Land Grants in Colonial Brazil: Long-Term Effects on Inequality and Development*

Vinicius Okada da Silva†

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Abstract

The economics literature has argued that inequality can positively or negatively impact long-term economic development. Brazil is a prime case study due to its colonial history of land inequality. This paper examines the long-term effects of colonial land grants on current agricultural land distribution and development across Brazilian municipalities. Using a novel dataset that I collected of 3,577 grants from Brazil's Northeast and Southeast regions, along with historical and modern census data, I find that these grants are associated with increased land concentration—showing a 2-8% increase in large farm holdings in 1920 and 1995. Municipalities with land grants exhibit higher modern GDP per capita and HDI but also greater income inequality, more land conflicts, and less land utilization. The research highlights the complex relationship between inequality and development in Brazil, which was shaped by its colonial institutions.

Keywords: Colonialism, Brazil, Land Grants, Land Inequality, Long-Run Development
JEL Classification: N5, N36, Q15, O13, O43

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†Contact information: University of Illinois at Urbana-Champaign. Department of Economics, 1407 W. Gregory Drive, David Kinley Hall: Room 126, Urbana, Illinois 61801. E-mail: vo10@illinois.edu

1. Introduction

> "The [system of colonial grants distribution] is the base to all of [Brazil's] land evolution"
> - The Sesmarial System in Brazil, Costa Porto (1979, p. 25)

A significant debate persists about whether land inequality can drive or hinder long-term economic growth, but the issue remains unresolved. [1] Brazil provides an ideal case study due to its significant and persistent land concentration, making it a prime candidate for studying the long-term impacts of land inequality. For example, in 2016, 1% of the population owned 45% of all the land (USAID, 2016).[2] High levels of land concentration have been argued to lead to lower rural wages, keeping rural workers away from the consumer markets, which leads to underdevelopment (Oliveira Andrade, 1980, p. 1). Further, since Brazil was a primarily rural country until the 1960s, land inequality is strongly associated with income inequality, as access to farmland was one of the primary forms of wealth accumulation. However, land inequality has existed in Brazil ever since its colonization, as the Portuguese Crown distributed land in large estates, called *sesmarias*, that were at best marginally cultivated (Mueller, 1995, p. 53).[3]

The *sesmarias*, land grants distributed in colonial Brazil by Portugal from 1550 to 1822, played a crucial role in shaping the country's land distribution and economic development. Portugal distributed these grants to encourage Brazil's settlement and early development, resulting in large grants extending to over 10,000 hectares. Throughout most of the colonial period, they were the primary means of gaining access to land. However, the grants were not accessible to everyone, often favoring those with the necessary financial means or political connections.

In this paper, I study the long-term effects of colonial land grants on land inequality and economic development. I collect and georeference a new dataset detailing the locations of 3,577 grants across seven coastal states, which were the initial areas of colonization. I then

[1] For example, some papers argue that inequality is a hindrance (Alesina and Rodrik, 1994; Banerjee and Iyer, 2005; Banerjee and Newman, 1993; Easterly, 2007; Galor et al., 2009; Galor and Zeira, 1993; Goñi, 2022; Lasheras and Pellegrino, 2024; Persson and Tabellini, 1994), or a driver (Banerjee and Duflo, 2003; Barro, 2000; Forbes, 2000) for long-term development.

[2] The elevated Gini coefficients of land inequality and the total land used for agriculture in the Northeast and Southeast have not changed much between 1960-1985 (Alston et al., 2010). Further, among developing countries, Brazil has one of the highest levels of land inequality measured by the land Gini, with a land Gini of 0.85 in 1971-1980. In contrast, Colombia had a land Gini of 0.77 in 1980-1991; Nigeria had a land Gini of 0.37 in 1973; India 0.59 in 1971-1980; and China 0.43 in 1995 (Griffin et al., 2002). In the 2017 Agricultural Census, the estimated land Gini in Brazil was 0.867, the highest as measured by the agricultural censuses. Other estimates by Imaflora in 2020 indicate that the land Gini is 0.73 (Imaflora, 2020).

[3] Throughout the paper, I will use land grants, grants, and *sesmarias* interchangeably.

combine this dataset with historical censuses and present-day administrative data to estimate the long-term effects of the grants. I use matching and an instrumental variable to estimate the associations and causal effects of colonial land grants on modern land concentration and long-term development. Both the matching and the instrumental variable estimates show that the presence of a land grant increases agricultural land concentration by reducing the share of smaller and medium-sized farms while increasing the share of large-sized farms. However, the areas that received a grant are also more developed, with higher GDP per capita and Human Development Index scores. Similarly, I find a strong association with income inequality, driven by the top quintile of the income distribution.

I begin by conducting a descriptive analysis of the distribution of grants and their geographical expansion process. Earlier grants (pre-1700) were primarily located along the coast and in areas suitable for sugarcane production. Later land grants (post-1700) in Brazil were typically located further inland, near rivers, as the country expanded westward. These areas were less conducive to sugarcane plantations. Geographically, the grants were often grouped near the state capitals. Over time, the number of grants distributed increased during the 18^{th} century and the beginning of the 19^{th} century.

To estimate the long-term effects of the grants, I first use a matching procedure to create a sample of municipalities that did not receive a grant but are similar in observable characteristics to those that did. I choose a set of variables that were likely important to the first settlers in each region, such as geographical characteristics, soil suitability, and geographical proximity. The matching process generates a set of control municipalities that are balanced based on observable traits compared to those that received a grant, ensuring that the control municipalities were as attractive to settlers as those that received a land grant. The results show a strong association between the existence of a historical land grant and a shift in land concentration towards larger farms per municipality in 1920 and 1995. In 1920, the estimates indicate that compared to municipalities that did not receive a land grant, the total agricultural land in farms below 200 hectares (small farms) decreased by 1.3%. By 1995, the proportion of total farmland in farms below 200 hectares had decreased by 4.8%. In contrast, the proportion of agricultural land in large farms (above 2000ha) increases by 8.1% and 1.5%, respectively, in 1920 and 1995. This shift in distribution indicates that the grants led to increased land concentration, a trend that persisted from 1920 to 1995.

To further address the geographical selection of the grants, I use an instrumental variable that exploits the colonization process in Southeastern Brazil. I use Brazilian explorer routes, called the *Bandeira Paulistas*, as an exogenous determinant of the grant locations. The *Bandeira Paulistas* were a cycle of exploration that radiated from the city of São Paulo during the mid-17^{th} and 18^{th} centuries and opened up large portions of Central and Southwestern

Brazil. The explorers, known as *bandeirantes*, initially focused on searching for Indigenous slaves and minerals rather than seeking suitable land for farming. Once the area had been explored and cleared of possible threats, other settlers would claim the land by requesting land grants. Considering the role of these explorers in expanding Brazil's territory to the west and the fact that their main economic motive was not the search for land, I argue that their exploration paths are a plausible exogenous factor influencing the locations of land grants in the Southeast. In line with the matching results, I observe similar distributional effects in the Southeast. Point estimates show that in 1995, there is a 25% decrease in small farms' total farmland share relative to municipalities that did not receive a grant, indicating increased land concentration.

Given the findings on land inequality, I examine whether land grants are linked to income inequality and long-term development. Previous research has produced mixed results regarding the impact of inequality on long-term development. Some researchers argue that inequality can promote long-term economic development (Banerjee and Duflo, 2003; Barro, 2000; Boberg-Fazlić et al., 2022; Forbes, 2000). On the other hand, another group of scholars contends that inequality has adverse long-term effects on development (Alesina and Rodrik, 1994; Banerjee and Iyer, 2005; Galor et al., 2009; Kuznets, 1955; Persson and Tabellini, 1994). In the context of colonial Brazil, while land grants may have contributed to higher income inequality, they were also instrumental in driving the initial economic growth of a region and providing land rights. I find that municipalities with land grants tend to be more developed, with higher per capita incomes, lower poverty rates, and a higher Human Development Index (HDI). However, this development comes with increased income inequality. While households in every income group have higher incomes, the top quintile of earners benefit the most, earning an average of 10% more than the control mean; in comparison, the bottom quintile earns only 3% more.

I then investigate whether the increased concentration of land has other potential negative effects, specifically regarding the underutilization of land and land-related conflicts. In theory, land inequality is not a problem if consolidating land into larger farms leads to greater efficiency. As observed in some African countries and India, land distributed in smaller plots can result in economic inefficiencies. However, prior research has shown that in Brazil, the opposite is true: high land concentration is linked to lower productivity and increased underutilization of land (Benjamin, 1995; Benjamin, 1992; Berry and Cline, 1979; Carter, 1984; USAID, 2016; World Bank, 2004). I examine the relationship between the size of agricultural landholdings in Brazil and their land usage. I find that the effects of land underutilization are driven by medium-sized farms, despite the fact that land concentration is caused by large farms. Conversely, the effects are minimal or negative for small and large

farms. Closely related to land concentration and lower land usage are present-day land conflicts.[4] In Brazil, most land-related conflicts occur between large landowners and small families, who often settle on unused land. I find that the presence of a grant is associated with an increase of 4.3% in land-related conflicts between 2015 and 2022.

Additionally, I test whether the grants are associated with demographic differences, mainly due to the heavy reliance on slavery in colonial Brazil's agriculture. Previous research has documented the enduring negative effects of slavery as an institution (Acemoglu et al., 2012; Dell, 2010; Papadia, 2019). However, using the 1872 Census, I do not find any association between the presence of a grant and an increase in slavery.

I also investigate whether the land grants have differing effects on land concentration and long-term development between Brazil's Northeast and Southeast regions. Historically, the Northeast was the first region settled in Brazil, and the local economy was heavily centered on sugarcane production. The Southeast was only settled later with a broader economic base. The results indicate that land grants are associated with increased land concentration and land inequality in both regions. However, the effects are stronger in the Northeast while present but much smaller in the Southeast. These results indicate that the grants had not only a regional impact but were also pervasive in both regions.

The main contribution of this paper is the collection of novel historical data. This paper provides a novel georeferenced dataset of colonial land grants in Brazil for seven states in the Northeast and Southeast.[5] Through archival work and collaboration with Brazilian researchers, 3,577 land grants were successfully georeferenced, providing a novel dataset that allows future researchers to study and understand Brazil's colonization patterns and land distribution. Further, the states analyzed in this paper are also historically where colonization began, making the study of their colonial past especially relevant.[6]

This paper contributes to understanding of colonial institutions and their long-term effects on development (Acemoglu et al., 2005; Bruhn and Gallego, 2012; Engerman and Sokoloff, 2002; Eslava and Valencia Caicedo, 2023; Nunn, 2020). Previous studies in Latin America have studied the institutions of the *mita*, *haciendas*, and *concertaje* in Spanish America, such as Dell (2010), Faguet et al. (2022) and Rivadeneira (2024). While the *sesmarias* are similar to the *haciendas*, the size of the *sesmarias* and the fact that they were often freely distributed to wealthy people in colonial Brazil gives a different perspective on how they could affect long-term development. This paper adds to the literature by studying a key institution that prevailed in Brazil for over 200 years, the *sesmarias*.

[4]Research such as Alesina and Perotti (1996) argues that inequality can drive instability and conflicts.

[5]The list of states is: Alagoas, Paraiba, Pernambuco, Rio Grande do Norte, Bahia, Minas Gerais, and São Paulo.

[6]Current work is being done to collect and georeference the data for the rest of Brazil.

Moreover, no empirical papers study the direct causes of colonial land distribution in Brazil. Previous literature has found negative long-term effects of colonial land usage in Africa and South America (Dye and La Croix, 2020; Lowes and Montero, 2021; Montero, 2022; Sellars and Alix-Garcia, 2018). However, there exists evidence that not all colonial land regimes led to negative effects and instead led to economic development, with examples in India and Indonesia (Banerjee and Iyer, 2005; Caum-Julio, 2023; Dell and Olken, 2020; Ratnoo, 2023). Other studies have analyzed the effect of the Land Grant Act of 1850 in the United States (Akee and Jorgensen, 2014; Allen, 2019), and the 1862 Homestead Act (Mattheis and Raz, 2021; Smith, 2023). By studying Brazil, one of the countries with the highest levels of land inequality in the world, I conduct the first empirical study analyzing the historical roots of land inequality in the country.

This paper also contributes to the understanding of Brazil's historical economic development by explaining the diverging paths in development in each region. Ehrl and Monasterio (2019) study the persistence of occupations from 1872 to the present. Related literature has also analyzed the effect of the Spanish-Portuguese borders and the role of sugarcane and gold mining in Brazil (Laudares and Caicedo, 2023; Naritomi et al., 2012). Part of the literature has studied the role of pre-colonial institutions and their influence on long-term development in Latin and North America (Angeles and Elizalde, 2017; Feir et al., 2023; Maloney and Valencia Caicedo, 2016). The work by Wigton-Jones (2020) is closely related to my paper. The author finds large negative effects of land inequality in 1920 on present-day measures of development. My paper finds that while the land grants did lead to long-term effects on both land and income inequality, the grants are associated with more modern-day development. This paper adds to the literature by focusing on a specific Portuguese institution, the *sesmarias*, to study how it affects present-day Brazil.

The paper is divided as follows. In Section 2, I briefly describe the history of land in Brazil, from its colonial times to the present-day system. In Section 3, I describe the land grant dataset, its collection, and the other datasets used. In Section 4, I quickly describe the evidence of the geographical selection of the land grants in Brazil, discuss the main concerns in studying the long-term effect of land grants in Brazil, and the main identification methods used in the paper.[7] In Section 5, I show the results on land inequality for both main approaches. Section 6 discusses other channels through the land grants that also affect present-day development. In Section 7, I use colonial policies to estimate some possible mechanisms for persistence. I discuss robustness checks in Section 8. Lastly, Section 9

[7]In Subsection 4.3.1, I show both OLS and matching estimates of the long-term effects. In Subsection 4.3.2 I discuss the instrumental variable and its results. In Subsection 7.1, Subsection 7.2, and Subsection 7.3, I exploit three sources of variation - based on institutional knowledge of colonial policies - to study the differential effect of the grants.

concludes the paper.

2. Historical Background

In this section, I describe the historical setting on Brazil's colonization and the role of the grants in moving people from Portugal to Brazil. I also describe the process needed for petitioners to get a grant, alongside the conditions that the Portuguese government required. Lastly, I also show both contemporaneous sources alongside historical evidence on the long-lasting effects of the grants in Brazil.

2.1. History of Land Grants in Portugal and Brazil

Portuguese presence in Brazil began in 1500, and shortly afterward when the colonization process began. Early on, to deal with the costs of managing an overseas empire, the Portuguese Crown split the country into fifteen tracts of land called *capitanias*, each given to a set of powerful individuals from Portugal. However, one of the key aspects of this division was that each captain was supposed to distribute the land as grants in order to settle colonial Brazil. When Portugal abolished the system of the *capitanias*, it kept the distribution of the land grants.[8]

The Portuguese government tried to implement a similar system of land distribution in Brazil, which they had successfully implemented in the Azores and Portugal. According to Smith (1944), the only way Portugal knew how to distribute the lands in Brazil was through the large *sesmaria*. However, while the legislation for granting the land was the same, two main issues differentiated how it was applied in Portugal and Brazil. Portugal, as a smaller state, the *sesmaria* led to small properties. Meanwhile, in Brazil, by the need of colonization and the large area of the country, the implementation of grant distribution led to the creation of larger estates than the ones seen in Portugal (Costa Porto, 1979, p. 58-59; Diffie, 1987, p. 28; Panini, 1990, p. 23-24).

While technically anyone could apply for a land grant, the requirement to develop the land often led people with sufficient wealth to apply. In practice, that led to the applications being done only by a select few who had either the money or political connections (Diffie, 1987, p. 434; Bradford Burns, 1993, p. 80). In the letter descriptions, the applicants would boast about their wealth and connections to get a grant (Lima, 1954, p. 36). Those applicants

[8]Some municipalities were directly created and first settled because of the land grants. For example, the municipality of Taipu in the state of Rio Grande do Norte is described as being "first settled because of a land grant in 1608". More information is available (in Portuguese) at https://www.taipu.rn.leg.br/a-cidade/.

that had the financial means to get a land grant would often get large estates, "customarily one to three leagues in extent (16.7 to 50.1 square miles)" (Dean, 1971).[9]

Given that the grants were distributed to only a few people with sufficient capital, it would generate the first division of wealth in Brazil's colonial society. Lima (1954, p. 36) indicates how people who got grants would become the "future sugar engine owners and farmers that would create the economic aristocracy of the colonial society".[10] Further, those who did not have the means to get a land grant would often be marginalized in colonial society (Simonsen, 2005). Some contemporary evidence from the French botanist Augustin Saint-Hilaire describes how "the poor that couldn't have titles, establish themselves in the land that they don't know if it is owned; they plant, build small houses, raise chickens, and when the least expected, a rich man appears with a title, expels them and enjoys the fruits of their labor" (Costa Porto, 1979, p. 143).[11] The presence of the grants land led to land concentration through the consolidation of land in the hands of owners that successfully developed their land (Manchester, 1931).

2.2. End of the Land Grants, the 1850 Land Act, and Long Term Effects

On the brink of Brazil's independence in 1822, land concentration in Brazil was high due to the land grants throughout its colonial period (Smith, 1972). Contemporaries describe that a key issue of the *sesmaria* system was that a lot of the land had already been given, which led to a lot of poor families who were not able to claim land (Lima, 1954, p. 42-43). As a push against the grants and the issues they were causing, in 1822, the Emperor of Brazil banned the system of grant distributions in Brazil.[12] What followed were 28 years of confusion, during which time there was no legal way to obtain land. As a result, squatting became a common practice during this time.

To solve this issue, the Brazilian government passed the Land Law in 1850, officially establishing rules for how land would be distributed in Brazil from then on. Land squatting would be limited but allowed to become private property if it was being developed. Also, all former land grants would need to be revalidated with evidence that the land was being used appropriately. However, the enforcement of the Land Law did not happen, and it had

[9] Approximately 4,300 to 13,000ha.

[10] Additionally, Lima (1954, p. 47) states that the "The *sesmaria* is the large estate, inaccessible to the farmer without resources."

[11] More evidence from the issues of squatting is further described in the letter by two grantees in 1702, who requested land alongside a river but claims people were living there without a *sesmaria* grant (Costa Porto, 1979, p. 142). In the interior of the Northeast, when the land was full of squatters or bandits, they would often grant them away (Poppino, 1968, p. 88).

[12] Surprisingly, in the dataset, I still observe grants being given post-1822, possibly indicating that the law was not immediately binding.

the opposite consequences. Instead, large landowners started to squat land and claim it as part of their own.

While the distribution of land through colonial grants officially ended in 1822, many historians have discussed the impact of these grants on Brazil's current land inequality issues. Andrade (1980, p. 18) describes the actual system of land ownership in Brazil as "continuation of the colonial system, with the *sesmaria* becoming the [large private estates]". Further, the low to zero cost of getting a land grant also led to low incentives for the landlords to improve it (Mueller, 1995, p. 42).[13]

Cruz and Ghidorsi (2023) argues that the lack of a strict law on the grant distribution, alongside the lack of boundaries and enforcements that combined with the 1850 Land Act, allowed the concentration of land by the elites and dissuaded smallholders from obtaining land legally in Brazil.[14] Baer (2014, p. 16) describes largely negative effects of the sugar economy, especially in the Northeast, which led to the region's concentration of wealth and economic backwardness.

3. Data

To study the long-term effects of the grants in modern Brazil, I use a combination of a novel dataset on the location of the grants alongside historical and present-day censuses.

3.1. Land Grant Dataset

The main dataset used in this paper is a novel dataset on the location of the colonial land grants in Brazil. As described in Section 2, the petitioners submitted a letter to the state government detailing their qualifications and information on the grant's location. Given the nature of the grant application and the requirement that a letter be sent to the governor and approved, many of the letters were stored in state archives throughout Brazil. The letters, or

[13] Oliveira Andrade (1980, p. 34-35) argues that "one of the causes that most aggravate [the considerable increase in population, without a corresponding increase in possibilities for employment, is much more a swelling than an orderly growth] is the land tenure system, dominant since colonization. It tends to contribute to the concentration of property and the lack of guarantees, of written and respected contracts, that would give greater stability to the sharecroppers in the Agreste and the sertão and to the agricultural workers in the Zona da Mata."

[14] A report to the Minister of Agriculture in 1873 already stated complaints about the issues of land inequality. The report states, "The majority of the land in our province is divided into great properties, remains of the ancient *sesmaria*, of which few have been subdivided. The proprietor or the renter occupies a part of them and abandons, for a small payment, the right to live on and cultivate the other portions to one hundred, two hundred and sometimes to four hundred families of free mulattoes or blacks, of whom he becomes the protector but from whom he demands complete obedience and over whom he exercises the most complete despotism" (Smith, 1972, p. 325).

transcribed versions of them, kept by state archives, are the primary source of information available on the location of the land grants.

The grant letters used in this project were obtained through my own work and a collaboration with the "Sesmarias of the Luso-Brazilian Empire Database".[15] Overall, the information on the grants was preserved in three main ways: original manuscripts, transcribed manuscripts, and tabulated formats.[16] For the states of São Paulo and Minas Gerais, I use archival data published by each state's public archive to get access to either the letters themselves or the inventory summaries.[17] For the states in the Northeast, I collaborated with the *Sesmarias of the Luso-Brazilian Empire Database* to get access to digitized information on the grants.[18] The Database uses archival data from state records, original manuscripts, and other historical data sources to obtain textual information on the historical concession of land grants in Brazil.[19]

The land grants are then georeferenced based on the geographical information present in the text, allowing me to trace them approximately to a geographical point measured as a latitude and longitude coordinate, or at least within a certain municipality boundary.[20] For this paper, I consider the land grants in the states of Paraiba, Rio Grande do Norte, Pernambuco, Alagoas, Bahia, São Paulo, and Minas Gerais. These states, located alongside the Northeast and the Southeast, are the most suitable places to study the long-term effect of the land grants in colonial Brazil. Given their proximity to the coast, all of them were settled early and consequently received earlier grants, unlike other states in the Center-West and the South. Additionally, those states were historically more dependent on agriculture during their colonial time, unlike the states in the North.[21]

3.2. Outcome Data

I combine two agricultural censuses to estimate the medium-term and long-term effects of land grants on land concentration. First, I use the 1920 Agricultural Census, taken less than

[15] Information on the content of the letters is available at http://plataformasilb.cchla.ufrn.br/. I, alongside some RAs, was responsible for georeferencing the grants, which is in collaboration with the Database but as an entirely separate project.

[16] More information on the sources used for this project is available in Appendix B.

[17] An example of a transcribed manuscript published by the state of São Paulo is available at Figure A.2. An example of the grants being described by name and location, as it is in the case of Minas Gerais, is available in Figure A.3

[18] The *Sesmarias of the Luso-Brazilian Empire Database* is currently digitizing and inputting information of other states into their website.

[19] An example of an original manuscript can be found in Figure A.4.

[20] A more in-depth description of how the sources of the letters and how the land grants were georeferenced is available in Appendix C

[21] For example, the states in the Amazonian region of Brazil (mainly the current states of Para and Amazonas) relied on the export of spices and later on rubber production (Assis Costa, 2018).

a century after officially abolishing the *sesmaria* distribution.[22] I also use the 1995 Brazilian Agricultural Census to study the long-term effects of the grants on land inequality.[23] Both censuses provide information at the municipality level on the distribution of agricultural holdings' sizes which can be used to estimate the land gini and the share of farmland in small, medium-sized, and large farms, defined as 1-200ha, 200-2000ha, and above 2000ha, respectively.[24] For 1995 only, I have information on land usage and tenure types.

I use several rounds of Brazilian censuses to study the effects on development. First, I use the 1872 Brazilian Imperial census, which occurred only 50 years after the formal ban on land grants in Brazil, to study the medium-term effects of the grants. Census data for 1872 is obtained from the Nucleus of Research in Economic and Geographic History from the Federal University of Minas Gerais.[25] The 1872 Imperial Census contains demographic data at the municipality and parish level and was the last census taken before slavery was abolished in Brazil.[26, 27] In addition, I use modern censuses to study the persistence of these effects. Censuses from 1970-2010 are obtained from the Brazilian Institute of Geography and Statistics (IBGE).[28] Information on poverty rates, HDIs, and income per capita for 2010 are also obtained from IPEA.[29] To study the effects on land conflict in Brazil, I obtain data from yearly reports from the Pastoral Commission of Land (CPT) from the years 2014-2022.[30,31]

3.3. Geographical Boundaries and Controls

I obtain geographical characteristics and shapefiles at the municipality level from various sources. Shapefiles for the coast of Brazil, municipality seats, and municipality boundaries from 1872-2010 are obtained from IBGE through Pereira and Goncalves (2023). Informa-

[22] The 1920 census is not publicly available, I would like to thank Felipe Valencia Caicedo for sharing it.

[23] Can be accessed at https://sidra.ibge.gov.br/pesquisa/censo-agropecuario/censo-agropecuario-1995-1996

[24] These cutoffs are chosen because they allow me to aggregate these groups into similar categories in both 1920 and 1995.

[25] Available at http://www.nphed.cedeplar.ufmg.br/

[26] It is important to note that the 1872 census does not measure land distribution nor agricultural output.

[27] During the 1872 census, the lowest geographical unit at which the census was taken was at the parish level, and each municipality included at least one parish. As a result, additional work was done to create a novel database at the parish's finer geographical level for the 1872 census. In total, after georeferencing the parishes, the sample size increases from 469 municipalities to 1,115 parishes, which allows for better precision in the estimates. Distribution of the 1872 parishes alongside the municipality boundaries is available at Figure A.11.

[28] Microcensus is available through the IBGE, but the data is downloaded through the R package *censobr* Pereira and Barbosa (2023)

[29] Available at http://www.ipeadata.gov.br/Default.aspx

[30] Annual reports from 2014-2022 are available to download at https://www.cptnacional.org.br/downlods/category/4-areas-em-conflito.

[31] Geographical distribution of the conflicts on the selected states is Figure A.7. The conflicts are georeferenced to a municipality based on the 2010 boundaries in Brazil.

tion on the slope comes from the European Environment Agency,[32] and elevation comes from Amatulli et al. (2018). Data on the maximum calories based on pre-Columbian and post-Columbian crops are obtained from Galor and Özak (2016). Potential sugarcane production is obtained from the FAO-GAEZv4 dataset.[33] Soil types in Brazil are obtained from EMBRAPA (Brazilian Agricultural Research Corporation).[34] The shapefile for the major rivers in Brazil were also obtained from IBGE.[35]

4. Concerns over Selection and Identification

4.1. Historical Selection of the Land Grants Location

I show the time and geographical variation of the grants in two ways. First, in Figure A.1, I show a histogram of the number of grants distributed by decade. Overall, there are only a few grants in the dataset that were granted pre-1700; however, after 1700, there is a quick increase in the number of grants being distibuted.[36] Second, I show the geographical distribution of the land grants across the states from which I gathered information Figure 1.[37,38] The grants were geographically concentrated on the coast in both the Southeast and the Northeast. Grants were also often centered around the capitals of each state and did not go further into the interior until the 1700s.

Using the 1995 census municipality boundaries to select states, I conduct a balance test on a set of geographical observables to see whether municipalities that received a land grant differed from those that did not. Table 1 shows strong evidence of the non-random location of the grants. Overall, municipalities that received a land grant were located near a coast, have

[32] Available at https://www.eea.europa.eu/data-and-maps/data/world-digital-elevation-model-etopo5

[33] Can be accessed at https://gaez.fao.org/pages/data-viewer.

[34] Available at https://www.embrapa.br/busca-de-solucoes-tecnologicas/-/produto-servico/2236/banco-de-dados-de-solos---bd-solos

[35] https://metadados.snirh.gov.br/geonetwork/srv/api/records/a01764d3-4742-4f7d-b867-01bf544dde6d

[36] It is important to note that while the grants effectively began being distributed by 1522, in my available data the earliest grant I have access to is during the 1590s. Therefore, it is likely that I am missing the very early grants. However, as discussed in Subsection 4.2, I assume the dataset is geographically representative of the actual distribution. In this case, it would imply that if I do not have the very early grants, at least the municipality that would have an early grant does have another one in the future, so it is considered "treated" in my analysis.

[37] Due to data limitations, I do not have information on the grants in the states of Rio de Janeiro, Espirito Santo, and Sergipe which are the three other coastal states without grants. Therefore, they are not considered in this version of this paper.

[38] Some of the grants located in other states either occurred because, at one point, the states were a single one (e.g., São Paulo and Parana), or due to mix-ups on where the letters themselves were stored. As a result, while I have *some* information on grants in other states, since I do not have the full sample, they are not included in my analysis.

a lower average slope, are located in places with less elevation, and have a lower potential for sugarcane relative to municipalities that did not have a land grant. I further break down the grants into earlier vs. later, considering 1700 as the cutoff. In Table A.1, I show that pre-1700 grants were more likely to be closer to the coast than municipalities that never got a grant or those that received a grant post-1700. This follows Brazil's historical settlement pattern, as colonization began along the coast and was later expanded to the West.

4.2. Challenges to Identification

As described in Subsection 4.1, the land grants were mainly located close to the coast, and often clustered near the capital of each state - both indicating the selection into geographical characteristics of the grant. The main concern on any causal interpretation of the results comes from this issue of endogeneity on the location grants. I discuss it below how I address it alongside two other potential data concerns:

1. The main concern is the endogenous location of the land grants. Given that the people requesting the grant could request its location, it is likely that they would want to select the best location possible. For example, historically, it is known that sugarcane plantations, and therefore the grants, were located in areas suitable for it.[39] To partially address this concern, all regressions include a large set of geographical controls that act as proxies to what colonial settlers would likely have looked for when requesting a grant. Further, the matching estimates use the same geographical variables to estimate the control group. I also address the endogeneity concerns with the proposed instrument in Subsection 4.3.2.

2. The second concern is the selection of the sample that reflects the actual distribution of the land grants. Given the sources used in this paper, for the states chosen, I was able to successfully georeference 80-85% of the total land grants found in the archives. Many of the missing ones either lack sufficient geographical information or the letter is mostly illegible, with only fragments left. This would be a major concern if those missing letters correlate with unobservables, preventing me from assigning the correct treatment definition for them. While I cannot fully address the potential for missing data or the possibility that it is non-random, I assume that the *current land grant dataset is at least a representative sample of their original geographical distribution.*

3. The third concern is how precise the georeferencing of the land grants was. In some cases, the letters give precise information on the location of the grants, which allows

[39] Farmers would often look for high-quality soil, known as *terra roxa*, to decide whether the soil was of quality for sugarcane (Schwartz, 1985).

precise georeferencing of the grants. However, in some situations, the grants could not have been precisely georeferenced due to the broad definition of the geographical characteristics in the letter. That is a possible concern since the definition of $Treat_m$ could be wrongly assigned per municipality. In those cases, the grants are approximated to the level of the closest municipality. This is done since the definition of the treatment in the specifications is done at the municipality level.

Additionally, any estimates in the following specifications are likely not the full causal estimates of the grants themselves. Given the large period between the grant distribution and the observations in the datasets used, other historical events could have caused the effects. Therefore, any interpretation of the coefficients should be interpreted as the long-term total effect of the grants but not the direct causal effect. However, the combination of all the results provides evidence of a strong association between colonial land grants and present-day land inequality.

4.3. Empirical Strategies

To study the long-term effects of the colonial land grants on modern land concentration, I use two approaches. First, I show the association between the two by using a matching procedure that selects municipalities that never received a grant that have similar geographical characteristics to those that did. Second, using institutional knowledge on the territorial expansion of Brazil, I propose that the proximity to exploration routes can be used as an instrument to where grants were located post-1700 in the Southeast.

4.3.1. Matching

To study the association of the grants and present-day outcomes, I use a propensity score matching procedure to select control municipalities with geographical characteristics similar to those that received at least one land grant. The propensity score matching consists of two steps. In the first step, I estimate the following using a logit regression:

$$AnyGrants_m = X_m + \mu_s + \epsilon_{m,s} \tag{1}$$

Where $AnyGrants_{m,s}$ is a binary variable that takes the value of 1 if the municipality had any land grants and 0 otherwise. X_m is a set of geographical variables that include: latitude, longitude, mean elevation, mean slope, soil quality for food crops (Galor and Özak, 2016), potential sugarcane output from the FAO, the distance to the coast, distance to the nearest river, the presence of four types of soil (latosol, argosol, cambisol, and spondosol),

and the area of the municipality.[40] These variables are selected because they are proxies for soil quality, potential agricultural output, geographical location, market access, and possible production for Brazil's main export during colonial times, sugarcane. Given the coefficients on the estimated geographical set of variables, I use them to calculate the predicted probability that a municipality will receive a land grant. I select one untreated municipality for each treated municipality to be its control, which generates the *matched sample*.[41]

For the matched sample, I estimate the following equation:

$$Y_{m,s} = \beta_1 \times AnyGrants_m + X_m + \mu_s + \epsilon_{m,s} \tag{2}$$

The assumption for the matched sample is that conditional on the set of controls, the municipalities that received a land grant are *as good as random* since the control municipalities had similar geographical characteristics. The estimator β_1 indicates the long-term effects of the land-grant presence in a municipality. If the land grants are expected to have a long-term impact on the land distribution, it is expected that $\beta_1 > 0$.[42,43,44]

I also estimate the following equation to understand if differential effects exist between the earlier vs. the later grants with the following specification:

$$Y_{m,s} = \beta_1 \times FirstGrantPre1698_m + \beta_2 \times FirstGrantPost1698_m + X_m + \mu_s + \epsilon_{m,s} \tag{3}$$

For both regressions, I use two main independent variables. The first is the land gini in each municipality, the second is the share of agricultural land in small (below 200ha), medium (200-2000ha), and large (above 2000ha) farms per municipality.

4.3.2. Instrumental Variable - Bandeirantes Exploration

To further address the concerns on the endogeneity of the estimators, I propose an instrumental variable approach that uses the exploration routes of the *bandeirantes* (explorers) in

[40] The choice of these soils comes from Rocha et al. (2017), as they are Brazil's most common soil types.

[41] The matched sample will also be used throughout the paper in the other specifications.

[42] It is important to note that the matched sample is only created when the sample is past 1970; for the 1872 and 1920 censuses, the total number of municipalities that received a land grant was over 50%. Therefore, a 1-1 propensity score matching is not possible. Instead, I only show the OLS results with the geographical controls for census results before 1970.

[43] While the matching sample, it is of note that in pre-colonial times, there was zero land inequality since the Indigenous people did not own land; therefore, the effects of β_1 are capturing the total effect on land concentration of the grants themselves.

[44] While I do not address spatial spillovers, the matching results would provide lower bounds of the estimates if it is believed that the grants expanded over nearby municipalities. This occurs since the control municipalities are often near treated municipalities.

Southeastern Brazil.[45] The *bandeirantes* explorations were one of the key events in the mid 17th and 18th century in the Southeast (Fausto, 2014, p. 46-47). These explorations, called *bandeiras*, were often motivated by the search for minerals or Indigenous slaves.[46] They irradiated from the city of São Paulo and spread towards the interior of Brazil, which at the time was still unexplored.

The *bandeiras* are of historical importance to Southeastern Brazil, as they cleared paths and, by the enslavement of the indigenous people, allowed settlement in the region (Smith, 1972, p. 320). The settlement, however, would often come in the form of land grants, as the explorer would argue that due to their exploration, they were entitled to the land they had discovered. As a result, the explorers would often "appropriate [...] large tracts for cattle raising" for their entire family (Smith, 1972, p. 320).

Given the explorers' role in the opening of the Brazilian West, as well as their direct involvement in land grant distribution in the region, I propose that the distance from the explorers' paths can serve as an exogenous factor influencing the locations of the grants in the Southeast. I use a map from the *Historical Atlas of Brazil* to digitize the location in which the explorers first went.[47] I then calculate the distance from a municipality to the nearest explorer path and use it as an instrument for the probability that the municipality received a grant. Figure A.9 shows the geographical expansion of the Bandeiras as they expanded in São Paulo, Minas Gerais.

For this analysis, I select only the states of São Paulo and Minas Gerais, which were explored due to the *bandeiras*.[48] The explorers I consider, which are the same ones reported on the map, are as follows: Antonio Raposo Tavares, Fernao Dias Pais, Manuel Preto, and Pascoal Moreira Cabral Leme.[49,50]

[45]The most similar instrumental variable in the literature, to the best of my knowledge, is the use of exploration routes in the United States by Duranton and Turner (2011).

[46]Morse (1965, p. 142) even mentions how "the penetration of the [interior] was frequently motivated more to satisfy a sportive instinct than to answer an economic necessity"

[47]Map can be accessed here: https://atlas.fgv.br/marcos/bandeiras-e-bandeirantes/mapas/bandeiras-e-entradas. Paths were verified using Santos (2022) and Cortesao (1958).

[48]This section focuses on the Bandeiras Paulistas, which radiated from São Paulo. Expansion to the West on the other states was due to other factors, unlike the selected states in the Southeast in which Bandeirantes were looking for gold or indigenous people to slave towards the center of Brazil.

[49]Most of them are described as the most noteworthy Bandeirantes in the history of São Paulo (Prestes Filho, 2012, p. 43)

[50]Out of the group, the most famous one was Antonio Raposo Tavares. Raposo Tavares was a Bandeirante whose one exploration was aimed to the West of the Treaty of Tordesillas solely on clearing indigenous people and attacking the Jesuit missions in the area (Franco, 1954, p. 406). The expulsion of the Jesuits allowed the subsequent claim of land to the West of Brazil for the states of Parana, Santa Catarina, Rio Grande do Sul, and Mato Grosso (Franco, 1954, p. 405). Tavares' second most famous exploration started in São Paulo and ended up at the mouth of the Amazon River in the city of Belem. Raposo Tavares' explorations were "essentially aimed at the geographical discovery, and the search for mines" (Cortesao, 1958, p. 395). While Raposo Tavares never claimed any land through his explorations, it is reported that after he attacked the

To estimate the causal effect of the grants on land concentration in Southeast Brazil, I estimate a two-staged least square regression. The first-stage equation is as follows:

$$LandGrant1700_{m,s} = \delta \times BandeiraDist_{m,s} + X_{m,s} + \mu_s + \epsilon_{m,s} \tag{4}$$

Where $LandGrant_{m,s}$ is a binary variable that is 1 if the municipality received a land grant post-1700 and zero otherwise. $BandeiraDist_m$ is the instrument, and it measures the distance from a municipality to the closest *bandeirante* route. X_m is the same set of geographical controls previously described, and μ_s are state fixed-effects

The second stage is as follows:

$$Y_{m,s} = \beta \times \widehat{LandGrant}1700_{m,s} + X_{m,s} + \mu_s + \epsilon_{m,s} \tag{5}$$

The exclusion restriction assumes that conditional on the set of controls, *the proximity to an explorer route only affects land concentration through the increased presence of land grants*. Given the presence of a strong first-stage and the exclusion restriction holding, the estimate β captures the causal effect of the grants in land inequality for the set of compliers - municipalities that are close to the exploration routes that received a grant.

5. Results - Land Concentration

This section discusses the results of both the association between the land grants and land concentration, estimated through the matching estimates, and also the causal effect, estimated by the instrumental variable in the Southeast.

5.1. Matching

5.1.1. Post-Balance Matching

I first show, that the matching procedure produces a sample of municipalities that received a grant that is similar in observables to those that did. Comparing Table 1 with Table 2, I demonstrate that the matching procedure yields a sample of municipalities that did not receive a grant that is geographically similar to those that received a grant. While in Table 1, there were significant differences in 11 out of 13 geographical variables in the balance sample there are only two significant differences. Geographically, the comparison between the unmatched and matched sample can be seen in Figure 2. Visually, the matching proce-

Jesuit missions, since they were located to the west of the Treaty of Tordesillas, many Portuguese settlers started moving into the region as it was not under the dominion of the Spanish (Franco, 1954, p. 406).

dure generates a control set of municipalities geographically close to treated municipalities. The balance table and the visual geographic distribution show that the matching procedure selects municipalities without a grant that have very similar characteristics to those that had one.[51]

5.1.2. Results

I estimate the results of Equation 2 in land concentration using both the 1920 and 1995 Agricultural Censuses. Table 3 shows the results of a municipality receiving at least one colonial land grant in land gini and the share of agricultural area in small, medium, and large-sized farms for 1920. In column (1) I show the point-estimates on land gini - while the point estimate is positive it is not statistically significant.[52] However, the presence of a grant is associated with a decrease of 1.4% in farmland in farms below 200ha (column (2)), with a decrease of 6.6% in farms between 200 and 2000ha (column (3)), with the increase being only for farms above 2000ha (column (4)). The results for 1920 indicate that municipalities that had a grant had a top heavy land concentration, with small and medium-sized farms occupying lower total areas.

To study if these results have persisted across the decades I then take a look at the 1995 Agricultural Census, results can be found on Table 4 In column (1), I find that there is an increase in the land gini for municipalities that received a grant. In column (2), the point estimate indicates a decrease of 4.8% in the total share of farmland in small farms, with the increase being offset in both medium (column (3)) and large farms (column (4)).[53]

The combination of 1920 and 1995 reveals an interesting pattern. The effects in 1920 show an increase in land concentration; however, this came at the cost of medium-sized farms (up to 2,000ha) farms, with the increase coming in farms above 5,000ha. However, in 1995, the effect came at the cost of smaller farms (those below 200ha), with an increase in the share of all agricultural land for all bins afterward. The results indicate an evolution of land concentration through those seven decades, in which concentration was always favored for larger farms; however, the size of the farms being absorbed has decreased.

[51] While there is a large statistical difference between the areas of the treated and control municipalities, I show that the estimates are robust to dropping those large-sized municipalities in Section 8.

[52] This can be explained by the fact that the 1920 Agricultural Census has coarser bins for farmland size, which makes the estimates of the land gini more imprecise.

[53] Graphically, the results can also be found in Figure 3 and Figure 4 for 1920 and 1995 respectively. In subfigure (a) of Figure 3, there is evidence that a land grant is associated with increased land inequality. The point estimates indicate that the total percentage of farmland in farms below 2,000 ha decreased in 1920, with an increase in the concentration of land for farms above 2,000 ha. A similar pattern is found when analyzing the land distribution with the 1995 Agricultural census. In subfigure (a) of Figure 4, there are significant decreases in the share of agricultural land in farms below 200ha, with the increase in concentration happening for farms above 200ha.

5.2. Instrumental Variable

5.2.1. Instrument Validity

To test the instrument's validity, I first show that visually, a strong negative correlation exists between the proximity to a *bandeirante* route and the probability of a municipality receiving a land grant post-1700. Figure A.10 shows the grants' geographical distribution alongside each municipality's proximity to each explorer route. In subfigure (a), I show the distribution of grants Pre-1700 in the states of Sao Paulo and Minas Gerais. Visually, the grants were concentrated close to the city of Sao Paulo, and only a few were given in the state of Minas Gerais. In subfigure (b), I consider only the grants given post-1700. While there are still clusters around the city of Sao Paulo, there is a vast expansion North and Westwards of the grants, and seemingly following up the exploration routes. Visually, Figure A.10 provides some evidence that the expansion of the explorer is associated with a higher presence of grants.

Second, using the timing of when the grants were given, I conduct a placebo test on whether the instrument was valid. I estimate Equation 4 separately for pre-1700 and post-1700 grants. The idea is that since the explorations took place between the mid-17$^{\text{th}}$ century and later, it would be expected that the explorer routes would not be a strong predictor for earlier grants but only for later grants. I show in column (1) of Table A.6 that the explorer routes have a weak association with the presence of pre-1700 grants with a first-stage F-stat of only 2.11. In contrast, in column (2), there is a strong first stage, with the coefficient indicating that for every 10km farther away from an explorer route, the probability that the municipality received a grant drops by 3.1%. Additionally, the first-stage F-stat is 25.47, indicating that the distance to the explorer route has significant explanatory power on the location of the grants post-1700. This further provides evidence that the *bandeirantes* were responsible for expanding the land grants in the region.

5.2.2. Results

Table 5 shows the point estimates for the instrumental variable specification, alongside the matching estimators when looking at post-1700 grants.[54] In column (1), the point estimate for the effects of the post-1700 grants using the matching estimator is a drop of 5.097% in the share of small farms in the municipalities. In contrast, in column (2), the 2SLS estimator indicates a significantly larger drop of 25.3%. The decrease in the share of small farms is not driven by increases in medium-sized farms, as seen in the point estimates in columns (3) and (4). Instead, it is concentrated mostly in large farms, with columns (5) and (6) indicating

[54] I also show the full distributional effects on and Figure 5.

an increase of 3.3% and 27.3% in their share of agricultural land when using the matching and 2SLS estimators, respectively.

The results point out large, significant differences in municipalities that received a grant compared to those that did not when considering land distribution in the Southeast. The larger effects of the instrumental variable approach could be explained by the fact that it is estimating the LATE, which measures the effects on the compliers. In this case, the compliers would be municipalities closer to the explorer routes that also received a grant. The results could imply that municipalities that received grants because of the explorers had stronger effects on land inequality. However, it is important to note that both the matching and the IV results show an increase in land distribution, with the differences being the total magnitude.

6. Long-Term Development

In the previous section, I show that the presence of a land grant is associated with an increase in land concentration in 1920 and 1995, indicating that land inequality has been a persistent attribute of the Brazilian economy. In this section, I explore how the grants can also be associated with income inequality and present-day development. I also investigate whether the grants are associated with lower land usage by larger farms and whether they are associated with present-day land conflicts.

6.1. Development and Income Distribution

I test whether the grants are associated with income inequality and poverty in 2010 by estimating Equation 8. Results can be found on Table 7. In column (1), I test the association with GDP per capita. The positive coefficients indicate that even though the municipalities with a grant are associated with increased land concentration they are also more developed in the present. In columns (2) and (3), I measure whether the increase in income only affects the upper tail of the distribution of wealth by looking at poverty rates. The point estimates indicate that municipalities with a grant are also associated with a decrease in both poverty (column (3)) and extreme poverty (column (4)). Lastly, I also show that the effects on the Human Development Indexes are positive indicating that the increased development is not only based on income. This shuts down the possibility of the channels previously stated in the literature of inequality being against long-term development based on lower public investments.

Even though there are gains in the average income of the households, it is also important to consider who benefits the most. I test the effects on income distribution by having

the main dependent variable as the mean household income by quintile. Results for the specification are found in Table 8. In column (1), I show the association of the grants with income inequality, measured by the gini coefficient. Not surprisingly, there is a positive association between the presence of a grant and income inequality. Additionally, I test where in the income distribution are people earning more. The results are found broken down by quintile on columns (2) to (6). All the point estimates are positive and significant, indicating that the presence of a grant is associated with an increase in the average household income throughout the five quintiles. However, the gain, in both magnitude and in percentage terms is significantly higher for the richest quintiles. As an example, in column (2), the average poorest quintile of households earns 2 more Brazilian Reais, which is an increase of 3.35% relative to the control mean. In contrast, in column (6), the households in the richest quintile have an increase in income of 119.7 Brazilian Reais, which also corresponds to an increase of 10.6% of the control mean.

The results of this subsection indicate that the presence of a grant led to a development path of both increased inequality and more development. The results can be explained by the fact that while the grants contributed to an initial setting in which land, and therefore wealth, were all concentrated in a small set of people, the requirement that the land had to be developed alongside the fact that those grants were often the first settlements in a region led to a development path of both high inequality but also of more development, relative to the municipalities that did not get a grant.

6.2. Land Usage

A key problem in Brazil's land distribution is the dominance of large farms, which are often underutilized despite being abundant. Previous literature finds that to be the case in Brazil, in contrast to Africa, in which too many small farms are the biggest impediment to economic development (Benjamin, 1995; Benjamin, 1992; Berry and Cline, 1979; Carter, 1984).[55] Even more recent research shows that in India, the large number of small farms is a driver of lower productivity and rural incomes (Foster and Rosenzweig, 2022).

Further, empirical literature and government reports point towards the negative effects of land concentration in Brazil, with a majority concluding that it has negative effects. To test whether I observe similar patterns in the 1995 Agricultural Census data, I estimate Equation 2 with the main dependent variable being the share of unproductive land for

[55] Agency reports lower productivity of larger farms relative to smaller farms (World Bank, 2004), and the fact that landowners due to market frictions can hold vast amounts of underutilized land (USAID, 2016).

each cutoff.[56] Results can be found in Table 6 [57] It is important to note one key thing - while farms between 200 and 2000ha do have a higher share of total agricultural land (as measured in Table 4) - they do even have a higher share of unproductive land. For example, in municipalities that have a grant, medium-sized farms have an increase of 3.3% in their share of agricultural land. However, they also have an increase of 4.6% in the total unutilized land. This indicates that relative to municipalities without a grant, there is a net increase of 1.4% in their share of unproductive land. In contrast, there are no results for small or large-sized farms. This is in contrast with the previous literature, as the results of this section show that municipalities with a grant have a U-shaped land size - land utilization curve. Small and large farms are fully utilizing their land, but medium-sized farms are the ones that the ones underutilizing it.

6.3. Land Conflicts

Another possible mechanism by which the grants, through land inequality, themselves could affect present-day outcomes is an increase in land conflicts. Historically, the lack of demarcation of large farms alongside a weak judicial system occasionally led to conflict between large landowners and land squatters. Even in the present, land concentration, alongside the lower land usage by large plots is one of the causes of land conflict (Reydon et al., 2015). As a result of land squatting, large landholders often hire armed gunmen to harass landless families and prevent land reform in their holdings (USAID, 2016).

Even in the present, land conflicts in Brazil are frequent, with the Comissão Pastoral da Terra reporting that in the first semester of 2023, over 973 land-based conflicts were reported on Brazil.[58] Most of these conflicts occur as clashes between large estate owners with smallholders or people without farms. The conflicts often happen through the occupation of vacant land, destruction of property, large farmers expropriating land from smaller farms, or even murders.

Given that lack of access to land caused by land concentration is a key motive for why land conflicts exist, I test whether the presence of historical grants affects the present-day conflict over land in Brazil.[59] Results can be found in Table A.11. The results in Panel A indicate that the presence of any land grant in a municipality is associated with an increase

[56]The 1995 Agricultural Census describes it as "land that could have been use for agricultural purposes, livestock raising, and others, that has not been used for the past four years".

[57]I also show the distributional effects in Figure A.12. The results for the share of unproductive land are similar to the ones found in the land concentration found in Figure 4.

[58]More information can be found at: https://cimi.org.br/2023/10/comissao-pastoral-da-terra-cpt-divulga-dados-parciais-de-conflitos-no-campo-brasileiro-do-1o-semestre-de-2023/

[59]For the geolocation of land conflicts, I use the 2010 municipality boundaries since they are the ones used to track down where the conflict was located.

of 6.2 percentage points in the probability of a modern-day land conflict. In Panel B, I test whether pre-1700 or post-1700 grants drive those effects. The results indicate that both pre-1700 and post-1700 grants are associated with higher conflict incidence. Municipalities that received a grant pre-1700 are associated with a 9.1 percentage points increase in the likelihood of having a land conflict, while municipalities that received a grant post-1700 have an increase of 6 percentage points.

6.4. Slavery and Demographics

A possible mechanism by which the grants themselves are affecting present-day outcomes is through the presence of slavery in the region. While the grants often required enslaved people, there was plenty of variation. For example, livestock grants would often use few slaves, as the labor requirement for livestock raising is low. Previous research has also found negative effects of slavery in the Americas. For example, Acemoglu et al. (2012) finds that slavery is strongly associated with land inequality in Colombia. Papadia (2019) also finds negative associations between slavery and contemporary development in Brazil.[60] To study whether the presence of grants was associated with slavery, I estimate Equation 2 and Equation 8 using data from the Brazilian 1872 census as it is the only census that was carried before abolition in 1888.[61] In this case, $Y_{m,s}$ is now the share of slaves to the total population.

Results for 1872 are found in Table A.9. In Panel A, the results indicate that a grant is not associated with either the percentage of slaves or the percentage of slaves working in agriculture. However, in Panel B, the first row shows that parishes that had a grant before 1700 had a 2.0 percentage point decrease in the percentage of slaves to the total population. The results indicate that there is not a strong association between the grants and the institution of slavery. This indicates that the persistent effects on land and income inequality seen in the present are not being driven by differential share of slaves in municipalities that had a grant. [62]

Overall, the results of this section follow the previous literature indicating that in Brazil, the issue with large farms is not only land concentration but also the fact that they are not

[60] Other related papers are Althoff and Reichardt (2024) and Theodoridis et al. (2024), who both found that slavery is a factor in keeping inequality in the U.S. and the Caribbean, respectively.

[61] For the results in the 1872 census, I do not report matching estimators because over 50% of the parishes had a land grant within its boundary. Therefore, a 1-1 propensity score matching procedure would yield the same results as the OLS.

[62] I also try the same specification using the 1980 Brazilian Census - the first modern census that includes the respondent's race. Results can be found on Table A.10. The results indicate some weak effects on post-1700 grants in the Southeast, as there was a decrease in the white population with an increase in black and mixed race, followed from the higher share of free blacks in the 1872 census.

fully using their entire plots.

6.5. Northeast and Southeast

Given the present-day economic disparities and their different colonial histories, the grants could have differential effects on Brazil's Northeast and Southeast regions. Historically, land inequality has been more pronounced in the Northeast, primarily due to the expansion of cattle estates. The western area of the Northeast, known as the *sertão*, was known for the presence of large estates dominated by a few rancher families (Bethell, 1984, p. 460-461).[63] Further, the Northeast was more intensely colonized early on due to its proximity to Portugal, while the development of the Southeast would only happen later in the 17th and 18th centuries.

Given the historical differences between the colonization patterns and economic development, I estimate whether the effects of the grants vary by region. I estimate Equation 8 breaking down into two geographical regions, the Northeast and the Southeast.[64] Point estimates are in Table A.12. The results indicate that a large part of the variation comes from an increase in land inequality in the Northeastern states.[65] In the Southeast, however, when considering the presence of any grants, there are no effects.[66]

7. Interaction with Colonial Institutions

In this section, I test whether three sets of colonial policies that occurred during the same period the grants were being distributed have any contributing effects on land inequality.

7.1. Land Usage - Coastal Ban on Livestock

I exploit a policy that caused the land grants to be geographically separated based on their economic activity. In 1701, the Portuguese Crown enacted a ban on cattle ranching from 80km of the coast (10 leagues) (Fausto, 2014, p .40; Simonsen, 2005, p .198; Bethell, 1984, p .460).[67] The law went into effect after local farmers complained that cattle grazing

[63] Costa Porto (1979, p. 53) mentions a reason on why the large estates were so prominent in Northeastern Brazil, because "large tracts of lands were given as *sesmaria* to the same person".

[64] Northeast includes the states of Rio Grande do Norte, Paraiba, Bahia, Alagoas, and Pernambuco. The Southeast includes the states of São Paulo and Minas Gerais.

[65] To generate the matched sample for the Northeast and Southeast, I ran separately the same propensity score matching procedure from Subsection 4.3 for each subsample.

[66] These results should not be surprising since, as discussed in the instrumental variable approach, land pre-1600 in the Southeast was heavily concentrated around the city of Sao Paulo. The expansion to the West only began around the 1700s.

[67] The first reference to this law comes from "Economic History of Brazil" from Roberto Simonsen, which was originally published in 1937. The 2005 version cited in this paper comes from a republication from the

was destroying the sugar plantations in the area. In effect, that led to the coast to be primarily an agricultural area and allowing the expansion of cattle towards Brazil's interior (Júnior and Macedo, 1968, p. 216). This split between agriculture and livestock led to "a clear specialization between the two activities" (Ribeiro, 2012).[68]

Historically, the size of landholdings in the interior of Brazil at this time was extensive. As Fausto (2014, p .41) indicates, the need for large lands to allow cattle to roam free led to the creation of large estates in the area, even bigger than those of the coast.[69] Even with restrictions on the sizes of the land grants taking into effect in 1698, due to the lack of government oversight, the "[land grants] on which cattle ranches were established sometimes exceeded hundreds of thousands of acres" (Bethell, 1984).[70]

Given the policy, I estimate the following regression to estimate the heterogeneous effects of the grants in two ways. First, I compare the effects only using the pre-1700 grants by estimating the following difference-in-differences equation.

$$\begin{aligned} Y_{m,s} = & \zeta_1 \cdot (FirstGrant1701to1721_m \times More80km_m) + \\ & \zeta_2 \cdot (FirstGrant1701to1721_m \times Less80km_m) + \\ & \delta \cdot More80km_m + X_m + \mu_s + \epsilon_{m,s} \end{aligned} \tag{6}$$

Where $FirstGrant1701to1721_m$ indicates whether the municipality *first got a grant* between 1701 to 1721, so within twenty years of the law being passed. I choose this forty-year cutoff because the grants distributed during this period should be similar, as the grantees would have decided on their grant location based on the same set of information.[71] $More80km_m$ and $Less80km_m$ are binary variables that take the value 1 if the municipality is more than 80km from the coast and zero otherwise. The base group to which the estimators are being compared are municipalities that did not receive a grant but are less than 80km from the coast.[72]

Brazilian Senate.

[68] An example of the effect can be seen in the Municipality of Ruy Barbosa, and the state of Bahia and Caico in the state of Rio Grande do Norte. Both are described as being created by the cattle expansion due to the 1701 Royal Decree. (Chari et al., 2017).

[69] An example of this would be the d'Avila family, which owned a large estate in the state of Bahia.

[70] Bértola and Williamson (2017, p. 117) describes colonial cattle raising as an industry that "was radically different from the sugar industry, occupying extensive areas of land, and the impact of the dry seasons was reflected in the absence of permanent occupation. Not only was there no need for large initial capital investments but also the large amount of land available hindered productivity increases".

[71] I also choose to not compare them to places that got grants earlier, as it will be discussed in a future section that in 1698 there was a law limiting the grant size. As a result, comparing with earlier grants would cause a confounding effect.

[72] This specification is similar to Barsanetti (2021).

Based on the historical context, it is possible to make predictions based on the signs of the coefficients of Equation 6.

1. If the expansion of grants towards the West was mostly driven by livestock creation, it would be expected that in 1872, there would be a higher share of people working in livestock in those areas. Similarly, in 1995, a higher share of agricultural land should be reported for livestock. Therefore, in both cases, it would be expected that $\zeta_1 > \zeta_2 = 0$

2. If livestock areas are the main drivers for land concentration, it should be the case that $\zeta_1 > \zeta_2$ when measuring land concentration in 1920 and 1995.

Table A.15 shows the point estimate for 1872 and 1920. In column (1), I test the first hypothesis: whether those municipalities that got a grant more than 80km from the coast had an increase in the share of ranchers. The point estimates confirm the first hypothesis, with municipalities with a grant more than 80km from the coast having a 1.3% increase in the total population working on ranching. In comparison, municipalities less than 80km have a statistically insignificant decrease of -0.587. The difference between the two coefficients is significant at the 10% confidence level, further supporting the prediction that those areas were historically more dedicated to livestock. In columns (2), (3), and (4), I show the point estimates for land concentration, which tests the second hypothesis. Surprisingly, I find the opposite effects as expected, in which municipalities with a grant within 80km of the coast have increased land concentration. The point estimates for municipalities within 80km of the coast show a large and significant decrease in the share of small and medium-sized farms of 5.7 and 18.2%, respectively. The increase is only in large farms, which have a 24.0% higher share of total farmland in a municipality. In contrast, no significant results are found for municipalities with grants more than 80km from the coast. In addition, the F-stat indicates that the differences are significant.

Table A.16 has the results when using the 1995 Agricultural Census. In column (1), I use the share of agricultural land used in livestock creation to measure livestock presence. I find that similarly to 1872, only municipalities that got a grant more than 80km from the coast are associated with a statistically significant increase in the area used for livestock; however, the F-stat p-statistic indicates that economic activity did not persist strongly. In columns (2), (3), and (4), I analyze the effects on land concentration. I find not only that there are statistically significant increases in land concentration in both areas that got the grants but also that they are not significantly different. The point estimates indicate that in both cases, there is a decrease in the share of agricultural land in small farms with an increase in medium-sized farms and no effects on large-sized farms. Additionally, it is not

possible to reject that any of the coefficients are equal, which indicates that livestock is not a key driver of present-day land inequality.

The results of this section show that while it has been argued that the expansion of the livestock towards the West of Brazil driven by the 1701 law led to large estates, which in turn led to increased land concentration, it is false. While I find that in 1872 and 1995, the areas with municipalities with a grant more than 80km from the coast are associated with increased livestock production, I do not find any effects on land concentration. Instead, the empirical results show that in 1920, the opposite is true: land concentration is higher in municipalities with a grant *within 80km* of the coast. However, these differential effects did not persist through the centuries, with any differences gone by 1995.

7.2. Land Size Limit

In 1698, a law was passed that limited the maximum size of the grant to 10,800ha. This law was originally passed in response to local complaints about the large size of the grants and the inability of some people to access them. It generates variation in the original size of the grants, allowing me to test whether that is a possible mechanism for the persistence of land inequality. I first provide evidence in Figure A.13 that the law was mostly binding, with letters post-1697 having the size requested not going over the cutoff. To estimate whether there are differential effects on land concentration between the original size of the grants, I consider municipalities that *received their first grant* within 20 years of 1698. That allows me to narrow down to municipalities that got a grant, but the grantees made decisions at a similar time, using the same information. I then estimate the differential effects with the following equation:

$$Y_{m,s} = \gamma_1 \times FirstGrant1678to1697_m + \gamma_2 \times FirstGrant1698to1717_m + X_m + \mu_s + \epsilon_{m,s} \quad (7)$$

In the above specification, $FirstGrant1678to1697_m$ is a binary variable that equals 1 if the municipality first received a land grant between 1678 and 1697 and 0 otherwise. Similarly, $FirstGrant1698to1717_m$ is a binary variable equal to 1 if the municipality first received a land grant between 1698 and 1707 and 0 otherwise. X_m are the same controls as previously mentioned and μ_s are state fixed effects. The control group for this specification are the municipalities that never received a grant.

Given the variation in their size, it gives the possible hypothesis. If the presence of the grant itself mattered, then it is expected that $\gamma_1, \gamma_2 \geq 0$. Additionally, if the initial land size mattered for land concentration, it would be the case that $\gamma_1 > \gamma_2$ given that places that

got a grant from 1698 to 1717 had a maximum size limit.

I show that municipalities that first got a grant in 1678 to 1697 are not different in the set of observables to those that got a grant in 1698 to 1717 in Table A.13, with the only geographical difference that is significant being the average elevation of the municipality. This reinforces the assumption that given that the grantees of this period had a similar information set on the possible locations to where request a grant.

The estimates for Equation 7, are found in Table A.14 and Figure A.14. For both types of municipalities, I first show that there is a similar pattern in the distribution of agricultural land in a municipality. In column (1), both are associated with an increase in the land gini, with only municipalities with the first grant in 1698-1707 being statistically significant. In column (2), the point estimates indicate a statistically significant drop of 10.3% and 6.2% on the share of agricultural land in farms below 200ha for municipalities that first received a grant in 1678-1697 or 1698-1707, respectively. In column (3), the point estimates indicate a statistically significant increase of 9.827% and 7.383% on the share of agricultural land in farms between 200ha and 2000ha. Lastly, in column (4), there are no effects on the share of agricultural land in farms above 2,000ha. In summary, there is an increase in land concentration for municipalities that first received a grant in either of those periods. This increase in land concentration affects the share of agricultural land in farms between 200 and 2000ha, but it has no significant effect on the share of land in farms above 2000ha. However, I do not find statistical differences, with the lowest F-stat p-value being 0.213.

The results of this section indicate that the grants' initial land size did not have differential effects on present-day land inequality. However, it is important to note that regardless of size differences, the law's cutoff still applies to large-sized farms, which could explain the non-differential effects.[73]

7.3. Institutional - Treaty of Tordesillas

Another possible source for heterogeneous effects of the grants is the Treaty of Tordesillas, which split Brazil between a Spanish and a Portuguese side. The treaty established *de jure* that the Portuguese would not be allowed to settle west of the line; however, in practice,

[73] I also test a broader specification that considers *municipalities that got any grants* pre-1698 and post-1698 by estimating the following equation for the matched sample:

$$Y_{m,s} = \gamma_1 \times GrantsPre1698_m + \gamma_2 \times GrantsPost1698_m + X_m + \mu_s + \epsilon_{m,s} \quad (8)$$

In this case, $GrantsPre1698_m$ is a binary variable that takes the value of 1 if the municipality had a grant pre-1698 and 0 otherwise, while $GrantsPost1698_m$ is defined similarly, but for post-1698 grants. Similar to the previous specification, if the law was truly effective and initial land size mattered for future land concentration, it would be expected that $\gamma_1 > \gamma_2$. Results are qualitatively the same as Equation 7, they can be found on Figure A.15.

that was not the case.[74] The treaty ended in 1750 with the Treaty of Madrid when Brazil's boundaries were officially expanded.

Given the natural geographical assignment of land in Brazil for the Portuguese and Spanish, it offers a natural source of variation for the presence of the grants. The motivation behind this idea is that previous research by Laudares and Caicedo (2023) finds that the Portuguese side of Brazil has higher income inequality, mostly driven by the fact of increased slavery presence in colonial times. I follow the definition of the Treaty line being at 48.7^o W from Laudares and Caicedo (2023).[75] In Figure A.8, I show the treaty line alongside the land grants in the states of São Paulo and Minas Gerais.[76]

To estimate the differential effect of the grants on municipalities located in the Portuguese and Spanish sides of colonial Brazil, I estimate the following equation:

$$\begin{aligned} Y_{m,s} =& \beta_1 \cdot (Grant_m \times Portuguese_m) + \beta_2 \cdot (Grant_m \times Spanish_m) + \\ & \delta \cdot Portuguese_m + X_m + \mu_s + \epsilon_{m,s} \end{aligned} \tag{9}$$

Where $Grant_m$ is defined if the municipality had any land grants. $Spanish_m$ is a binary variable is equal to 1 if the municipality is located on the Spanish side of Brazil (left of the Treaty of Tordesillas Line) and zero otherwise. $Portuguese_m$ is a binary variable that is 1 if the municipality is located on the Portuguese side of Brazil (right of the Treaty of Tordesillas Line) and zero otherwise.

In this regression, the control group are municipalities on the Spanish side that did not receive a grant. The coefficient β_1 measures the effect of the grant on the outcome on the Portuguese side. Similarly, the coefficient β_2 measures the effect of the grants on the outcome on the Spanish side. The coefficient δ captures the effect on land inequality for municipalities on the Portuguese side. X_m are the same geographical controls used in the previous equations; however, I also add the distance to the Tordesillas Line. μ_S are state fixed effects.

This historical division of Brazil between Spain and Portugal allows for a few hypotheses to be tested. First, if the land grants matter to land inequality, both β_1 and β_2 should be positive. Second, if there are differential effects between Portuguese and Spanish on land inequality $\delta \neq 0$, as δ captures the differential effects between the two regions. Third, given that the grants were solely a Portuguese institution, and technically, the grants could not

[74] My land grant dataset also agrees with the historical accounts. I see no grants being given on the Spanish side in the 17^{th} century, and the first grant was given in 1717. Further, that also matches the history described in Subsection 4.3.2.

[75] The authors of the paper describe this cutoff as the one agreed by most historians.

[76] Those states are selected since out of my sample they are the only ones that have municipalities on both sides of the line.

have been assigned in the Spanish area until after 1750, if what matters is the exposure to the *sesmaria* institution it would be expected that $\beta_1 > \beta_2$. If the coefficients are equal, that indicates that it was not just the Portuguese colonization that mattered for land inequality, but instead that the grants are the drivers of the difference. Previous research by Laudares and Caicedo (2023) finds that in the Portuguese side of Brazil, there is higher income inequality, which is driven by the higher presence of slavery in colonial times.

Table A.17 shows the differential effects of the grants on the Spanish and Portuguese sides, estimated by Equation 9.[77] In column (1), I estimate the effects on the land gini. The point estimates indicate a significant increase in land inequality only in municipalities that got a grant on the Spanish side. However, based on the F-stat p-value of 0.128, I cannot reject the fact that the coefficients differ. Similarly, in columns (2), (3), and (4), I find consistently larger coefficients of the grants on the Spanish side; however, neither of them are significant. Further, in neither case, I can reject the fact that the coefficients between the grants on the Spanish side are different from the grants on the Portuguese side.

Overall, the results of this section indicate that the mere difference between Portuguese and Spanish colonization does not explain the difference between land inequality for the municipalities in Southeast Brazil. Instead, part of that is compounded by the historical presence of land grants, which are associated with increases in land inequality in both areas.

8. Robustness

8.1. Removing outliers

A possible concern is if the results are being driven by outliers. First, based on Figure 1, large municipalities are much more likely to have a grant. Even after controlling for the area of a municipality it could be the case that these large municipalities are the ones who are driving the results. To deal with this, I estimate Equation 8 but I drop from the sample all municipalities whose area is larger than the median.[78] Second, I consider robustness to removing outliers by estimating Equation 8 by excluding municipalities that have *any agricultural land in farms above 2,000ha*. Therefore, I focus only on the distributional effects between small-sized and medium-sized farms and exclude the possibility that municipalities that have a high share of farmland in large farms are the ones driving the results.

Table A.18 has the results for both robustness specifications. In Panel A, I show the results for dropping municipalities above the median in area. In column (1), there are no

[77] I also show the distributional effects on Figure A.16. However, the estimates are noisier than the aggregate ones shown in the main table.

[78] In the matched sample, the median size of a municipality is $380 km^2$.

effects on the gini, but the coefficient remains positive. In columns (2) and (3), there is still an increase in land concentration towards farms above 200ha, with the coefficients being similar to the ones found on Table 4.[79] In Panel B, I show the results considering only municipalities with no farmland in farms above 2000ha. Similarly, the coefficients are not drastically different from Table 4. The results indicate that it is not the case that outliers, both in area and large land concentration, are driving the main results.

9. Conclusion

In this paper, I describe, using novel data, the historical determinants of land grant distribution in Brazil. I find that colonial land grants given by Portugal in Brazil during the 17th and 18th century had persistent effects on land concentration when measured in the 1920 and 1995 Agricultural Censuses. The matching estimators reveal a 6.2% decrease in the total share of farms below 200ha. Results are robust to including geographical controls, a 1-1 propensity score matching procedure, or different definitions of land concentration based on the 1995 Agricultural Censuses. To approximate the causal effect of the grants, I narrow down the estimates to the states of São Paulo and Minas Gerais to exploit the *bandeiras* as an instrument on the location of the grants. Consistent with the previous results, the estimates indicate an increase in land concentration in municipalities that received a grant, with point estimates indicating a decrease of 25% in the total share of agricultural land in farms below 200ha in the Southeastern states.

I also test what are other possible economic ramifications of the grants. I find that not only are the land grants associated with land inequality, but they are also associated with income inequality, indicating a strong relationship between land access and wealth. The results also show that the presence of a grant is associated with higher incomes and less poverty in the present day. However, the grants are associated with more modern-day land conflicts and lower agricultural land utilization. Overall, the presence of a land grant has mixed effects on long-term effects

Further, I test whether three colonial policies—one that set a size limit on the grants, one that split the region into cattle-raising and plantation-based areas, and another institutional-based—in colonial Brazil caused differential effects of the land grants. First, I find no differential effects on land concentration when considering municipalities that first received grants between 1678 and 1697 and those that first received a grant between 1698 and 1717. These results indicate that initial land concentration is not a key factor driving land inequality.

[79]The coefficients in Table 4 are 0.014, -4.679, 3.421, and 1.258 for land gini, the share of land in small farms, the share of land in medium-sized farms, and the share of land in large farms respectively. While the coefficients on Table A.18 are 0.014, -4.825, 3.311, and 1.513.

Second, a coastal livestock ban in 1701 pushed livestock production away from the coast and led to the increased distribution of grants towards the west of Brazil. I test whether there are differential effects for municipalities that first received a grant between 1701 and 1721 within 80km and more than 80km of the coast. I find that the only municipalities with grants over 80km of the coast have an increase in the share of ranchers in 1872 and an increase in the share of agricultural land used for livestock in 1995. However, when considering the effects on land concentration, there are no differential effects on land concentration between the two. The results indicate that while the policy introduced an economic division for areas with livestock and areas for plantations, that difference does not explain the effects on land concentration. Lastly, exploiting the fact that Brazil was divided between Spain and Portugal, I test whether there are institutional differences between Portugal and Spain that compound land inequality. I find that while municipalities on the Portuguese side are associated with an increase in land inequality, the presence of a land grant is also associated with it in either the Portuguese or Spanish side. This provides evidence that the *sesmaria* is a driver in Brazil's regional inequality.

Lastly, I contribute through a novel georeferenced dataset of land grants given in colonial Brazil between 1590-1850. This paper provides the first georeferenced dataset for colonial land grants in Brazil through archival work and a partnership with Brazilian researchers. This dataset, which contains 3,577 total grants for seven states in the Northeast and Southeast, could further allow researchers to study Brazil's colonization and development of its agrarian structure.

While this paper focuses solely on Brazil's Northeast and Southeast, the grants were present throughout the territory. Further work can be conducted to understand how these grants operated differently in Northern and Central Brazil. Both regions were occupied later than the Northeast and Southeast, so the presence of grants there might not have been as pervasive; however, due to their distance to the coast, that allowed, and still allows, a vast amount of land to be squatted. Understanding the interactions between the historical roots of colonization and the present-day expansion toward the West could help us better understand the roots of land inequality today in the rest of Brazil.

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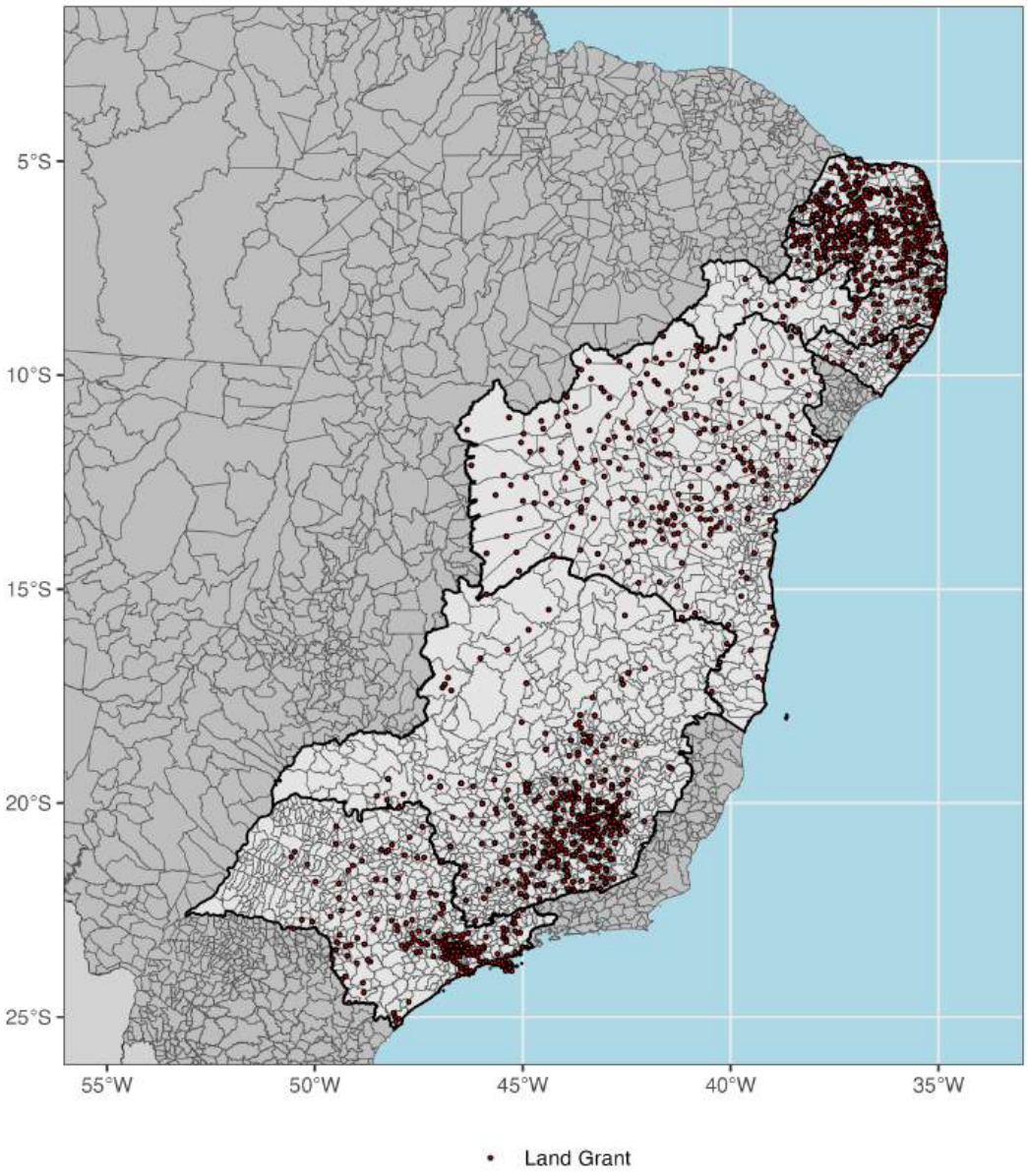
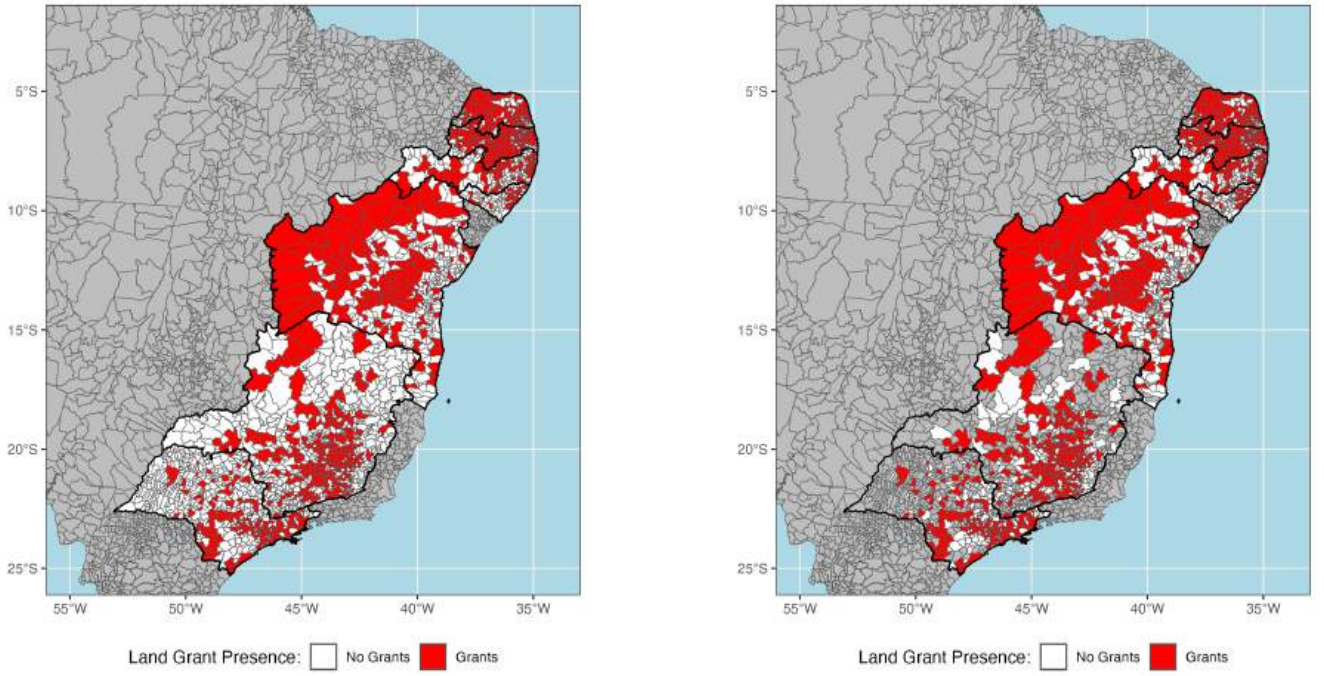
Figure 1: Land Grant Distribution



Notes: Geographical distribution of the land grant dataset. Each red dot indicates a unique land grant. Grey states are not part of the sample as data has not been collected. White states are states that are part of the sample. Borders within each state are 1995 municipalities.

Figure 2: Geographical Land Grant Distribution - Treated and Control Municipalities

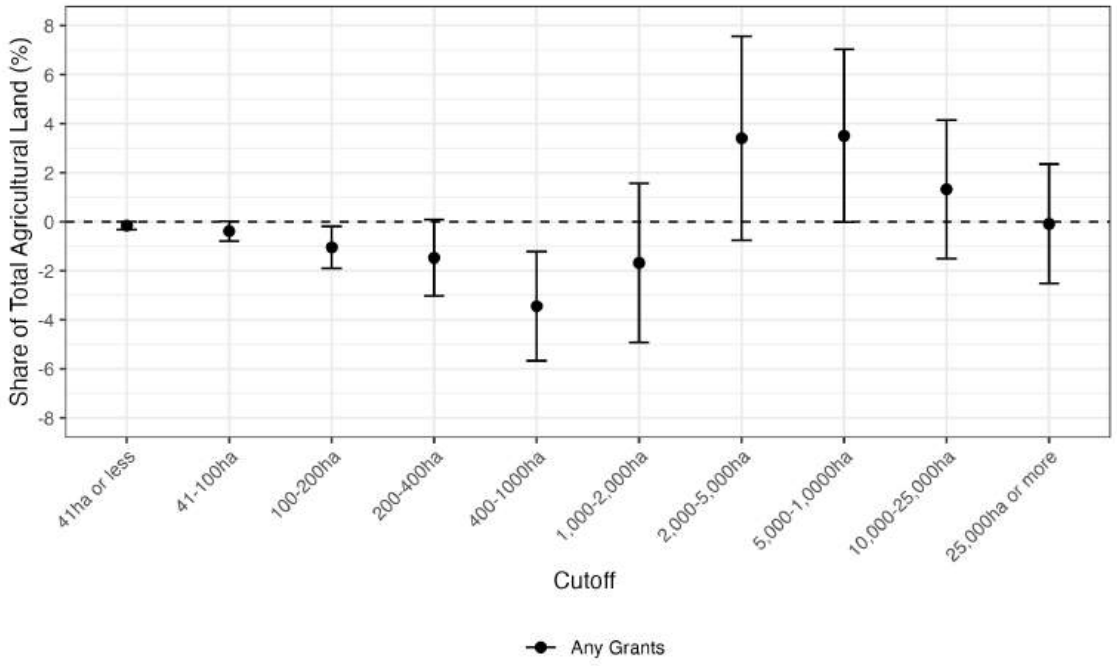


(a) Pre-matching Sample

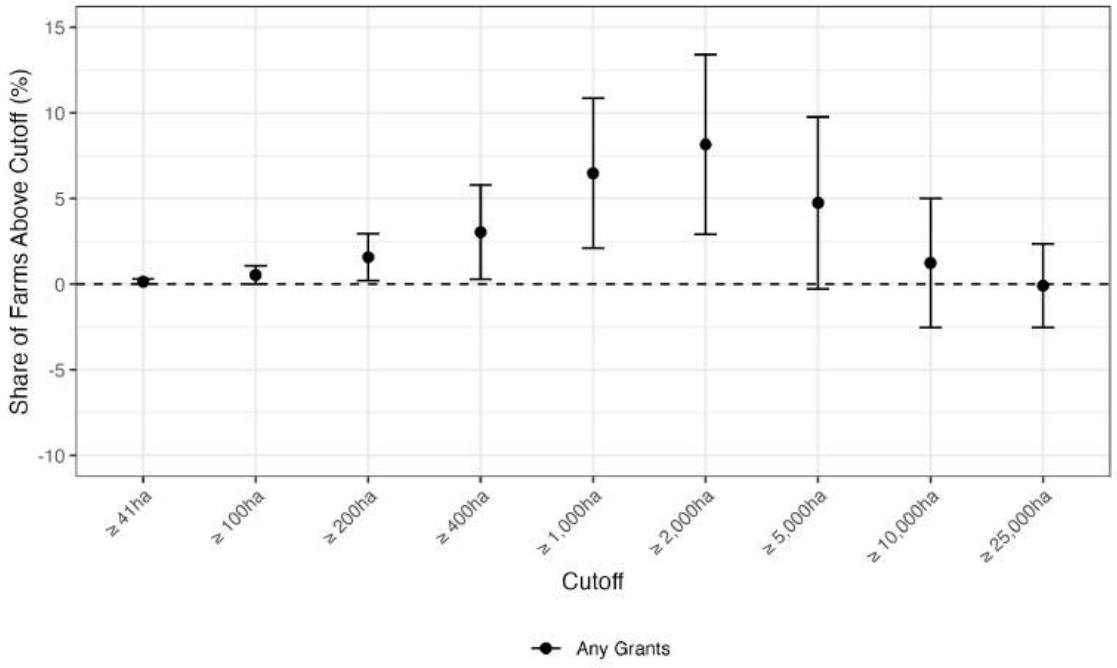
(b) Post-matching Sample

Notes: Geographical distribution of the land grants across the states. Municipalities for the 1995 census for the states in which information on the land grants is available are highlighted in red.

Figure 3: Distribution Effects of the Grants - 1920 Agricultural Census



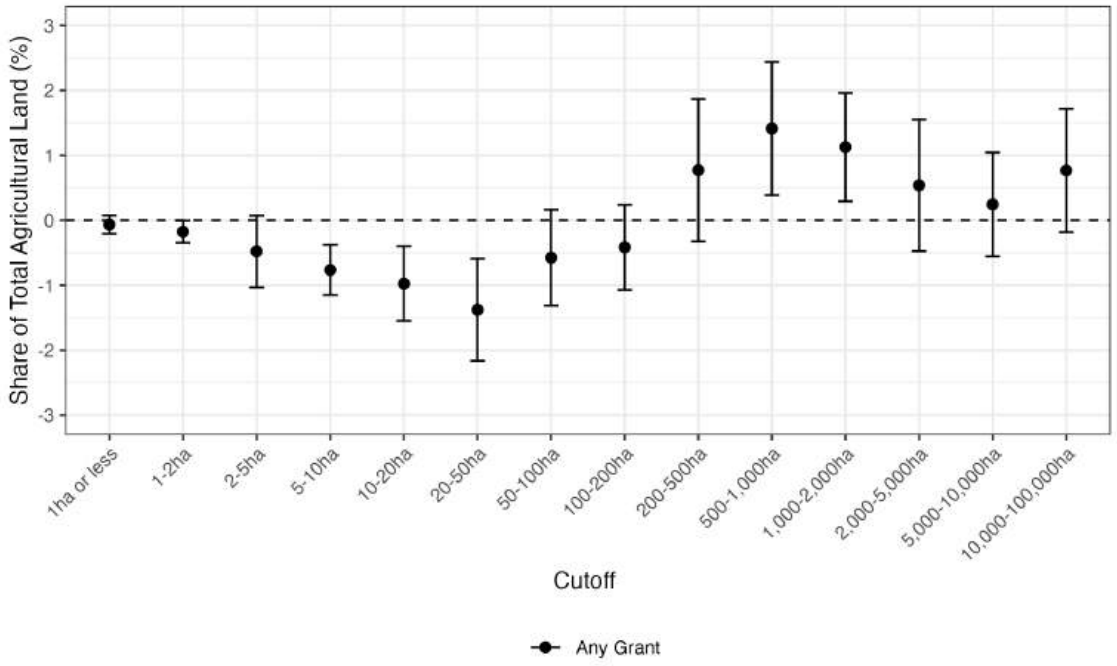
(a) Marginal Effects



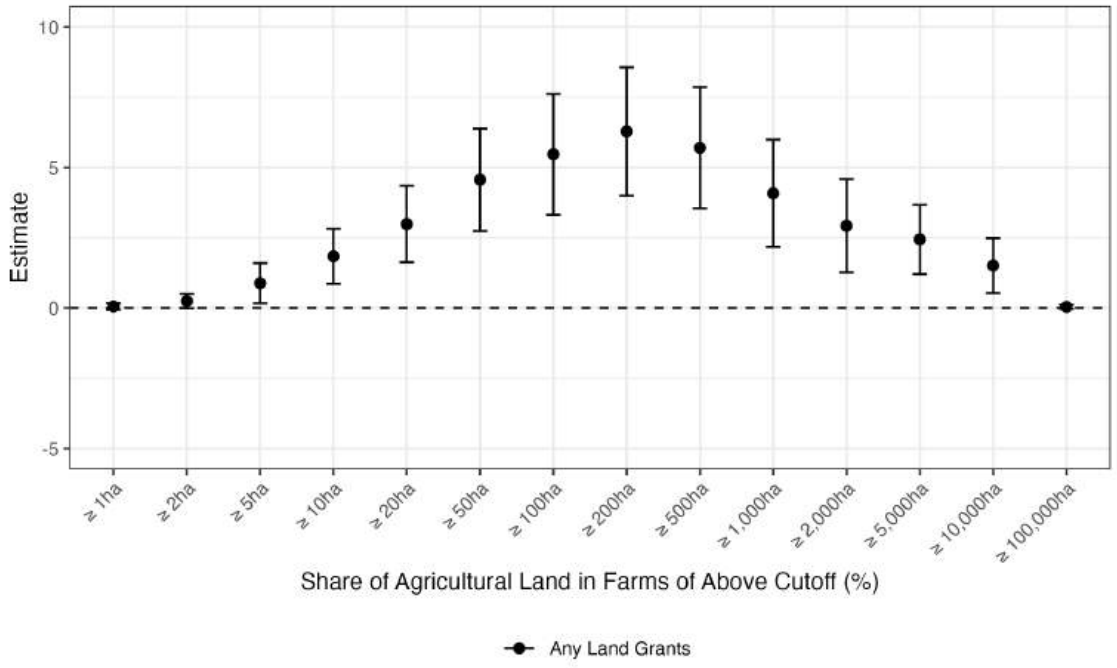
(b) Cumulative Effects

Notes: This figure shows the estimates using Equation 8 on distributional effect using the 1920 Agricultural Census. In subfigure (a), I show the effects on the marginal distribution. In subfigure (b), I show the effects of the cumulative distribution. Point estimates for subfigure (a) can be found in Table A.2.

Figure 4: Distribution Effects of the Grants - 1995 Agricultural Census



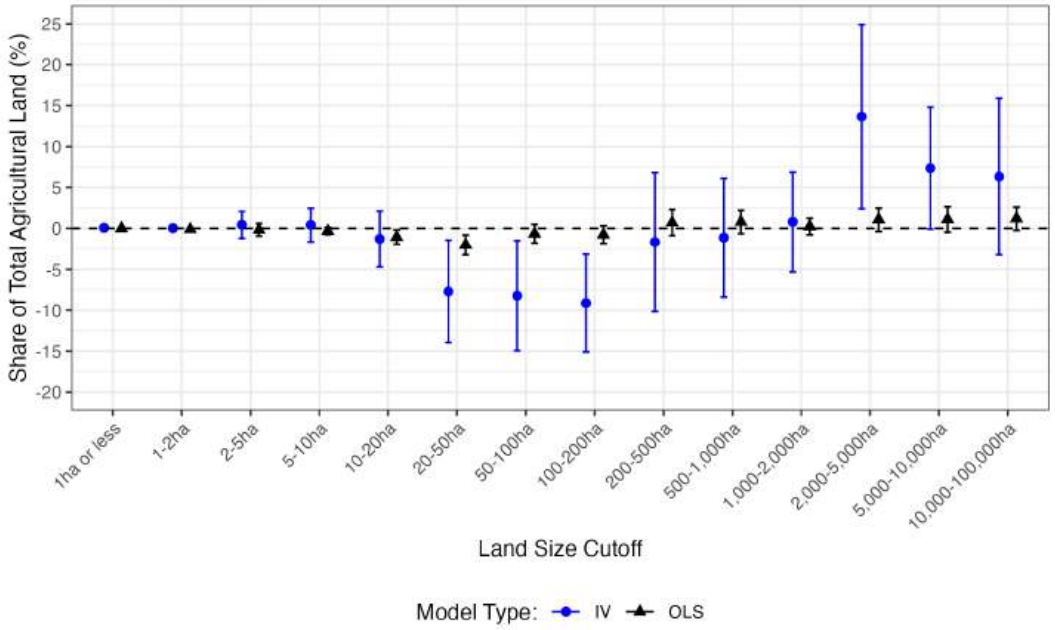
(a) Marginal Effects



(b) Cumulative Effects

Notes: This figure shows the estimates using Equation 8 on distributional effect using the 1920 Agricultural Census. In subfigure (a) the point estimates are shown for the marginal distribution of land. In subfigure (b) the estimates are shown for the cumulative distribution. Estimates for the marginal effect can be found on Table A.7.

Figure 5: IV and OLS Marginal Distribution Results - Southeast



(a) Marginal Effects

Notes: This figure shows the estimates using Equation 2 and Equation 5 on distributional effect using the 1995 Agricultural Census. The point estimates are shown for the marginal distribution of land. Table A.5.

Table 1: Geographical Characteristics of Municipalities with and without a Land Grant

	Land Grant (N=736)		No Land Grant (N=1636)			
	Mean	Std. Dev.	Mean	Std. Dev.	Diff. in Means	Std. Error
Accessibility						
Average Slope	3.64	2.17	4.02	2.40	0.38***	0.10
Average Elevation	517.90	315.82	536.35	292.04	18.45	13.70
Distance to the Coast (km)	168.92	137.55	225.83	166.65	56.91***	6.53
Distance to Nearest River (km)	149.56	146.55	105.32	125.84	−44.24***	6.23
Land Quality						
Potential Sugarcane	1517.23	500.95	1680.78	529.44	163.56***	22.63
Potential Calories pre-1500	10 293.80	1832.00	10 142.47	1449.58	−151.32**	76.45
Potential Calories post-1500	11 095.70	1425.70	11 065.62	1087.59	−30.08	59.03
Latosol Presence (0/1)	0.58	0.49	0.64	0.48	0.06***	0.02
Argisol Presence (0/1)	0.50	0.50	0.59	0.49	0.09***	0.02
Cambisol Presence (0/1)	0.27	0.45	0.18	0.38	−0.10***	0.02
Spondosol Presence (0/1)	0.01	0.12	0.02	0.12	0.00	0.01
Other						
Latitude	−41.24	4.32	−43.49	4.83	−2.25***	0.20
Longitude	−14.27	6.52	−16.96	5.57	−2.69***	0.28

Notes: This table shows the balance on set of geographical characteristics using 1995 municipality census boundaries in Brazil. It compares municipalities that received a grant versus those that did not for the pre-matching sample.

Table 2: Geographical Characteristics of Municipalities with and without a Land Grant

	Land Grant (N=736)		No Land Grant (N=736)			
	Mean	Std. Dev.	Mean	Std. Dev.	Diff. in Means	Std. Error
Accessibility						
Average Slope	3.64	2.17	3.83	2.13	0.19*	0.11
Average Elevation	517.90	315.82	523.91	316.32	6.01	16.48
Distance to the Coast (km)	168.92	137.55	164.74	134.25	−4.18	7.08
Distance to Nearest River (km)	149.56	146.55	143.37	139.13	−6.19	7.45
Land Quality						
Potential Sugarcane	1517.23	500.95	1569.90	501.76	52.67**	26.13
Potential Calories pre-1500	10 293.80	1832.00	10 265.94	1751.45	−27.85	93.42
Potential Calories post-1500	11 095.70	1425.70	11 114.66	1312.66	18.96	71.43
Latosol Presence (0/1)	0.58	0.49	0.61	0.49	0.04	0.03
Argisol Presence (0/1)	0.50	0.50	0.51	0.50	0.00	0.03
Cambisol Presence (0/1)	0.27	0.45	0.25	0.43	−0.02	0.02
Spondosol Presence (0/1)	0.01	0.12	0.01	0.12	0.00	0.01
Other						
Latitude	−41.24	4.32	−41.43	4.16	−0.19	0.22
Longitude	−14.27	6.52	−14.80	6.18	−0.52	0.33

Notes: This table shows the balance on set of geographical characteristics using 1995 municipality census boundaries in Brazil. It compares municipalities that received a grant versus those that did not for the post-matching sample.

Table 3: Effects of Grants on the Share of Agricultural Land - 1920 Agricultural Census

	Land Gini	Share Below 200ha (%)	Share Between 200ha and 2000ha (%)	Share Between Above 2000ha (%)
	(1)	(2)	(3)	(4)
Any Grants	0.010	-1.392*	-6.658***	8.049***
	(0.010)	(0.722)	(2.391)	(2.736)
N	641	641	641	641
Control Mean	0.61	7.41	51.15	41.44

Notes: This table presents the estimators on the marginal distribution of agricultural land in the 1920 Agricultural Census. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parentheses.
* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Matching Estimates - Share of Agricultural Land - 1995 Agricultural Census

	Land Gini	Share Below 200ha (%)	Share Between 200ha and 2000ha (%)	Share Between Above 2000ha (%)
	(1)	(2)	(3)	(4)
Any Grants	0.014***	-4.825***	3.311***	1.513*
	(0.005)	(1.150)	(1.005)	(0.815)
N	1472	1472	1472	1472
Control Mean	0.7	56.55	34.96	8.48

Notes: This table presents the matching estimators on the marginal distribution of agricultural land in the 1995 Agricultural Census. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parentheses.
* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: IV and Matching Estimates on Agricultural Land Size - 1995 Agricultural Census

	Share Below 200ha (%)		Share 200-2000ha (%)		Share Above 2000ha (%)	
	Matching	2SLS	Matching	2SLS	Matching	2SLS
Grants Post-1700	−5.097***	−25.358***	1.742	−1.999	3.356***	27.359***
	(1.588)	(9.135)	(1.383)	(8.332)	(1.262)	(8.040)
N	630	1365	630	1365	630	1365
Control Mean	41.2	49.9	33.7	39.4	7.5	10.5

Notes: This table presents the results of the matched estimators alongside the 2SLS estimators for post-1700 grants on land concentration in the Southeast. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol), and the area of the municipality. Robust standard errors are in parenthesis.

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

Table 6: Matching Estimates - Share of Unproductive Land - 1995 Agricultural Census

	Share Below 200ha (%)	Share Between 200ha and 2000ha (%)	Share Between Above 2000ha (%)
	(1)	(2)	(3)
Any Grants	-5.431***	4.595***	0.414
	(1.546)	(1.404)	(0.879)
N	1472	1472	1472
Control Mean	61.84	31.38	5.69

Notes: This table presents the matching estimators on the marginal distribution of unproductive land, defined in the 1995 Agricultural Census as land that could be used for agriculture but has not been used for the past four years. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parentheses.
* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Matching Estimates on 2010 - GDP per capita, Poverty, and Human Development Indexes

	GDP per Capita	Percentage in Poverty (%)	Percentage in Extreme Poverty (%)	HDI - Income	HDI - Education	HDI - Health
	(1)	(2)	(3)	(4)	(5)	(6)
Any Grants	32.170***	−0.820**	−0.578*	0.009***	0.007**	0.005***
	(7.218)	(0.405)	(0.298)	(0.002)	(0.003)	(0.001)
N	1550	1550	1550	1550	1550	1550
Control Mean	420.95	26.8	12.7	0.620	0.538	0.790

Notes: This table presents the results of the matching estimators for GDP per capita, poverty rates, and Human Development Indexes for income, education, and health for 2010. Percentage in Poverty indicates the percentage of people making less than 140 Brazilian Reais per month in August of 2010. Percentage in Extreme Poverty indicates the percentage of people making less than 70 Brazilian Reais per month in August of 2010. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol), and the area of the municipality. Robust standard errors are in parenthesis.

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

Table 8: Matching Estimates on 2010 - Income Distribution

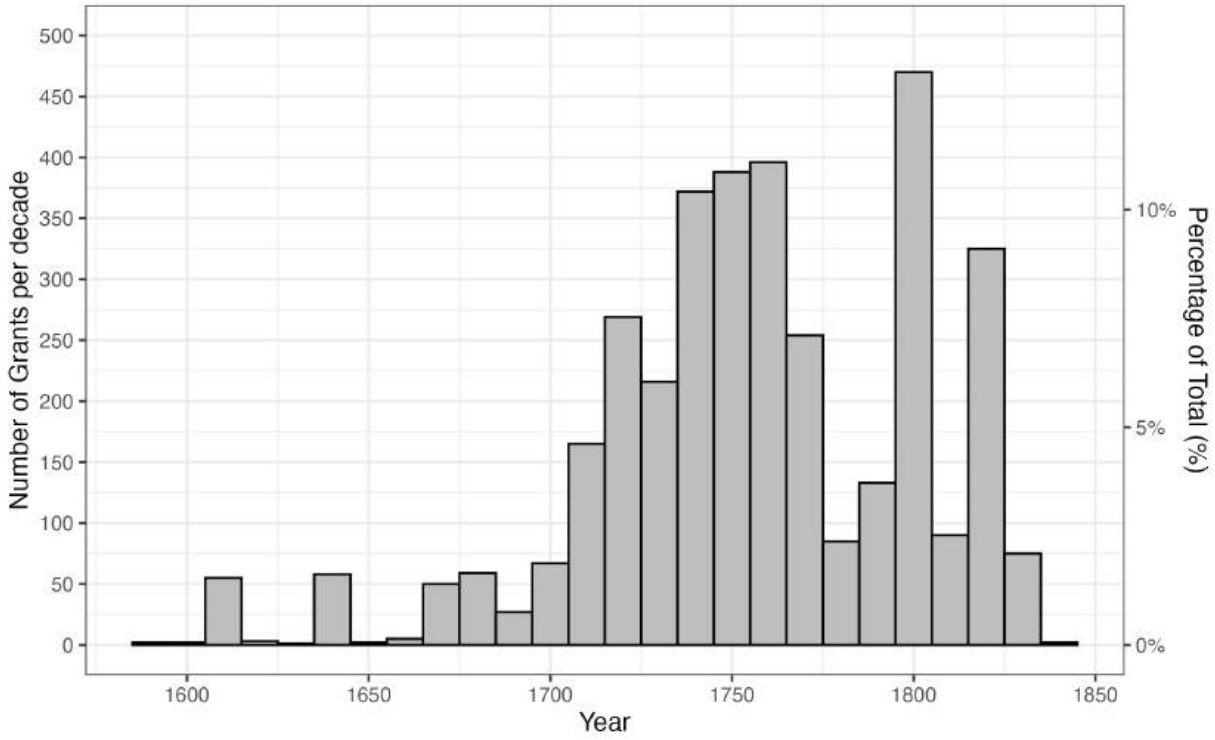
	Income Gini	Household Income of Poorest Quintile	Household Income of Second Poorest Quintile	Household Income of Third Poorest Quintile	Household Income of Fourth Poorest Quintile	Household Income of Richest Quintile
	(1)	(2)	(3)	(4)	(5)	(6)
Any Grants	0.011***	2.854*	6.125**	9.972***	21.681***	119.703***
	(0.002)	(1.534)	(2.553)	(3.545)	(5.590)	(25.101)
% of the Mean	2.24	3.36	3.36	3.51	5.03	10.66
Control Mean	0.49	84.84	182.48	284.27	431.24	1122.40
N	1550	1550	1550	1550	1550	1550

Notes: This table presents the results of the matching estimators for the average quintile income. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol), and the area of the municipality. Robust standard errors are in parenthesis.

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

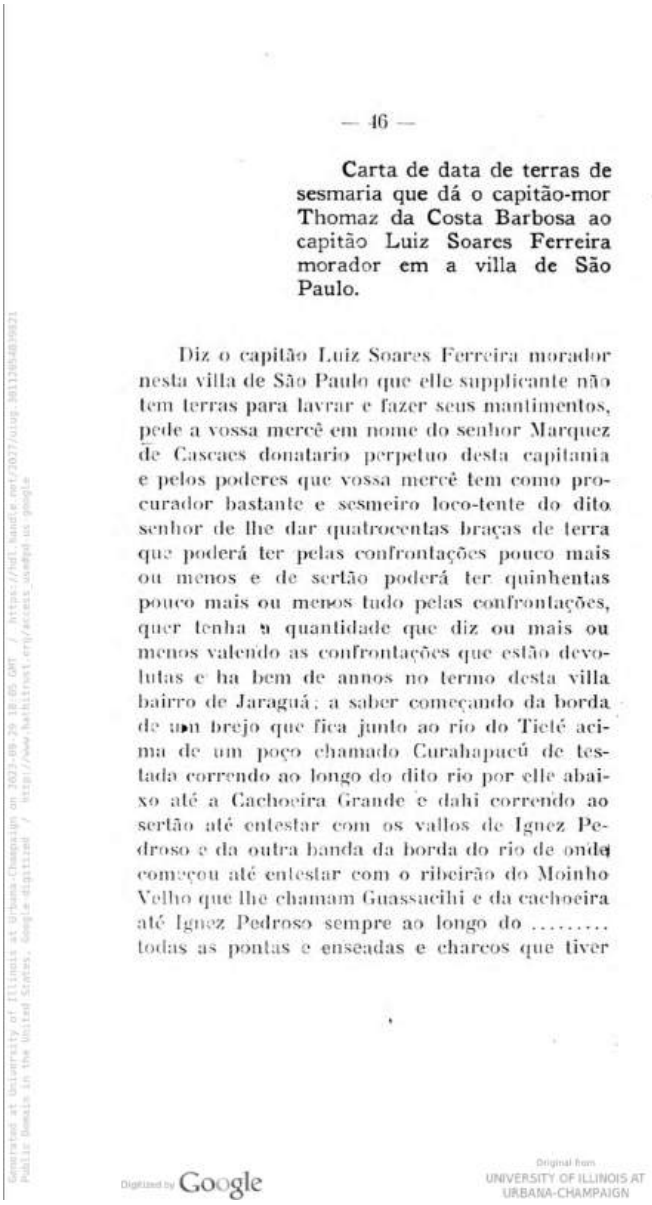
A. Figures and Tables

Figure A.1: Number of Land Grants per Decade 1590-1840



Notes: Histogram describing the distribution of the land grants used in the dataset per decade. The first land grant in my dataset is given in the 1590s, while the last is in the 1850s.

Figure A.2: Example letter from *Sesmarias; documentos do Archivo do Estado de São Paulo* (1921)



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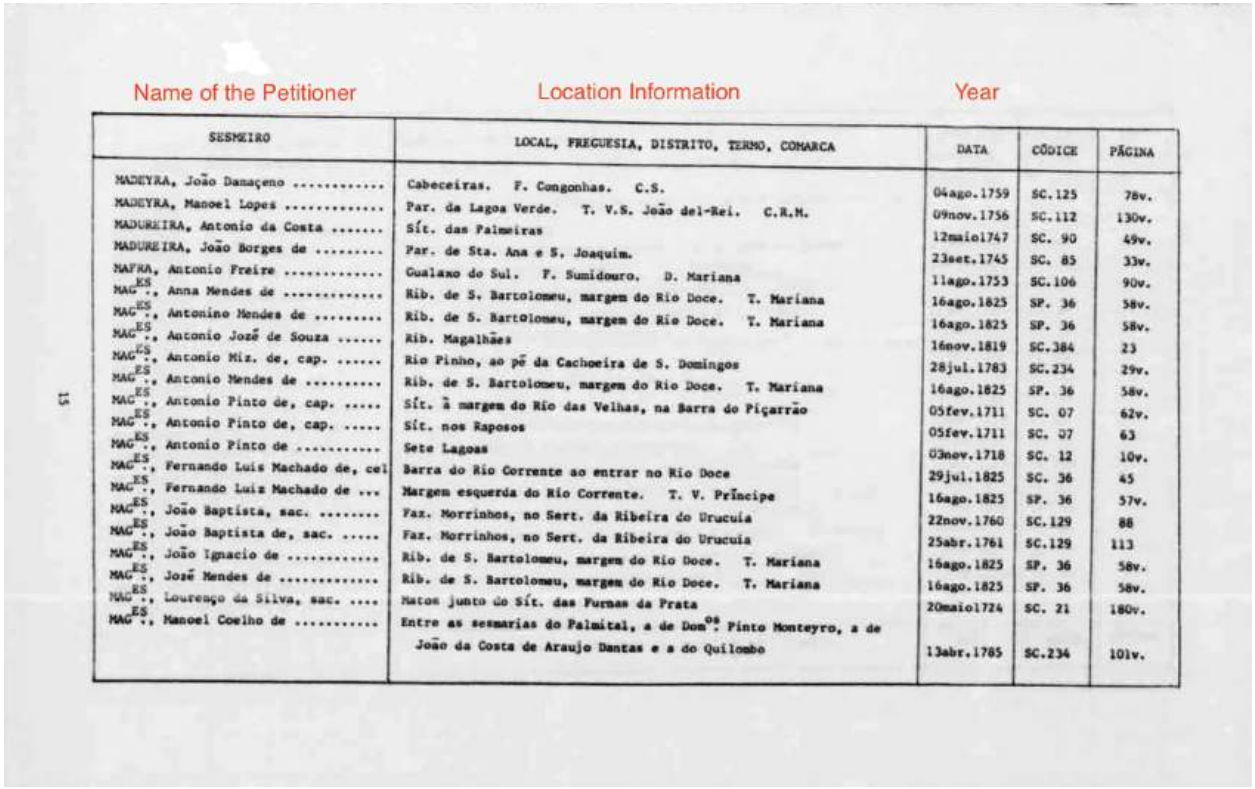
Carta de data de terras de sesmaria que dá o capitão-mor Thomaz da Costa Barbosa ao capitão Luiz Soares Ferreira morador em a villa de São Paulo.

Diz o capitão Luiz Soares Ferreira morador nesta villa de São Paulo que elle supplicante não tem terras para lavrar e fazer seus mantimentos, pede a vossa mercê em nome do senhor Marquez de Cascaes donatario perpetuo desta capitania e pelos poderes que vossa mercê tem como procurador bastante e sesmeiro loco-tente do dito senhor de lhe dar quatrocentas braças de terra que poderá ter pelas confrontações pouco mais ou menos e de sertão poderá ter quinhentas pouco mais ou menos tudo pelas confrontações, quer tenha a quantidade que diz ou mais ou menos valendo as confrontações que estão devolutas e ha bem de annos no termo desta villa bairro de Jaraguá; a saber começando da borda de um brejo que fica junto ao rio do Tieté acima de um poço chamado Curahapucú de testada correndo ao longo do dito rio por elle abaixo até a Cachoeira Grande e dahi correndo ao sertão até entestar com os vallos de Ignez Pedroso e da outra banda da borda do rio de onde começou até entestar com o ribeirão do Moinho Velho que lhe chamam Guassucihi e da cachoeira até Ignez Pedroso sempre ao longo do ..... todas as pontas e enseadas e charcos que tiver

Notes: Example letter for the state of São Paulo, obtained from *Sesmarias; documentos do Archivo do Estado de São Paulo* (1921, p. 47). Based on the letter, we extract information on the geographical location, along with the year of concession, economic activity, etc. This letter extends to another page and includes more information.

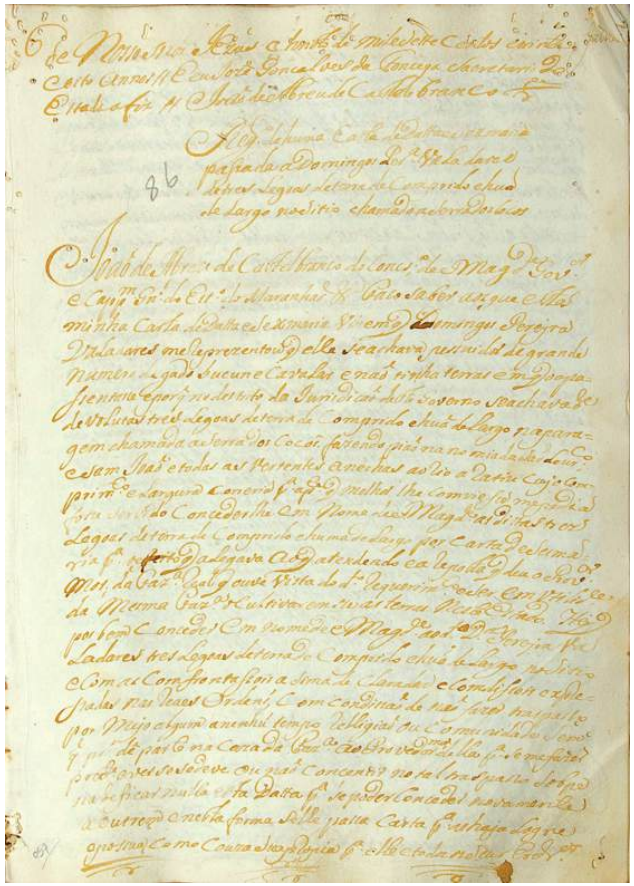
Figure A.3: Example Inventory of *sesmaria* from the Minas Gerais State Archives



SESMEIRO	LOCAL, FREGUESIA, DISTRITO, TERMO, COMARCA	DATA	CÓDICE	PÁGINA
MADEYRA, João Damaçeno	Cabeceiras. F. Congonhas. C.S.	04ago.1759	SC.125	78v.
MADEYRA, Manoel Lopes	Par. da Lagoa Verde. T. V.S. João del-Rei. C.R.M.	09nov.1756	SC.112	130v.
MADUREIRA, Antonio da Costa	Sít. das Palmeiras	12maio1747	SC. 90	49v.
MADUREIRA, João Borges de	Par. de Sta. Ana e S. Joaquim.	23set.1745	SC. 85	33v.
MAFRA, Antonio Freire	Gualaxo do Sul. F. Sumidouro. D. Mariana	11ago.1753	SC.106	90v.
MAG^{ES}., Anna Mendes de	Rib. de S. Bartolomeu, margem do Rio Doce. T. Mariana	16ago.1825	SP. 36	58v.
MAG^{ES}., Antonino Mendes de	Rib. de S. Bartolomeu, margem do Rio Doce. T. Mariana	16ago.1825	SP. 36	58v.
MAG^{ES}., Antonio José de Souza	Rib. Magalhães	16nov.1819	SC.384	23
MAG^{ES}., Antonio Miz. de, cap.	Rio Pinho, ao pé da Cachoeira de S. Domingos	28jul.1783	SC.234	29v.
MAG^{ES}., Antonio Mendes de	Rib. de S. Bartolomeu, margem do Rio Doce. T. Mariana	16ago.1825	SP. 36	58v.
MAG^{ES}., Antonio Pinto de, cap.	Sít. à margem do Rio das Velhas, na Barra do Piçarrão	05fev.1711	SC. 07	62v.
MAG^{ES}., Antonio Pinto de, cap.	Sít. nos Raposos	05fev.1711	SC. 07	63
MAG^{ES}., Antonio Pinto de	Sete Lagoas	03nov.1718	SC. 12	10v.
MAG^{ES}., Fernando Luis Machado de, cel	Barra do Rio Corrente ao entrar no Rio Doce	29jul.1825	SC. 36	45
MAG^{ES}., Fernando Luiz Machado de ...	Margem esquerda do Rio Corrente. T. V. Príncipe	16ago.1825	SP. 36	57v.
MAG^{ES}., João Baptista, sac.	Faz. Morrinhos, no Sert. da Ribeira do Urucuia	22nov.1760	SC.129	88
MAG^{ES}., João Baptista de, sac.	Faz. Morrinhos, no Sert. da Ribeira do Urucuia	25abr.1761	SC.129	113
MAG^{ES}., João Ignacio de	Rib. de S. Bartolomeu, margem do Rio Doce. T. Mariana	16ago.1825	SP. 36	58v.
MAG^{ES}., José Mendes de	Rib. de S. Bartolomeu, margem do Rio Doce. T. Mariana	16ago.1825	SP. 36	58v.
MAG^{ES}., Lourenço da Silva, sac.	Matos junto do Sít. das Furnas da Prata	20maio1724	SC. 21	180v.
MAG^{ES}., Manoel Coelho de	Entre as sesmarias do Palmital, a de Dom^{os}. Pinto Monteyro, a de João da Costa de Araujo Dantas e a do Quilombo	13abr.1785	SC.234	101v.

Notes: Example of an inventory page for the state of Minas Gerais, obtained from the Revista do Arquivo Publico Mineiro - Inventory of the sesmarias letters on the Public Archive Codex - Volume 37 (1988). Based on the letter, I extract the name, the location, and the year of concession. The first column indicates the name of the petitioner, the second column the geographical information, the third column is the year.

Figure A.4: Example original letter alongside its transcribed version



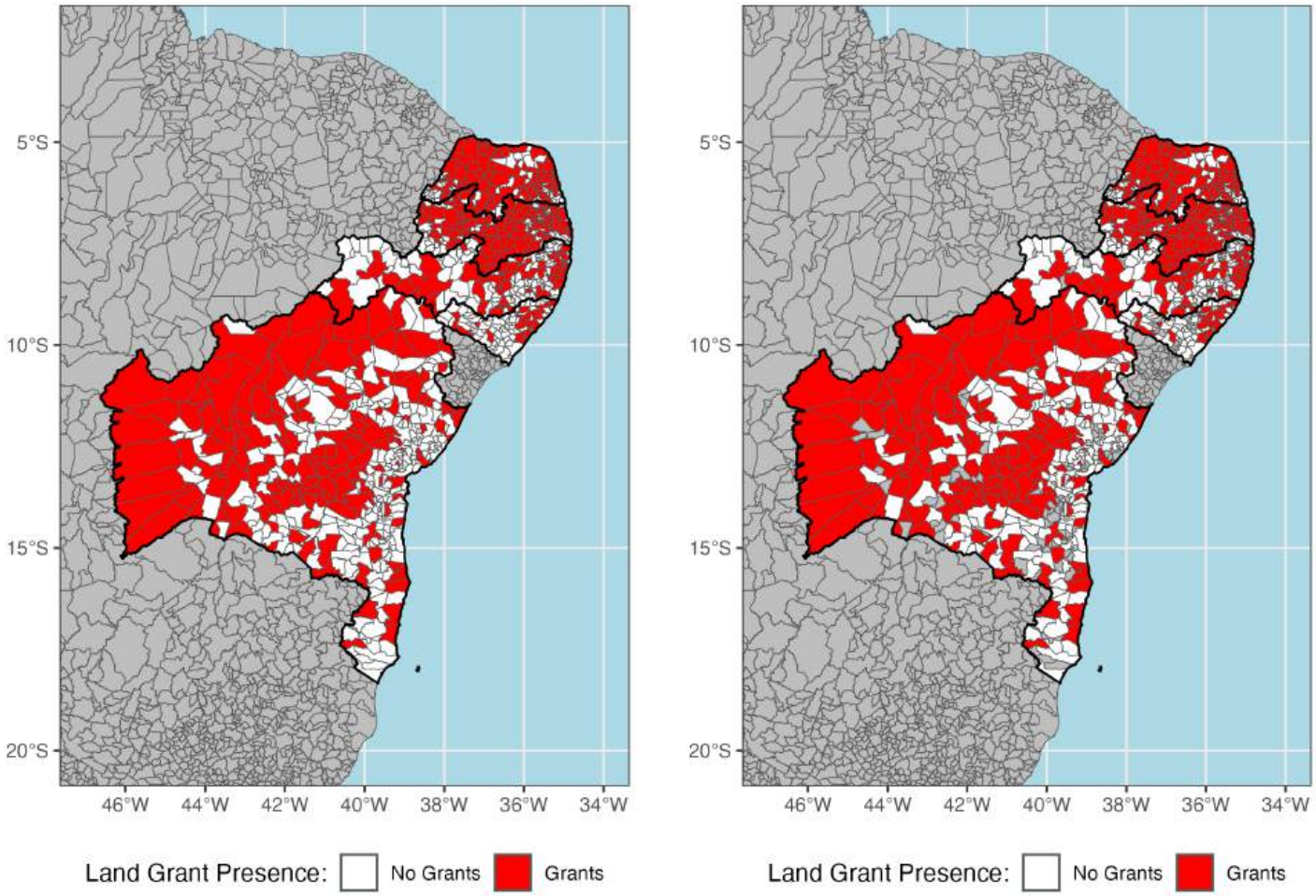
PA 0001
Carta de concessão a Domingos Pereira Valadares - 19/06/1738

Registro de uma carta de data e sesmaria passada a Domingos Pereira Valadares de 3 léguas de terra de comprimento e uma de largura, no sítio chamado a Serra dos Cocos.

João de Abreu Castelo Branco, do Conselho de Sua Majestade, governador e capitão-general do estado do Maranhão, etc. Faço saber, aos que esta minha carta de data e sesmaria virem, que Domingos Pereira Valadares me representou que ele se achava possuidor de grande número de gado vacum e cavalar, e não tinha terras em que apascentasse, e porque no distrito da jurisdição deste governo se achavam devolutas 3 léguas de terra de comprido e uma de largo, na paragem chamada a Serra dos Cocos, fazendo pião na nomeada São Lourenço e São João, e todas as vertentes anexas ao Rio Araticu, cujo comprimento e largura correria para a parte que melhor lhe conviesse; me pedia fosse servido conceder-lhe, em nome de Sua Majestade, as ditas 3 léguas de terra de comprido e uma de largo, por carta de sesmaria, para efeito que alegava; ao que atendendo, e a resposta que deu o provedor-mor da Fazenda Real, que houve vista do dito requerimento, e ser em utilidade da mesma Fazenda o cultivarem-se as terras neste estado. Hei, por bem, conceder, em nome de Sua Majestade, ao dito Domingos Pereira Valadares, 3 léguas de terra de comprido e uma de largo, no sítio e com as confrontações acima declaradas e condições expressadas nas Reais Ordens, com condição de não fazer trespasse, por meio algum, em nenhum tempo, religião ou comunidade, sem que primeiro dê parte na Casa da Fazenda ao provedor-mor dela, para se me fazer presente e ver se se deve ou não consentir no tal trespasse, sob pena de ficar nula esta data para se poder conceder novamente a outrem. E, nesta forma, se lhe passa carta para as haja, logre e possua como coisa sua própria, para ele e todos os seus herdeiros, ascendentes e descendentes, sem pensão, nem tributo algum mais que o dízimo a Deus, Nosso Senhor, dos frutos que nelas tiver; a qual concessão lhe faço não prejudicando a terceiro nem a Sua Majestade, se no dito sitio quiser mandar fundar alguma vila, reservando os paus Reais que nelas houver para embarcações, com declaração que mandará confirmar esta data por Sua Majestade dentro de 3 anos primeiros seguintes, e cultivará as ditas terras de maneira que dê fruto; e dará caminhos públicos e particulares aonde forem necessários para pontes, fontes, portos e pedreiras; e se demarcará, ao tempo da posse, por rumo de corda e braças craveiras, como é estilo e o dito senhor ordena. E, outrossim, não sucederão nelas religiões ou pessoas eclesiásticas por nenhum título; e, acontecendo, possuí-las será com o encargo de pagar delas dízimos a Deus como se fossem possuídas por seculares; e, faltando a qualquer destas cláusulas, se haverão por devolutas e se darão a quem as denunciar. Pelo que mando ao provedor-mor da Fazenda Real, e mais ministros e pessoas a que tocar, que, na forma referida, deixem ter e possuir ao dito Domingos Pereira Valadares as ditas terras, para ele e todos os seus herdeiros, ascendentes e descendentes, como coisa sua própria. Cumpram e guardem esta carta de data e sesmaria tão inteiramente como nela se contém, a qual lhe mandei passar por mim assinada e selada com o sinete de minhas armas, que se registrará aonde tocar e se passou por duas vias. Dada na cidade de São Luís do Maranhão, aos 19 dias do mês de junho do ano do nascimento de Nosso Senhor Jesus Cristo de 1738. E eu, José Gonçalves da Fonseca, secretário do estado, a fiz // João de Abreu Castelo branco//.

Notes: Example of an original manuscript (on the left) and its transcribed version (on the right). Obtained from *SILB*.

Figure A.5: Geographical Land Grant Distribution

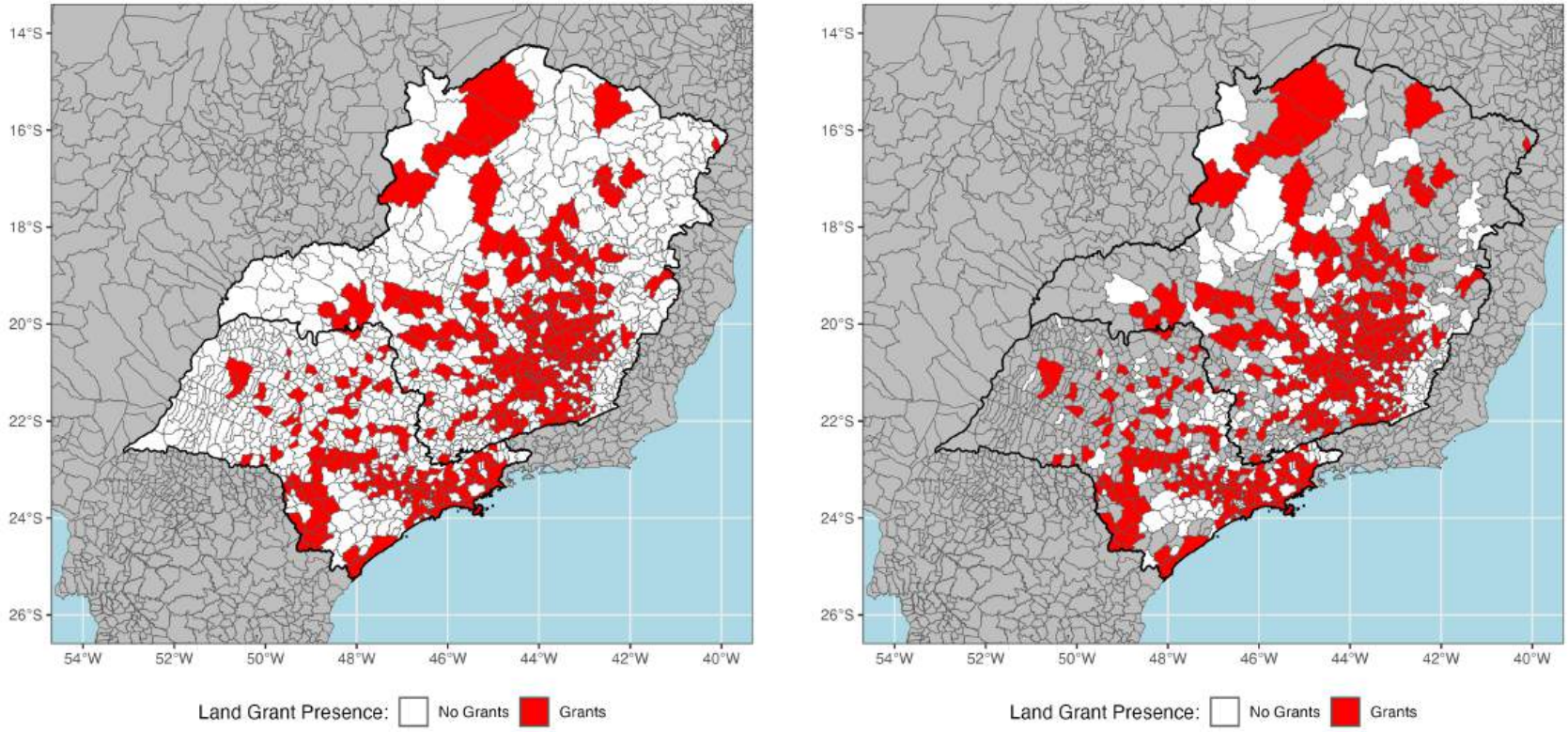


(a) Pre-matching Sample

(b) Post-matching Sample

Notes: Geographical distribution of the land grants across the states in the Northeast. Municipalities for the 1995 census for the states which information on the land grants is available are highlighted in red.

Figure A.6: Geographical Land Grant Distribution

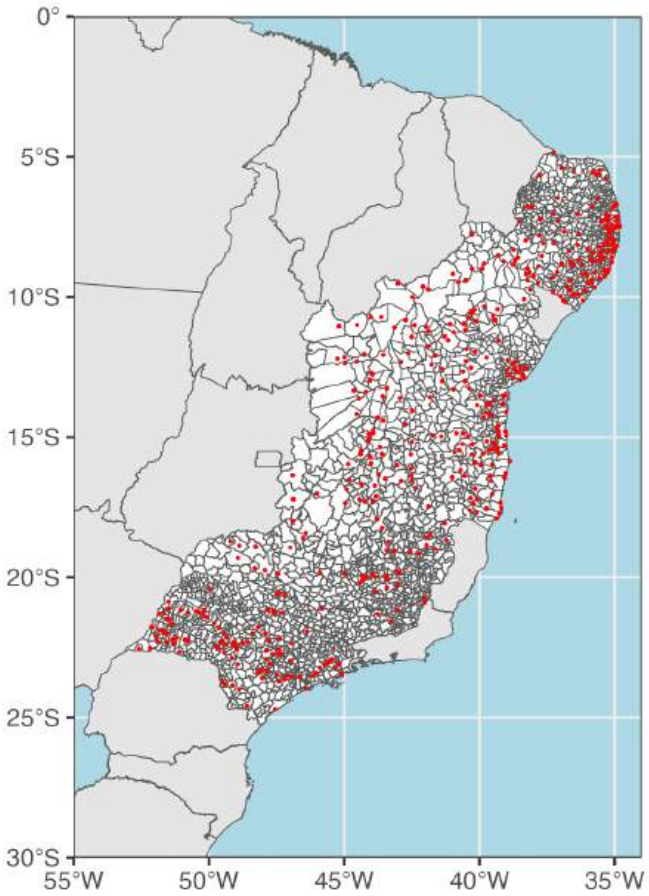


(a) Pre-matching Sample

(b) Post-matching Sample

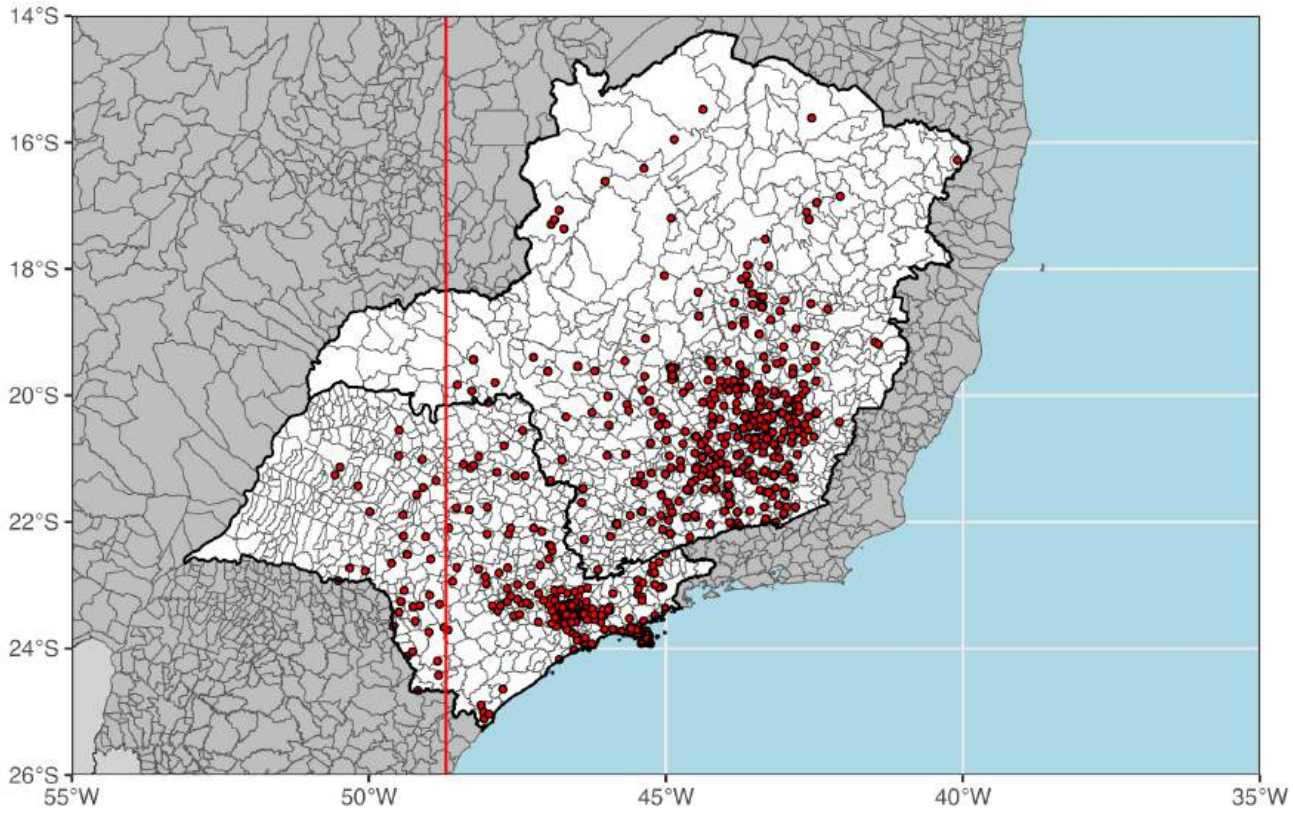
Notes: Geographical distribution of the land grants across the states. Municipalities for the 1995 census for the states where information on the land grants is available are highlighted in red.

Figure A.7: Geographical distribution of Land Conflicts in Brazil



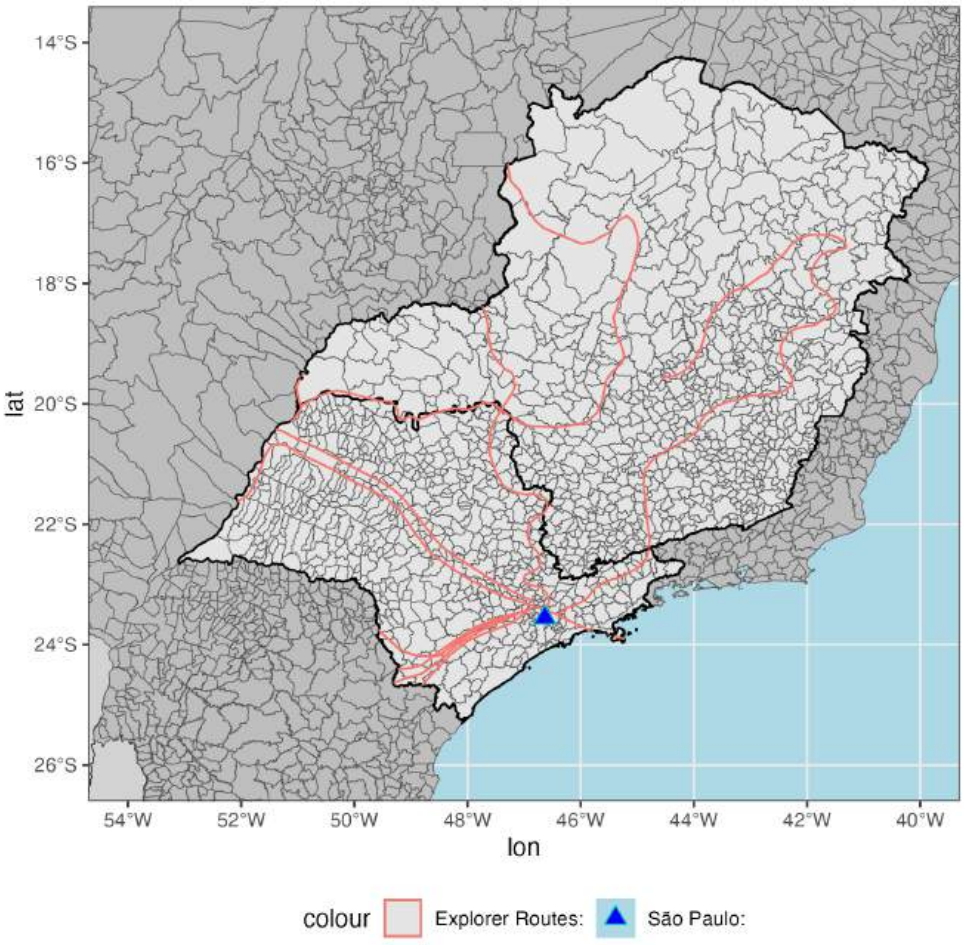
Notes: Geographical distribution of Land Conflicts in Brazil from 2014-2018 from the *Comissao Pastoral da Terra* (Pastoral Comission of Land). Red dots indicate a conflict as reported on their yearly reports alongside with 2010 municipality boundaries.

Figure A.8: Distribution of Land Grants in Minas Gerais and São Paulo alongside the Treaty of Tordesillas line



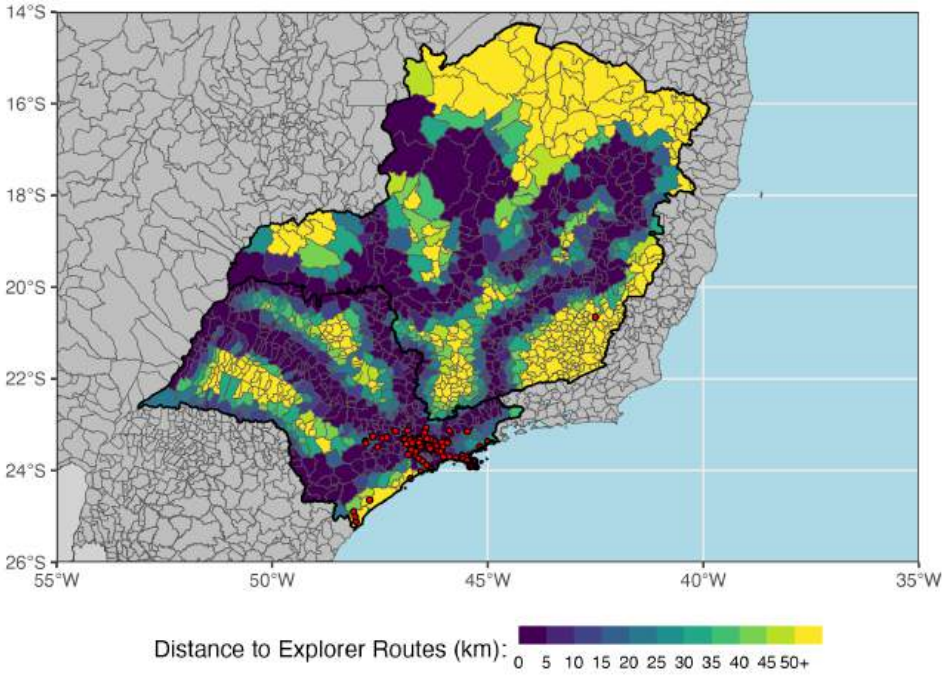
Notes: This figure shows the distribution of land grants in the states of Minas Gerais and São Paulo (shaded in gray) alongside the Treaty of Tordesillas. Black dots indicate the location of the land grants. The red vertical line is the Treaty of Tordesillas line following Laudares and Caicedo (2023). The treaty line is located at 48.7 W.

Figure A.9: Distribution of Land Grants alongside Bandeiras

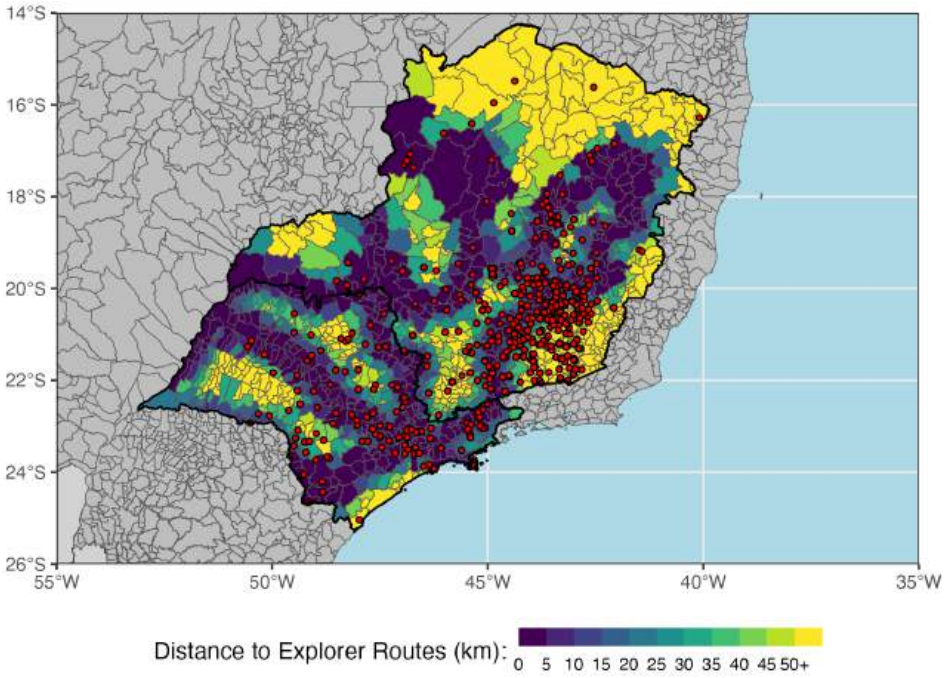


Notes: This figure shows the distribution of the land grants alongside the *bandeiras* routes. Each black dot represents a grant, while the red lines indicate the *bandeiras*. Present-day state boundaries are shown.

Figure A.10: Exploration Routes and 1995 Municipalities



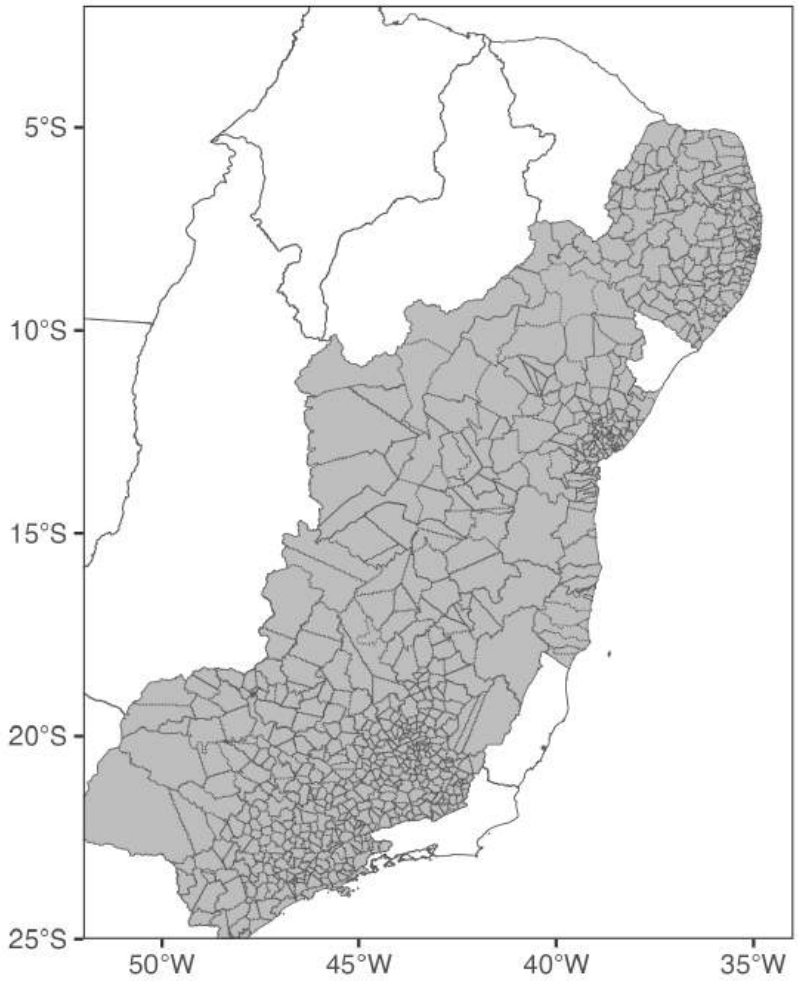
(a) Pre-1600



(b) Post-1700

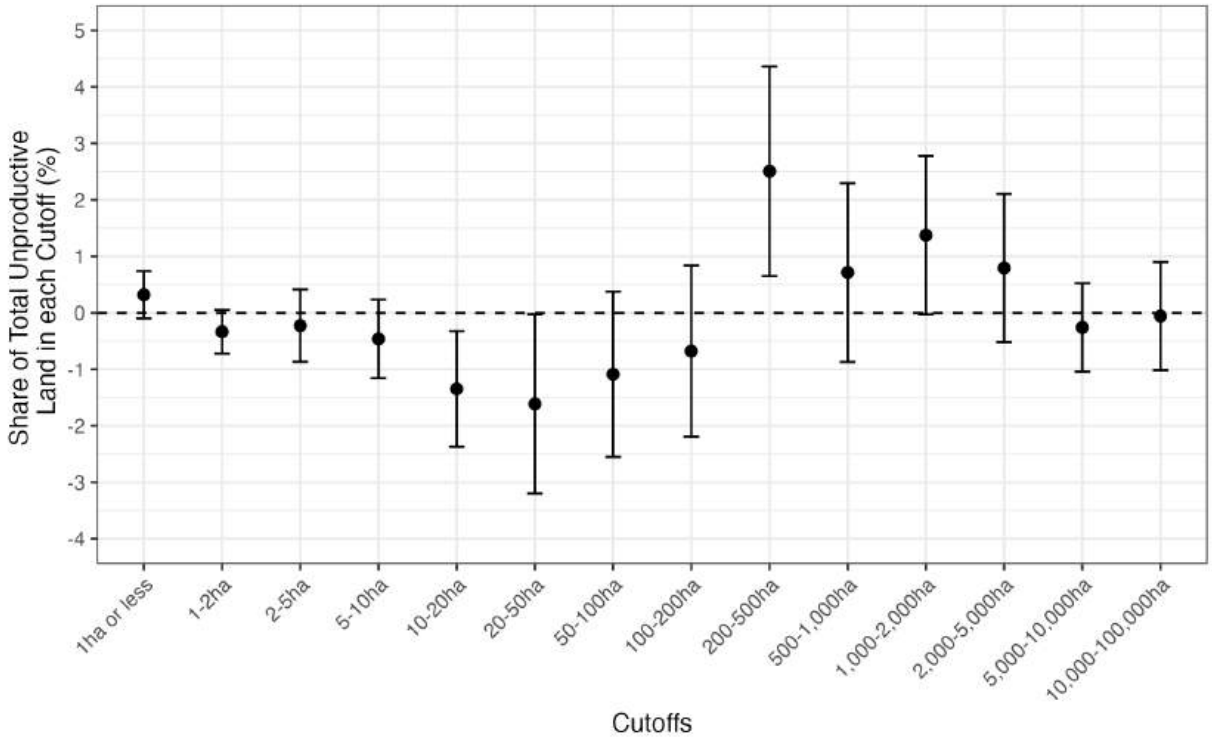
Notes: Proximity to an exploration route (*bandeira*) and 1995 municipalities boundaries in the states of São Paulo and Minas Gerais. Darker colors indicate that the municipality is close to a *bandeira*, while lighter colors indicate that the municipality is further away. Yellow indicates municipalities more than 50km from the explorer route. Red dots indicate the grants in those two states.

Figure A.11: 1872 Municipalities and Parish Locations



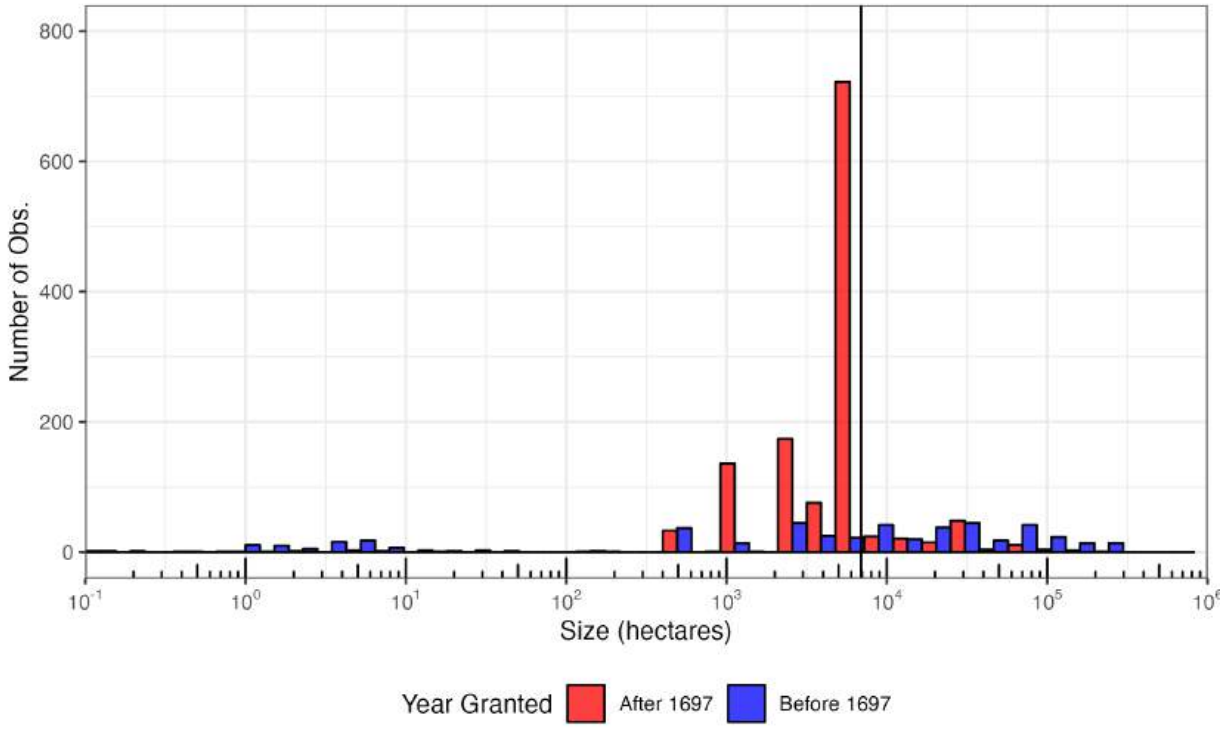
Notes: Geographical distribution of 1872 parishes alongside 1872 municipality and state boundaries. The states to which I have information on the land grants are highlighted in red. This map shows that several municipalities, especially in the Southeastern states, have more than one parish per municipality. The sample increases by using parish-level information instead of municipalities from 337 to 815.

Figure A.12: Effects on Unproductive Land - 1995



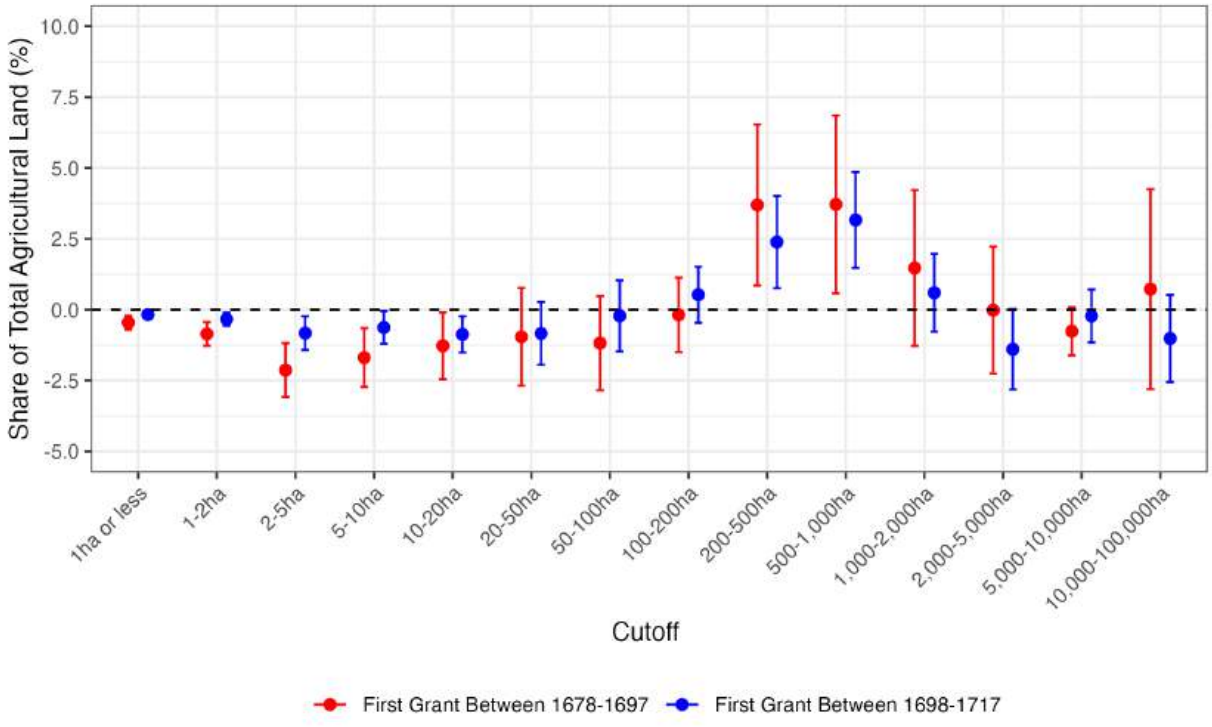
Notes: This figure combines estimates from Equation 9 on the percentage of unproductive agricultural land in farms for different size cutoffs and grant periods using the 1995 Agricultural Census. This serves as a measure of land usage intensity. Individual point estimates are found in Table A.4. The aggregate point estimates between 0-200ha, 200 to 2000ha, and above 2000ha are found in Table 6.

Figure A.13: Size Distribution of the Grants: Pre- and Post- 1697



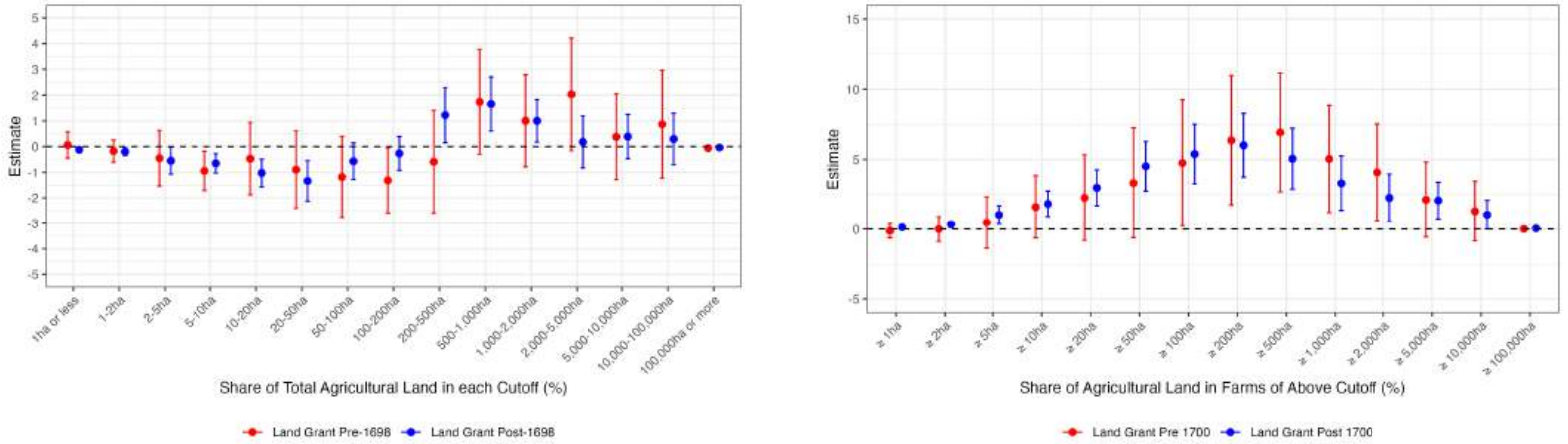
Notes: This figure shows the size distribution of the grants based on the request of the petitioner before 1697 and after 1697, when a law was passed limitng it size to 10,800ha.

Figure A.14: Size Distribution of the Grants: Pre- and Post- 1697



Notes: This figure combines estimates from Equation 7 on the percentage of agricultural land in farms for different size cutoffs and grant periods using the 1995 Agricultural Census.

Figure A.15: Distributional Effects of the Grants

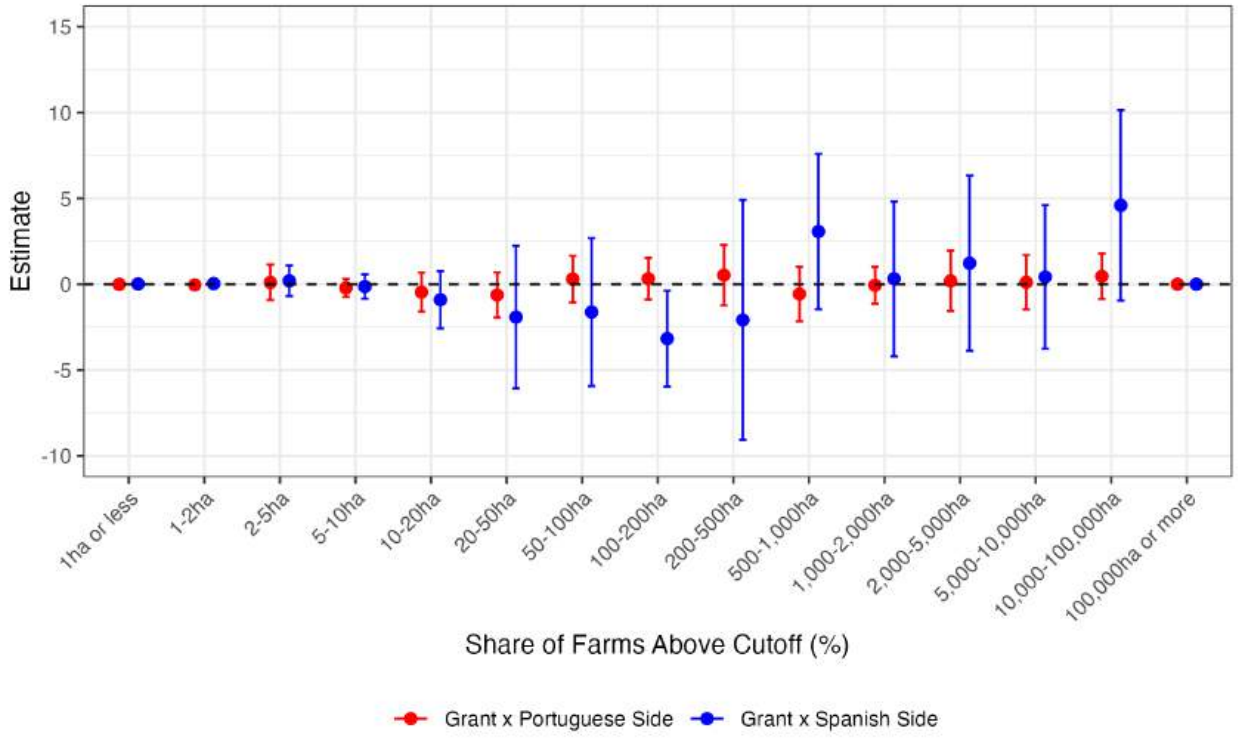


(a) Marginal Distribution (Pre-1700 vs. Post-1700 Grants)

(b) Cumulative Distribution (Pre-1700 vs. Post-1700 Grants)

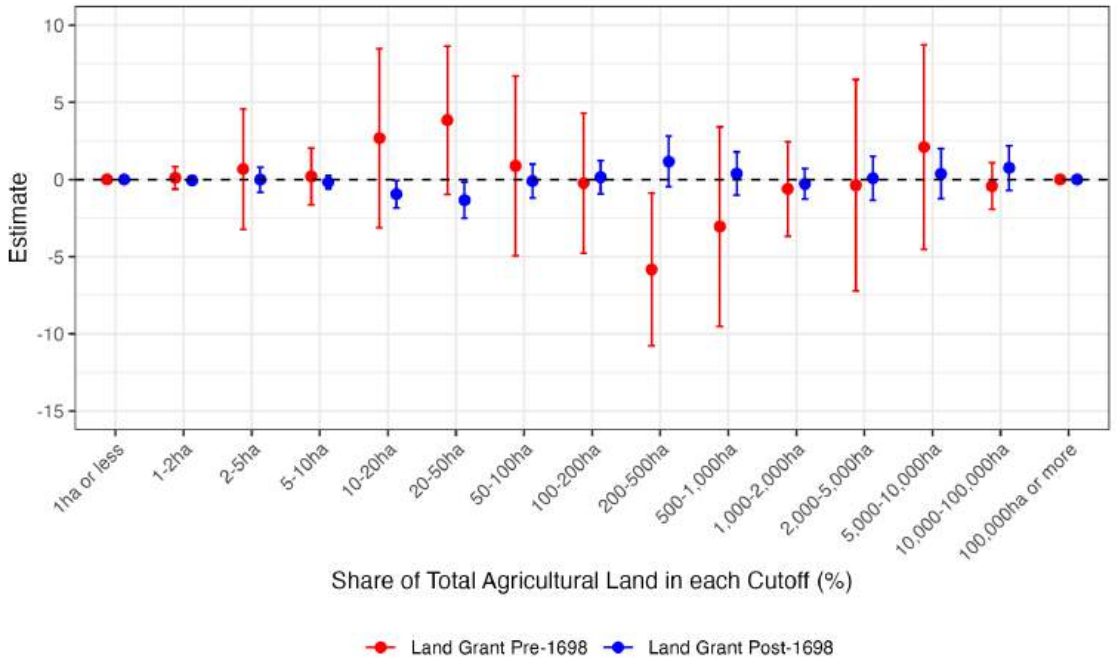
Notes: This figure combines estimates from Equation 8 on the percentage of agricultural land in farms for different size cutoffs and grant periods using the 1995 Agricultural Census. Panels (a) and (b) show marginal and cumulative distributions for pre-1700 and post-1700 grants.

Figure A.16: Portuguese and Spanish Split on Marginal Land Distribution - 1995

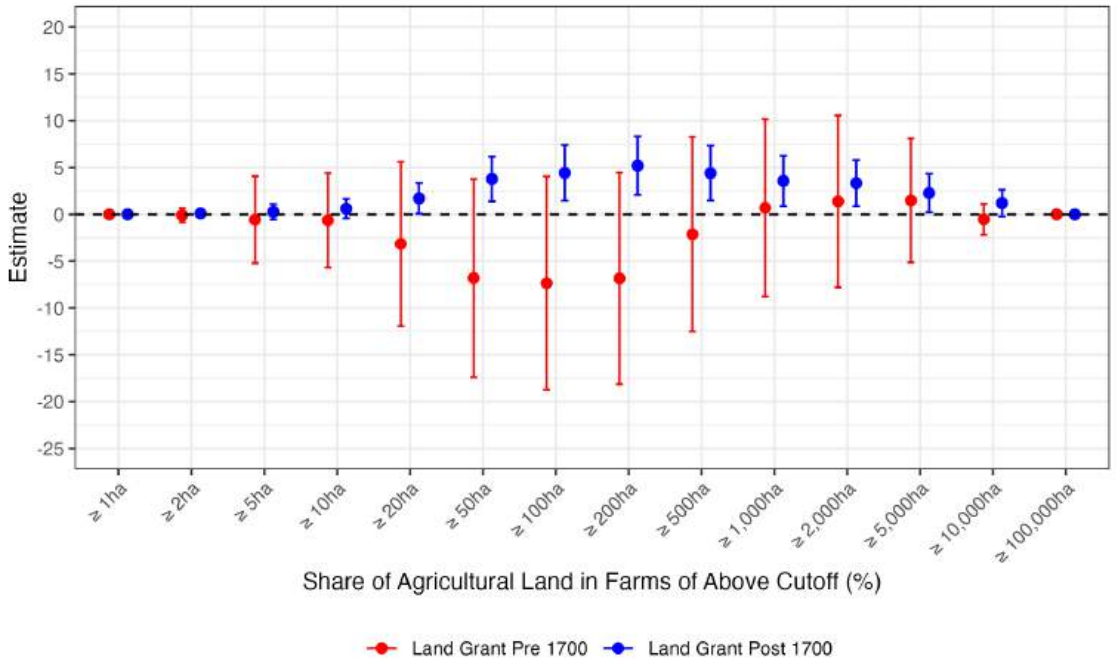


Notes: This figure combines estimates from Equation 9 on the percentage of agricultural land in farms for different size cutoffs and grant periods using the 1995 Agricultural Census. Point estimates for Table A.17.

Figure A.17: Distribution Effects of the Grants - Northeastern and Southeastern States



(a) Northeast Sample



(b) Southeast Sample

Notes: This figure shows the estimates using Equation 8 on the percentage of agricultural land in farms above a certain cutoff for both pre-1700 and post-1700 grants on the Northeast states. Figure (a), uses the states in the Northeast, while Figure (b) uses the states in the Southeast.

Table A.1: Geographical Characteristics of Municipalities with a Land Grant Pre-1700, a Land Grant Post-1700, or no Land Grant

	No Grants (N=1637)		Post-1700 Grant (N=648)		Pre-1700 Grant (N=87)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Accessibility						
Average Slope	4.02	2.40	3.63	2.13	3.69	2.45
Average Elevation	536.29	291.96	538.21	315.07	367.68	282.17
Distance to the Coast (km)	225.81	166.60	180.48	137.96	82.66	99.90
Distance to Nearest River (km)	105.40	125.85	147.78	147.83	161.76	137.37
Land Quality						
Potential Sugarcane	1681.08	529.41	1502.83	494.12	1616.92	539.71
Potential Calories pre-1500	10 142.74	1449.18	10 389.84	1752.44	9575.24	2233.16
Potential Calories post-1500	11 065.32	1087.32	11 184.93	1362.25	10 437.12	1705.53
Latosol Presence (0/1)	0.64	0.48	0.59	0.49	0.46	0.50
Argisol Presence (0/1)	0.59	0.49	0.49	0.50	0.62	0.49
Cambisol Presence (0/1)	0.18	0.38	0.29	0.45	0.15	0.36
Spondosol Presence (0/1)	0.02	0.12	0.01	0.10	0.06	0.23
Other						
Latitude	−43.49	4.83	−41.40	4.32	−40.11	4.18
Longitude	−16.96	5.57	−14.35	6.55	−13.68	6.34

[a] This table shows the balance on set of geographical characteristics using 1995 municipality census boundaries in Brazil. It compares municipalities that received a grant pre-1700, those that received a grant post-1700, and those that never received a grant.

Table A.2: OLS Estimates - 1920 Agricultural Census

	41ha or less	41-100ha	100-200ha	200-400ha	400-1,000ha	1,000-2,000ha	2,000-5,000ha	5,000-10,000ha	10,000-25,000ha	25,000ha or more
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Any Grants	-0.157*	-0.382*	-1.041**	-1.466*	-3.440***	-1.676	3.410	3.510*	1.324	-0.082
	(0.081)	(0.204)	(0.435)	(0.793)	(1.133)	(1.651)	(2.116)	(1.795)	(1.440)	(1.240)
N	685	685	685	685	685	685	685	685	685	685

Notes: This table presents the estimators on the marginal distribution of land for the 1920 Agricultural Census. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parentheses.

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

Table A.3: Matching Estimates - 1995 Agricultural Census

	1ha or less	1-2ha	2-5ha	5-10ha	10-20ha	20-50ha	50-100ha	100-200ha	200-500ha	500-1,000ha	1,000-2,000ha	2,000-5,000ha	5,000-10,000ha	10,000-100,000ha	100,000ha or more
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Any Grants	−0.065	−0.175**	−0.478*	−0.765***	−0.975***	−1.377***	−0.576	−0.415	0.772	1.412***	1.127***	0.540	0.244	0.767	−0.037
	(0.073)	(0.087)	(0.282)	(0.197)	(0.293)	(0.401)	(0.376)	(0.334)	(0.558)	(0.523)	(0.426)	(0.517)	(0.407)	(0.484)	(0.038)
N	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472

Notes: This table presents the Matcing estimators on the marginal distribution of land. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parenthesis.

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

Table A.4: Matching Estimates - Share of Unproductive Land - 1995 Agricultural Census

	1ha or less (1)	1-2ha (2)	2-5ha (3)	5-10ha (4)	10-20ha (5)	20-50ha (6)	50-100ha (7)	100-200ha (8)	200-500ha (9)	500-1,000ha (10)	1,000-2,000ha (11)	2,000-5,000ha (12)	5,000-10,000ha (13)	10,000-100,000ha (14)	100,000ha or more (15)
Any Grants	0.319	-0.336*	-0.226	-0.462	-1.347***	-1.613**	-1.089	-0.678	2.507***	0.714	1.375*	0.793	-0.259	-0.060	-0.061
	(0.213)	(0.197)	(0.326)	(0.355)	(0.522)	(0.809)	(0.746)	(0.772)	(0.946)	(0.807)	(0.714)	(0.669)	(0.399)	(0.487)	(0.062)
N	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472

Notes: This table presents the matching estimators on the marginal distribution of unproductive land, defined in the 1995 Agricultural Census as land that could be used for agriculture but has not been used for the past four years. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parentheses.
* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.5: OLS and IV Estimates on 1995 Land Distribution

	Over 2ha (1)	Over 5ha (2)	Over 10ha (3)	Over 20ha (4)	Over 50ha (5)	Over 100ha (6)	Over 200ha (7)	Over 500ha (8)	Over 1,000ha (9)	Over 2,000ha (10)	Over 5,000ha (11)	Over 10,000ha (12)
Panel A - OLS Matched Sample												
Grants Post-1700	-0.062	-0.008	-0.175	-0.947**	-1.336**	-0.103	0.149	1.168	-0.276	0.079	0.374	0.751
	(0.042)	(0.413)	(0.214)	(0.454)	(0.594)	(0.556)	(0.547)	(0.838)	(0.507)	(0.728)	(0.831)	(0.732)
N	630	630	630	630	630	630	630	630	630	630	630	630
Panel B - IV												
Grants Post-1700	1.256	2.094	0.447	-4.281	-5.561	-11.680***	-6.122	-4.793	-3.109	14.294**	9.956**	7.033
	(1.065)	(1.371)	(2.255)	(3.819)	(3.915)	(4.300)	(5.300)	(4.793)	(4.006)	(7.015)	(4.736)	(6.215)
N	1365	1365	1365	1365	1365	1365	1365	1365	1365	1365	1365	1365

Notes: This table presents the results of the OLS (Panel A) and IV (Panel B) estimators for the matched sample. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, and other geographical variables. Robust standard errors are in parenthesis.
* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.6: First-Stage Results (1995 Municipality Boundaries)

	Grant Presence Pre-1700s	Grant Presence Post-1700s
Distance to Bandeira (10km)	-0.002	-0.031***
	(0.002)	(0.006)
Geographical Controls	✓	✓
Dependent Variable Mean	0.03	0.21
N	1365	1365
F-stat	2.11	25.47

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

[a] All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils. For the sake of the cregression I consider the variable determined in tens of kilometers, so the coefficients are multiplied by 10. States considered are Sao Paulo and Minas Gerais.

Table A.7: Matching Estimates - 1995 Agricultural Census

	1ha or less (1)	1-2ha (2)	2-5ha (3)	5-10ha (4)	10-20ha (5)	20-50ha (6)	50-100ha (7)	100-200ha (8)	200-500ha (9)	500-1,000ha (10)	1,000-2,000ha (11)	2,000-5,000ha (12)	5,000-10,000ha (13)	10,000-100,000ha (14)	100,000ha or more (15)
Panel A - Northeast:															
Any Grants	-0.129	-0.320**	-1.183***	-1.492***	-1.884***	-3.147***	-2.091***	-1.447***	1.150*	3.190***	2.612***	1.594**	0.947**	2.123***	0.077
	(0.131)	(0.144)	(0.312)	(0.286)	(0.290)	(0.474)	(0.411)	(0.385)	(0.683)	(0.671)	(0.616)	(0.656)	(0.382)	(0.671)	(0.077)
N	842	842	842	842	842	842	842	842	842	842	842	842	842	842	842
Panel B - Southeast:															
Any Grants	-0.008	-0.057	-0.034	-0.374	-0.655	-1.397**	-0.356	-0.733	0.098	0.064	0.362	1.120	0.783	1.186*	0.000
	(0.014)	(0.068)	(0.450)	(0.240)	(0.517)	(0.654)	(0.656)	(0.571)	(0.821)	(0.762)	(0.530)	(0.813)	(0.728)	(0.703)	(0.000)
N	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630

Notes: This table presents the Matcing estimators on the marginal distribution of land. Panel A shows the effects in the Northeast, while on Panel B it shows the effects on the Southeast. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parenthesis.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.8: OLS and Matching Estimates on 1995 Land Distribution

	Over 2ha (1)	Over 5ha (2)	Over 10ha (3)	Over 20ha (4)	Over 50ha (5)	Over 100ha (7)	Over 200ha (7)	Over 500ha (8)	Over 0,000ha (9)	Over 2,000ha (10)	Over 5,000ha (11)	Over 10,000ha (12)
Panel A - Entire Sample												
Grants Pre-1700	0.131	0.562	1.560	2.361	3.767*	5.276**	7.019***	7.747***	5.529***	4.121**	1.909	1.319
	(0.461)	(0.940)	(1.114)	(1.533)	(1.954)	(2.233)	(2.251)	(2.048)	(1.852)	(1.678)	(1.293)	(1.019)
Grants Post-1700	0.308***	0.847***	1.468***	2.282***	3.444***	4.043***	4.482***	3.966***	2.809***	2.025**	1.915***	1.232**
	(0.103)	(0.312)	(0.427)	(0.597)	(0.832)	(1.000)	(1.080)	(1.042)	(0.933)	(0.825)	(0.659)	(0.520)
N	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372	2372
Panel B - Matched Sample												
Grants Pre-1700	-0.002	0.481	1.597	2.258	3.317*	4.743**	6.363***	6.924***	5.033***	4.070**	2.119	1.297
	(0.459)	(0.946)	(1.142)	(1.563)	(2.005)	(2.295)	(2.349)	(2.156)	(1.951)	(1.761)	(1.371)	(1.096)
Grants Post-1700	0.343***	1.035***	1.825***	2.977***	4.513***	5.381***	6.010***	5.049***	3.299***	2.256***	2.062***	1.040*
	(0.118)	(0.338)	(0.470)	(0.653)	(0.902)	(1.084)	(1.158)	(1.107)	(0.991)	(0.863)	(0.671)	(0.531)
N	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472	1472

Notes: This table presents the results of the OLS (Panel A) and Matching (Panel B) estimators. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parenthesis.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.9: OLS Estimates on 1872 Racial Composition

	White (%)		Slaves (%)		Free Blacks (%)		Mixed Race (%)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A - Entire Sample								
Grants Pre-1700	0.339	0.200	-1.722**	-2.029***	0.315	0.261	1.067	1.569
	(1.184)	(1.231)	(0.691)	(0.751)	(0.714)	(0.730)	(1.234)	(1.333)
Grants Post-1700	-1.034	-0.862	0.175	0.108	-0.101	0.104	0.959	0.650
	(0.859)	(0.893)	(0.664)	(0.668)	(0.453)	(0.432)	(0.859)	(0.852)
Geographical Controls		✓		✓		✓		✓
Control Mean	37.5	37.5	16.1	16.1	11.8	11.8	34.6	34.6
N	813	813	813	813	813	813	813	813
Panel B - Northeast								
Grants Pre-1700	-2.074	-2.213	0.135	0.575	0.454	0.656	1.485	0.982
	(1.414)	(1.404)	(0.781)	(0.786)	(0.998)	(0.980)	(1.673)	(1.753)
Grants Post-1700	0.277	-0.437	-2.285**	0.461	-1.528	-1.072	3.536**	1.047
	(1.445)	(1.611)	(0.976)	(1.056)	(1.107)	(1.111)	(1.643)	(1.778)
Geographical Controls		✓		✓		✓		✓
Control Mean	25.2	25.2	13.7	13.7	16.6	16.6	44.5	44.5
N	330	330	330	330	330	330	330	330
Panel C - Southeast								
Grants Pre-1700	5.140**	1.654	-4.940***	-5.026***	0.481	1.008	-0.681	2.363
	(2.127)	(2.618)	(1.344)	(1.576)	(0.793)	(0.998)	(1.625)	(2.285)
Grants Post-1700	-1.564	-0.681	1.358	0.183	0.650*	0.629*	-0.444	-0.132
	(1.058)	(1.062)	(0.864)	(0.797)	(0.368)	(0.365)	(0.992)	(0.950)
Geographical Controls		✓		✓		✓		✓
Control Mean	45.2	45.2	17.5	17.5	8.9	8.9	28.4	28.4
N	483	483	483	483	483	483	483	483

Notes: This table presents the results of the OLS estimators. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parenthesis.
* p < 0.1, ** p < 0.05, *** p < 0.01

Table A.10: OLS and Matching Estimates on 1980 Racial Composition

	White (%)		Black (%)		Mixed Race (%)	
	OLS (1)	Matching (2)	OLS (3)	Matching (4)	OLS (5)	Matching (6)
Panel A - Entire Sample						
Grants Pre-1700	-2.100	-1.359	0.172	0.371	1.741	0.846
	(1.417)	(1.423)	(0.459)	(0.462)	(1.419)	(1.422)
Grants Post-1700	-1.615**	-1.580*	0.193	0.015	1.421*	1.584*
	(0.766)	(0.817)	(0.239)	(0.256)	(0.763)	(0.815)
Geographical Controls	✓	✓	✓	✓	✓	✓
Control Mean	52.8	48.8	6.0	6.4	40.5	44.2
N	2208	1468	2208	1468	2208	1468
Panel B - Northeast						
Grants Pre-1700	0.490	1.145	0.772	0.759	-1.265	-1.893
	(1.586)	(1.622)	(0.544)	(0.547)	(1.625)	(1.666)
Grants Post-1700	0.882	0.811	-1.250***	-1.208***	0.382	0.405
	(1.157)	(1.160)	(0.337)	(0.337)	(1.219)	(1.223)
Geographical Controls	✓	✓	✓	✓	✓	✓
Control Mean	26.0	26.1	6.3	6.4	67.0	66.7
N	915	820	915	820	915	820
Panel C - Southeast						
Grants Pre-1700	-6.902***	-2.885	-0.298	-1.154**	6.395***	3.482
	(2.415)	(2.286)	(0.436)	(0.452)	(2.174)	(2.161)
Grants Post-1700	-3.605***	-3.354***	0.990***	0.651*	2.604***	2.706***
	(0.982)	(1.099)	(0.320)	(0.370)	(0.928)	(1.034)
Geographical Controls	✓	✓	✓	✓	✓	✓
Control Mean	66.9	68.7	5.8	7.2	26.6	23.5
N	1293	648	1293	648	1293	648

Notes: This table presents the results of the OLS and Matching estimators. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parenthesis.

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

Table A.11: Effects of Land Grants in Land Conflict 2015-2022

	Entire Sample		Northeast		Southeast	
	(1)	(2)	(3)	(4)	(5)	(6)
Any Land Grants	0.043**		0.055*		0.031	
	(0.020)		(0.029)		(0.026)	
Grants Pre-1698		0.055		0.066		0.131
		(0.040)		(0.046)		(0.079)
Grants Post-1698		0.050**		0.064**		0.022
		(0.021)		(0.030)		(0.027)
Control Mean	0.19	0.19	0.25	0.25	0.11	0.11
N	1472	1472	842	842	630	630

Notes: This table presents the results of the matching estimators on the report of at least one land conflict between 2015-2022. Odd numbered columns measures the effects of any grants, while even numbered columns measures the differential effects between pre-1698 and post-1698 grants. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parenthesis.

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

Table A.12: Matching Estimates - Share of Agricultural Land Northeast and Southeast - 1995 Agricultural Census

	Land Gini	Share Below 200ha (%)	Share Between 200ha and 2000ha (%)	Share Between Above 2000ha (%)
	(1)	(2)	(3)	(4)
Panel A - Northeast				
Any Grants	0.019***	-8.730***	6.691***	2.039*
	(0.007)	(1.530)	(1.305)	(1.046)
Control Mean	0.73	56.47	35.58	7.95
N	842	842	842	842
Panel B - Southeast				
Any Grants	0.009	-0.962	-0.032	0.994
	(0.007)	(1.573)	(1.428)	(1.242)
Control Mean	0.66	56.66	34.14	9.2
N	630	630	630	630

Notes: This table presents the matching estimators on the marginal distribution of agricultural land in the 1995 Agricultural Census broken down by region. The two regions are the Northeast and Southeast of Brazil. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parentheses.

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

Table A.13: Balance on Geographical Characteristics - First Grant 1678-1697 and First Grant 1698-1707

	Accessibility				Soil Suitability							Geographical Proximity and Size		
	Average Slope	Average Elevation	Distance to the Coast (km)	Distance to Nearest River (km)	Potential Sugarcane	Potential Calories pre-1500	Potential Calories post-1500	Latosol Presence (0/1)	Argisol Presence (0/1)	Cambisol Presence (0/1)	Spondosol Presence (0/1)	Latitude	Longitude	Area
First Grant 1678-1697	-0.315*	-59.681**	-15.708	-0.115	-20.487	-544.691**	-348.710*	0.037	0.079	0.071*	-0.021**	0.173	0.075	531.577***
	(0.163)	(30.014)	(15.325)	(13.906)	(64.227)	(237.598)	(200.848)	(0.063)	(0.070)	(0.039)	(0.009)	(0.196)	(0.139)	(185.036)
First Grant 1698-1707	-0.344**	46.085**	7.801	-18.938**	-55.414	-135.463	-219.604*	0.028	-0.017	0.082**	-0.002	0.016	0.124	652.012***
	(0.144)	(19.423)	(10.185)	(8.659)	(47.894)	(140.759)	(125.429)	(0.036)	(0.046)	(0.033)	(0.014)	(0.120)	(0.117)	(164.388)
N	956	956	956	956	956	956	956	956	956	956	956	956	956	956
F-test	0.883	0.002	0.167	0.221	0.648	0.114	0.561	0.891	0.222	0.82	0.144	0.46	0.772	0.607

Notes: This table shows the geographical balance between municipalities that first got a grant in 1678 to 1697 and those that first got a grant in 1698-1707. F-test on the difference between the two coefficients is reported at the bottom. All regressions include state fixed effects. Robust standard errors are in parenthesis.
* p < 0.1, ** p < 0.05, *** p < 0.01

Table A.14: Effects on Land Concentration for First Grant 1678-1697 and First Grant 1698-1707

	Land Gini	Share of Agricultural Land in Farms Below 200ha (%)	Share of Agricultural Land in Farms Between 200ha and 2000ha	Share of Agricultural Land in Farms Above 2000ha (%)
	(1)	(2)	(3)	(4)
First Grant 1678-1697	0.018	-10.345***	9.827***	0.519
	(0.012)	(2.966)	(2.845)	(2.180)
First Grant 1698-1707	0.019**	-6.228***	7.383***	-1.155
	(0.009)	(1.905)	(1.644)	(1.299)
N	956	956	956	956
F-test p-value	0.948	0.213	0.423	0.497

Notes: All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, and whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol). Robust standard errors are in parenthesis.

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

Table A.15: Effects of the Coastal Ban of Livestock in 1701 - Ranchers (1872) and Land Concentration (1920)

	1872 Census	1920 Agricultural Census		
	Ranchers (%) (1)	Share Below 200ha (%) (2)	Share Between 200-2000ha (%) (3)	Share Above 2000ha (%) (4)
First Grant 1701-1720 x Less than 80 km from the Coast	-0.587	-5.793***	-18.239***	24.031***
	(0.721)	(1.738)	(5.990)	(6.865)
First Grant 1701-1720 x More than 80 km from the Coast	1.330*	-0.811	-5.429	6.240
	(0.677)	(1.568)	(5.208)	(6.006)
N	436	364	364	364
Control Mean	0.49	7.54	51.28	41.19
F-stat p-value	0.08	0.01	0.08	0.03

Notes: This table measures the differential effects of the grants located more than 80km of the coast and less than 80km of the coast using the 1872 Census and the 1920 Agricultural Census. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol), and the area of the municipality. Robust standard errors are in parenthesis.

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

Table A.16: Effects of the Coastal Ban of Livestock in 1701 - Area used for Livestock and Land Concentration

		Land Concentration		
	(1)	(2)	(3)	(4)
First Grant 1700-1720 x Less than 80 km from the Coast	2.536	-5.115	7.219***	-2.103
	(3.796)	(3.160)	(2.660)	(2.447)
First Grant 1700-1720 x More than 80 km from the Coast	7.686***	-5.976***	7.002***	-1.026
	(2.669)	(2.269)	(2.015)	(1.224)
N	893	893	893	893
Control Mean	43.79	56.55	34.96	8.48
F-stat p-value	0.29	0.82	0.95	0.68

Notes: All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol), and the area of the municipality. Robust standard errors are in parenthesis.

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

Table A.17: Land Concentration Estimates - Tordesillas Treaty - 1995 Agricultural Census

	Land Gini	Share Below 200ha (%)	Share Between 200ha and 2000ha (%)	Share Between Above 2000ha (%)
	(1)	(2)	(3)	(4)
Any Grant x Portuguse Side	0.008	-0.650	-0.110	0.761
	(0.008)	(1.657)	(1.522)	(1.280)
Any Grant x Spanish Side	0.045*	-7.532	1.296	6.233
	(0.023)	(6.067)	(5.008)	(4.403)
N	630	630	630	630
F-test p-value	0.128	0.275	0.789	0.234
Control Mean	0.67	42.55	46.13	11.32

Notes: This table presents the differential effects of grants located on the Spanish side vs. on the Portuguese side on the land concentration . All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol), the are of the municipality, and the euclidean distance to the Tordesillas Treaty Line (48.7 W). Robust standard errors are in parentheses.
* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.18: Robustness - Matching Estimates - Land Concentration in the 1995 Agricultural Census

	Land Gini	Share Below 200ha (%)	Share Between 200ha and 2000ha (%)	Share Between Above 2000ha (%)
	(1)	(2)	(3)	(4)
Panel A - Dropping Above Median Sized Municipalities				
Any Grants	0.014*	-4.679***	3.421**	1.258
	(0.008)	(1.769)	(1.609)	(1.251)
Control Mean	0.69	61.79	32.48	5.73
N	736	736	736	736
Panel B - Dropping Municipalities with Any Farms Above 2000ha				
Any Grants	0.008	-4.177***	4.177***	
	(0.006)	(1.386)	(1.386)	
Control Mean	0.66	67.65	32.35	
N	856	856	856	

Notes: This table presents the matching estimators on the marginal distribution of agricultural land in the 1995 Agricultural Census. In Panel A, I drop all municipalities that are above the median size of the matched sample. In Panel B, I drop all municipalities that have any farms above 2000ha. All regressions include state fixed effects. Geographical controls include latitude, longitude, average slope, average elevation, distance to the nearest navigable river, distance to the coast, maximum caloric output from pre-Columbian and post-Columbian crops, whether or not the municipality contains four different types of soils (latosol/argisol/cambisol/spondosol), and the area of the municipality. Robust standard errors are in parentheses.

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

B. Data Source Appendix

Below, I describe the sources from which the land grants were compiled. The states with a * indicate that the data collection was done by the researchers at SILB.

Pernambuco*

- Documentação Histórica Pernambucana. Recife: Imprensa Oficial, 1954. Vol. 1-2
- Documentação Histórica Pernambucana: sesmarias. Recife: Secretaria de Educação e Cultura. Biblioteca Pública, 1959. Vol. 1-4
- Coleção Documentos Históricos Biblioteca Nacional do Rio de Janeiro. Vol. 20-22
- Arquivo Nacional do Rio de Janeiro. Códice 427
- Arquivo Nacional do Rio de Janeiro. Códice 155
- Livro do Tombo do Mosteiro de São Bento de Olinda, Imprensa Oficial - Recife, 1948
- Livros do Tombo de São Bento. Book 1-3
- Revista do Instituto Arqueológico, Histórico e Geográfico Pernambucano, 1896.
- Revista do Instituto Histórico de Goiana, 1871.

Rio Grande do Norte*

- O Treslado do auto e mais diligências que se fizeram sobre as datas de terras da capitania do Rio Grande, que se tinham dado. Fortaleza: Revista do Instituto do Ceará, 1909, Ano XXIII.
- IHGRN - Fundo Sesmarias - Books 1-9
- Documentos Históricos da Biblioteca Nacional do Rio de Janeiro..Vol. 23
- Documentos Históricos da Biblioteca Nacional do Rio de Janeiro..Vol. 24 Arquivo Nacional Rio de Janeiro, Códice 427

Bahia*

- Códice 427 - Rio de Janeiro
- FREIRE, Felisbello. História territorial do Brasil. Salvador: Secretaria da Cultura e Turismo, Instituto Geográfico e Histórico da Bahia, 1998
- DHBN - cartas publicadas na coleção Documentos Históricos da Biblioteca Nacional - DHBN, volumes 13 a 22
- Anais do Arquivo Público do Estado da Bahia - Publicação dos anais do APEB - Anais do Arquivo Público do Estado da Bahia. Volumes 3 e 11
- Códice 155 - Rio de Janeiro
- Mosteiro de São Bento - Cartas publicadas nos Livros do Tombo do Mosteiro de São Bento

Paraiba*

- British Library: Livro 1 (Land Grants (sesmarias) / Land Registers, 1757 - 1764); Livro 2: (Plots of Land 1722-1727 / Land Grants (sesmarias) 1722-1727); Livro 3: (Land Grants (sesmarias), 1785 -1787); Livro 4: (Land Grants (sesmarias), 1728 -1738); Livro 5: (Land Grants (sesmarias), 1816 - 1824); Livro 6: (Land Grants (sesmarias), 1747 - 1755); Livro 7: (Land Grants (sesmarias), 1789 - 1808); Livro 8: (Plots of Land - 1714-1717 / Land grants (sesmarias); Livro 9: (Land Grant - Various Parishes, 1768 - 1776); Livro 10: (Land Grants 1704-1722 / Sesmarias 1704-1722)
- TAVARES, João de Lira. Apontamentos para a História territorial da Parahyba. ed. Facsimilar. Brasília: Senado Federal, 1982. vol. CCXLV.
- Documentação Histórica Pernambucana: sesmarias. Recife:
- SECRETARIA DE EDUCAÇÃO E CULTURA BIBLIOTECA PÚBLICA, 1959
- Documentos Históricos da Biblioteca Nacional (DHBN): DHBN, V. 23. P.402-405.
- Códice 427 - Arquivo Nacional - Rio de Janeiro PUBLICAÇÕES DO ARCHIVO NACIONAL. VOL XXVII RIO DE JANEIRO Officinas Graphicas do ARCHIVO NACIONAL 1931. (Códice 155)
- Biblioteca Pública do Estado de Pernambuco (BPE) - Recife

São Paulo

- *Sesmarias; documentos do Archivo do Estado de São Paulo* (1921) Vols. 1-3
- Instituto Histórico e Geográfico de São Paulo (1928)

Minas Gerais

- Revista do Arquivo Publico Mineiro - Inventory of the sesmarias letters on the Public Archive Codex - Volume 37 (1988)
- Revista do Arquivo Publico Mineiro - Volumes 10-24 (1905-1933).

C. Description of Letters and Georeferencing

Below is a description on how the process used to georeference the land grants.

1. Based on the letter information, since a location was required for the land to be granted, the geographical information on where the land was requested and who their neighbors was extracted.

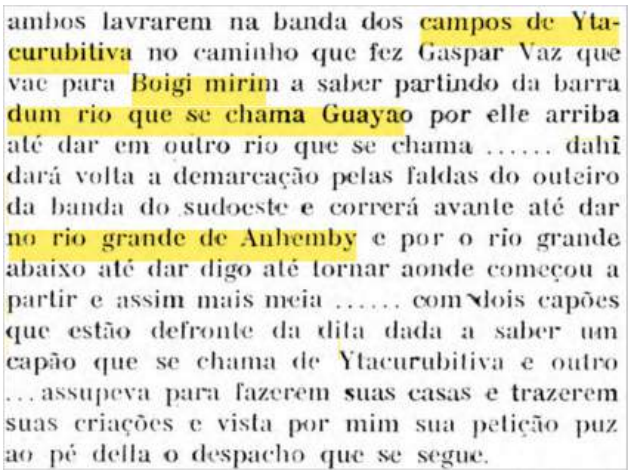
2. It is also possible to georeference based on the person's neighbors.

   (a) For example, the sesmaria of Matheus Ferndandes Ramos, granted in 1698, is described as being close to the sesmaria of Lucas Pedroso, granted in 1638.

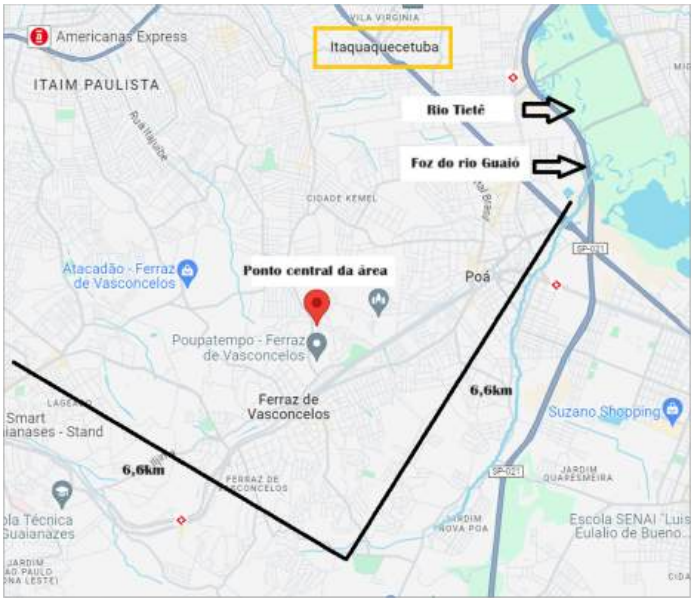
3. When not possible to georeference based on the above, the location is approximated at the municipality level.

An example on how the georeferencing process was done can be seen below.

1. First, the geographical landmarks in the text are identified.


ambos lavrarem na banda dos campos de Ytacurubitiva no caminho que fez Gaspar Vaz que vae para Boigi mirim a saber partindo da barra dum rio que se chama Guayao por elle arriba até dar em outro rio que se chama ..... dahi dará volta a demarcação pelas faldas do outeiro da banda do sudoeste e correrá avante até dar no rio grande de Anhemby e por o rio grande abaixo até dar digo até tornar aonde começou a partir e assim mais meia ..... com dois capões que estão defronte da dita dada a saber um capão que se chama de Ytacurubitiva e outro ... assupeva para fazerem suas casas e trazerem suas criações e vista por mim sua petição puz ao pé della o despacho que se segue.

- **Campos de Ytacurubitiva** (Fields of Ytacurubitiva) → Same as Itaquaquecetuba (Costa, 2021).
- Boigi Mirim → Municipality of Mogi das Cruzes (Leme, 2014).
- Rio Grande de Anhemby → Tiete River (Vilardaga, 2020).
- Rio Guyao → Guaio River.



2. Based on the landmarks, it is possible to approximate the location of the grant in the following location. The are is currently a rich area of the city of São Paulo.

   Coordinates: (-46.3, -23.5)

D. Data Appendix - 1872

Below are the definitions of the variables measured for the 1872 census and how they were constructed. Some of the variables are already defined in the census:

D.1. Base Variables, available by gender and free vs. enslaved:

1. Demographic Information on Race
   (a) Number of Enslaved People
   (b) Number of Pardos
   (c) Number of Whites
   (d) Number of Blacks
   (e) Number of Caboclos

D.2. Constructed Variables:

1. Proportion of Slaves to Free Population:

$$100 \times \frac{\#\text{ of Enslaved People}}{\#\text{ of Free People}}$$

2. Proportion of Slaves in Agriculture:

$$100 \times \frac{\#\text{ of Slaves in Agriculture}}{\#\text{ of Slaves}}$$