

# Land Grants in Colonial Brazil and Long-Term Effects on Development

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## Abstract

Land access in Brazil has been a key political issue for the past century. The concentration of land in large estates that are often unproductive is argued to be a factor in the low social mobility and inequality of the rural population. However, restricted land access in Brazil has its roots in colonial times. Large plots of land were granted from 1530-1822 through land grants called *sesmarias*. These land grants were often given to people with substantial financial means, restricting land access to most of the population. I contribute to the understanding of colonial land tenure in Brazil by collecting a novel dataset on the location of these land grants alongside a matching procedure. Results indicate that the land grants had persistent effects on land concentration, tenure, and usage until the 20th century.

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## 1. Introduction

“In the *sesmarialismo*, thus, is the base to all of [Brazil’s] land evolution .”

- O Sistema Sesmarial no Brasil, Costa Porto ([1979](#), p. 25)

Brazil has one of the highest levels of land inequality in the world, with the USAID reporting in 2016 that 1% of the population owns 45% of all the land ([USAID, 2016](#)). The issue of land inequality is compounded by the fact that large agricultural lands in Brazil are often unproductive. The Brazilian Agrarian Reform Agency (INCRA) reported that in 2010 “72% of all land occupied by large holdings was considered unproductive” ([Carlson, 2019](#)). The combination of both land concentration and low levels of utilization has compounding effects on the economy as it depresses rural wages, keeping rural workers away from the consumer markets ([Oliveira Andrade, 1980](#), p. 1). However, land inequality is something that has existed in Brazil ever since its colonization, as most of the more suitable land had been taken in large estates that were not intensely cultivated ([Mueller, 1995](#), p. 53).

In this paper I analyze the historical colonial causes of land inequality in Brazil, by exploiting time and geographical variation in the request for land grants, called *sesmarias*. These land grants were often given to people with direct financial means, and were large in size.

I exploit the geographical, time, and economic variation of the grants to study their long-term effects on the economic development of Brazil. Given the prominence of land grants in colonial Brazil and the variation on why the land was granted, this paper studies the long-term effects of the role of colonial land assignment in development.

I first describe how the grants themselves were distributed and describe the process of their geographical expansion.

In order to estimate the long-term effect of the grants I use a matching algorithm to show that the land grants in Brazil are associated with increased land concentration in Brazil in 1995. Results indicate that municipalities that had a colonial land grant within their boundary see an increase in the percentage of farms that are above 2000 hectares. Similar results hold if considering different cutoffs such as 5000, or 10.000 ha.

I first address endogeneity by exploiting variation in two sets of policies in colonial Brazil. First, I consider a 1701 ban of livestock grazing within 80km of the coast. When considering the coastal ban on livestock, the results indicate that only in areas further than 80km from the coast and that received a land grant there is persistence in land inequality.

Second, I consider the Tordesillas Treaty which split Brazil between Spain and Portugal until 1750.

To further address the issue of endogeneity, I use an instrumental variable approach, similar to [Duranton](#)

et al. (2011). I use the explorer routes of the *Bandeira Paulistas* as an exogenous determinant of the grand locations. Given their historical context on how the *bandeirantes* further expanded Brazil's territory to the West, and historically how they would often request land grants in the areas they have claimed to discover, that gives a possible exogenous determinant of the land grant locations in the Southeast. Consistent with the previous results, I find that the effects of land concentration remain in the Southeast on those municipalities that had a colonial land grant.

I then turn to understand what are the mechanisms that are driving the results. First, I measure effects in 1872, through a novel georeferenced dataset at the parish level.

Second, . Using Brazilian microcensus data from 1970-2010 I find that [...]

I additionally check for other potential channels to which land inequality could have persisted. First, I study whether there are long-term hindrances to human capital, as measured by literacy, due to the concentration of land a mechanism proposed by [Galor, Moav, and Vollrath \(2009\)](#).

This paper contributes to the literature in several ways. First, the paper provides a novel georeferenced dataset of colonial grants in Brazil for a total of eight states in the Northeast and Southeast of Brazil. Through archival work, and collaboration with researchers in Brazil over 4,000 land grants were successfully georeferenced providing a novel dataset that allows researchers to study and understand the patterns of colonization in Brazil. The eight states in which this works is focused on constitute X% of the total area and X% of the population of Brazil. Further, these states were also historically where colonization began, making the study of the colonial past especially relevant.<sup>1</sup>

Second, this paper contributes to the further understanding of colonial institutions and their long-term effects on development. ([Acemoglu et al., 2005](#))

Third, there are no empirical papers studying 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 ([Dell, 2010; Lowes et al., 2021](#)). However, there exists evidence that not all land regimes led to negative effects and instead led to economic development, with examples in India and Indonesia ([Banerjee et al., 2005; Dell and Olken, 2019; Ratnoo, 2023](#)). Other studies have analyzed the effect of land grants in the United States ([Akee et al., 2014; Allen, 2019; C. Smith, 2023](#))

This paper also contributes to the understanding of the historical economic development of Brazil by trying to explain the diverging paths in development in each region. The land regime and size in each region, as measured by the land grants could have differential impacts on development. [Wigton-Jones \(2020\)](#) studies the effects of 1920 agricultural census land inequality and how it still has persisted to the present. The literature has analyzed how different economic cycles and how immigration led to differential

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<sup>1</sup>Further work must be done to collect and georeference data for the rest of Brazil.

educational outcomes in Brazil (Musacchio et al., 2014; Rocha et al., 2017; Carvalho Filho et al., 2012). Related literature has also analyzed the effect of the Spanish-Portuguese borders in South America, the role of sugarcane, and gold mining in Brazil (Laudares et al., 2022; Naritomi et al., 2012).

(Dell, 2010) (Sokoloff et al., 2000) (Montero and Yang, 2022) (Montero, 2022)[Land in El Salvador] (Reed et al., 2012)[Land in Medieval England] (Goñi, 2022)[Elites and local provision]

Ratnoo (2023) [Paper about land tenure in India]

Albertus et al. (2018)

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.

## 2. Historical Background

### 2.1. Land Grant Implementation in Brazil

Portuguese presence in Brazil began in 1500, when [...].

Something about the capitaniias here [...]

Quote about how the captains had to give land grants.

Implementation in the following years.<sup>2</sup>

Portugal tried to implement in Brazil a similar system of land distribution they had successfully done in the Azores and in Portugal. According to T. L. Smith (1944) the only way Portugal knew how to distribute the lands in Brazil, were through the large *sesmarias*. However, while the legislation for granting the land was the same two main issues differentiated on how they were applied in Portugal and Brazil. Portugal, as a smaller state, the *sesmarias* led to small properties. Meanwhile, in Brazil, by the need of colonization and the large area of the country, the implementation of the *sesmaria* system led to the creation of the large 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 to get a land grant, the requirement to develop the land often led to people of great wealth to apply. In practice, that led to the applications being done only by a select few, those that had the money or political connections (Diffie, 1987, p 434) In the letter descriptions, the applicants would boast about their wealth and connections in order to be able to get a grant (Lima, 1954, p. 36). Those applicants that had the financial means to get a land grant would often get large estates,

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<sup>2</sup>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". In total 17 grants were given in this municipality, being a primary cause of its creation. More information is available at <https://www.taipu.rn.leg.br/a-cidade/>.

“customarily one to three leagues in extent (16.7 to 50.1 square miles)” (Dean, 1971). Lima (1954, p. 36) indicates how those people would become the “future sugar engine owners and farmers that would create the economic aristocracy of the colonial society”.<sup>3</sup> Further, those who did not have the means to get a land grant, would often be marginalized at the colonial society (Simonsen, 2005). Contemporary evidence from the French botanist Augustin Saint-Hilaire, describes how “the poor that couldn’t have titles, establish themselves in 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).<sup>4</sup>

(Carlson, 2019) “For many Latin American scholars seeking to explain their region’s backwardness in the first half of the twentieth century, the prevalence of latifundio-dominated agrarian structures was key. The latifundio was seen as a fundamental impediment to economic development due to its feudal-like social relations, its tendency for monocropping, and its negative impact on the formation of domestic markets. However, it was these scholars’ emphasis on the labor regimes that were characteristic of the latifundio that prevented them from fully grasping the nature of the problem.”

(Carlson, 2019) “Going back to colonial times, land in Latin America has often been acquired outside of market mechanisms. This typically occurred through massive land grants from the crown such as the merced, or the sesmaria in Brazil, or, after independence, through free or low-cost land concessions from national or local governments (Furtado 2003, 68–80).”

(Carlson, 2019) “Not only do extensive activities predominate, but land use statistics reveal the low-investment and low-productivity nature of these types of production. On grazing land, for example, if we divide the total number of animals on large farms by total hectares of pasture, Brazil’s large farms have only 0.65 animals per hectare of grazing land, while in Peru it is an incredibly low 0.06 animals per hectare (IBGE 2012; INEI 2012).”

(Carlson, 2019) “As Edelman (1992, 22) explains: “the important point is that the dynamics of accumulation are radically different than those of classical capitalist development. Rather than investing heavily in improved technologies, employing productive human labor, attempting to capture increased market shares, or developing linkages with other production processes, latifundistas could become wealthy from harvesting natural and quasi-natural products of the land.””

#### Diégues Júnior (1959)

Oliveira Andrade (1980, p. 113) “Extensive cattle raising, with open grazing, did not require much

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<sup>3</sup> Additionally, Lima (1954, p. 47) states that the “The *sesmaria* is the large estate, inaccessible to the farmer without resources.”

<sup>4</sup> More evidence from the issues of squatting is further described in the letter by two grantees em 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 land was full of squatters or bandits they would often grant them away (Poppino, 1968, p. 88).

attention or labor. For that reason, the number of slaves in the region was small”

Oliveira Andrade (1980, p. 119) “[The cotton] advantage was a stimulus to the large landowners of the region, since they could increase their profits without modifying their traditional economic activities, and without forsaking cattle raising. Even today one can see that in the Agreste and Sertao cattle raising is the economic activity most associated with the latifundia. The large landowners are always principally cattle raisers and only secondarily farmers. This pattern is broken in the wet areas where climatic conditions are less favorable to cattle raising and where land is almost always in small holdinds”

This paper describes the history of land usage in Brazil and discusses the roles of the sesmarias in it (Reydon et al., 2015).

Oliveira Andrade (1980, p. 157) “Cattle raising is today, as in the past, the source of great wealth in the Sertao [...] The system of cattle raising on the large fazendas of the Sertao has changed little in recent years”

“The slaves in Brazil were at least partially integrated into society and possessed rights, quite a legal contrast to the plight of the slaves in the United States. Hence their transition from slave to freedman was facilitated. One paramount privilege the slaves enjoyed was their ability to purchase their own freedom. Blacks, taking advantage of the many Catholic holidays to work on their own, saved money for that purpose. They occasionally formed their own mutual aid societies to facilitate their purchase of freedom.”

## 2.2. End of the Land Grants and the 1850 Land Act

Land concentration in Brazil in the brink of Brazil’s independence in 1822, was high as a result from the land grants throughout its colonial period (T. L. Smith, 1972). Contemporaries describe that a key issue of the sesmaria system was a lot of the land had already been given which led to a lot of poor families which were not able to claim land (Lima, 1954, p. 42-43)

Between 1822 and 1850 there was no clear way on how to obtain lands in Brazil.

1850 Land Law allowed [...]

The first big land reform was in 1964 with the Land Act.

1985 National Agrarian Reform Plan was used.

Land grants were given until 1822, shortly before Brazil’s independence.

Dutch Brazil ? ”dois fatores contribuíram para a penetração do gado para o interior nordestino. O primeiro reside na necessidade de abastecer as áreas açucareiras do litoral com animais para o transporte e de carne para as populações urbanas. O segundo fator foi a presença dos holandeses no século XVII levando os criadores a sair do litoral em direção ao interior devido o temor de perder seus alimentos para os invasores que os requisitavam. Ao fazer isso, os criadores passaram a se estabelecerem em extensões de terra doadas em

sesmarias. Um outro fator que também não podemos esquecer é que nesse momento a economia voltava-se para a expansão da empresa comercial canavieira a ponto de a “Carta Régia” de 1701 chegar a proibir a criação de gado até dez léguas da costa”

“Além deste fator, o autor explicita um condicionante geográfico para a existência desses mercados, pois, as maiores feiras de gado existentes na região se localizam nas cidades que estão exatamente no contato entre o litoral e o sertão.” ([Galdino Dantas, 2008](#))

“A cana-de-açúcar foi plantada, de início, nas sesmarias e grandes propriedades doadas de 500 braças, até 50 e 200 léguas. Nos séculos XVI e XVII, com os altos preços alcançados pelo açúcar, verificou-se uma reação da pequena propriedade, de exploração agrícola limitada, que, entretanto, foi logo absorvida pelos latifúndios. Nos princípios do século XIX, o panorama da região açucareira apresenta-se diferente, com o regime da média propriedade, resultante do parcelamento dos latifúndios, doados pelo excesso de terras devolutas, pela escassez de colonizadores ou pela repartição entre os herdeiros. Foi a época em que os engenhos não possuíam mais do que léguas e meia ou duas léguas .” ([Geografía, 1970](#), p. 118)

“Nos sertões da Bahia, Pernambuco, Paraíba, Rio Grande do Norte, Ceará, Piauí, as primeiras estradas foram os caminhos das boiadas. Assim é que numerosas povoações - núcleos de futuras vilas e cidades - estabeleceram-se às margens dos rios, nos lugares onde estes ofereciam passagem mais fácil aos anjinhos, e à beira dos caminhos, nos pontos em que as boiadas paravam para descansar.” ([Geografía, 1970](#), p. 164) ([Panini, 1990](#))

Maybe can combine the São Paulo ones with the immigration that happened there and contrast with data from ([Rocha et al., 2017](#)).

A report to the Minister of Agriculture in 1873 already had stated that ([T. L. Smith, 1972](#), p. 324)

“The major part of the land in our province is divided into great properties, remains of the ancient sesmarias, 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” ([T. L. Smith, 1972](#), p. 325)

### 2.3. Present Day System

Oliveira Andrade ([1980](#), p. 1) “The agrarian problem is one of the most serious the country has, because of the great concentration of land ownership and the low level of utilization by the large and medium property owners. A majority of the rural population receives very low wages, which practically puts them outside the

consumer market”

While a lot has changed about access to land, and land redistribution throughout the past century some of the effects can be traced to colonial times. Oliveira Andrade (1980, p. 36) states how in the Northeast “The concentration of landholdings [...] is a consequence of the essentially commercial character of agriculture there. This character has manifested itself since the start of colonization”.

Oliveira Andrade (1980, p. 34-35) argues that “one of the causes that most aggravate the problem [the considerable increase in population, without a corresponding increase in possibilities for employment, is much more a swelling than an orderly growth] is the system of land tenure, 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.”

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]”

Baer (2014, p. 16) describes largely negative effects of the sugar economy, especially in the Northeast, which led to the concentration of wealth and economic backwardness of the region.

Some of the same issues of large estates and poor utilization of land persist to the present. Carlson (2019) based on INCRA data indicates how even up to 2010 “more than 50 percent of all large landholdings and 72 percent of all land occupied by large holdings was considered ‘unproductive’ according to agency parameters”.

### 3. Data

This section describes the datasets used in the analysis.

#### 3.1. Land Grant Dataset

Given the nature of the grant application, and the requirement of a letter to be sent to the governor and approved, a vast number of the letters were stored in archives throughout Brazil.

The main source of historical data comes from both a collaboration with the *Sesmarias of the Luso-Brazilian Empire Database*.<sup>5</sup> For the states in the Northeast, I collaborated with the *Sesmarias of the Luso-Brazilian Empire Database* in order to get access to digitized information of the grants.<sup>6</sup> The database

<sup>5</sup>Information on the content of the letters is available at <http://plataformasilb.cchla.ufrn.br/>. The georeferencing process was done in collaboration but as a separate project for this paper.

<sup>6</sup>The *Sesmarias of the Luso-Brazilian Empire Database* is currently digitizing and inputting information of other states into their website.

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.<sup>7</sup> For the states of Sao 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.<sup>8</sup>

When available in the text, information such as the name of the petitioner, year, and the reason for the request, are coded.<sup>9</sup> 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.<sup>10,11</sup>

For this paper I consider the land grants in the states of: Paraiba, Rio Grande do Norte, Pernambuco, Alagoas, Bahia, Sao 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.

In [Figure 2](#) I show the geographical distribution of the land grants across the states from which I gathered information.<sup>12,13</sup> Overall, the grants were geographically concentrated on the coast in both the Southeast and in the Northeast. In all the states they were also often centered around the capitals of each state.

### 3.2. Agricultural Census data

In order to study the long-term effects of the grants on land inequality the main dataset used is the 1995 Brazilian Agricultural Census. It provides information at the municipality level on the distribution of the size of agricultural holdings, their usage, and their tenure type in Brazil.<sup>14</sup> I estimate land inequality as the percentage of all agricultural properties that exceed 2000 hectares.<sup>15</sup>

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<sup>7</sup>An example of an original manuscript can be found in [Figure A.2](#).

<sup>8</sup>An example of a transcribed manuscript published by the state on Sao Paulo is available at [Figure A.1](#). An example of the grants being described by name and location, as it is in the case of Minas Gerais, is available in ??

<sup>9</sup>The reason for request information is only missing for the state of Minas Gerais, since the land grants located there were described in a tabulated format.

<sup>10</sup>More information on the sources used for this project is available in [Appendix D](#).

<sup>11</sup>A more in-depth description of how the sources of the letters and how the *sesmarias* were georeferenced is available in [Appendix E](#)

<sup>12</sup>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 coastal states without grants. Therefore, they are not considered in this version of this paper.

<sup>13</sup>Some of the grants located in other states either occurred because at one point the states were a single one (eg. Sao Paulo and Parana), or due to mix-ups on where the letters themselves were stored.

<sup>14</sup>Earlier agricultural censuses such as 1920, 1940, and 1960 existed, however, to the best of my knowledge they have either not been digitized or made available online.

<sup>15</sup>I later show that results are robust to different cutoffs.

### 3.3. Census Data

To study the medium-term effects of the grants at an earlier period, I use the 1872 Brazilian Imperial census, which happened only 50 years after the formal ban of land grants in Brazil. Census data for 1872 is obtained from the Nucleus of Research in Economic and Geographic History from the Federal University of Minas Gerais.<sup>16</sup> The 1872 Imperial Census contains demographic data at the municipality and parish level and was the last census taken before the abolition of slavery in Brazil.<sup>17</sup>

Additional work was done to get a novel database at a finer geographical level for the 1872 census. At that time, the lowest geographical unit at which the census was taken was at the parish level and each municipality included at least one parish. I then georeference the parishes, allowing me to study the effects with the 1872 census at a smaller geographical unit allowing for better precision of the estimates.<sup>18,19</sup> Figure A.8 shows the geographical distribution of the parishes alongside their municipality boundaries.

To study the persistence of these effects I use data from other censuses from 1970-2010 are obtained from the Brazilian Institute of Geography and Statistics (IBGE).<sup>20</sup>

### 3.4. Geographical Boundaries and Controls

In addition, I obtain geographical characteristics and shapefiles at the municipality level from a variety of sources. Shapefiles for the coast of Brazil, municipality seats, and municipality boundaries from 1872-2010 are obtained from IBGE through Pereira and Goncalves (2023).<sup>21</sup> Information on the slope comes from the European Environment Agency<sup>22</sup>, and elevation comes from Amatulli et al. (2018). Data on the maximum amount of calories based on pre-Columbian and post-Columbian crops are obtained from Galor and Özak (2016). Soil types in Brazil is obtained from EMBRAPA (Brazilian Agricultural Research Corporation). Terrain ruggedness comes from Nunn et al. (2012). Rivers and streams [...].<sup>23</sup>

To study the effect of land usage and tenure I combine satellite data alongside Brazilian Agricultural Censuses. Land usage from 1985-2010 is obtained from Mapbiomas (Souza et al., 2020)<sup>24</sup>. Data for current land tenure in 2021 in Brazil is obtained from Sparovek et al. (2019).<sup>25</sup>

<sup>16</sup> Available at <http://www.nphed.cedeplar.ufmg.br/>

<sup>17</sup> It is important to note that the 1872 census does not measure land distribution nor agricultural output.

<sup>18</sup> Distribution of the 1872 parishes alongside the municipality boundaries is available at Figure A.8. For the sample used, I have 469 municipalities and 1,115 parishes. Information on how the parishes were georeferenced alongside how their borders were constructed are available at Appendix F

<sup>19</sup> More information on the construction of the variables based on the 1872 census data is available on Appendix G

<sup>20</sup> Microcensus is available through the IBGE but the data downloaded through the R package *censoibr* from Pereira and Barbosa (2023)

<sup>21</sup> I would like to thank Luis Claudio Barbosa for helping collect the 1995 Census boundaries, which are not available online.

<sup>22</sup> Available at <https://www.eea.europa.eu/data-and-maps/data/world-digital-elevation-model-etopo5>

<sup>23</sup> <https://metadados.snirh.gov.br/geonetwork/srv/api/records/a01764d3-4742-4f7d-b867-01bf544dde6d>

<sup>24</sup> Available at <https://brasil.mapbiomas.org/en/>

<sup>25</sup> Available at <https://atlasagropecuario.imaflora.org/>.

### 3.5. Land Conflict Data

Land conflict in Brazil comes from the CPT (Comissão Pastoral das Terras) from the years of 2014-2018.<sup>26,27</sup>

(Klein Goldewijk et al., 2017)

## 4. Descriptive

### 4.1. Summary Statistics

Summary statistics for the 1872 censuses are available in ???. Overall, we can see that municipalities farther from the coast

## 5. Historical Selection of the Land Grants Location

### 5.1. Geographical Information on the Land Grants

[add here summary statistics of the land grants]

Following Lowes et al. (2021) I show balance on geographical characteristics at the 0.5 x 0.5 (55 x 55km) grid level in [reference to table here]. [add here summary statistics at the grid level]. Overall, some patterns seem to emerge When comparing

## 6. Challenges to Identification

Given the descriptives and historical of the previous subsection, we see that the land grants were mainly located in [...]. Below I describe the main concerns with any possible identification strategy:

1. The main concern is the selection of the location of the land grants. Given that the people requesting the grant 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. Farmers would often look for the *terra roxa* in order to decide whether the soil was of quality for sugarcane. In order to partially deal with this concern, all regressions include a large set of geographical controls which

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<sup>26</sup>Annual reports from 2015-2022 are available to download at <https://www.cptnacional.org.br/downloads/category/4-areas-em-conflito>.

<sup>27</sup>Geographical distribution of the conflicts on the selected states is Figure A.4.

are proxies to what farmers during the colonial period would be likely looking for when requesting a grant. I further address this concern using the method from [add citation here].

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 X% of the total land grants found in the archives. Many of the missing ones either lack sufficient geographical information, or the letter itself is mostly illegible with only fragments left. While I cannot fully address the potential for missing data, I conduct randomization exercises in which I assume the existence of missing land grants and show how the results are affected by it.
3. The third concern is how precise the georeferencing of the land grants was done. In some cases, the letters themselves give precise information on the location of the grants, which allows 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. 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 that happened between the grant distribution to the observations in the datasets used, other historical events could have caused the effects seen. Therefore, any interpretation of the coefficients should be interpreted more as the long-term total effect of the grants, but not the direct causal effect.

## 7. Proposed Identification

Given the concerns discussed in the previous section

## 8. OLS + Matching

To first study the effects of the land grants I use a propensity score matching procedure to select control municipalities that are similar in geographical characteristics to those that received at least one land grant. In the first step, I estimate the following:

$$LandGrant_m = X_m + \mu_s + \epsilon_{m,s} \quad (1)$$

The set of variables,  $X_m$ , used to match are: 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, and the presence of four types of soil.<sup>28</sup> These variables are selected because they are proxies for agricultural output, geographical location, market access, and the main export of Brazil during the colonial times which was sugarcane. For each treated municipality I select one untreated municipality to be its control, which generates the matched sample.

For the matched sample I then estimate the following equation:

$$Y_{m,s} = \beta_1 \cdot AnyGrants_m + X_m + \mu_s + \epsilon_{m,s} \quad (2)$$

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.

Based on the 1-1 propensity score matching, I estimate the following equation: The estimator  $\beta_1$  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  $\beta_1 > 0$ .

Another important fact is that in 1698, there was a limit imposed on the size of the grants, that they could not exceed three squared leagues. Defined as pre-1700, and later grants, defined as post-1700 grants with the following equation:

$$Y_{m,s} = \gamma_1 \cdot GrantsPre1700_m + \gamma_2 \cdot GrantsPost1700_m + X_m + \mu_s + \epsilon_{m,s} \quad (3)$$

## 8.1. Results - Land Inequality

The main results for land inequality come directly from the 1995 Agricultural Census, in which I measure the proportion of agricultural land over a certain area cutoff. For the main definition used throughout the paper, I define a large farm as one whose area exceeds 2000ha. Given the historical context of the land grants, it would be expected that municipalities that have received a grant are more likely to have larger farms which implies a higher concentration of land.

Matching with the historical records, the results of [Table 2](#) indicate that municipalities with a grant, either it pre-1700 or post-1700 are associated with a higher share of total agricultural land assigned to farms over 2000 hectares. Even without any controls, the presence of a colonial land grant in a 1995 municipality is associated with an increase of the percentage of farms over 2000 hectares. When adding geographical

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<sup>28</sup>In Appendix ? I show that the results are robust to a different set of control variable.

controls, or through the matching approach the coefficients indicate that municipalities with grants pre-1700 are associated with a 4% increase in the share of farms over 2000 hectares in a municipality and post-1700 grants with a 2% increase. Both results are of economic importance, since the mean of municipalities that did not receive a grant is of 9%, indicating that the presence of historical land grants is associated with a 25 to 50% increase in the share of large estates in a municipality.

Results are consistent with either OLS or matching estimates.

[Table A.1](#) provides further results by varying the proportion of agricultural land above a certain cutoff. Instead of considering 2000 hectares and the main cutoff, I use cutoffs for both 5,000 and 10,000 hectares. Results are consistent throughout, with municipalities with a grant post-1700 have a higher proportion of lands above each individual cutoff. The coefficients vary between 1 to 2% depending on the estimation method used. Overall, the results are robust to different definitions of a large agricultural estate.

## 8.2. Heterogeneity by Region

The effects between the Northeast and Southeast of Brazil [...]

“Facil, assim, compreender por que houve tanto latifundio, sobretudo no Nordeste: areas imensas dadas de sesmaria ao mesmo morador” ([Costa Porto, 1979](#), p. 53)

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 3](#) breaking down into two geographical regions, the Northeast and the Southeast.<sup>29</sup>

In I show that for the 1905 Agricultural census in the Northeast municipalities, the presence of a land grant is still associated with an increase in the proportion of large farms in a municipality. This result persists for both pre-1700 and post-1700 grants, indicating that

Estimates in the Northeast indicate that there is evidence that the land grant presence in a municipality is associated with increases in land inequality. In [ref] the effects for the Southeastern states of Sao Paulo and Minas Gerais are similar. While municipalities with a pre-1700 grant indicate no effects on the land distribution across those two states, municipalities with a grant post-1700 have a significant increase of large estates between 2.4 and 3.3%.

The contrast comes from the effects of the Pre-1700 grants, which only affected land inequality in the Northeastern states.

[Talk here why the results are expected to be different]

([Mueller, 1995](#))

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<sup>29</sup>Northeast includes the states of Rio Grande do Norte, Paraiba, Bahia, Alagoas, and Pernambuco. The Southeast includes the states Sao Paulo and Minas Gerais.

## 9. Coastal Ban on Livestock

In 1701, the Portuguese Crown enacted a ban on cattle ranching from 80km of the coast (10 leagues) (Fausto et al., 2014, p .40; Simonsen, 2005, p .198; Bethell, 1984, p .460). The law went into effect after complaints from local farmers that cattle grazing was destroying the sugar plantations in the area. In effect that led to reserving the coast to be primarily an agricultural area and allowing the expansion of cattle towards the interiors of Brazil (Júnior, 1967, p. 216). That led to “a clear specialization between the two activities” (Ribeiro, 2012).<sup>30</sup>

Historically, the size of landholdings in the interior of Brazil at this time was extensive. As Fausto et al. (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 compared to the coast.<sup>31</sup> Even with restrictions on the sizes of the land grants taking into effect in 1698, due to the lack of government oversight the “sesmarias on which cattle ranches were established sometimes exceeded hundreds of thousands of acres” (Bethell, 1984).

(Carlson, 2019) “Extensive activities like cattle grazing continued to operate largely as before, as Bicalho and Hoefle (1990, 57) explain for northeast Brazil: “While the new system of cattle raising uses such technical innovations as planted pasture, pasture divisions with rotation of use, purchased animal feed, improved breeds and the greater use of vaccines, which together with the use of waged labour, satisfy the most demanding definitions of capitalized agriculture, the productivity per hectare has not increased significantly. Mere pseudo-modernisation has occurred. The ranches have all the trappings of being highly productive but the pastures only have one or two steers per hectare.””

(Boxer, 1962, p .)

“Cattle farming was to supply dry beef, leather, and carrying animals to the sugar mills and, later, to the villas that emerged around mining, but was not to mix itself geographically with these other two important export activities from the colonial period, nor with the coffee estates that emerged during the nineteenth century, when Brazil was already independent from Portugal.” (Ribeiro, 2012).

“It was there that farms measuring thousands of hectares emerged, where cattle found favourable environmental conditions for the multiplication of herds.”(Ribeiro, 2012).

Secondly, using the 1872 I analyze whether or not there were any effects of the coastal livestock ban on the demographics and economic activities at that time.

Mueller (1995)

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<sup>30</sup>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 that happened because of the 1701 Royal Decree. (*IBGE n.d.*)

<sup>31</sup>An example of this would be the d'Avila family which owned a large estate in the state of Bahia [...]

"Sesmarias remained the only way through which the Crown granted land apart from the tolerance of squatting"

"In Brazil land was abundant and did not represent a constraint for the production of sugar Any individual who possessed the capital and slaves to establish a sugar mill could readily obtain a sesmaria in which to do so In fact, in many instances it became necessary to have the means to establish a sugar mill in order to be granted a sesmaria"

"By squatting the settler risked being expelled as the frontier advanced, yet this was often far in the future Furthermore, increasingly through time, there was the possibility that through occupation and cultivation of the land the settler could acquire property rights, either through informal recognition of those rights or through the ex-post granting of a sesmaria"

Historically livestock-raising areas were [...]

With the standard errors being clustered at the municipality level.

Provision of Public goods is the cause for the effects on literacy in 1970 and onwards (?).

Other links:

[http://historialuso.an.gov.br/index.php?option=com\\_content&view=article&id=6191:escravos-de-ganho&catid=2073&Itemid=121](http://historialuso.an.gov.br/index.php?option=com_content&view=article&id=6191:escravos-de-ganho&catid=2073&Itemid=121)

<https://www.nexojornal.com.br/especial/2017/07/07/censo-de-1872-o-retrato-do-brasil-da-escravidao>

"Quando o senhor não tinha uma função para o escravo, ele deixava o escravo ao ganho", explica o historiador Diego Bissigo. "Ele ia para cidade buscar emprego e o senhor ficava com o salário que o escravo recebesse. É uma forma de uso para o escravo. Assim, ou alugando para outro senhor também."

"O termo jornaleiro, refere-se geralmente, a um trabalhador que trabalha à "jorna". Isto é, era contratado para trabalhos de pequena duração temporal, geralmente agrícolas, ( vindimas, colheitas, poda...) e como tal, pago ao dia (jornada?)."

"Criado de servir era um termo mais aplicado aos empregados que trabalhavam na Casa ou em serviços mais ligados à Casa (Jardim, cavalos, recados, etc.) ."

(Oliveira Andrade, 1980, p. 142)

Given the policy, I estimate the following regression to estimate the heterogeneous effects of the grants:

$$Y_{m,s} = \beta_1 \cdot (Grant_m * More80km_m) + \beta_2 \cdot (Grant_m * Less80km_m) + \delta \cdot More80km_m + X_m + \mu_s + \epsilon_{m,s} \quad (4)$$

The coefficients of  $\beta_1$  and  $\beta_2$  give the differential impacts of the grants in municipalities more than 80km from the coast and less than 80km from the coast. If this policy generated variation on the grants being expanded westward, which were aimed towards livestock and as a result would often expand in land, it would

be expected that  $\beta_2 > \beta_1$ .

## 9.1. Results

Results for the differential effects can be found in [Table 15](#). First, given that the goal of the ban was to remove livestock grants from the coast I analyze whether or not that was the case. In both Panels, the percentage of agricultural area used for livestock is lower. However, if the municipality received a grant, there is a positive effect. These results indicate that

Given that there are effects on the dispersion of livestock in grants more than 80km from the coast of Brazil, I then turn to analyze whether they are followed by an increase in land size. Results can be found in [Table 16](#). Consistent in every Panel, the percentage of farms that are above 2000ha is strictly lower in municipalities that are more than 80km from the coast. However, the effect of land concentration only shows up in municipalities that are further from the coast and received a colonial land grant.

I further consider the differential effects between when the municipalities received the earliest grant. Given that the law only took effect in 1701, it would be expected that the effects would be concentrated in [...]

[add those tables here]

## 10. Treaty of Tordesillas

Another source for the heterogeneous effects of the grants comes from 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 that was not the case.<sup>32</sup> The treaty would end 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. Portuguese grants could have only been assigned to the I follow the definition of the Treaty line being at  $48.7^\circ$  W from [Laudares et al. \(2022\)](#).<sup>33</sup> Therefore, the time of the presence of the grants is going to be located for municipalities to the east of the line.

In [Figure 5](#), I show the treaty line alongside the land grants in the states of São Paulo and Minas Gerais.<sup>34</sup> I estimate the following equation:

$$Y_{m,s} = \beta_1 \cdot (Grant_m * East_m) + \beta_2 \cdot (Grant_m * West_m) + \delta \cdot East_m + X_m + \mu_s + \epsilon_{m,s} \quad (5)$$

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<sup>32</sup>In [Figure 5](#), I show that even before 1750, some land grants were already located in the Spanish side.

<sup>33</sup>The authors of the paper describe this cutoff as the one agreed by most historians.

<sup>34</sup>Those states are selected, since out of my sample they are the only ones that have municipalities on both sides of the line.

## 10.1. Results

# 11. Instrumental Variable - Bandeirantes Exploration

The bandeirantes explorations were one of the key events in the 17<sup>th</sup> and 18<sup>th</sup> century in the Southeast (Fausto et al., 2014, p. 46-47). These explorations were often motivated by the search for minerals or indigenous slaves. They would often start from the city of Sao Paulo and spread towards the interior of Brazil, which at the time was still unexplored.

“Owing in large measure to the intrepid Paulistas of the seventeenth century, the menace of Indian attacks from the interior was largely eliminated, and the lands themselves were appropriated in extremely large tracts for the purposes of cattle raising” (T. L. Smith, 1972, p. 320). These same explorers would often ask land in the form of land grants of the maximum size for their entire family (T. L. Smith, 1972, p. 320).

Figure 4 shows the geographical expansion of the Bandeiras, as they expanded from Sao Paulo, Minas Gerais, and Bahia.

Lima (1954, p. 44) indicates that at the time of independence, Goncalves Chaves reported that [...]

For this analysis, I select only the states of Sao Paulo and Minas Gerais the states which had Bandeirantes explorations.<sup>35</sup>

The Bandeirantes I consider are as follows: Antonio Raposo Tavares, Fernao Dias Pais (who was the father-in-law of the famous Manuel de Borba Gato), Manuel Preto, and Pascoal Moreira Cabral Leme.<sup>36</sup>

[Have to add here their history and why they are the most important ones].

The most famous one, Raposo Tavares was a bandeirante that [...] (Franco, 1954)

<sup>37</sup>

First, I show that there is a strong negative correlation between the proximity to a bandeirante route and the probability of a municipality receiving a land grant. Figure A.9 and Figure A.10 show the geographical distribution of the grants alongside the explorer routes with a binscatter version indicating the probability of a municipality getting a grant based on how close it is to the explorer route. Second, I show that the first-stage regression only exists for grants post-1700. This is important for two reasons, first, since most of the *bandeiras* took place during the mid to late 1600s, it would be unlikely that grants were being distributed

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<sup>35</sup>The focus of this section is on the Bandeiras Paulistas, which radiated from Sao 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.

<sup>36</sup>Most of them are described as the most noteworthy Bandeirantes (Prestes Filho, 2012, p. 43)

<sup>37</sup>The exploration routes have also been crosschecked with [add citation here from below once it complies] and Santos (2022)

Given this strong evidence of a first stage, I estimate the following equation:

$$LandGrant_{m,s} = \delta \cdot BandeiraDist_{m,s} + X_{m,s} + \mu_s + \epsilon_{m,s} \quad (6)$$

The second stage would be as follows:

$$Y_{m,s} = \beta \cdot \widehat{LandGrant}_{m,s} + X_{m,s} + \mu_s + \epsilon_{m,s} \quad (7)$$

The exclusion restriction assumes that conditional on the set of controls, the proximity to the Bandeirantes routes that the Bandeirantes only affects the outcomes through the increased presence of land grants.

As a placebo, I test whether there is a first-stage effect on the grants pre-1600. Since most of the explorations took place between the mid-17<sup>th</sup> 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.

The estimates of the first-stage between municipalities that were crossed by the Bandeirantes and the location of land grants vary between 15% to 20% more likely for those municipalities crossed to have a land grant. In all cases the F-statistic is sufficiently above 20, indicating that the instrument is valid [add the table here].

### 11.1. Results

[Keep in mind that the IV is the LATE, not the ATE which is what the OLS + the matching is giving. Which implies that we are comparing the compliers vs. the general population.]

Overall, the results seem to indicate that there is a bias towards zero in the traditional OLS estimates for the Southeastern region of Brazil.

<sup>38</sup>

## 12. Mechanisms

Having established that there are persistent effects of the land grants in present-day land inequality in Brazil. The next question is through what mechanisms it has persisted, and what are their subsequent effects. This section addresses both issues:

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<sup>38</sup>As robustness, I estimate the effects only considering the effects of post-1700 grants. Results can be found in [add ref here] and remain qualitatively similar.

## **12.1. Land Usage**

## **12.2. Labor Specialization**

## **12.3. Human Capital Accumulation**

I test whether ([Galor and Moav, 2006](#)). Following [Galor, Moav, and Vollrath \(2009\)](#) I test whether there are associated effects of land concentration on education and human capital accumulation.

[Also add about the role of specific institutions ([Acemoglu et al., 2005](#))]

First, I test whether there are any effects in literacy or school attendance in 1872. [Table 11](#)

Overall, there are no persistent effects in

## **12.4. Land Conflicts**

Another possible mechanism by which the grants, through land inequality, themselves could affect present-day outcomes is through an increase in land conflicts. Land conflicts in Brazil are frequent, with the Comissão Pastoral da Terra reporting about XXX incidents a year.<sup>39</sup> Most of these conflicts occur as clashes between large estate owners with smallholders or people without farms. They either occur through the occupation of vacant land [...] or through large farmers expropriating land from smaller farms.

Given that land inequality is a driver on why these conflicts exist, I study whether, the presence of historical grants affects the present-day conflict over land in Brazil.

([Albertus et al., 2018](#))

<sup>40</sup>

## **12.5. Effects on Slavery**

A possible mechanism by which the grants themselves are affecting present-day outcomes is through the presence of slavery in the region. The expansion of the Bandeirantes,

Results using the 1872 census can be found in [Table 14](#). Similar to previous results, the OLS estimates indicate that there are null results b

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<sup>39</sup>Add link to the report here.

<sup>40</sup>For the measure of land conflicts, I use the 2010 municipality boundaries since they are the ones used to track down where the conflict was located.

## 13. Robustness

### 13.1. Removing outliers

A possible concern is that the results are solely being driven by outliers, municipalities in which the majority of agricultural land is over 2000 hectares.<sup>41</sup>

In Figure A.12 I show the OLS estimates of Equation 2. The results are consistently positive, indicating that the presence of a land grant is associated with an increase in the presence of farms over 2000 ha. [Add more here]

### 13.2. Coefficient Bounds

I use the methodology from to estimate how much unobservables could be impacting the main estimates Masten et al. (2022).

### 13.3. Randomization

## 14. Conclusion

In this paper, I find that colonial land grants given by Portugal in Brazil during the 17<sup>th</sup> and 18<sup>th</sup> century had persistent effects on land concentration when measured by the 1995 Agricultural Census.

Results are robust to the inclusion of geographical controls, a 1-1 propensity score matching procedure, or different definitions of land concentration based on the 1995 Agricultural Censuses.

This paper focuses solely on the Northeast and Southeast of Brazil, however, those grants were present in the entirety of the territory. Further work can be conducted to understand how these grants operated differently in Northern and Central Brazil. Both regions were occupied later in comparison to 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 alongside the present-day expansion towards the West could help us better understand the effects on issues such as deforestation.

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<sup>41</sup>Add here a link to the histogram of the distribution of

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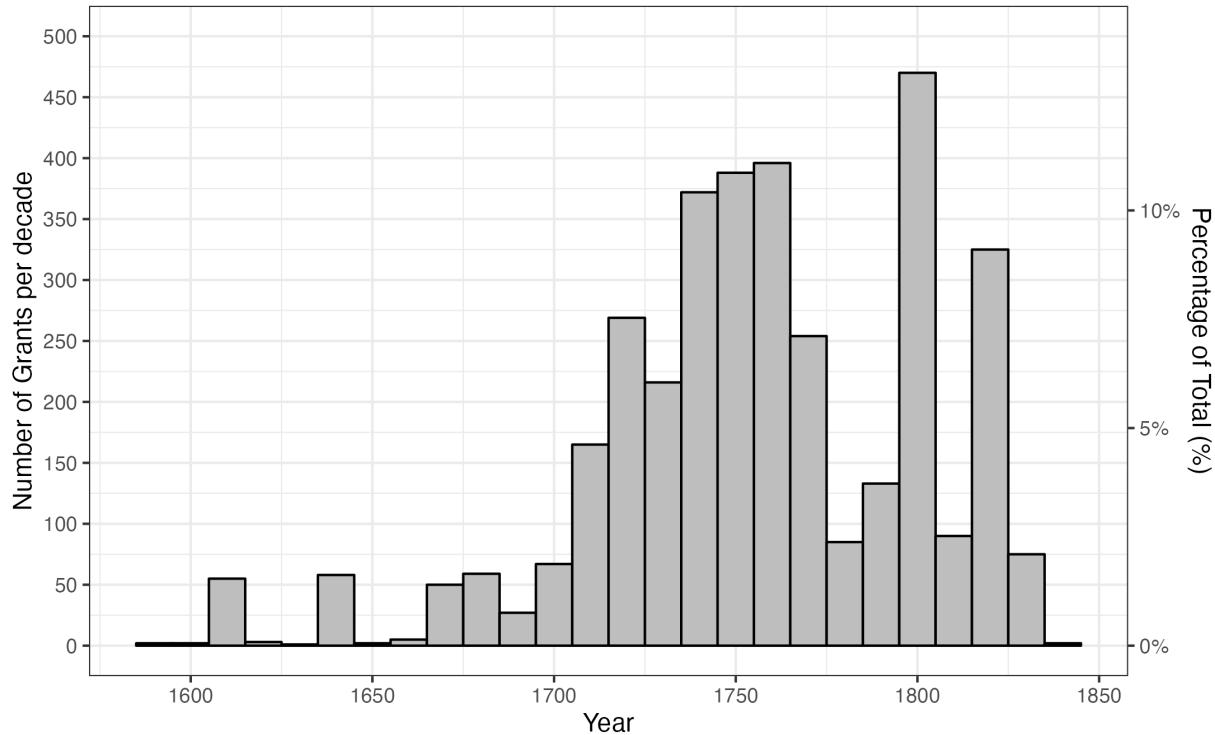
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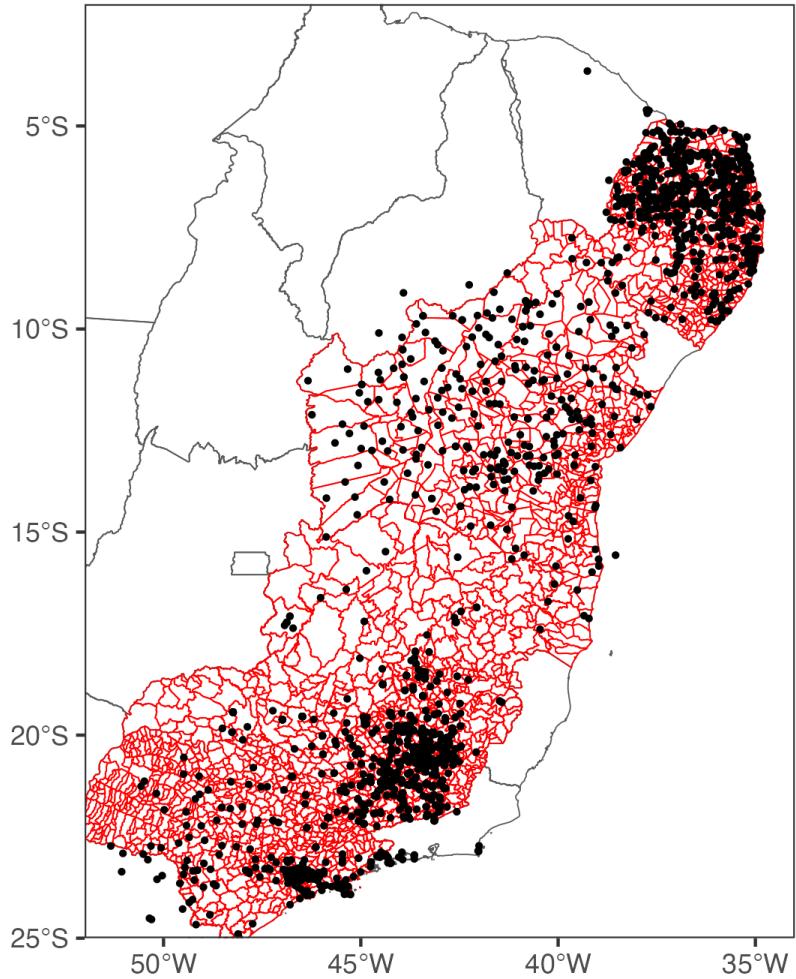
## Figures

Figure 1: Land Grant Year Histogram



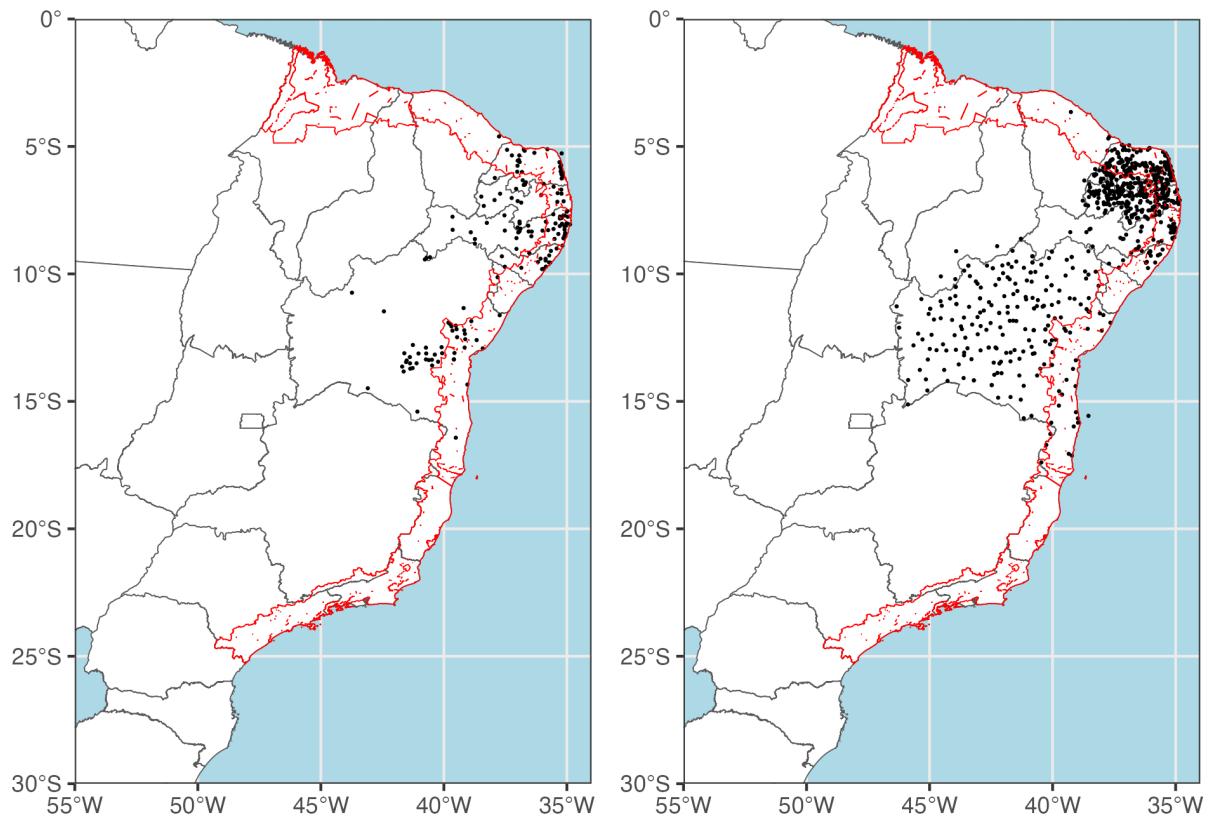
*Notes:* Histogram describing the yearly distribution of the land grants used in the dataset.

Figure 2: Land Grant Distribution



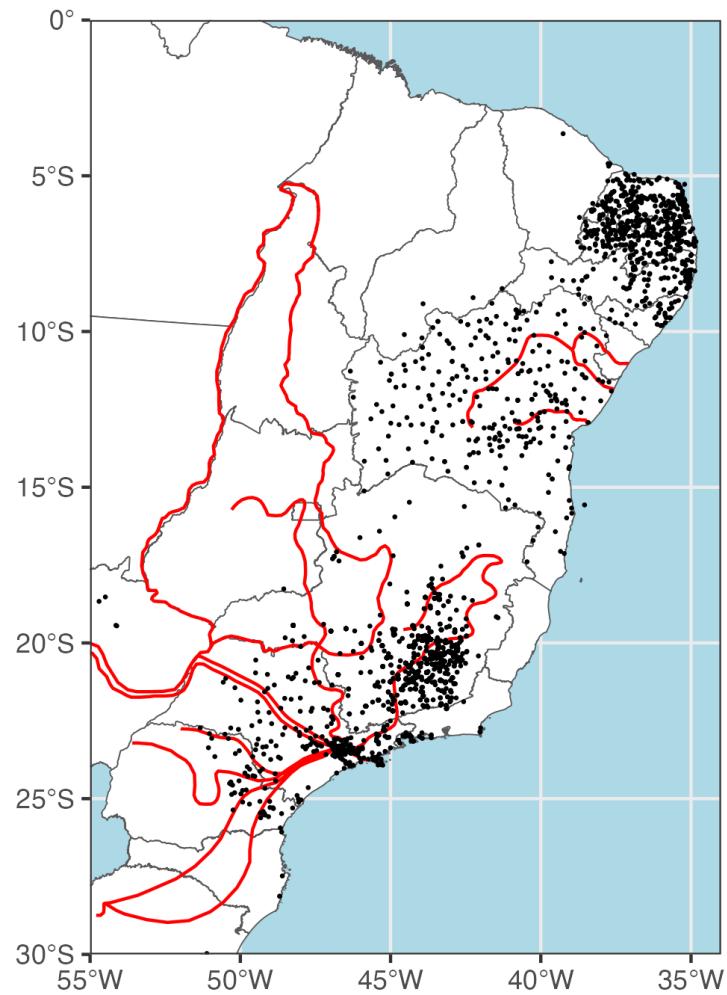
*Notes:* Geographical distribution of the land grants across the states. Municipalities for the 1991 census for the states which information on the land grants is available are highlighted in red. Each point indicates a unique land grant.

Figure 3: Distribution of Land Grants pre- and post- 1701



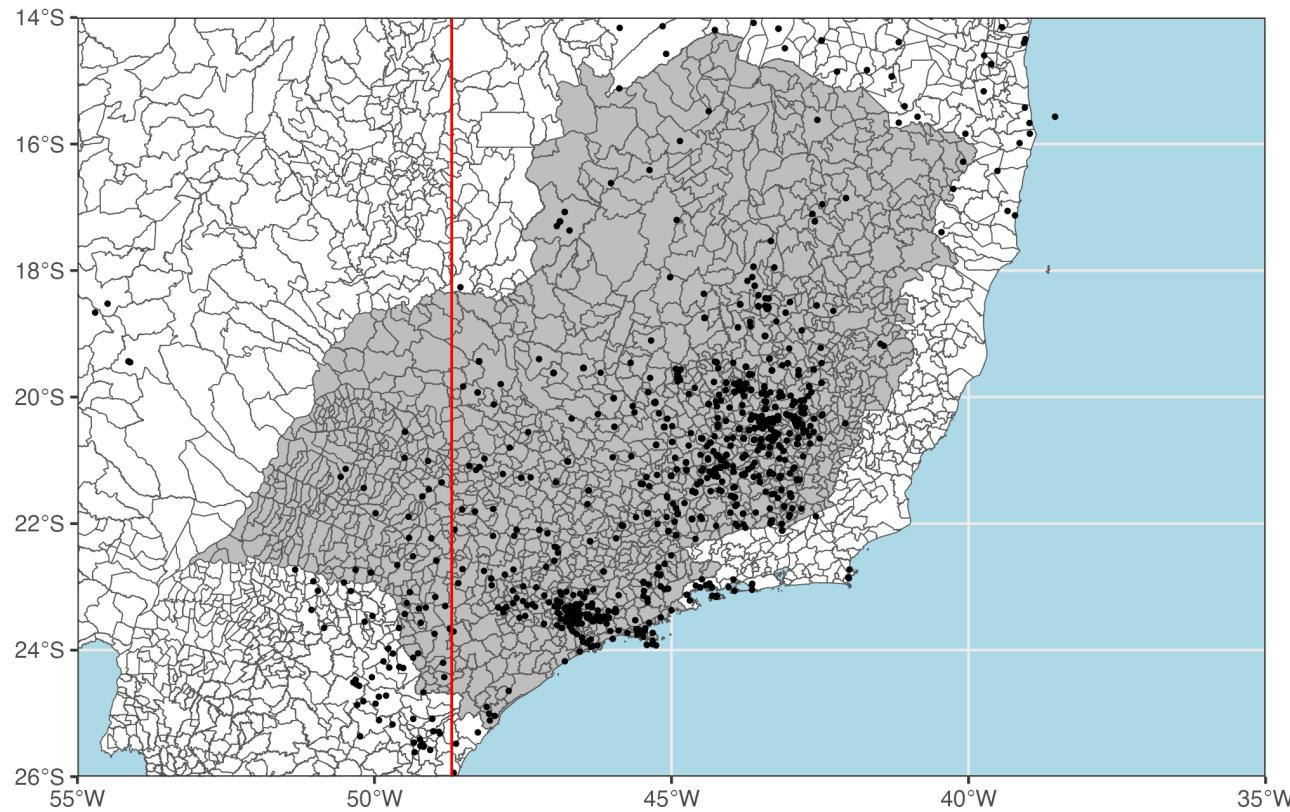
*Notes:* This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 4: Distribution of Land Grants alongside Bandeiras



*Notes:* This figure shows the distribution of the land grants alongside the *bandeiras* routes.

Figure 5: Distribution of Land Grants in Minas Gerais and Sao 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 alongside the Treaty of Tordesillas. The definition of the Treaty of Tordesillas line follows [Laudares et al. \(2022\)](#), being located at 48.7 W.

## Tables

### 14.1. Summary Statistics

## 14.2. Matching

Table 1: OLS and Matching Estimates on 1995 Agricultural Census

	Farms over 2000ha (%)			Occupied Land (%)			Leased Land (%)			Area Used for Livestock (%)		
	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching
<i>Panel A</i>												
Any Land Grants				-1.231 (2.629)	-0.666 (2.750)	-1.962 (3.025)	3.942 (3.219)	4.076 (3.778)	2.524 (3.807)	2.076 (1.452)	4.732*** (1.655)	5.695*** (1.595)
Grants Pre-1700	3.193*	4.210**	4.128**									
Geographical Controls		✓	✓									
Control Mean	9.2 (1.669)	9.2 (1.674)	8.2 (1.753)	9.6	9.6	9.3	9.4	9.4	10.9	46.1	46.1	43.1
Grants Post-1700	2.823*** (0.868)	2.101** (0.825)	2.367*** (0.862)									
N	2372	2372	1472	2372	2372	1472	2372	2372	1472	2372	2372	1472
Geographical Controls		✓	✓		✓	✓		✓	✓	✓	✓	✓
<i>Panel B</i>												
Control Mean	9.8	9.8	6.9	9.3	9.3	9.1	9.7	9.7	3.8	47.1	47.1	40.5
R <sup>2</sup>	0.04	0.14	0.16	0.00	0.01	0.01	0.00	0.02	0.03	0.03	0.12	0.12
Grants Pre-1700	3.649** (1.658)	4.484*** (1.670)	6.011*** (1.963)	-4.575*** (1.402)	-3.915*** (1.508)	-6.104 (5.966)	10.382 (8.287)	12.220 (8.671)	17.833** (8.561)	-3.118 (2.534)	0.430 (2.596)	0.792 (2.659)
N	2372	2372	292	2372	2372	292	2372	2372	292	2372	2372	292
Geographical Controls		✓	✓		✓	✓		✓	✓	✓	✓	✓
<i>Panel C</i>												
Control Mean	9.3	9.3	8.7	9.4	9.4	6.6	9.6	9.6	10.7	45.9	45.9	43.4
R <sup>2</sup>	0.03	0.14	0.13	0.00	0.01	0.04	0.00	0.02	0.05	0.03	0.11	0.35
Grants Post-1700	2.981*** (0.861)	2.275*** (0.826)	2.823*** (0.893)	-0.492 (2.855)	-0.036 (2.970)	1.452 (2.872)	4.031 (3.361)	3.657 (3.838)	2.060 (3.960)	2.685* (1.550)	4.950*** (1.799)	5.895*** (1.713)
N	2372	2372	1300	2372	2372	1300	2372	2372	1300	2372	2372	1300
R <sup>2</sup>	0.03	0.14	0.20	0.00	0.01	0.01	0.00	0.02	0.03	0.03	0.12	0.11

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

<sup>a</sup> 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. All regressions are weighted by the area of the municipality.

### 14.3. Regional Heterogeneity

Table 2: Effects of Land Grants in Land Inequality - (%) of Farms over 2000 ha 1995

	Whole Sample			Northeast			Southeast		
	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching
Grants Pre-1700	3.193*	4.210**	4.128**	4.180**	5.015***	5.332***	-0.055	4.178	2.811
	(1.669)	(1.674)	(1.753)	(1.735)	(1.773)	(1.833)	(4.151)	(4.540)	(4.691)
Grants Post-1700	2.823***	2.101**	2.367***	5.133***	3.153***	3.269***	0.815	2.378**	3.306***
	(0.868)	(0.825)	(0.862)	(1.291)	(1.101)	(1.110)	(1.162)	(1.153)	(1.247)
N	2372	2372	1472	1007	1007	842	1365	1365	630
Geographical Controls		✓	✓		✓	✓		✓	✓
Control Mean	9.2	9.2	8.2	7	7	7.4	10.5	10.5	7.5

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

<sup>a</sup> 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.

Table 3: OLS and Matching Estimates on 1995 Agricultural Census - Northeastern States Only

	Farms over 2000ha (%)			Occupied Land (%)			Leased Land (%)			Area Used for Livestock (%)		
	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching
<i>Panel A (Any Grants)</i>												
Any Land Grants	6.017*** (1.142)	4.489*** (1.026)	4.742*** (1.067)	-0.439 (2.554)	0.309 (2.450)	0.457 (2.478)	4.120 (5.634)	4.177 (6.434)	3.429 (6.334)	8.203*** (2.565)	7.938*** (2.891)	7.249** (2.946)
N	1007	1007	842	1007	1007	842	1007	1007	842	1007	1007	842
Geographical Controls		✓	✓		✓	✓		✓	✓		✓	✓
Control Mean	7	7	7.4	6.9	6.9	6.3	10.6	10.6	11.9	43.4	43.4	45.3
R <sup>2</sup>	0.07	0.20	0.21	0.00	0.02	0.01	0.00	0.02	0.02	0.04	0.10	0.09
<i>Panel B (Pre 1700 Grants)</i>												
Grants Pre-1700	4.905*** (1.676)	5.470*** (1.738)	7.015*** (2.159)	-3.249** (1.278)	-3.005** (1.488)	-1.145 (0.828)	14.275 (11.216)	12.581 (11.377)	17.452 (12.669)	-2.894 (3.010)	-1.616 (2.872)	3.527 (2.797)
N	1007	1007	220	1007	1007	220	1007	1007	220	1007	1007	220
Geographical Controls		✓	✓		✓	✓		✓	✓		✓	✓
Control Mean	9	9	6.3	7.2	7.2	5.2	9.9	9.9	8.7	47	47	41.3
R <sup>2</sup>	0.05	0.20	0.15	0.00	0.02	0.16	0.01	0.02	0.05	0.03	0.09	0.50
<i>Panel C (Post 1700 Grants)</i>												
Grants Post-1700	5.415*** (1.265)	3.516*** (1.091)	3.698*** (1.158)	0.595 (2.872)	1.378 (2.919)	1.340 (3.072)	3.799 (5.932)	4.446 (6.852)	4.177 (6.735)	9.913*** (2.840)	9.517*** (3.360)	9.690*** (2.716)
N	1007	1007	716	1007	1007	716	1007	1007	716	1007	1007	716
Geographical Controls		✓	✓		✓	✓		✓	✓		✓	✓
Control Mean	7.5	7.5	8.5	6.5	6.5	6.3	11.1	11.1	9.7	43.5	43.5	44.3
R <sup>2</sup>	0.06	0.19	0.23	0.00	0.02	0.01	0.00	0.02	0.02	0.04	0.10	0.14

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

<sup>a</sup> 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. All regressions are weighted by the area of the municipality. States considered are Bahia, Rio Grande do Norte, Paraiba, Pernambuco, and Alagoas.

Table 4: OLS and Matching Estimates on 1995 Agricultural Census - Southeastern States Only

	Farms over 2000ha (%)			Occupied Land (%)			Leased Land (%)			Area Used for Livestock (%)		
	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching
<i>Panel A (Any Grants)</i>												
Any Land Grants	0.405 (1.149)	2.442** (1.162)	3.089** (1.266)	-1.977 (4.499)	-3.430 (4.991)	-5.125 (6.215)	3.774 (3.318)	4.201 (4.524)	0.653 (4.245)	-3.688*** (1.428)	2.075 (1.533)	2.418 (1.700)
N	1365	1365	630	1365	1365	630	1365	1365	630	1365	1365	630
Geographical Controls		✓	✓		✓	✓		✓	✓		✓	✓
Control Mean	10.5	10.5	7.5	11.2	11.2	13.5	8.8	8.8	11.7	47.6	47.6	42.2
R <sup>2</sup>	0.02	0.18	0.19	0.00	0.01	0.03	0.00	0.03	0.07	0.03	0.24	0.17
<i>Panel B (Pre 1700 Grants)</i>												
Grants Pre-1700	0.123 (4.171)	4.513 (4.588)	-3.539 (6.676)	-8.299** (3.899)	-4.987 (5.023)	-4.527 (4.603)	-0.545 (1.728)	7.175 (4.768)	2.518 (2.585)	-3.746 (4.667)	2.298 (5.130)	-4.292 (6.885)
N	1365	1365	72	1365	1365	72	1365	1365	72	1365	1365	72
Geographical Controls		✓	✓		✓	✓		✓	✓		✓	✓
Control Mean	10.4	10.4	9.6	10.8	10.8	5.1	9.6	9.6	7.9	47.2	47.2	46.2
R <sup>2</sup>	0.02	0.17	0.13	0.00	0.01	0.23	0.00	0.03	0.30	0.03	0.24	0.44
<i>Panel C (Post 1700 Grants)</i>												
Grants Post-1700	0.813 (1.170)	2.460** (1.165)	2.768** (1.281)	-1.460 (4.752)	-3.499 (5.098)	-4.837 (6.576)	4.237 (3.541)	3.756 (4.593)	0.535 (5.010)	-3.751*** (1.440)	1.804 (1.532)	1.841 (1.729)
N	1365	1365	584	1365	1365	584	1365	1365	584	1365	1365	584
Geographical Controls		✓	✓		✓	✓		✓	✓		✓	✓
Control Mean	10.4	10.4	7.9	11.1	11.1	14.3	8.7	8.7	12.1	47.4	47.4	43.2
R <sup>2</sup>	0.02	0.18	0.24	0.00	0.01	0.02	0.00	0.03	0.06	0.03	0.24	0.18

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

<sup>a</sup> 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. All regressions are weighted by the area of the municipality. States considered are Sao Paulo and Minas Gerais.

Table 5: OLS and Matching Results for the 1995 Agricultural Census for the Northeastern states - Heterogeneity by Economic Acitivity

	Area Used for Livestock (%)		Farms over 2000ha (%)		Occupied Land (%)		Leased Land (%)	
	OLS	Matching	OLS	Matching	OLS	Matching	OLS	Matching
<i>Panel A (Livestock Grants Pre-1701)</i>								
Livestock Pre-1700	1.961 (3.604)	0.875 (4.557)	8.819*** (2.643)	6.985** (3.436)	-1.951 (1.460)	-1.536 (1.085)	32.459 (21.838)	24.887 (22.744)
N	1007	110	1007	110	1007	110	1007	110
R <sup>2</sup>	0.04	0.23	0.15	0.10	0.01	0.36	0.02	0.06
Control Mean	47.3	46.5	9.7	9.1	7.1	6.9	14.7	9.8
<i>Panel B (Livestock Grants Post-1701)</i>								
Livestock Post-1700	11.314*** (4.092)	11.265*** (3.088)	5.347*** (1.155)	5.645*** (1.292)	-2.875 (1.789)	-2.263 (2.574)	-0.513 (5.840)	-0.879 (6.003)
N	1007	584	1007	584	1007	584	1007	584
R <sup>2</sup>	0.06	0.10	0.15	0.20	0.01	0.01	0.01	0.02
Control Mean	42.9	43.3	7.4	7.6	7.5	7.4	9.1	12.5
<i>Panel C (Non-Livestock Grants)</i>								
Non-Livestock Grants	-0.670 (2.156)	-2.658 (4.012)	2.091 (1.309)	1.717 (1.675)	1.937 (4.064)	3.392 (3.782)	5.401 (7.248)	7.558 (8.499)
N	1007	384	1007	384	1007	384	1007	384
R <sup>2</sup>	0.04	0.07	0.13	0.11	0.01	0.01	0.01	0.03
Control Mean	49.1	46.8	10.3	8.9	4.9	6.5	8.9	10.7

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

Table 6: OLS and Matching Estimates on 1970 Census

	People Working on Sugarcane (%)			People Working on Livestock (%)			Proportion People Sharecropping (%)		
	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching
<i>Panel A (Any Grants)</i>									
Any Land Grants	0.547*** (0.175)	0.594*** (0.169)	0.551*** (0.166)	-2.104*** (0.605)	-1.612*** (0.491)	-1.782*** (0.468)	-1.092*** (0.211)	-0.942*** (0.225)	-0.765*** (0.249)
N	2208	2208	1468	2208	2208	1468	2208	2208	1468
Geographical Controls	✓	✓		✓	✓		✓	✓	✓
Control Mean	1.4	1.4	1.4	19.4	19.4	19	3.4	3.4	3.2
R <sup>2</sup>	0.07	0.14	0.18	0.20	0.40	0.48	0.21	0.28	0.25
<i>Panel B (Pre 1700 Grants)</i>									
Grants Pre-1700	0.538 (0.589)	0.577 (0.573)	0.543 (0.557)	-3.028*** (0.941)	-2.095** (0.830)	-2.160** (0.887)	-0.216 (0.327)	0.069 (0.341)	-0.314 (0.449)
N	2208	2208	1468	2208	2208	1468	2208	2208	308
Geographical Controls	✓	✓		✓	✓		✓	✓	✓
Control Mean	1.3	1.3	2	19.2	19.2	19.1	3.4	3.4	2.4
R <sup>2</sup>	0.06	0.14	0.18	0.20	0.39	0.47	0.19	0.27	0.37
<i>Panel C (Post 1700 Grants)</i>									
Grants Post-1700	0.631*** (0.182)	0.659*** (0.173)	0.619*** (0.166)	-1.491** (0.628)	-1.326*** (0.499)	-1.350*** (0.476)	-1.150*** (0.219)	-1.085*** (0.236)	-1.047*** (0.257)
N	2208	2208	1468	2208	2208	1468	2208	2208	1294
Geographical Controls	✓	✓		✓	✓		✓	✓	✓
Control Mean	1.4	1.4	1	19.3	19.3	19.1	3.4	3.4	3.6
R <sup>2</sup>	0.07	0.14	0.18	0.19	0.39	0.47	0.21	0.29	0.27

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

<sup>a</sup> 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. All regressions are weighted by the area of the municipality.

Table 7: OLS and Matching Estimates on 1970 Census - Northeast

	People Working on Sugarcane (%)			People Working on Livestock (%)			Proportion People Sharecropping (%)		
	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching
<i>Panel A</i>									
Any Land Grants	0.666*** (0.255)	0.692*** (0.225)	0.666*** (0.224)	-0.753 (0.868)	-1.375** (0.630)	-1.490** (0.669)	-0.214 (0.244)	-0.260 (0.276)	-0.322 (0.288)
N	915	915	820	915	915	820	915	915	820
Geographical Controls	✓	✓		✓	✓	✓	✓	✓	✓
Control Mean	1.9	1.9	1.6	23.1	23.1	23.5	2.6	2.6	2.9
R <sup>2</sup>	0.09	0.26	0.26	0.02	0.30	0.30	0.19	0.33	0.33
<i>Panel B</i>									
Grants Pre-1700	0.754 (0.670)	1.116* (0.630)	1.040* (0.607)	-1.990** (1.007)	-1.651* (0.855)	-2.011* (1.068)	0.061 (0.383)	-0.029 (0.346)	-0.602 (0.503)
N	915	915	228	915	915	228	915	915	228
Geographical Controls	✓	✓		✓	✓	✓	✓	✓	✓
Control Mean	1.6	1.6	2.1	23.1	23.1	21.7	3.1	3.1	2.6
R <sup>2</sup>	0.09	0.27	0.43	0.02	0.30	0.36	0.19	0.33	0.41
<i>Panel C</i>									
Grants Post-1700	0.755*** (0.269)	0.666*** (0.230)	0.508** (0.220)	0.096 (0.916)	-0.761 (0.647)	-1.210* (0.685)	-0.388 (0.260)	-0.448 (0.299)	-0.447 (0.316)
N	915	915	694	915	915	694	915	915	694
Geographical Controls	✓	✓		✓	✓	✓	✓	✓	✓
Control Mean	2	2	1.4	22.9	22.9	24.2	2.6	2.6	3.5
R <sup>2</sup>	0.09	0.26	0.27	0.01	0.30	0.31	0.19	0.33	0.35

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

<sup>a</sup> 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. All regressions are weighted by the area of the municipality.

Table 8: OLS and Matching Estimates on 1970 Census - Southeast

	People Working on Sugarcane (%)			People Working on Livestock (%)			Proportion People Sharecropping (%)		
	OLS	OLS	Matching	OLS	OLS	Matching	OLS	OLS	Matching
<i>Panel A</i>									
Any Land Grants	0.434*	0.502**	0.412**	-3.394***	-1.680***	-2.547***	-1.929***	-1.390***	-0.992***
	(0.242)	(0.224)	(0.163)	(0.868)	(0.636)	(0.612)	(0.321)	(0.295)	(0.341)
N	1293	1293	648	1293	1293	648	1293	1293	648
Geographical Controls	✓	✓		✓	✓		✓	✓	
Control Mean	1.1	1.1	0.9	17.4	17.4	15	3.9	3.9	3.3
R <sup>2</sup>	0.02	0.15	0.22	0.07	0.30	0.37	0.16	0.30	0.21
<i>Panel B</i>									
Grants Pre-1700	-0.658*	-0.125	0.853	-8.777***	-4.967***	-2.070*	-1.750***	-0.679	0.355
	(0.390)	(0.526)	(0.727)	(1.424)	(1.002)	(1.237)	(0.227)	(0.562)	(0.279)
N	1293	1293	80	1293	1293	80	1293	1293	80
Geographical Controls	✓	✓		✓	✓		✓	✓	
Control Mean	1.1	1.1	0.4	16.7	16.7	7	3.6	3.6	0.5
R <sup>2</sup>	0.02	0.14	0.31	0.05	0.30	0.79	0.10	0.27	0.74
<i>Panel C</i>									
Grants Post-1700	0.508**	0.519**	0.223	-3.064***	-1.514**	-1.358*	-1.904***	-1.365***	-1.151***
	(0.248)	(0.225)	(0.275)	(0.882)	(0.637)	(0.706)	(0.330)	(0.296)	(0.374)
N	1293	1293	600	1293	1293	600	1293	1293	600
Geographical Controls	✓	✓		✓	✓		✓	✓	
Control Mean	1.1	1.1	1.5	17.2	17.2	15.6	3.8	3.8	3.5
R <sup>2</sup>	0.03	0.15	0.25	0.05	0.30	0.38	0.15	0.29	0.23

\* p &lt; 0.1, \*\* p &lt; 0.05, \*\*\* p &lt; 0.01

<sup>a</sup> 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. All regressions are weighted by the area of the municipality.

	Sugarcane Area (%)		Pasture Area (%)		Urban Area (%)	
	OLS	Matching	OLS	Matching	OLS	Matching
<i>Panel A (Any Grants)</i>						
Any Land Grants	1.099*** (0.295)	1.004*** (0.289)	0.597 (0.981)	0.632 (1.178)	0.612*** (0.183)	0.648*** (0.164)
N	6747	1334	6747	1334	6747	1334
R <sup>2</sup>	0.22	0.29	0.34	0.20	0.03	0.05
Control Mean	0.9	0.7	30.1	28.6	0.2	0.2
<i>Panel B (Pre 1700 Grants)</i>						
Grants Pre-1700	2.739*** (0.883)	1.927* (1.145)	-6.423*** (2.367)	-9.338*** (3.034)	2.370*** (0.762)	2.324*** (0.793)
N	6747	258	6747	258	6747	258
R <sup>2</sup>	0.22	0.34	0.34	0.26	0.05	0.13
Control Mean	3.1	0.8	40.6	28.7	0.5	0.3
<i>Panel C (Post 1700 Grants)</i>						
Grants Post-1700	0.775*** (0.291)	0.577* (0.301)	1.705* (1.024)	2.778** (1.243)	0.236** (0.108)	0.345*** (0.130)
N	6747	1122	6747	1122	6747	1122
R <sup>2</sup>	0.22	0.35	0.34	0.23	0.03	0.04
Control Mean	1.2	0.8	28	28.7	0.3	0.3

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

## 15. Instrumental Variable Results

Table 9: First-Stage Results (1995 Municipality Boundaries)

	Grant Present (0/1)			
	(1)	(2)	(3)	(4)
Crossed by Bandeira	0.127*** (0.029)	0.106*** (0.029)		
Distance to Bandeira (km)			-0.001*** (0.000)	-0.001*** (0.000)
N	1365	1365	1365	1365
Geographical Controls		✓		✓
Control Mean/Mean	0.2	0.2	0.2	0.2
F-stat	18.84	16.54	26	16.49
R <sup>2</sup>	0.03	0.15	0.03	0.14

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

<sup>a</sup> 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. All regressions are weighted by the area of the municipality. States considered are Sao Paulo and Minas Gerais.

Table 10: IV and Matching Estimates on Agricultural Land Size - 1995 Agricultural Census

	Over 2,000ha (%)		Over 5,000ha (%)		Over 10,000ha (%)	
	Matching	2SLS	Matching	2SLS	Matching	2SLS
Any Land Grants	3.089** (1.266)	22.454* (12.246)	1.969** (1.002)	12.774 (9.354)	1.186* (0.703)	13.512* (7.796)
N	630	1365	630	1365	630	1365
Geographical Controls	✓	✓	✓	✓	✓	✓
Control Mean	10.5	10.5	4.3	4.3	1.9	1.9

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

<sup>a</sup> 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. States considered are Sao Paulo and Minas Gerais.

## Human Capital Accumulation

Table 11: IV Estimates - Literacy Rate and School Attendance in 1872

	Literacy Rate (%)			School Attendance (%)		
	All	Men	Women	All	Boys	Girls
Any Land Grants	-5.623** (2.704)	-5.966* (3.368)	-4.950** (2.466)	-9.078** (3.984)	-9.293** (4.383)	-9.390** (4.142)
N	483	483	483	483	483	483
Geographical Controls	✓	✓	✓	✓	✓	✓
Mean	18.4	23.6	13	16.8	20.5	13.5

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

<sup>a</sup> 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. States considered are Sao Paulo and Minas Gerais.

Table 12: IV and OLS Estimates - Literacy Rate in 1872

	Literacy Rate (%)		Men Literacy Rate (%)		Women Literacy Rate (%)	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Any Land Grants	1.170 (0.929)	-5.623** (2.704)	1.408 (1.136)	-5.966* (3.368)	1.076 (0.821)	-4.950** (2.466)
N	483	483	483	483	483	483
Geographical Controls	✓	✓	✓	✓	✓	✓
Mean	18.4	18.4	23.6	23.6	13	13

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

<sup>a</sup> 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. States considered are Sao Paulo and Minas Gerais.

Table 13: OLS, Matching, and IV Estimates - Literacy in 1970

	OLS	Matching	2SLS
Any Land Grants	0.135 (0.520)	0.764 (0.567)	-8.317* (4.751)
N	1293	648	1293
R <sup>2</sup>	0.63	0.52	0.54
Geographical Controls	✓	✓	✓
Mean	53.6	54.9	53.6

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

<sup>a</sup> 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. States considered are Sao Paulo and Minas Gerais.

## **Slavery**

Table 14: IV and OLS Estimates - Slavery in 1872

	Proportion of Slaves (%)		Slaves working on Agriculture (%)		Slaves working on Daily Jobs (%)	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Any Land Grants	-0.618 (0.838)	-8.456** (3.292)	0.379 (1.328)	-6.885* (3.808)	0.534 (0.717)	-4.070** (2.041)
N	483	483	483	483	483	483
Geographical Controls	✓	✓	✓	✓	✓	✓
Mean	17.6	17.6	36.4	36.4	5.9	5.9

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

<sup>a</sup> 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. States considered are Sao Paulo and Minas Gerais.

## **Heterogeneity by Coastal Livestock Ban**

Table 15: Effects of Land Grants in Livestock and Pastures - 1995

	Area used for Livestock (%)	Area used as Natural Pasture (%)	Area used as Planted Pasture (%)
<i>Panel A - Grants Pre- 1700</i>			
More than 80 km from the Coast	-5.459*** (1.994)	4.027*** (1.443)	-1.567 (2.770)
Grants Pre-1700 x More than 80 km from the Coast	6.631** (3.025)	1.216 (1.771)	-2.396 (2.265)
Grants Pre-1700 x Less than 80 km from the Coast	-4.176 (3.618)	3.429 (7.311)	-1.685 (2.482)
N	2372	2372	2372
<i>Panel B - Grants Post- 1700</i>			
More than 80 km from the Coast	-3.929* (2.349)	5.156*** (1.767)	-1.877 (2.914)
Grants Post-1700 x More than 80 km from the Coast	4.363*** (1.235)	1.464** (0.705)	1.693 (2.860)
Grants Post-1700 x Less than 80 km from the Coast	7.121 (5.646)	6.789 (5.033)	0.835 (4.751)
N	2372	2372	2372

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

<sup>a</sup> 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.

Table 16: Effects of Land Grants in Land Inequality - (%) of Farms over Size Cutoff 1995

	Over 2,000 ha (%)	Over 5,000 ha (%)	Over 10,000 ha (%)
<i>Panel A - Grants Pre- 1700</i>			
More than 80 km from the Coast	-6.100*** (1.261)	-3.563*** (0.926)	-2.407*** (0.621)
Grants Pre-1700 x More than 80 km from the Coast	7.894*** (2.104)	3.671** (1.612)	2.027 (1.299)
Grants Pre-1700 x Less than 80 km from the Coast	1.568 (2.377)	0.859 (1.802)	1.007 (1.422)
N	2372	2372	2372
<i>Panel B - Grants Post- 1700</i>			
More than 80 km from the Coast	-7.005*** (1.403)	-4.433*** (1.040)	-3.185*** (0.740)
Grants Post-1700 x More than 80 km from the Coast	3.310*** (0.881)	2.865*** (0.721)	1.992*** (0.563)
Grants Post-1700 x Less than 80 km from the Coast	-0.138 (1.716)	0.098 (1.285)	-0.217 (0.922)
N	2372	2372	2372

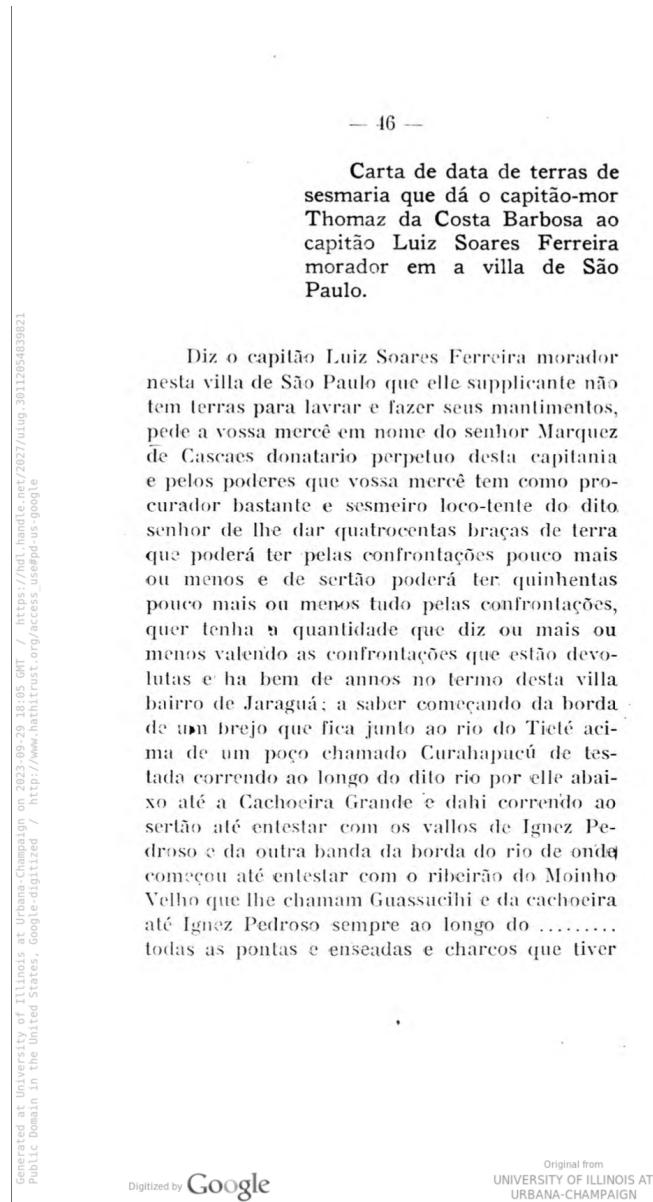
\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

<sup>a</sup> 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.

## **Heterogeneity by Treaty of Tordesillas Line**

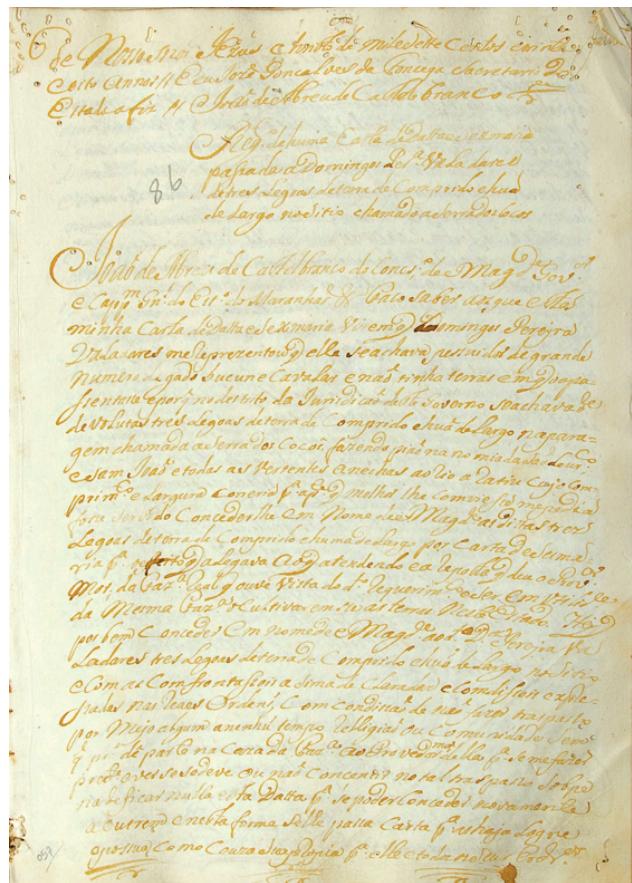
## A. Figures

Figure A.1: Example letter from *Sesmarias; documentos do Archivo do Estado de São Paulo* (1921)



*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, alongside year of concession, economic activity, and etc. This letter extends another page which includes more information.

Figure A.2: Example original letter alongside its transcribed version



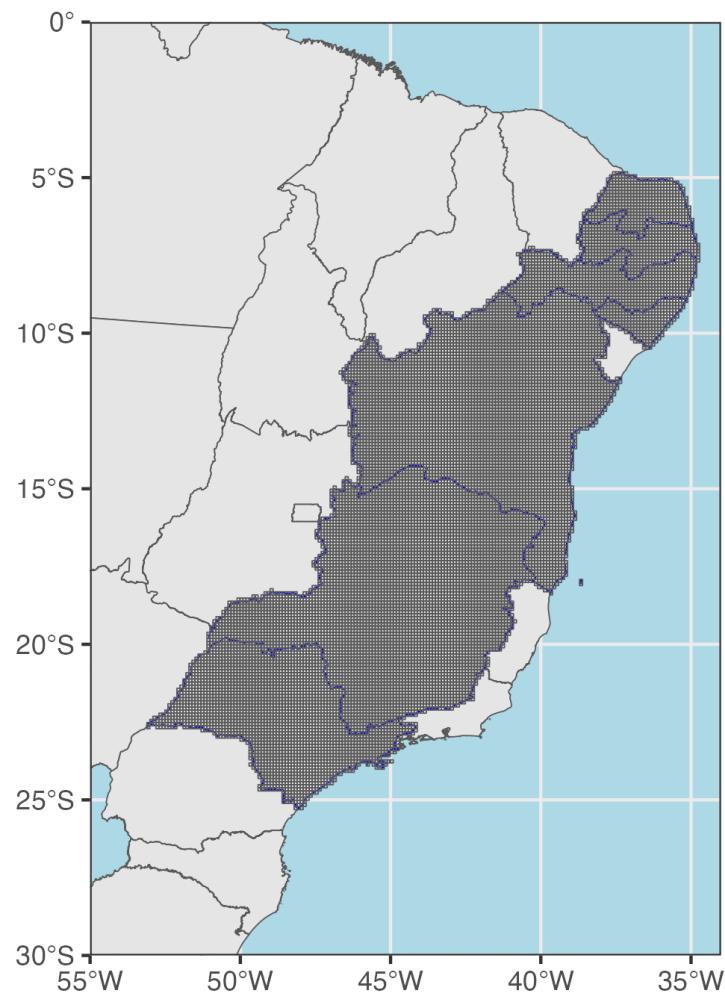
PA 0001  
Carta de concessão a Domingos Pereira Valadares - 19/06/1738

Registro de uma carta de data e sesmaria passada a Domingos Pereira Valadares de 3 léguas de terra de comprido 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 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 trespassse, por meio algum, em nenhum tempo, religião ou comunidade, sem que primeiro dé parte na Casa da Fazenda ao provedor-mor dela, para se me fazer presente e ver se se deve ou não consentir no tal trespassse, 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, Nossa Senhor, dos frutos que nelas tiver, a qual concessão lhe faço não prejudicando a terceiro nem a Sua Majestade, se no dito sítio quiser mandar fundar alguma vila, reservando os pais 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, outrrossim, não sucederá 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 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//.

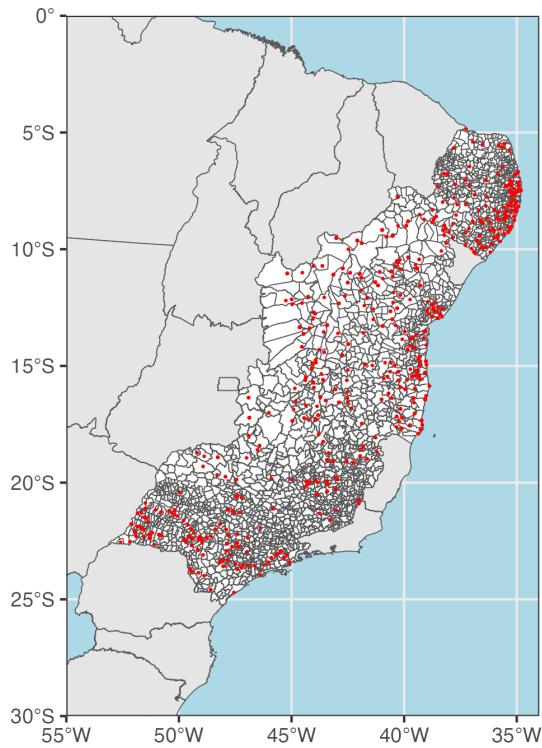
Notes: Example of an original manuscript and its transcribed version. Obtained from SILB with the original source being from ...

Figure A.3: Gridded Dataset for the Selected States



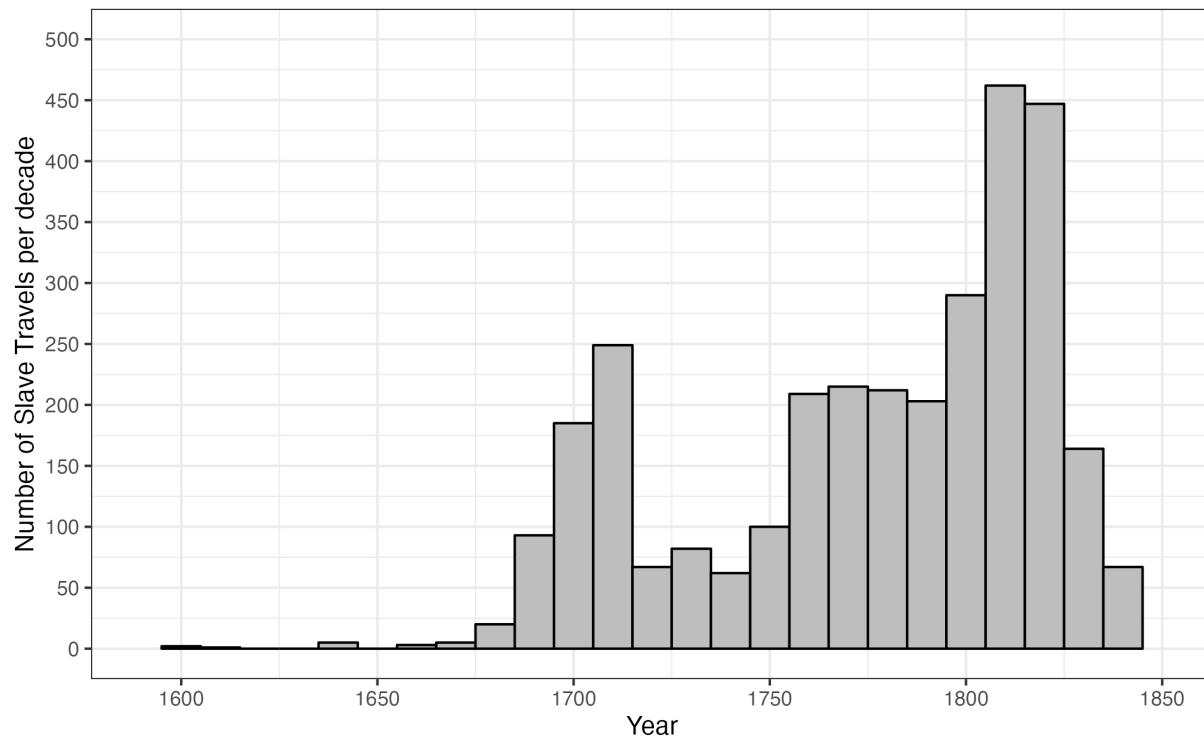
*Notes:* Gridded dataset. Each square represents  $0.1 \times 0.1$  degrees, which is approximately  $10 \times 10$  km.

Figure A.4: Geographical distribution of Land Conflicts in Brazil



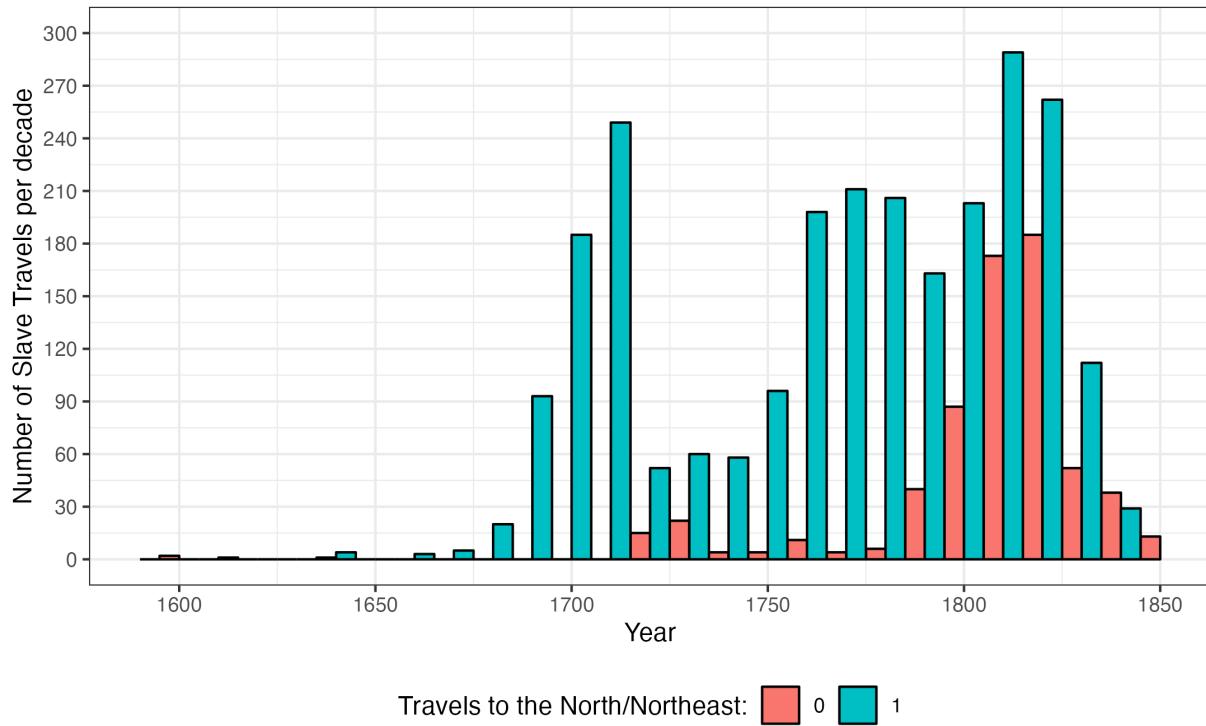
*Notes:* Geographical distribution of Land Conflicts in Brazil from 2014-2018 from [add source here]. Red dots indicate a conflict as reported on [add source here] alongside with 2010 municipality boundaries.

Figure A.5: Land Grant Year Histogram



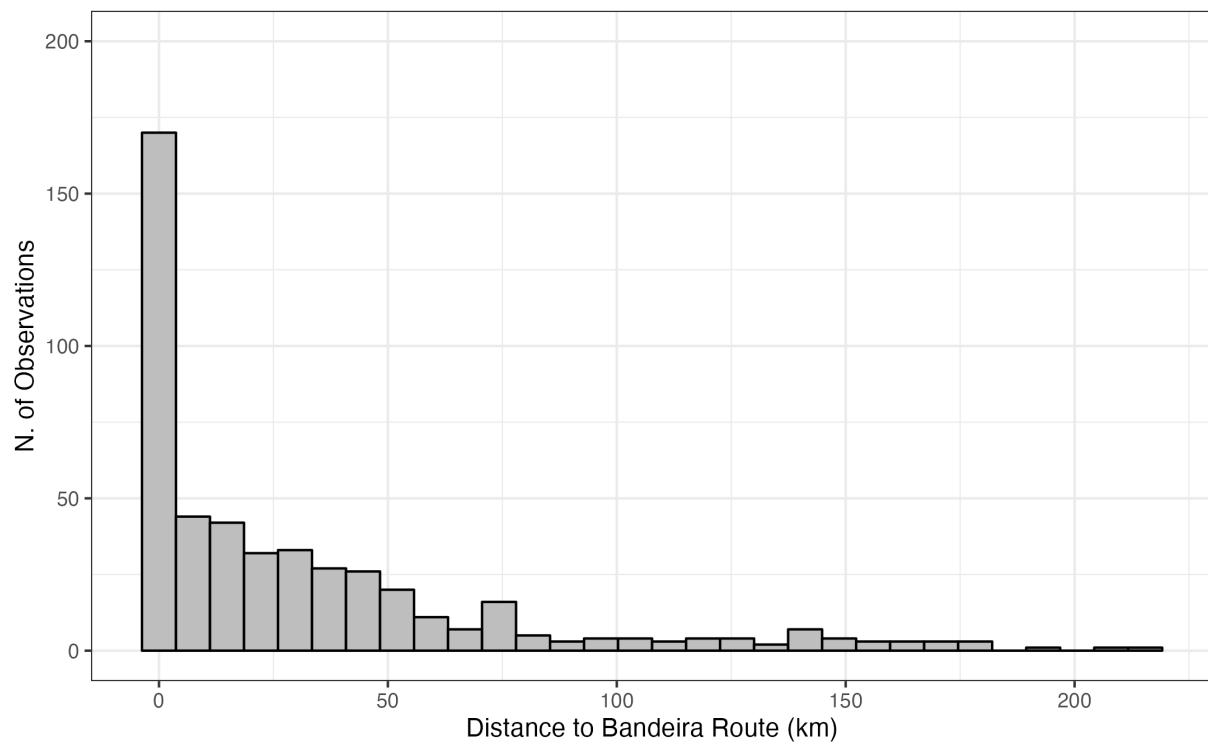
*Notes:* Histogram describing the yearly distribution of slave arrival ships from [add source here].

Figure A.6: Land Grant Year Histogram



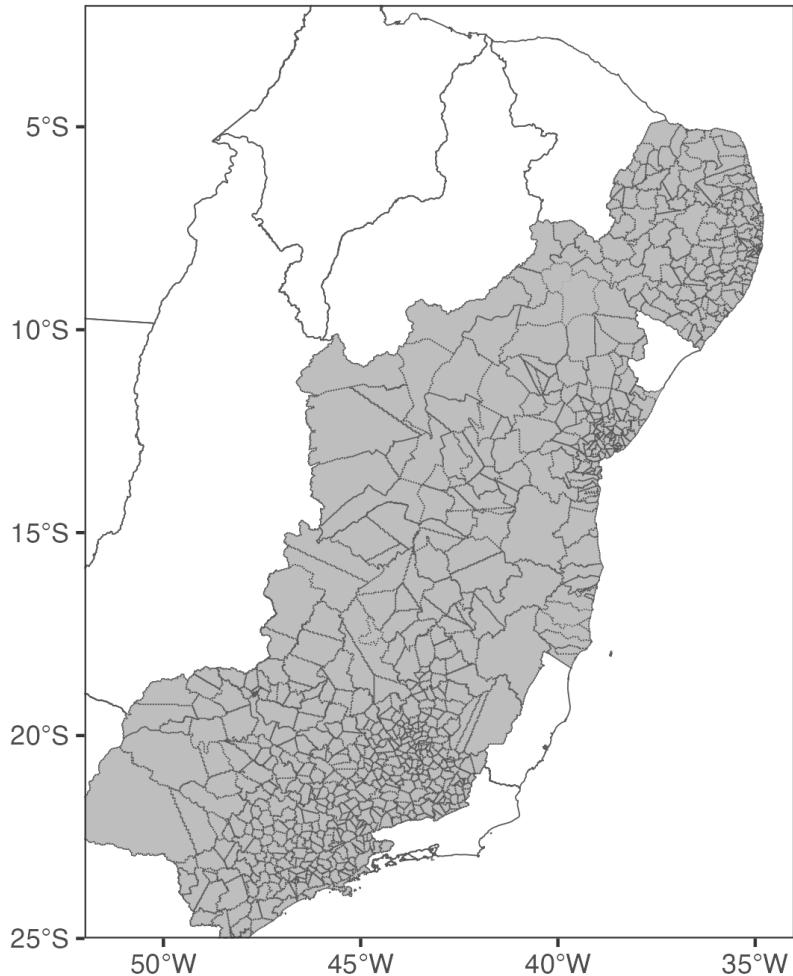
Notes: Histogram describing the yearly distribution of slave arrival ships from [add source here].

Figure A.7: Distance to Explorer Route Histogram - 1872



*Notes:* Histogram describing the variation in the distance to the nearest explorer route for the 1872 parish level information.

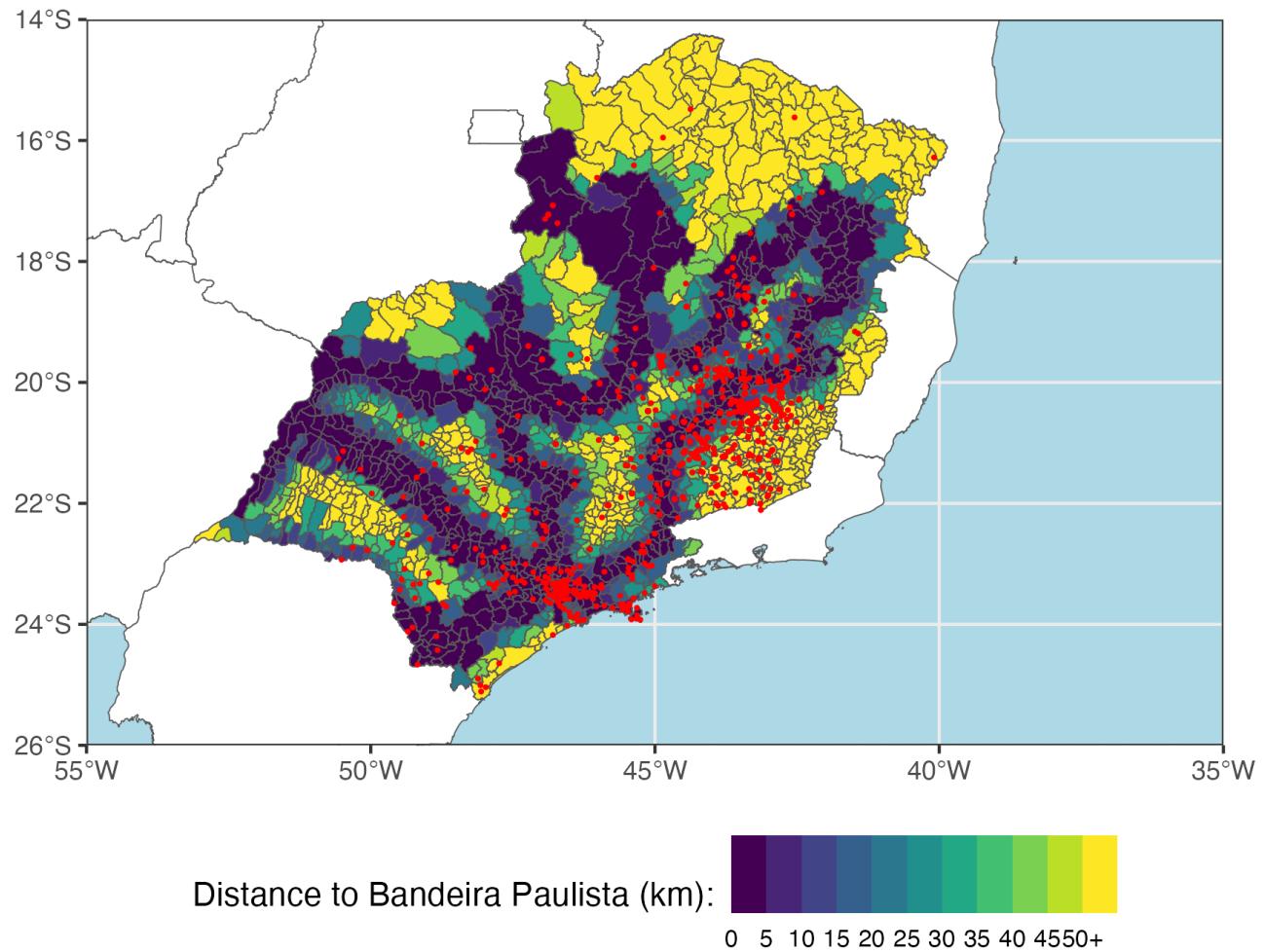
Figure A.8: 1872 Municipalities and Parish Locations



*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.

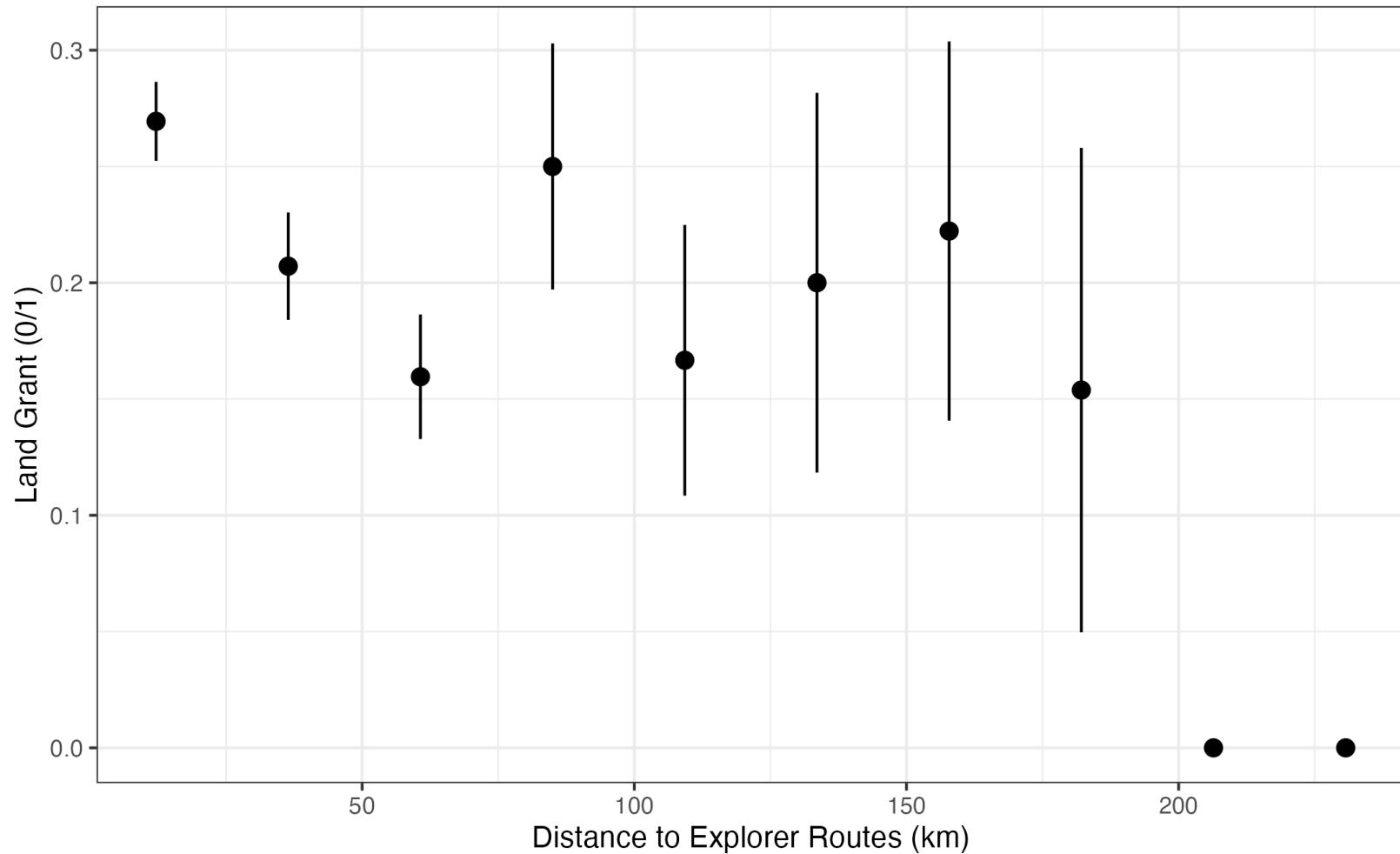
[add here the image with the 1872 municipalities split alongside the parishes]

Figure A.9: *Bandeira* Routes and 2010 Municipalities



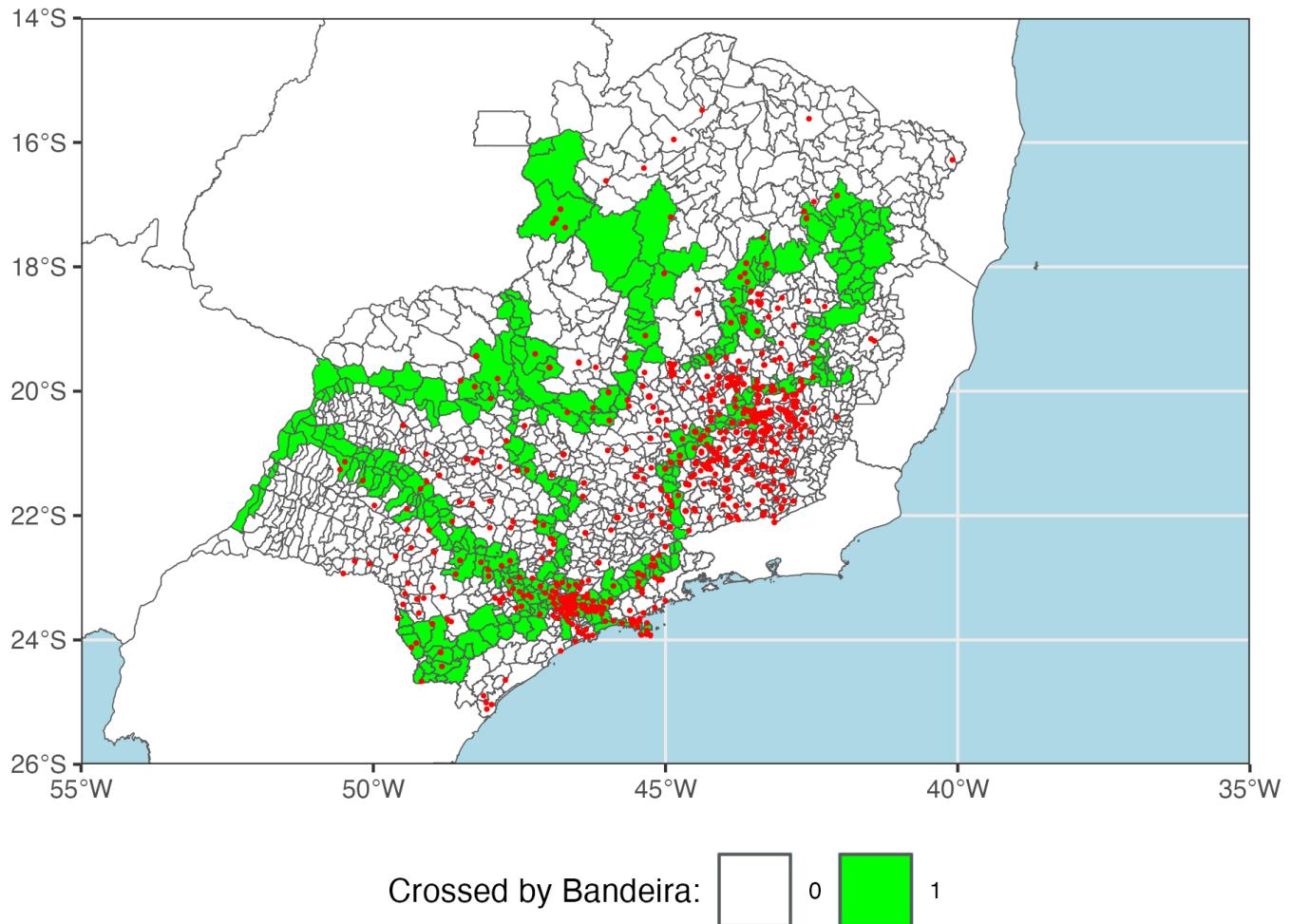
Notes: Proximity to a *Bandeira* route and 2010 municipalities boundaries in the states of São Paulo and Minas Gerais. Red dots indicate the grants in those two states.

Figure A.10: *Bandeira* Routes and 2010 Municipalities



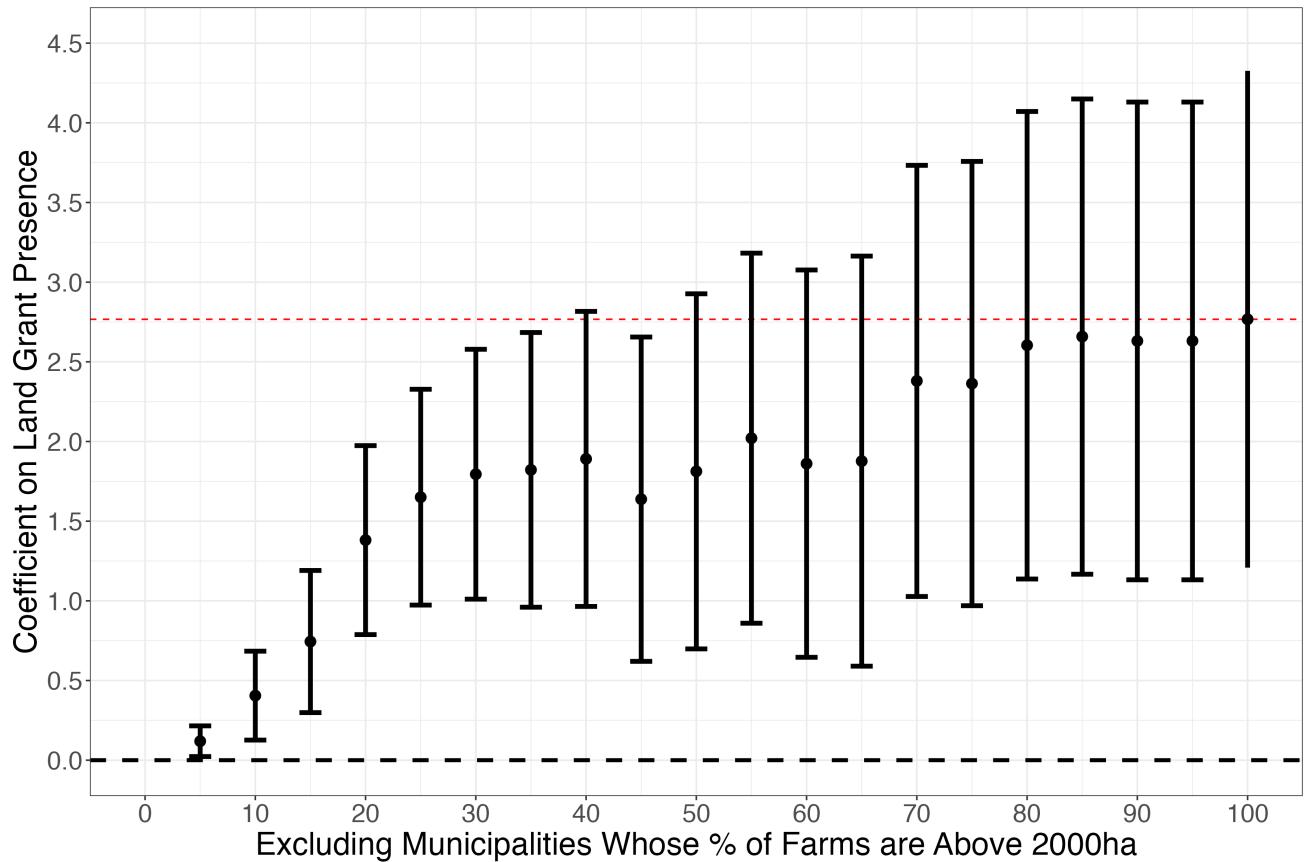
*Notes:* Proximity to a *Bandeira* route and 2010 municipalities boundaries in the states of São Paulo and Minas Gerais. Red dots indicate grants in those two states.

Figure A.11: *Bandeira* Intersection and 2010 Municipalities



Notes: Proximity to a *Bandeira* route and 2010 municipalities boundaries in the states of São Paulo and Minas Gerais. Red dots indicates the grants in those two states.

Figure A.12: Estimated Coefficients Excluding Municipalities Whose % of Agricultural Units are above a cutoff



Notes: Red line indicates the main estimate based on.

## B. Tables

Table A.1: OLS and Matching Estimates on 1995 Agricultural Census - Varying Land Sizes

	Over 2,000ha (%)		Over 5,000ha (%)		Over 10,000ha (%)	
	OLS	Matching	OLS	Matching	OLS	Matching
Grants Pre-1700	4.210** (1.674)	4.128** (1.753)	1.961 (1.288)	2.156 (1.362)	1.415 (1.024)	1.394 (1.100)
Grants Post-1700	2.101** (0.825)	2.367*** (0.862)	1.984*** (0.656)	2.151*** (0.668)	1.304** (0.515)	1.130** (0.527)
N	2372	1472	2372	1472	2372	1472
Geographical Controls	✓	✓	✓	✓	✓	✓
Control Mean	9.2	8.2	3.7	3.1	1.7	1.6

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

<sup>a</sup> All regressions include state fixed effects. Geographical controls, which are also used for the matching, 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.

## C. Matching Descriptives

Figure A.13: Example original letter alongside its transcribed version

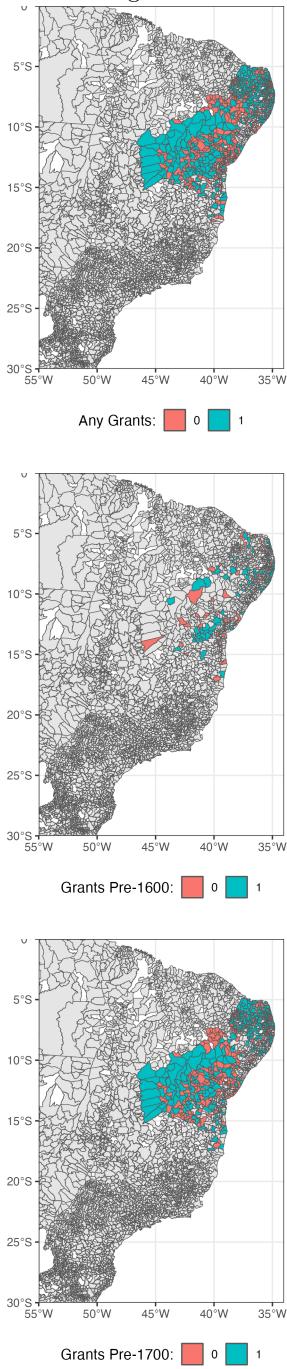
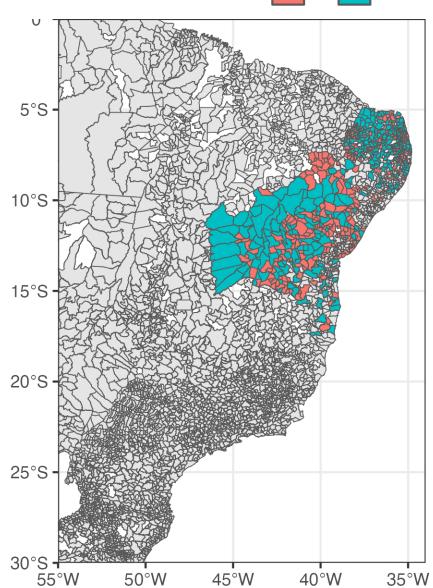
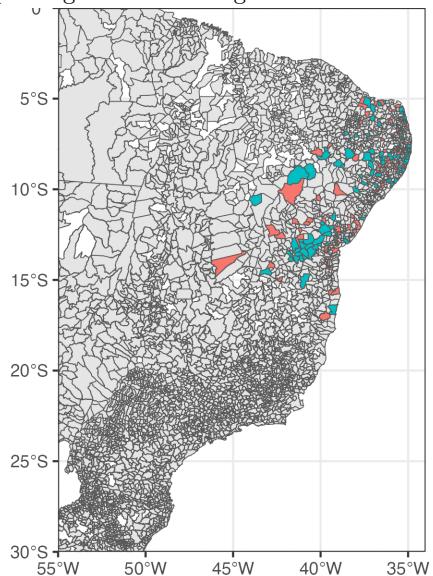


Figure A.14: Example original letter alongside its transcribed version



Grants Pre-1700: 0 1

*Notes:* Propensity Score Matching municipality selection for the 1995 Agricultural census. Blue municipalities represent municipalities that had at least one land grant within its boundaries, red represents the control municipalities.

## D. Data Source Appendix

Below I describe the sources to which the land grants were compiled from. The states with a \* indicate that the works 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
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## **E. 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 in order for the land to be granted, the geographical information on where the land was requested and who it was their neighbors is extracted.
2. For example, the sesmaria of
3. It is also possible to georeference based on who the neighbors of the person were.
  - (a) For example, the sesmaria of Matheus Ferndandes Ramos which was granted in 1698, is described as being close to the sesmaria of Lucas Pedroso which was granted in 1638.
4. When not possible to georeference based on the above, the location is approximated at the municipality level.
  - (a) For example, in Minas Gerais, [...]

Additionally, here are three practical examples on how each was georeferenced:

## F. Parish Level Georeferencing

The 1872 census was conducted at the parish level. For the 1872 census, the seven states that had a total of X municipalities, I georeferenced the information at the parish level for that census increasing the total sample size to X.

Below is a description of how the georeferencing was done:

1. If the municipalities only had one parish, then the parish location is the same as the municipality seat.
  - (a) The municipality of Serpa in Amazonas has only one parish, “Nossa Senhora do Rosário de Serpa”, therefore it is georeferenced to the municipality seat of Serpa.
2. If a municipality has more than one parish, first I checked based on the name whether or not the parish level can be traced to a present-day city.
  - (a) The municipality of Vigia in Para has three parishes: “Nossa Senhora de Nazaré da Vigia”, “Nossa Senhora do Rosário de Collares”, and “São Caetano de Odivellas”.
  - (b) All of these parishes can be traced down to present-day cities, “Nossa Senhora de Nazaré da Vigia” is the present-day municipality of Vigia, “Nossa Senhora do Rosário de Collares” is the present-day municipality of Collares, and “São Caetano de Odivellas” is the present-day municipality of São Caetano de Odivellas
3. If the parish cannot be traced down based on the name to a present-day municipality then I took a look at other sources.<sup>42</sup>
  - (a) For example, the parish of [...] in the state of RJ cannot be traced by name to a present-day municipality, however, the church of the same name remains in the same place.
  - (b) Other maps such as [add the historical minas one here] were also used to identify old names of places.

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<sup>42</sup><https://cidades.ibge.gov.br/> includes information on historical names for municipalities, based on their history.

## G. 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:

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

1. Number of Literate People
2. Number of People 6-15 Attending/Not Attending/No Information on Schooling
3. 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
4. Number of People not born in the state based on origin: Within Brazil or from another country.
5. Number of people on types of jobs: Liberal/Manual/Agricultural/Industry/Other Jobs/No Jobs
  - (a) Liberal: Religious men/women, judges, lawyers, notaries, attorneys, justice officials, medics, surgeons, pharmacists, midwives, teachers, public officials, and artists.
  - (b) Manual or Mechanical:
  - (c) Agricultural: Farmers and livestock breeders.
  - (d) Industry: Manufacturers and merchants.
  - (e) Other: Military officers, mariners, fishermen, capitalists/owners, *jornaleiros* (workers that are paid based on a working day), domestic workers, and no information
6. Number of people by age group.

### G.2. Constructed Variables:

1. Number of Free People Above the Age of 15

$$\sum \# \text{ Of Free People Above 15}$$

2. Literacy Rates, following [Rocha et al. \(2017\)](#):

$$100 \times \frac{\# \text{ of Literate Free People}}{\# \text{ of Free People Above the Age of 15}}$$

3. Men Literacy Rates:

$$100 \times \frac{\# \text{ of Literate Free Men}}{\# \text{ of Free Men Above the Age of 15}}$$

4. Women Literacy Rates:

$$100 \times \frac{\# \text{ of Literate Free Women}}{\# \text{ of Free Women Above the Age of 15}}$$

5. Total number of children between 6-15

$$\begin{aligned} & \# \text{ of Free People between the ages 6-15 who attend school} + \\ & \# \text{ of Free People between the ages 6-15 who do not attend school} + \\ & \# \text{ of Free People between the ages 6-15 with no information on schooling} \end{aligned}$$

6. Percentage of Children between age 6-15 who are attending school:

$$100 \times \frac{\# \text{ of Free People between the ages 6-15 who attend school}}{\text{Total } \# \text{ of Free Children between 6-15}}$$

7. Percentage of Boys between age 6-15 who are attending school:

$$100 \times \frac{\# \text{ of Free Boys between the ages 6-15 who attend school}}{\text{Total } \# \text{ of Free Boys between 6-15}}$$

8. Percentage of Girls between age 6-15 who are attending school:

$$100 \times \frac{\# \text{ of Free Girls between the ages 6-15 who attend school}}{\text{Total } \# \text{ of Free Girls between 6-15}}$$

9. Proportion of Slaves to Free Population:

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

10. Proportion of White/Caboclo/Black/Pardo:

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

11. Proportion of Internal/Foreign Immigrants:

$$100 \times \frac{\# \text{ of Free People of Certain Immigration Category}}{\# \text{ of Free People}}$$

12. Proportion of Teachers per 10,000:

$$10000 \times \frac{\# \text{ of Free People working as Teacher}}{\# \text{ of Free People}}$$

13. Proportion of Workers by Labor Market characteristics (as described in the data above):

$$100 \times \frac{\# \text{ of Total People in Certain Job}}{\# \text{ of Total People}}$$