DA COSTA, E. V. (2000): *The Brazilian Empire: Myths & Histories*. University of North Carolina Press.

DE CARVALHO, M. S. (2015): "Diamonds Are Forever: Long-Run Effects of Mining Institutions in Brazil," *Department of Economics, FEA-USP Working Paper*, 2015-46.

DE CARVALHO FILHO, I., AND R. P. COLISTETE (2010): "Education Performance: Was It All Determined 100 Years Ago? Evidence from São Paulo, Brazil," *MPRA Paper*, 24494.

DE CARVALHO FILHO, I., AND L. M. MONASTEIRO (2012): "Immigration and the Origins of Regional Inequality: Government-Sponsored European Migration to Southern Brazil before World War I," *Regional Science and Urban Economics*, 42(5), 794–807.

DE PAIVA RIO CAMARGO, A. (2009): "Mensuração Racial en Campo Estatístico nos Censos Brasileiros (1872-1940): Uma Abordagem Convergente," *Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas*, 4(3), 361–385.

DELL, M. (2010): "The Persistent Effects of Peru's Mining Mita," *Econometrica*, 78(6), 1863–1903.

DINCECCO, M., AND G. KATZ (2016): "State Capacity and Long-Run Economic Performance," *Economic Journal*, 126(590), 189–218.

ENGERMAN, S. L., AND K. L. SOKOLOFF (1997): "Factor Endowments, Institutions, and Differential Paths of Growth Among New World Economies: A View from Economic Historians of the United States," *in How Latin America Fell Behind, Stephen Haber (ed)*, Stanford University Press.

———— (2012): *Economic Development in the Americas since 1500: Endowments and Institutions.* Cambridge University Press.

FARFÁN-SANTOS, E. (2015): ""Fraudulent" Identities: The Politics of Defining Quilombo Descendants in Brazil," *Journal of latin American and Caribbean Anthropology*, 20(1), 110–132.

FAUSTO, B. (1999): *A Concise History of Brazil.* Cambridge University Press.

FERNANDES, G. V. (2005): "Tributaçao e Escravidão: O Imposto de Meia Siza sobre Comércio de Escravos na Província de São Paulo (1809-1850)," *Almanack Braziliense*, 2, 102–113.

FLORENTINO, M., AND M. AMANTINO (2012): "Uma Morfologia dos Quilombos na Américas, Séculos XVI-XIXs," *História, Ciências, Saúde – Manguinhos*, 19, 259–297.

FLORY, T. (1979): "Fugitive Slaves and Free Society: The Case of Brazil," *The Journal of Negro History*, 64(2), 116–130.

FOOD AND AGRICULTURE ORGANIZATION (2012): "Agro-Ecological Suitability and Potential Yields," *Global Agro-Ecological Zones (GAEZ) Data Portal*.

FUJIWARA, T., H. LAUDARES, AND F. VALENCIA CACEIDO (2017): "Tordesillas, Slavery and the Origins of Brazilian Inequality," *mimeo*.

FUNARI, P. P. A., AND A. V. DE CARVALHO (2005): "O Patrimônio em uma Pesrspectiva Crítica: O Caso do Quilombo dos Palmares," *Diálogos*, 9(1), 33–48.

FUNARI, P. P. P. (2017): "Inequality, Institutions, and Long-term Development: A Perspective from Brazilian Regions," *in Has latin American Inequality Changed Direction? Looking over the Long Run, Luis Bértola and Jeffrey Williamson (eds)*, SpringerOpen.

GADENNE, L. (2017): "Tax Me, but Spend Wisely? Sources of Public Finance and Government Accountability," *American Economic Journal: Applied Economics*, 9(1), 274–314.

GAGLIARDI, F. (1958): "Localização da Colonização Oficial em São Paulo," Digital Archive of the Museu da Imigração do Estado de São Paulo.

GRAHAM, R. (1990): *Patronage and Politics in Nineteenth-Century Brazil.* Stanford University Press.

———— (2016): "Free Afro-Brazilians in the 19th Century," *in Oxford Research Encyclopedia of Latin American History*, Oxford University Press.

HABER, S. (1997): "Introduction: Economic Growth and Latin American Economic Historiography," *in How Latin America Fell Behind, Stephen Haber (ed)*, Stanford University Press.

HOFFMAN, P. T. (2015): "What Do States Do? Politics and Economic History," *Journal of Economic History*, 75(2), 303–332.

HUGGINS, M. K. (1985): *From Slavery to Vagrancy in Brazil. Crime and Social Control in the Third World.* Rutgers University Press.

IBGE (2011): *Evolução da Divisão Territorial do Brasil 1872-2010*. Ministério do Planejamento, Orçamento e Gestão.

JOHNSON, N. D., AND M. KOYAMA (2017): "States and Economic Growth: Capacity and Constraints," *Explorations in Economic History*, 64(2), 1–20.

KANG, T. H. (2017): "Educação para as Elites, Financiamento e Ensino Primário no Brasil, 1930-1964," *Latin American Research Review*, 52(1), 35–49.

KLEIN, H. S. (1978): *The Middle Passage: Comparative Studies in the Atlantic Slave Trade.* Princeton University Press.

KLEIN, H. S., AND F. V. LUNA (2010): *Slavery in Brazil*. Cambridge University Press.

LEFF, N. H. (1997): "Economic development in Brazil, 1822-1913," *in How Latin America Fell Behind, Stephen Haber (ed)*, Stanford University Press.

MACHADO, M. H. P. T. (2006): "From Slave Rebels to Strikebreakers: The Quilombo of Jabaquara and the Problem of Citizenship in Late-Nineteenth-Century Brazil," *Hispanic American Historical Review*, 86(2).

MARKEVICH, A., AND E. ZHURAVSKAYA (2018): "Economic Effects of the Abolition of Serfdom: Evidence from the Russian Empire," *American Economic Review*, 108(4-5), 1074–1117.

MATTOS, H. (2005-06): "Remanescentes das Comunidades dos Quilombos: Memória do Cativeiro e Políticas de Reparação no Brasil," *Revista USP, São Paulo*, 68, 104–111.

MERRICK, T. W., AND D. H. GRAHAM (1981): *População e Desenvolvimento Econômico no Brasil*. Zahar.

MONASTEIRO, L. M. (2010): "Brazilian Spatial Dynamics in the Long Term (1872-2000): "Path Dependency" or "Reversal of Fortune"?," *Journal of Geographical Systems*, 12, 51–67.

MUSACCHIO, A., A. MARTÍNEZ FRITSCHER, AND M. VIARENGO (2014): "Colonial Institutions, Trade Shocks, and the Diffusion of Elementary Education in Brazil, 1889-1930," *Journal of Economic History*, 74(3), 729–765.

NAFZIGER, S. (2016): "Decentralization, Fiscal Structure, and Local State Capacity in Late-Imperial Russia," *in Economic History of Warfare and State Formation, J. Eloranta, E. Golson, E. Markevich and N. Wolf (eds)*, Studies in Economic History, Springer.

NARITOMI, J., R. R. SOARES, AND J. J. ASSUNÇÃO (2012): "Institutional Development and Colonial Heritage within Brazil," *Journal of Economic History*, 72(2), 393–422.

NORTH, D. C., W. SUMMERHILL, AND B. R. WEINGAST (2000): "Order, Disorder and Economic Change: Latin America vs. North America," *in Governing for Prosperity, Bruce Bueno de Mesquita and Hilton Root (eds)*, Yale University Press.

NUGENT, J. B., AND J. A. ROBINSON (2010): "Are Factor Endowments Fate?," *Revista de Historia Económica, Journal of Iberian and Latin American Economic History*, 28(1), 45–82.

NUNES LEAL, V. (1977): *Coronelismo: The Municipality and Representative Government in Brazil*. Cambridge University Press.

NUNN, N. (2008): "Slavery, Inequality, and Economic Development in the Americas: An Examination of the Engerman-Sokoloff Hypothesis," *in Institutions and Economic Perfomance, Elhanan Helpman (ed)*, Harvard University Press.

———— (2009): "The Importance of History for Economic Development," *Annual Review of Economics*, 1, 65–92.

PROGRAMA BRASIL QUILOMBOLA (2013): *Guia de Políticas Publicas para Comunidades Quilombolas*. Secretaria de Políticas de Promoção da Igualidade Racial.

REIS, E. (2017): "Historical Perspectives on Regional Income Inequality in Brazil, 1872-2000," *in Has latin American Inequality Changed Direction? Looking over the Long Run, Luis Bértola and Jeffrey Williamson (eds)*, SpringerOpen.

ROCHA, R., C. FERRAZ, AND R. R. SOARES (2017): "Human Capital Persistence and Development," *American Economic Journal: Applied Economics*, 9(4), 105–136.

RODRIGUES, L. L., R. J. CRAIG, P. SCHMIDT, AND J. L. SANTOS (2015): "Documenting, Monetising and Taxing Brazilian Slaves in the Eighteenth and Nineteenth Centuries," *Accounting History Review*, 25(1), 43–67.

ROWE, L. S. (1908): "Municipal Progress in Brazil – The Cities of the State of San Paulo," *American Journal of Sociology*, 13(4), 508–512.

SÃO PAULO (1912): *Annuario Estatístico de São Paulo*, vol. 2: Estatistica Economica e Financiera. Departamento Estadual de Estatística.

SANTOS SILVA, J. M. C., AND S. TENREYRO (2006): "The Log of Gravity," *Review of Economics and Statistics*, 88(4), 641–658.

SCHMITT, A., M. C. M. TURATTI, AND M. C. P. DE CARVALHO (2002): "A Atualização do Conceito de Quilombo: Identidade e Território nas Definições Teóricas," *Ambiente & Sociedade*, V(10), 1–6.

SHLEIFER, A., AND R. W. VISHNY (1993): "Corruption," *Quarterly Journal of Economics*, 108(3), 599–617.

SLENES, R. W. (1975): *The Demography and Economics of Brazilian Slavery, 1850-1888*. Stanford University Press.

———— (2010): "Brazil," *in The Oxford Handbook of Slavery in the Americas, Mark M. Smith and Robert L. Paquette (eds)*, Oxford University Press.

SOKOLOFF, K. L., AND E. M. ZOLT (2007): "Inequality and the Evolution of Institutions of Taxation. Evidence from the Economic History of the Americas," *in The Decline of Latin American Economies: Growth, Institutions and Crises, Sebastian Edwards, Gerardo Esquivel and Graciela Marquez (eds)*, University of Chicago Press.

STOLZ, Y., J. BATEN, AND T. BOTELHO (2013): "Growth Effects of Nineteenth-Century Mass Migrations: "Fome Zero" for Brazil?," *European Review of Economic History*, 17(1), 95–121.

SUMMERHILL, W. (2005): "Big Social Savings in a Small Laggard Economy: Railroad-Led Growth in Brazil," *Journal of Economic History*, 65(1), 72–102.

———— (2010): "Colonial Institutions, Slavery, Inequality, and Development: Evidence from São Paulo, Brazil," *MPRA Paper*, 22162.

———— (2015): *Inglorious Revolution: Political Institutions, Sovereign Debt, and Financial Underdevelopment in Imperial Brazil.* Yale University Press.

VOYAGES DATABASE: THE TRANS ATLANTIC SLAVE TRADE DATABASE (2009): "Estimates of the Slave Trade," *www.slavevoyages.org*, Accessed: 23/06/2017.

WITZEL DE SOUZA, B. G. (2016): "Immigration and the Path-Dependence of Education: German-Speaking Immigrants, On-the-Job Skills, and Ethnic Schools in São Paulo, Brazil (1840-1920)," *Ibero-Ameica Institute for Economic Research Discussion Paper*, 234.

WOODARD, J. P. (2005): "Coronelismo in Theory and Practice: Evidence, Analysis and Argument from São Paulo," *Luso-Brazilian Review*, 42(1), 99–117.

A   Variable definition and sources

Throughout the paper, I provide information on the sources of the data. In this Appendix, I provide information on how I deal with the creation of new municipalities after 1872, as well as any additional data issues. Additionally, I describe in detail how the variables used in the estimation are constructed. Unless otherwise stated, all the 1872 data is from that year's census (Brazil, 1876) and refer to Minas Gerais, Rio de Janeiro and São Paulo.

New municipalities: New municipalities were created between 1872 and 1920-23. In order to maximize the number of observations available and minimize measurement error that could arise through aggregation, I identify parishes present in the 1872 census that had become municipalities by 1923 and use their own data instead of the aggregate municipal measures. I also subtract these parishes from the municipality they belonged to in 1872, further increasing the precision of my estimates. All regressions are run based on municipalities existing in 1923.

An alternative to this strategy would be to aggregate municipalities in minimum comparable areas (MCAs) with unchanged borders between the periods of observation. This, however, would entail the loss of a large degree of information, since very heterogeneous units would be averaged out in the same geographical areas. For this reason, I prefer the painstaking manual linking of municipalities over time.

Not all 1923 municipalities existed as parishes in 1872 and can thus be identified in the census. Out of Minas Gerais' 178 municipalities in 1923 I identify 163, for São Paulo's I identify 123 out of 212 and for Rio de Janeiro, data can be retrieved for 48 out of the 49 municipalities existing in 1923. The remaining municipalities are assigned values from their municipality of origin, purged of the parishes which later on became municipalities.

Quilombos: Data on the location and number of officially recognized Quilombola communities in each Brazilian municipality comes from the government agency Fundação Cultural Palmares. According to Brazilian law (article 2 of Decree number 4887, of 20 November 2003) Quilombos or more precisely *comunidades remanescentes de quilombo* (remaining Quilombo communities) are ethnic and racial groups, which, according to criteria of self-attribution, have a distinct historical trajectory, specific relations to the local territory, and the presumption of a black ancestry related to the resistance to oppression suffered in history.[25]

Quilombos are entered in the regressions as a dummy, as the number of communities per municipality, both raw and normalized by the relevant population. I detail how the variable is used throughout the text.

Slave share: is the share of slaves in the population of each municipality. I calculate this for 1872.

Free Population of African descent: is the share of individuals classified as free blacks (pretos) or mulattoes (pardos) as a share of the total free population of each municipality; brancos (whites), and cablocos (people of indigenous origin) are the residula categories. I calculate this for 1872. For a discussion of the issue of racial classification in Brazilian censuses, see de Paiva Rio Camargo (2009).

---

[25]In the original Portoguese: "consideram-se remanescentes das comunidades dos quilombos, para os fins deste Decreto, os grupos étnico-raciais, segundo critrios de auto-atribuição, com trajetória histórica própria, dotados de relações territoriais específicas, com presunção de ancestralidade negra relacionada com a resistência á opressão histórica sofrida."

Location of commodity production: Data on where sugar, gold and coffee were produced in Brazil was kindly provided by Naritomi, Soares, and Assunção (2012). Sugar and gold refer to colonial period production, which, in the case of sugar, continued also post-Independence, whereas gold production became marginal by the end of the 18th century. Coffee production is divided into two separate parts referring to the early expansion of the coffee boom (up until 1886), and its successive expansion (1887-1935). I use both in my analysis depending on the specific needs of the regression and detail this in the text. The authors constructed a variable indicating the influence of the production of each of these commodities on each municipality in Brazil based on the inverse of the distance of their centroid from a municipality producing each commodity, capped at 200km. Municipalities where the commodity was produced receive a value of 1. I use this information to create two separate sets of variables: 1) dummies identifying municipalities where each commodity was actually produced, 2) variables containing the inverse of the distance from these same municipalities, capped at 200km, which interpret as the indirect influence of commodity production. In this way, I actually expand the informational content of the variables used in the original paper, since I distinguish between the effect of actual commodity production and its indirect influence.

Soldiers: This variable serves as a proxy for reach of the coercive power of the state. It is the number of soldiers residing in a municipality normalized by population size in 1872.

Justice workers: This is an alternative proxy for reach of the coercive power of the state. It is the number of judges, attorneys and justice officials residing in a municipality normalized by population size in 1872.

Literacy: measures the share of the population who is reported to be able to read and write. I calculate this for 1872 and 1920. All slaves were classified as illiterate, so for 1872 I calculate this only for the free population. The 1920 source is the census (Brazil, 1920b).

School attendance: is the the share of the eligible population – free children between the ages of 6 and 15 – who attended school. What "attending school" exactly meant at the time and how the classification between those who did and those who did not was drawn is not clear; e.g. how many school days per year did a child need to attend to be classified as having attended school in the census? This might help explain why the findings for this variable are inconclusive. I calculate this for 1872.

Public employment: This variable serves as a proxy for fiscal/state capacity. It is the number of public employees residing in a municipality normalized by population size in 1872.

Population density: is the number of people living within a municipality normalized by the surface area of that same municipality. I calculate this for 1872 and 1920 dividing the population size obtained from the 1872 census and IBGE (2011) by the area in square kilometers calculated based on the maps provided by IBGE (2011).

Public revenue and expenditure: refer to the public revenue and expenditure of the municipalities of Minas Gerias, Rio de Janeiro and São Paulo normalized by the size of the population for the respective years. I collect these variables for 1908-1912 from the 1908-12 Brazilian statistical yearbook (Brazil, 1908-1912). For 1923, the public finance data is from (Brazil, 1926), while the population data is from IBGE (2011).

Composition of revenue and expenditure: I collect this information for São Paulo in 1912 from the state's statistical yearbook from the same year (São Paulo, 1912). The data are more detailed than in the Brazil-wide yearbook, and thus provide a more complete picture of the municipalities' public finances. Revenue is classified as follows. Ordinary revenue: any remaining positive balance from the previous exercise, tax on industries and professions, property tax, transportation taxes, tax on coffee trees, taxes on water, sewer taxes, income of the cemetery, income of the slaughterhouse, income from the market, income from public lighting, recovery of active claims. Extraordinary revenue: deposits and cautions, state subsidy, loans obtained in the fiscal year. The components of expenditure are as follows. Ordinary expenditure: public works, street cleaning, public lighting, public health, market, cemetery, slaughterhouse, public water, public sewers, public education, wages and subsidies of municipal workers, office and publication expenses of the municipality, judicial expenses, extraordinary expenses, other expenses. Extraordinary expenditure: refunds and returned deposits.

Using these data, I construct my additional outcome variable: public service expenditure per capita. This is simply the expenditure on items clearly identifiable as public goods or other public services normalized by population. These services are: public works, street cleaning, public lighting, public health, market, cemetery, slaughterhouse, public water, public sewers, public education.

Wages: are the wages of carpenters collected in the 1920 census Brazil (1920a). The census reports the wages of a number of different professions, but carpenters' wages are the most widely reported. The census provides information on standard wages and wages when food and board are included, which are lower. I employ standard wages because the value and food and board would otherwise not be included in the remuneration measures and wages would offer only a partial picture.

Location of settler colonies: information on this comes from a map held at the Digital Archive of the Immigration Museum of São Paulo state (Gagliardi, 1958).

Foreign share: is the share of free citizens living in a municipality born outside of Brazil. This excludes free Africans, who are, most likely, freed slaves and thus not voluntary immigrants. I calculate this for 1872.

Imported slaves: is the share of slaves in the population of a municipality born in a Brazilian province other than the one where the municipality is located. I calculate this for 1872.

Industrialists and capitalists: I construct the two variables as the share of citizens in the total population categorized as such in the census. I calculate this for 1872.

Agricultural Share: is simply a measure of the share of citizens of a municipality working in the agricultural sector. This includes animal husbandry. I calculate this for 1872.

Racial fractionalization: the 1872 census divided the Brazilian population into four self-reported categories: brancos (whites), pardos (mulattoes), pretos (blacks) and cablocos (people of indigenous origin). I calculate the degree of fractionalization in each municipality using the the index proposed by Alesina, Baqir, and Easterly (1999). The index's formula is:

$$RacialFrac = 1 - \sum_{i=1}^{4} Race_i^2$$

where *Race* corresponds to share of the population belonging to each of the four self-reported categories outlined.

Geographical controls: Distance from the equator comes from Naritomi, Soares, and Assunção (2012). I construct the other variables – distance from the closest port, altitude, ruggedness and surface area – based on municipal borders in 1920 as per the maps provided by the Instituto Brasileiro de Geografia e Estatística (IBGE, 2011). All variables are municipal averages. Distance from the port – Rio de Janeiro or Santos – whichever is closer – is measured from to the centroid of each municipality and is an as the crow flies distance, taking into account the earth's curvature. The raw altitude data in 1km by 1km cells is from WorldClim (www.corldclim.org). I use this to calculate both average altitude of each municipality and its ruggedness.

Land suitability: I also construct these variables based on municipal borders in 1920 and as per the maps provided by the Instituto Brasileiro de Geografia e Estatística (IBGE, 2011). Again, these variables are municipal averages. the raw data is from the Food and Agriculture Organization (2012) and is based on monthly statistics of climatic variables and precipitation for the period 1960-90, collected in 10-30 arc minutes cells. It refers to the cultivation of sugar cane, coffee and cotton, Brazil's three main cash crops in the period I study. In all regressions, I also control for the suitability of land for cereal production, which provides information on general land suitability for non cash-crop production.

Although the FAO land suitability data is constructed using data from the 1960s until the 1990s, it is also extremely useful and widely used in historical studies. To get as close as possible to conditions faced by planters in the 19th and early 20th century, I use suitability data based on the absence of irrigation and the lowest possible level of inputs by planters. The low input scenario is essentially one of subsistence agriculture, with labor intensive techniques, no use of chemicals and minimal conservation measures. These assumptions are conservative given that the production of cash crops was well beyond subsistence and that, in the second half of the 19th century, mechanization of some processes had started to take place.

The data squares nicely with historical accounts of crops cultivation. The Paraíba valley, located across the border between the two states, stands out as a relatively suitable area for coffee production. Indeed, it was the first large-scale coffee production centre in the country. The north and west of São Paulo and the south of Minas Gerais also emerge as very suitable for coffee production and, in fact, these areas witnessed a huge expansion in coffee production in the late 19th and early 20th century. Regarding sugar cane, the east of Rio De Janeiro emerges as a particularly suitable area for its production, as it was indeed historically. The west and north of São Paulo also appear to be suitable for this cultivation, as well as for cotton. However, the late exploitation of the province's backlands means that São Paulo was never a big player in the production of these two commodities, although sugar was the province's main export before the arrival of coffee.