

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

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Latest Update: February 6, 2024

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1. Introduction

Brazil is a country that historically faces issues of both land and income inequality. Estimates from USAID in 2016

However, land inequality in Brazil is something that can be found in the past.

This paper tries to answer how much of Brazil's present-day inequality can be traced to colonial institutions. Specifically, this paper uses Portuguese land grants called *sesmarias*, to identify the historical persistence of colonial activity in Brazil to present-day inequality.

(Dell, 2010) (Sokoloff et al., 2000)

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

2. Historical Background

Dean (1971) - "Anyone who claimed to have the means and desire to make use of the land was given a grant, customarily one to three leagues in extent (16.7 to 50.1 square miles)."

Simonsen (2005) - "the ones that don't possess sesmarias or can't own land are disowned by the own society they live in"

3. Data

The main source of data comes from the *Sesmarias of the Luso-Brazilian Empire Database*¹. The database uses archival data from either state records or original manuscripts to obtain data on the concessions of sesmarias in Brazil. When available, information such as the year, the reason for the request, etc. are coded. The sesmarias are then georeferenced based on the geographical information present in the text, allowing us to trace them back to Brazilian municipalities.²

Data for current land tenure in 2021 in Brazil is obtained from Sparovek et al. (2019).³

Land usage from 1985-2010 is obtained from Mapbiomas.Souza et al. (2020)⁴

Census data for 1872 is obtained from the Nucleus of Research in Economic and Geographic History from the Federal University of Minas Gerais.⁵ The 1872 Imperial Census contains demographic data at the

¹Information 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.

²A more in-depth description on how the sources of the letters and how the sesmarias were georeferenced is available in Appendix B

³Available at <https://atlasagropecuario.imaflora.org/>

⁴Available at <https://brasil.mapbiomas.org/en/>

⁵Available at <http://www.nphed.cedeplar.ufmg.br/>

municipality and parish level and was the last census taken before the abolition of slavery in Brazil.⁶

Other census data is obtained from the IBGE ().⁷

4. Descriptive

4.1. Summary Statistics

Following [Lowes et al. \(2021\)](#) I show balance on geographical characteristics at the 10 x 10km grid level in [reference to table here].

4.2. OLS Descriptive

First I show descriptively through the 1872 census that the interiors of Brazil were more likely to be [...] ([Laudares et al., 2022](#)).

$$Y_{p,s} = \beta_1 \cdot \text{Morethan80km}_{p,s} + \mu_s + \epsilon_{p,s} \quad (1)$$

5. Identification Strategy

5.1. 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).

[Bethell \(1984\)](#) “Landholding in the sertao was truly extensive. Although there was legislation limiting the size of sesmarias to three square leagues, this restriction was simply disregarded. The sesmarias on which cattle ranches were established sometimes exceeded hundreds of thousands of acres”

The effect was the expansion of cattle ranches towards the west of Brazil, especially in the Northeastern states. 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.⁸ That led to a “a clear specialization between the two activities” ([Ribeiro, 2012](#)).⁹

([Boxer, 1962](#), p .)

⁶Distribution of the 1872 parishes alongside the municipality boundaries is available at [Figure 1](#). For the sample used, I have 469 municipalities and 968 parishes.

⁷Microcensus data downloaded through the R package *censobr* from [Pereira et al. \(2023\)](#)

⁸An example of this would be the d'Avila family which owned a large estate in the state of Bahia [...]

⁹An 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 and being created by the cattle expansion that happened because of the 1701 Royal Decree. ([IBGE n.d.](#))

“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](#)).

Given the nature of this ban, I exploit the cutoff of 80 km to use a regression discontinuity design to measure the effects between the two types of economies in the region.

In the first-stage I check whether post-1701 we see an increasing number of land grants dedicated to livestock in municipalities farther than 80 km from the coast.

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.

Historically livestock-raising areas were [...]

$$Y_{i,m,s} = \quad (2)$$

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

<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.”

([Oliveira Andrade, 1980](#), p. 142)

5.2. Treaty of Tordesillas

5.3. Instrumental Variable

6. Results

6.1. 1872

6.2. 1970-2010

References

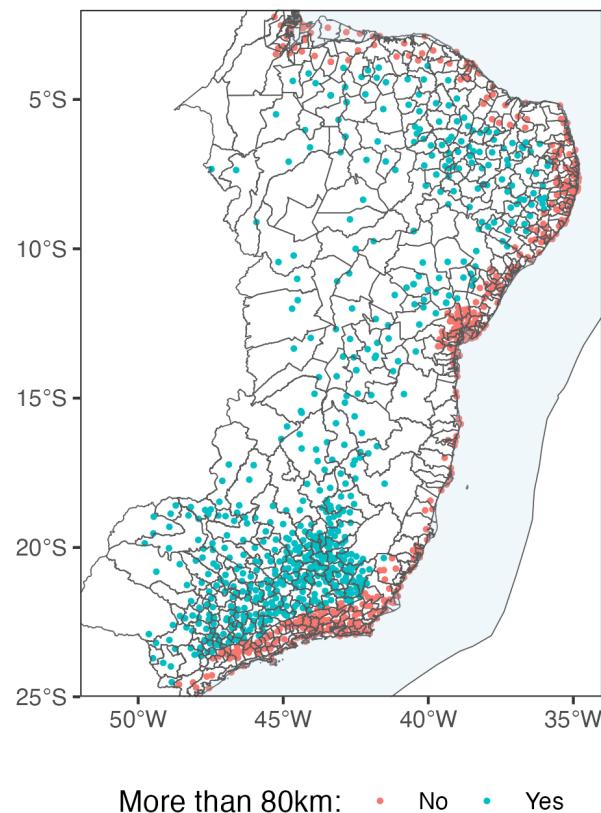
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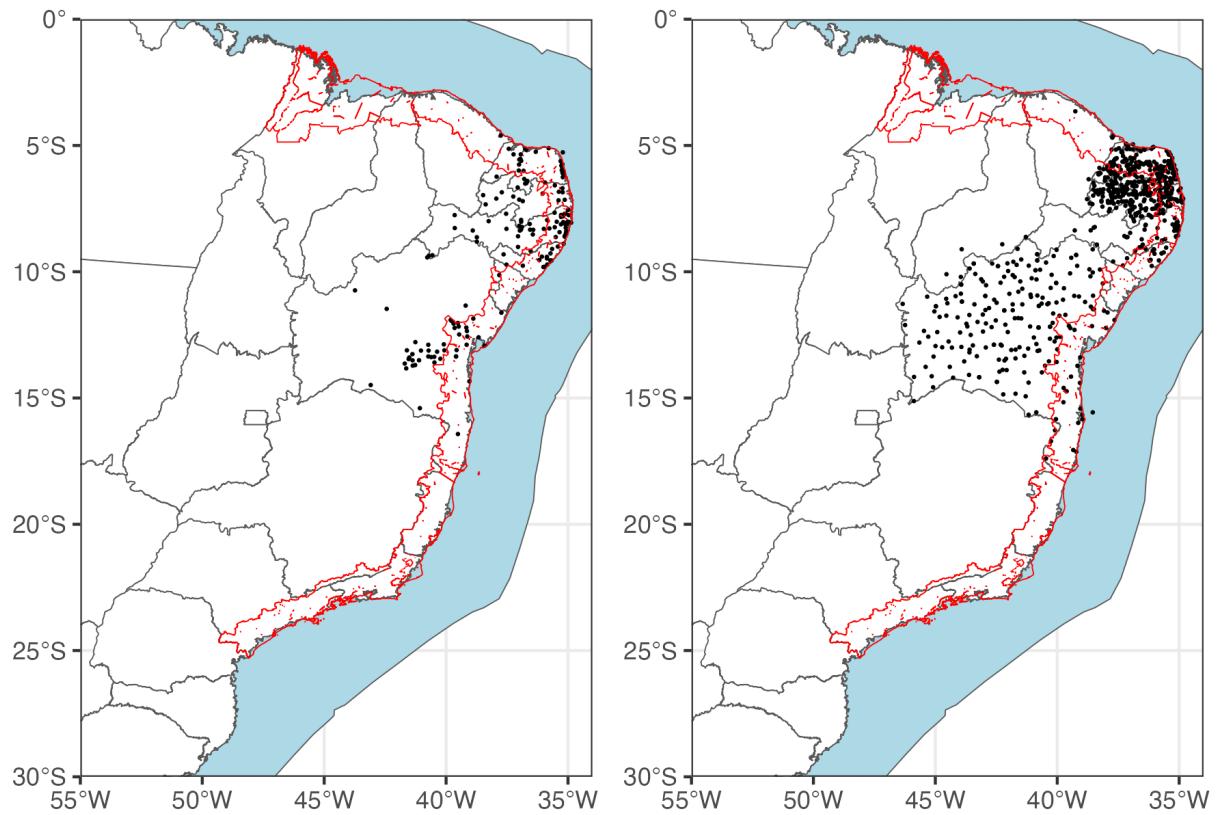
Figures

Figure 1: 1872 Municipalities and Parish Locations



Notes: Geographical distribution of 1872 parishes alongside 1872 municipality boundaries.

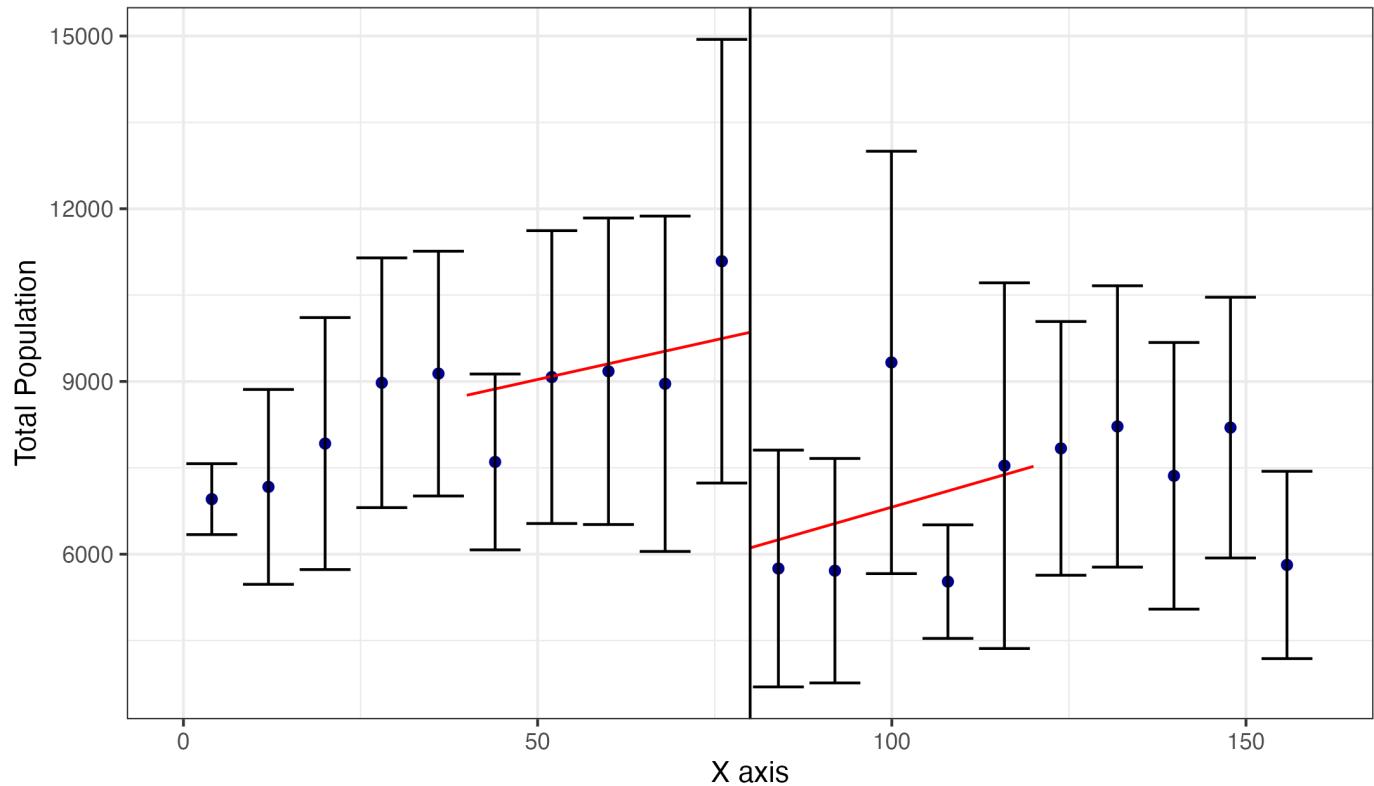
Figure 2: Distribution of Land Grants pre- and post- 1701



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

1872 RDD Plots

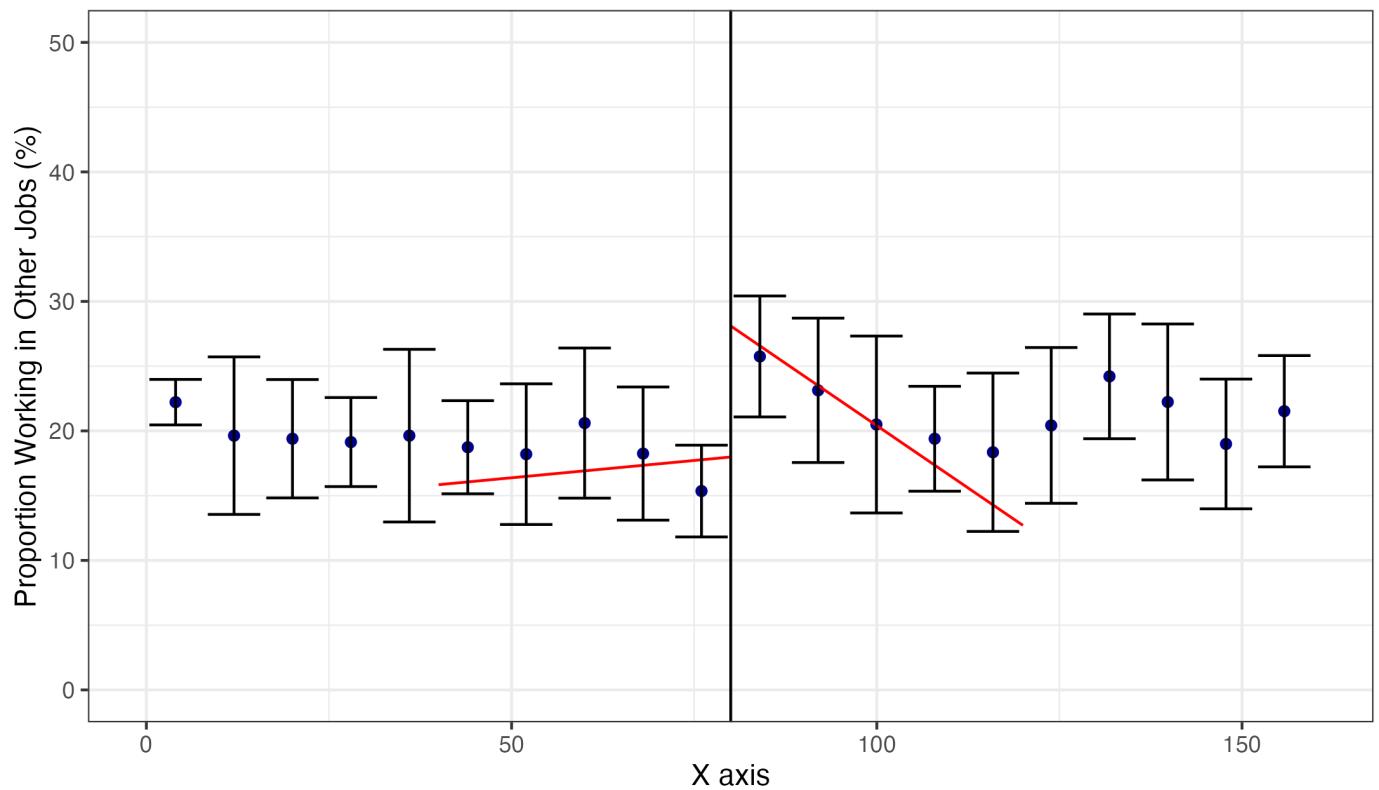
Figure 3: Coastal RDD Estimates for Total Parish Population



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

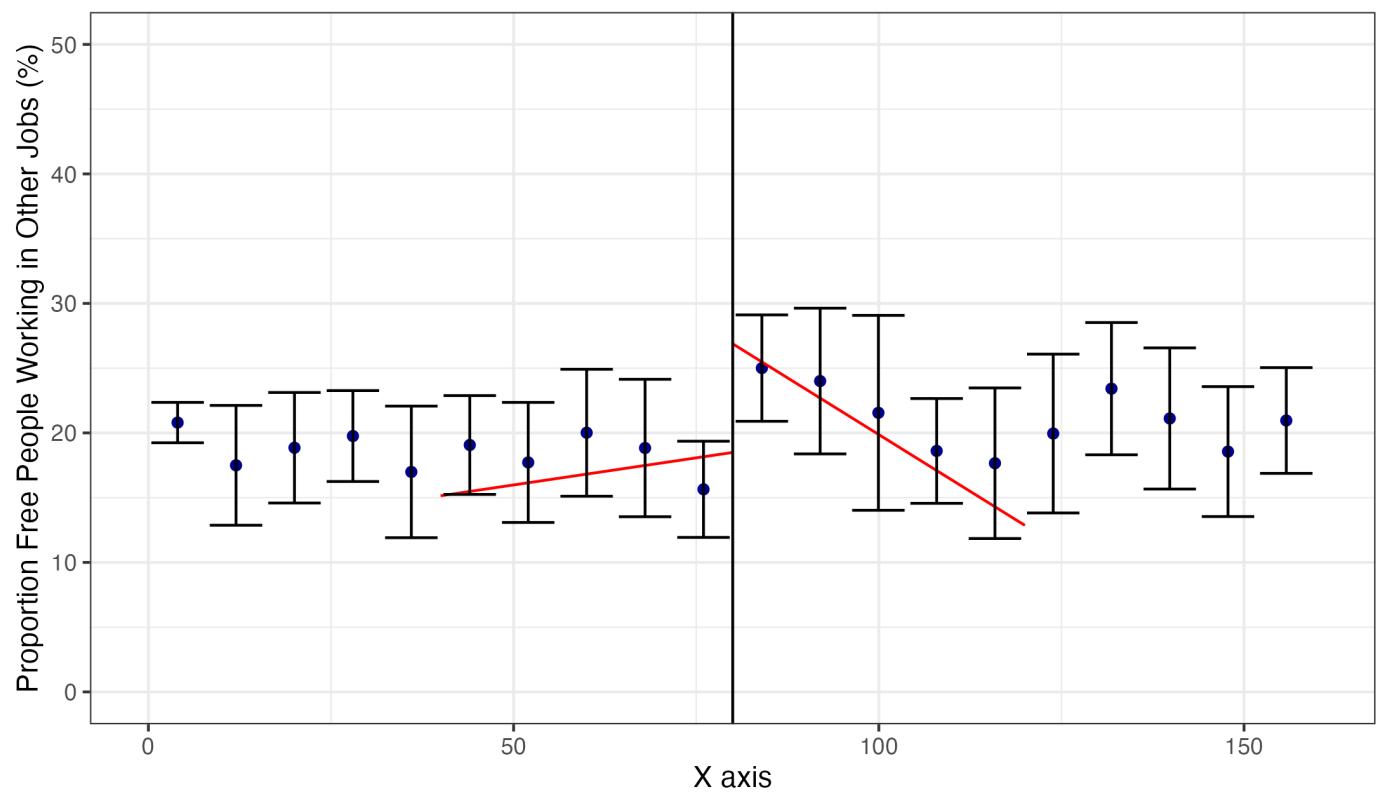
1970 RDD Plots

Figure 4: Coastal RDD Estimates for Other Jobs



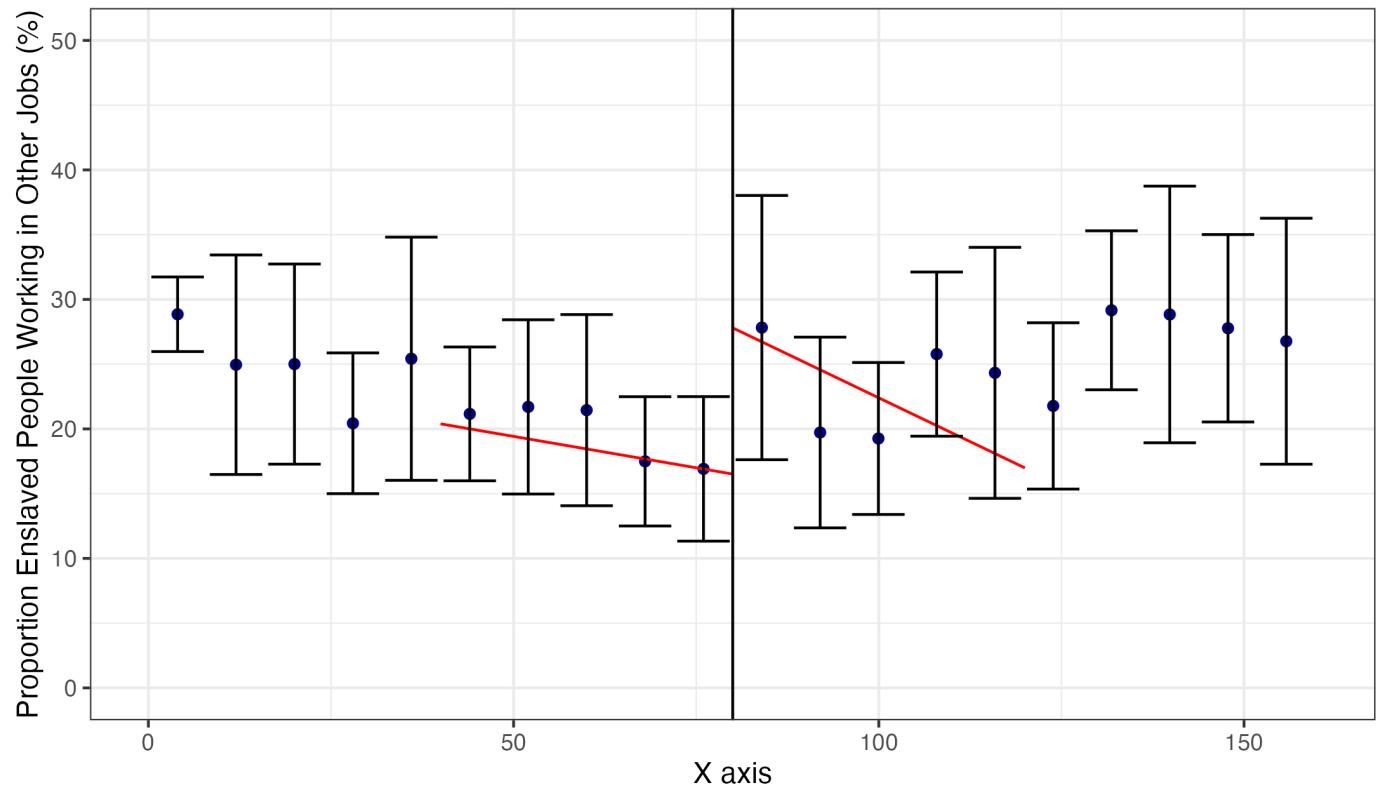
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 5: Coastal RDD Estimates for Free People Working on Other Jobs



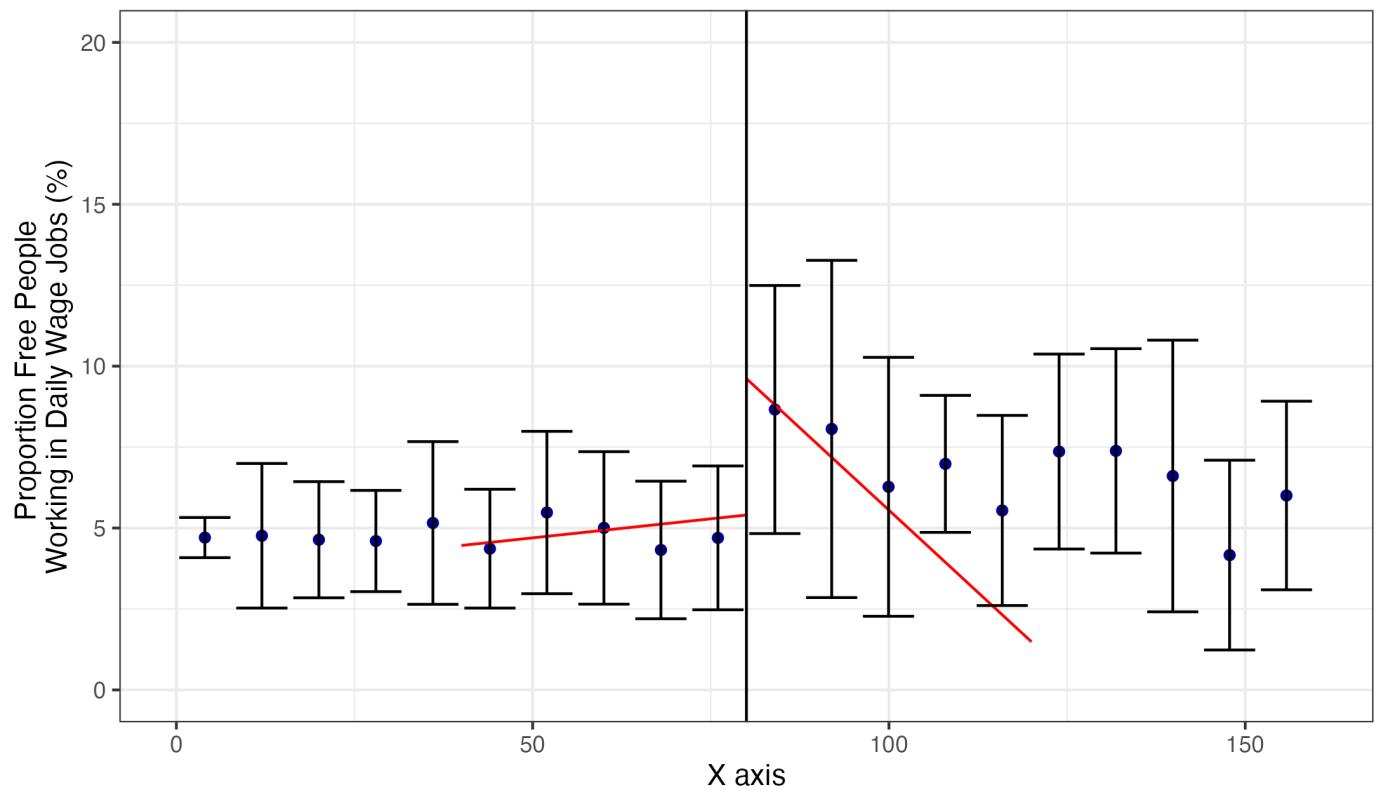
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 6: Coastal RDD Estimates for Enslaved People Working on Other Jobs



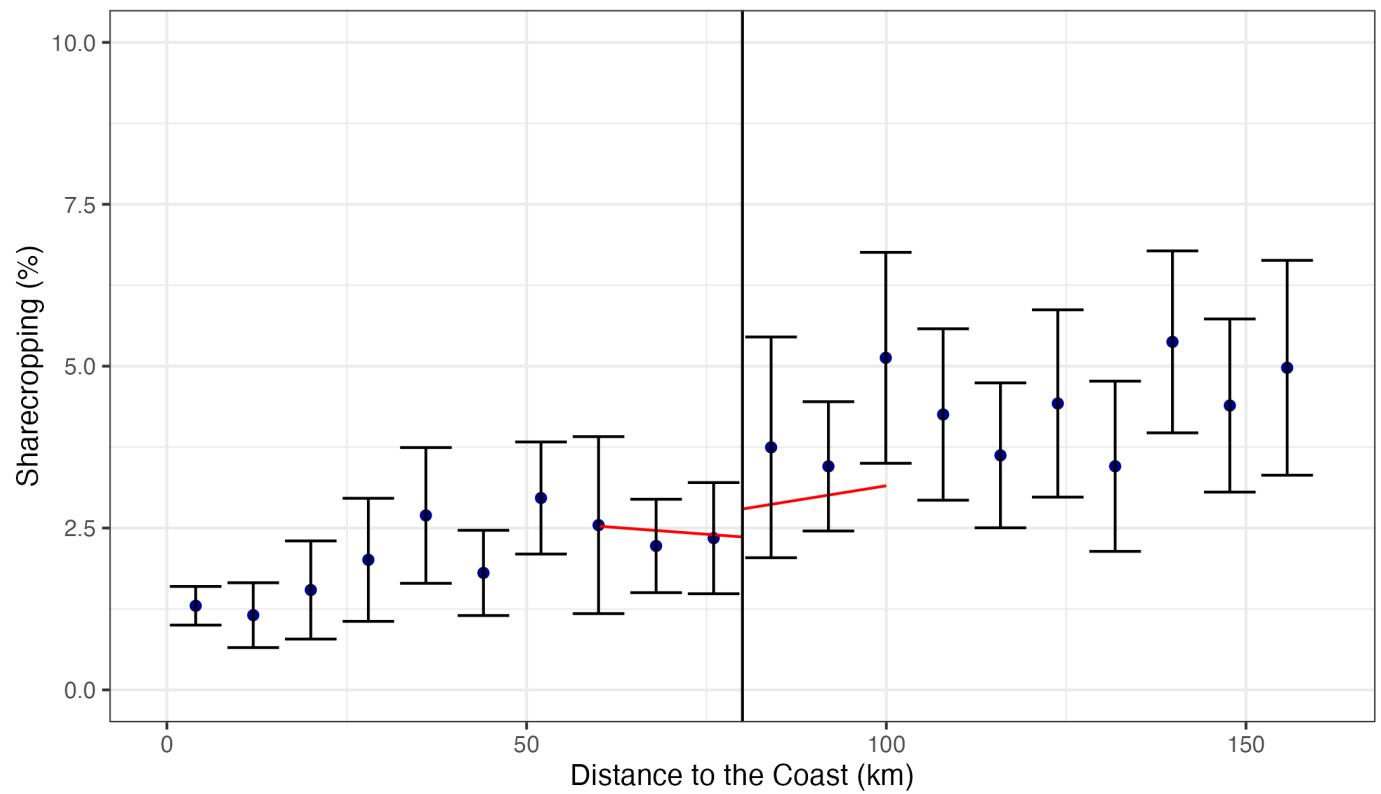
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 7: Coastal RDD Estimates for Enslaved People Working on Other Jobs



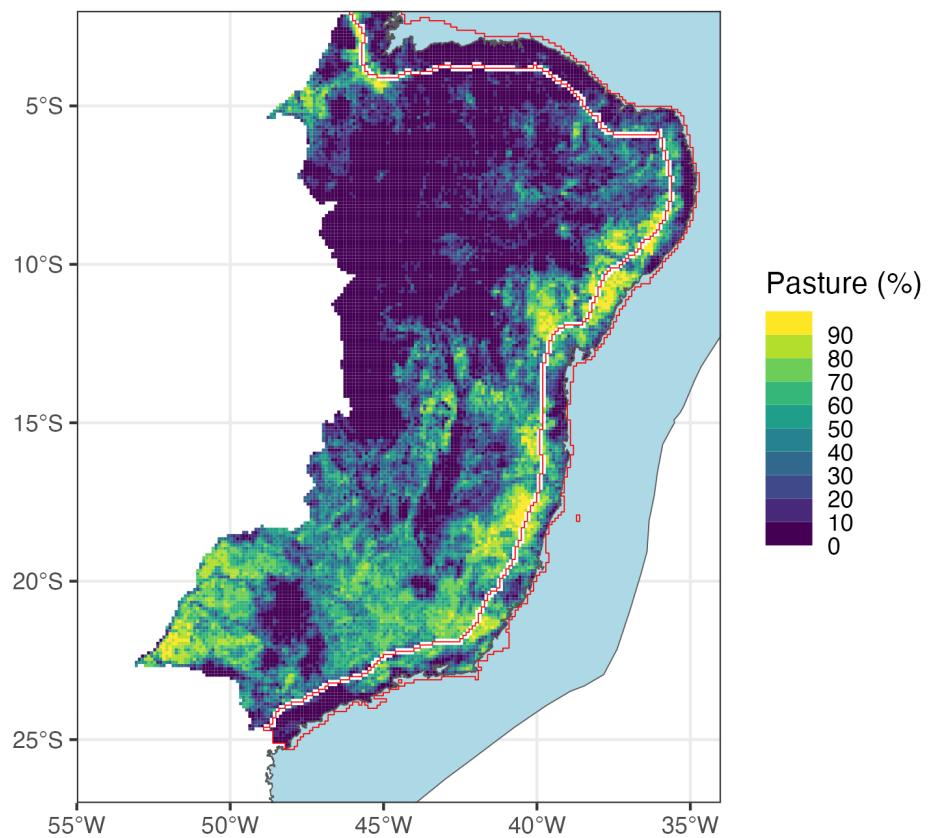
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 8: Coastal RDD Estimates for Percentage of People Sharecropping



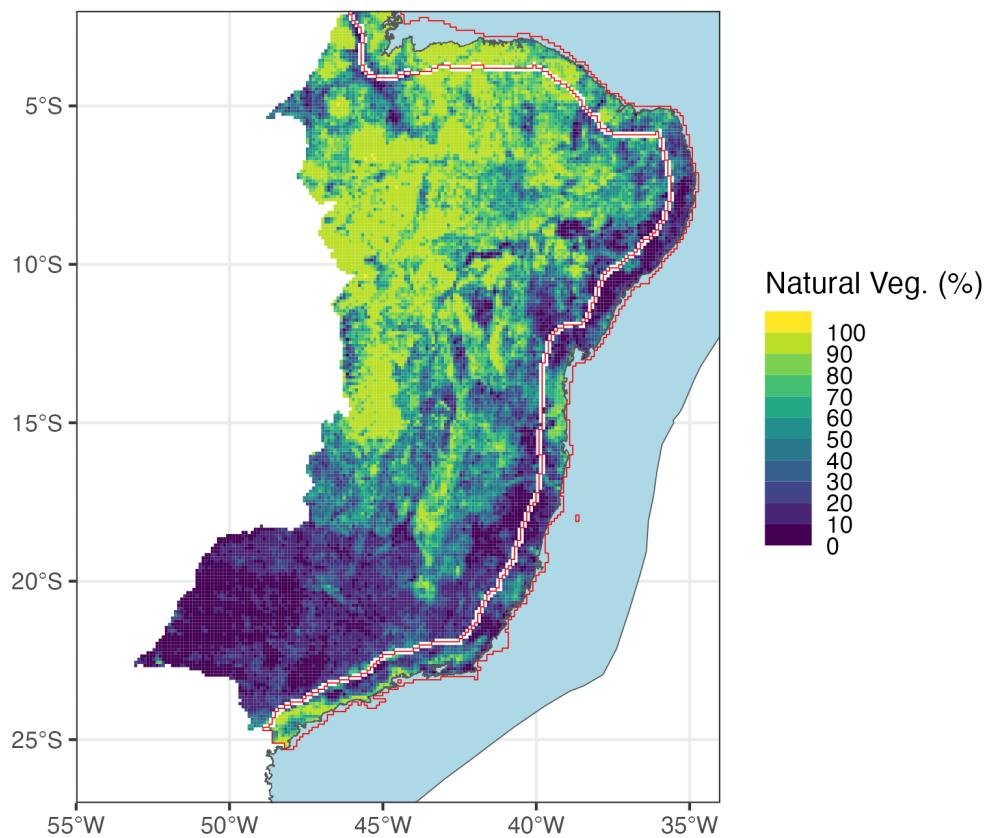
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 9: (%) of the Grid Measured as Pastures - Grid data



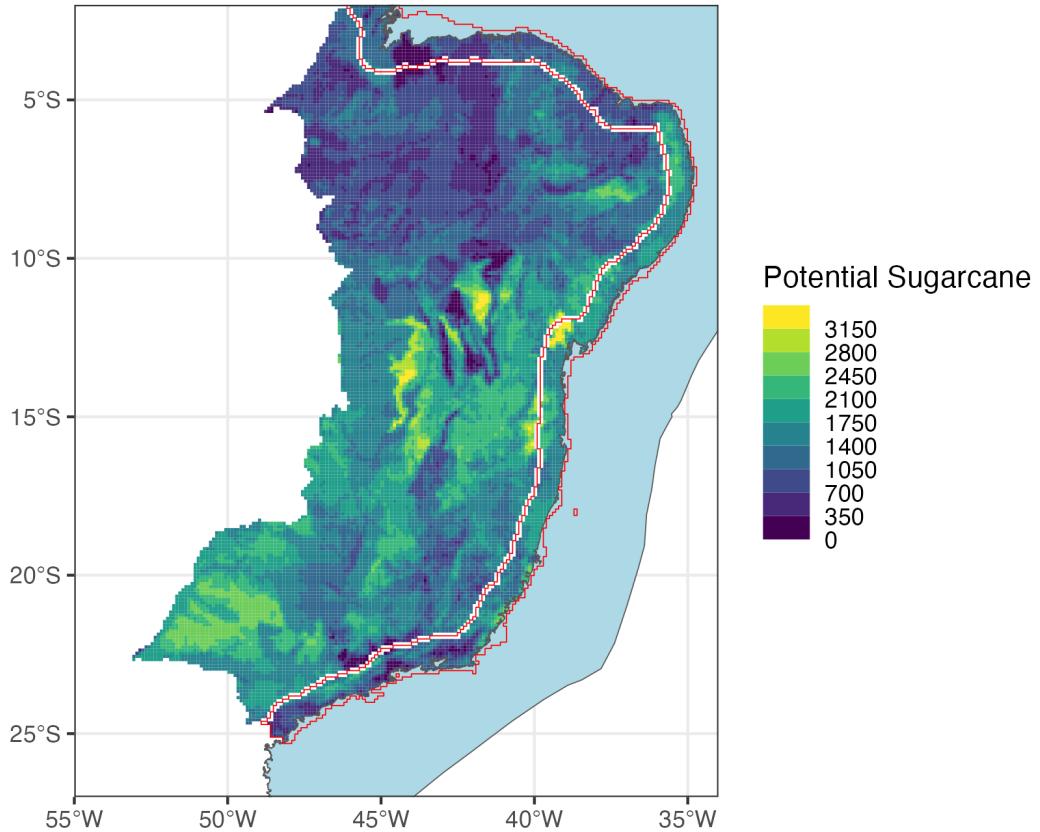
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 10: (%) of the Grid Measured as Natural Vegetation- Grid data



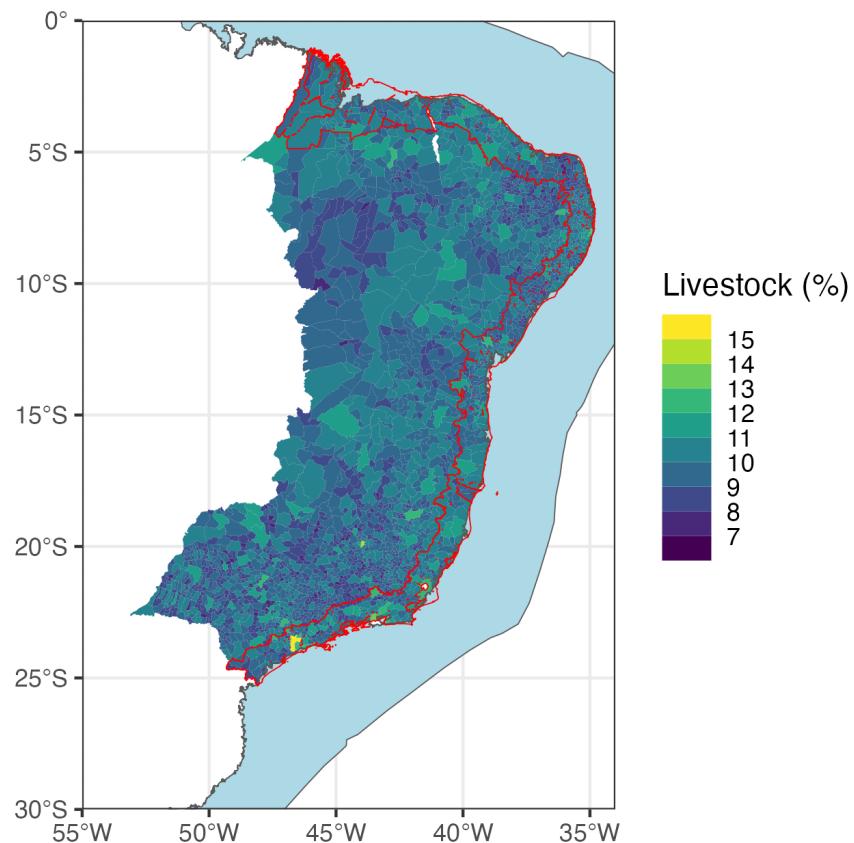
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 11: (%) of the Grid Measured as Sugarcane - Grid data



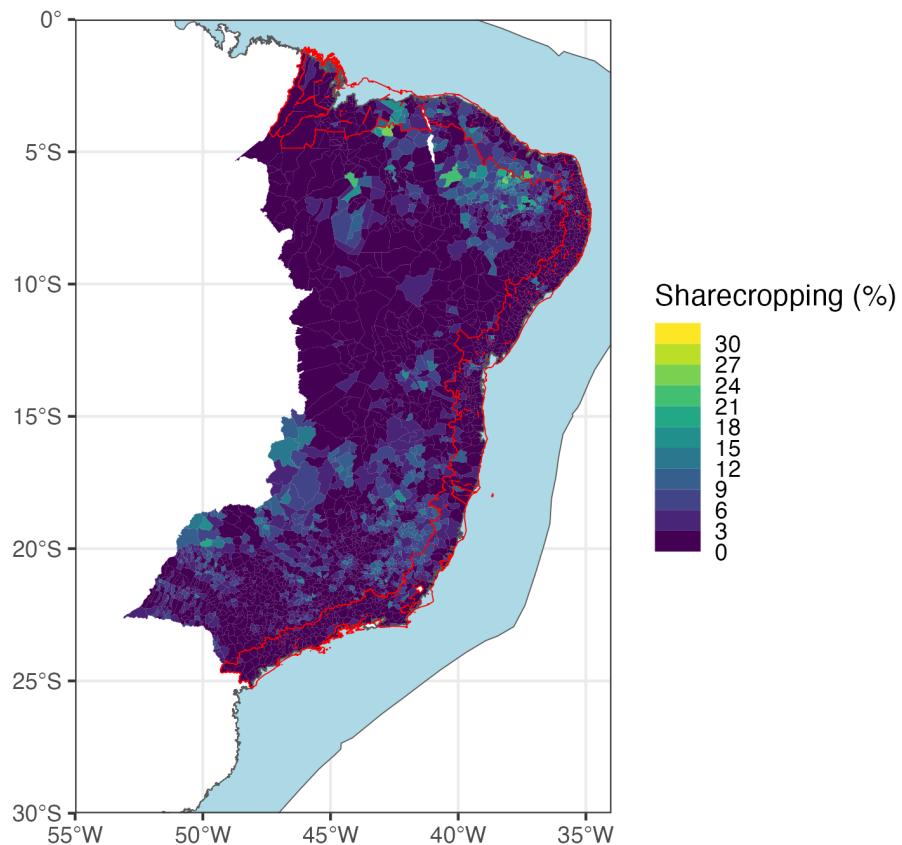
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 12: 1970 Municipalities and Sharecropping



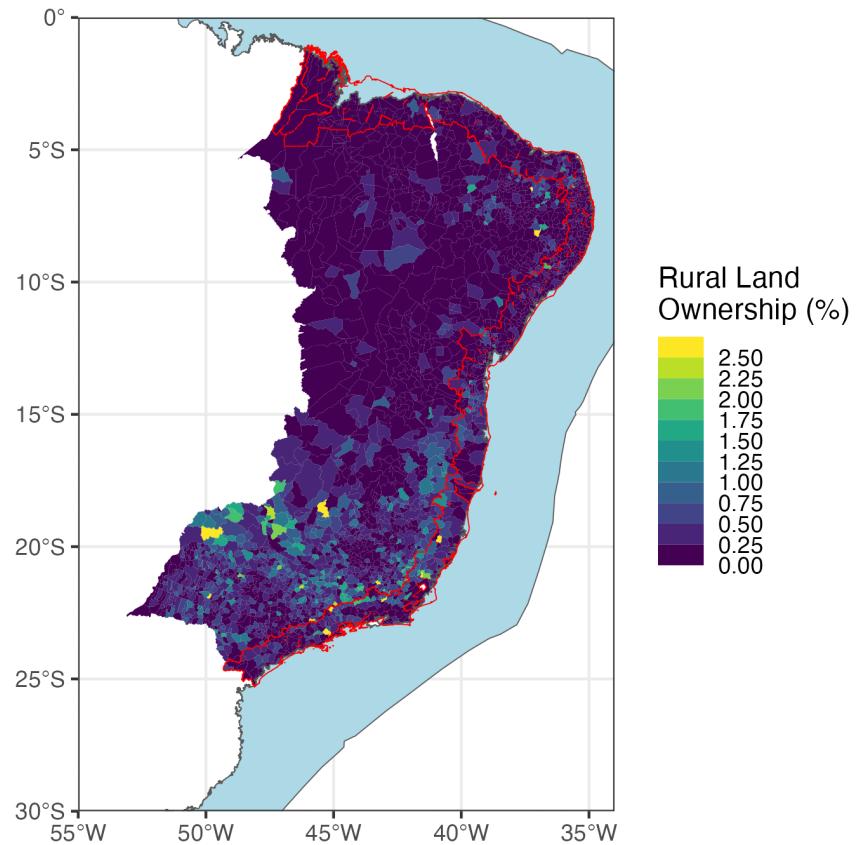
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 13: 1970 Municipalities and Sharecropping



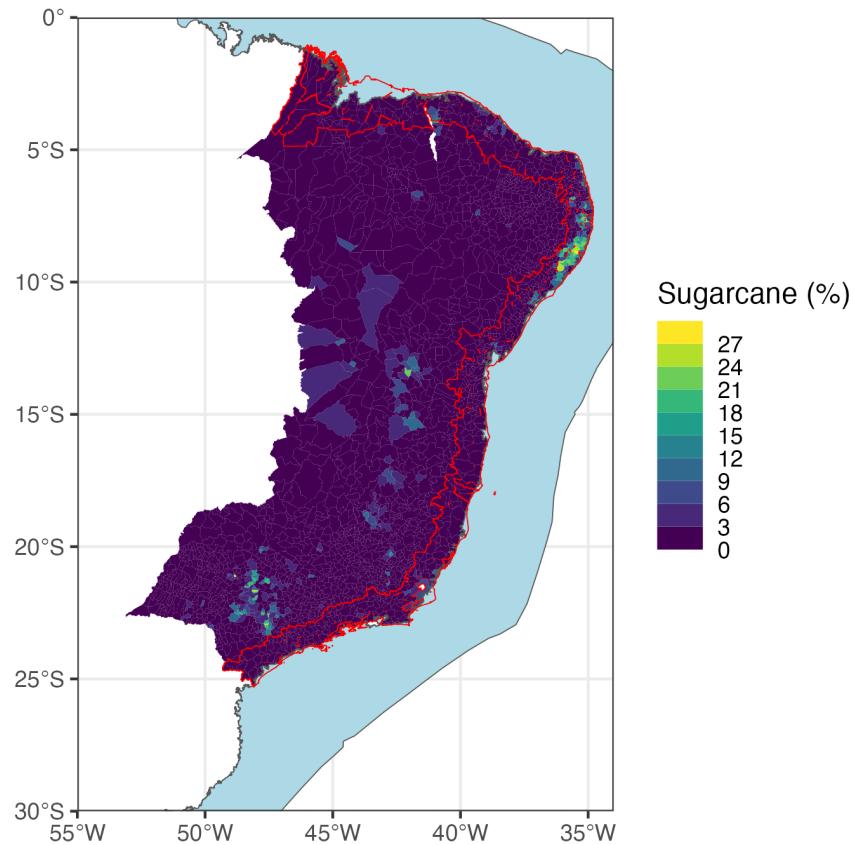
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 14: 1970 Municipalities and Land Ownership



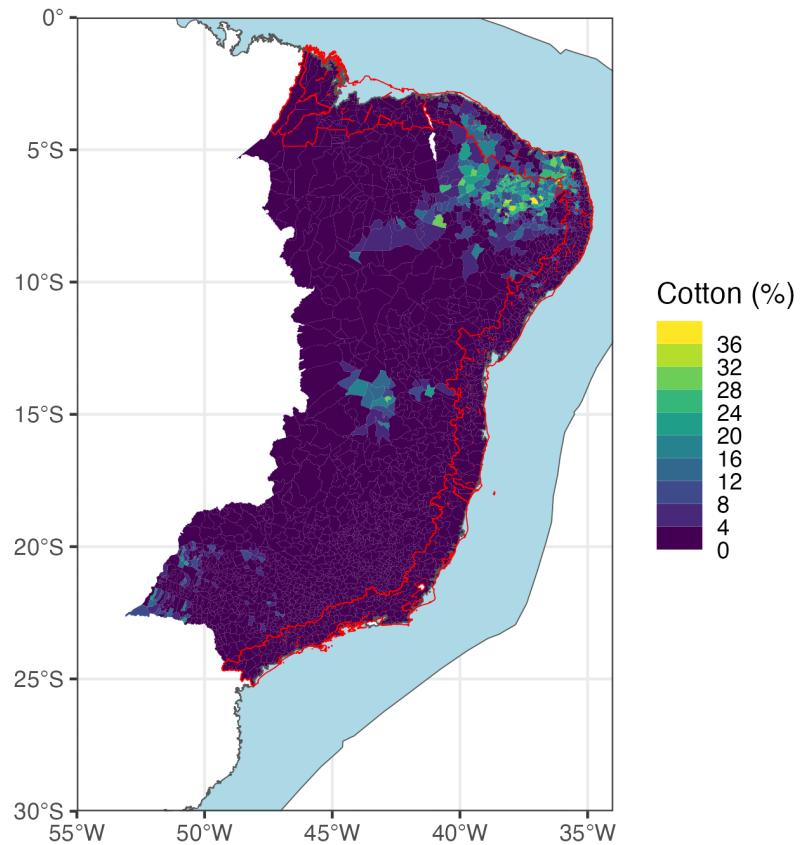
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 15: 1970 Municipalities and Sugarcane



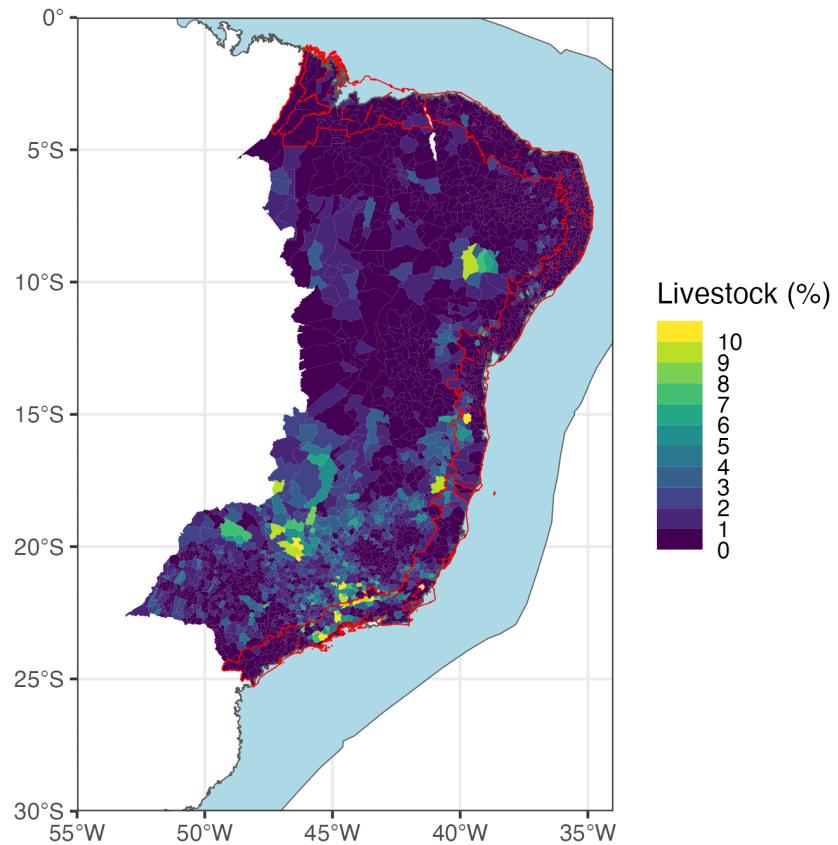
Notes: This figure considers whether or not any part of the municipality was within 80km of the coast.

Figure 16: 1872 Municipalities and Proximity to the Coast



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

Figure 17: 1872 Municipalities and Proximity to the Coast



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

Tables

6.3. Summary Statistics

Table 1: Summary Statistics for variables in 1872

	Less than 80 km from the Coast (N=504)		More than 80 km from the Coast (N=611)		Diff. in Means	Std. Error
	Mean	Std. Dev.	Mean	Std. Dev.		
Education						
Literacy Rate (%)	25.1	17.0	18.1	10.7	-7.0**	0.9
Men Literacy Rate (%)	31.1	18.5	23.4	12.3	-7.7**	1.0
Women Literacy Rate (%)	19.1	16.9	12.7	10.4	-6.4**	0.9
Demographics						
Total Population	7839.9	5591.2	7089.6	4374.3	-750.4**	305.5
Proportion White (%)	43.3	18.9	47.4	16.8	4.1**	1.1
Proportion Black (%)	13.1	10.3	11.5	6.9	-1.7**	0.5
Proportion Pardo (%)	39.3	17.3	37.9	15.3	-1.5	1.0
Proportion Caboclo (%)	4.2	6.6	3.3	4.4	-1.0**	0.3
Proportion Slaves (%)	19.0	14.1	15.2	9.7	-3.8**	0.7
Labor						
Proportion in Agriculture (%)	33.1	15.0	28.4	11.6	-4.7**	0.8
Proportion in Raising Livestock (%)	0.6	1.6	1.0	2.7	0.4**	0.1
Proportion in Industry (%)	1.7	1.7	0.9	0.7	-0.8**	0.1
Proportion in Manual Work (%)	7.5	5.2	10.6	5.9	3.1**	0.3
Proportion in Liberal Professions (%)	0.9	1.2	0.4	0.6	-0.5**	0.1
Proportion in Other Jobs (%)	20.5	13.7	22.2	10.1	1.7**	0.7
Free Labor						
Proportion Free in Agriculture (%)	30.8	14.7	26.9	11.7	-3.8**	0.8
Proportion Free in Industry (%)	2.2	2.2	1.0	0.8	-1.1**	0.1
Proportion Free in Manual Work (%)	8.2	5.9	11.3	6.4	3.1**	0.4
Proportion Free in Liberal Professions (%)	1.1	1.4	0.5	0.7	-0.6**	0.1
Proportion Free in Other Jobs (%)	19.6	12.1	21.7	10.2	2.1**	0.7
Proportion Owners of Land (%)	0.4	0.9	0.5	0.9	0.0	0.1
Proportion Free Wage Earners (%)	4.7	5.3	7.2	6.0	2.4**	0.3
Enslaved Labor						
Proportion Enslaved in Agriculture (%)	41.5	22.7	35.7	17.0	-5.8**	1.2
Proportion Enslaved in Manual Work (%)	5.2	5.1	7.2	6.3	2.0**	0.3
Proportion Enslaved in Other Jobs (%)	25.2	20.9	26.0	14.1	0.8	1.1
Proportion Enslaved Domestic Work (%)	16.2	12.7	20.3	12.1	4.0**	0.7
Proportion Enslaved Wage Earners (%)	8.5	15.6	5.6	8.0	-2.9**	0.8

Table 2: Summary Statistics for variables in 1872 - Within 40 to 120km of the coast

	Less than 80 km from the Coast (N=139)		More than 80 km from the Coast (N=90)		Diff. in Means	Std. Error
	Mean	Std. Dev.	Mean	Std. Dev.		
Education						
Literacy Rate (%)	22.9	13.1	20.9	10.9	-2.1	1.6
Men Literacy Rate (%)	29.1	15.7	26.2	12.1	-2.9	1.8
Women Literacy Rate (%)	16.2	11.5	15.5	12.3	-0.8	1.6
Demographics						
Total Population	8909.7	6462.4	6503.7	4424.7	-2406.0**	719.7
Proportion White (%)	49.1	18.4	51.8	15.9	2.7	2.3
Proportion Black (%)	11.8	9.9	10.2	6.8	-1.5	1.1
Proportion Pardo (%)	35.0	16.9	33.9	14.2	-1.1	2.1
Proportion Caboclo (%)	4.1	4.0	4.1	7.0	0.0	0.8
Proportion Slaves (%)	19.5	16.3	19.5	13.0	0.0	1.9
Labor						
Proportion in Agriculture (%)	36.2	13.5	30.0	12.6	-6.2**	1.8
Proportion in Raising Livestock (%)	0.7	1.5	0.9	3.1	0.2	0.4
Proportion in Industry (%)	1.2	1.0	0.9	0.6	-0.3**	0.1
Proportion in Manual Work (%)	6.5	4.5	8.2	4.9	1.7**	0.6
Proportion in Liberal Professions (%)	0.5	0.5	0.5	0.5	-0.1	0.1
Proportion in Other Jobs (%)	18.6	12.6	21.1	10.7	2.6***	1.5
Free Labor						
Proportion Free in Agriculture (%)	33.1	13.0	27.8	12.8	-5.3**	1.7
Proportion Free in Industry (%)	1.6	1.4	1.2	0.8	-0.4**	0.1
Proportion Free in Manual Work (%)	7.0	4.9	9.0	5.3	2.0**	0.7
Proportion Free in Liberal Professions (%)	0.7	0.6	0.6	0.6	-0.1	0.1
Proportion Free in Other Jobs (%)	18.6	11.8	20.9	10.7	2.3	1.5
Proportion Owners of Land (%)	0.3	0.5	0.4	1.0	0.1	0.1
Proportion Free Wage Earners (%)	4.7	5.7	7.1	6.7	2.4**	0.9
Enslaved Labor						
Proportion Enslaved in Agriculture (%)	46.7	21.3	39.6	18.1	-7.1**	2.6
Proportion Enslaved in Manual Work (%)	4.9	4.9	5.7	6.7	0.9	0.8
Proportion Enslaved in Other Jobs (%)	20.1	15.9	23.9	16.2	3.8***	2.2
Proportion Enslaved Domestic Work (%)	14.3	11.1	17.7	12.4	3.4**	1.6
Proportion Enslaved Wage Earners (%)	5.6	11.3	6.1	10.1	0.4	1.4

6.4. Descriptive OLS - 1872

Table 3: OLS Estimates of Coastal Ban - 1872

	Slaves	White	Black	Mixed	Caboclo
More than 80km of the coast	-2.084*** (0.740)	0.838 (1.026)	-1.743** (0.694)	1.301 (1.080)	1.301 (1.080)
State Fixed Effects	✓	✓	✓	✓	✓
N	1115	1115	1115	1115	1115
R ²	0.51	0.54	0.42	0.50	0.50

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

Table 4: OLS Estimates of Coastal Ban on Labor Distribution - 1872

	Agriculture	Ranching	Industry	Manual	Liberal	Other Prof.
More than 80km of the coast	2.234 (1.457)	-0.747*** (0.160)	-0.005 (0.495)	-0.467*** (0.108)	-1.741* (1.035)	-1.755* (1.041)
State Fixed Effects	✓	✓	✓	✓	✓	✓
N	1115	1115	1115	1115	1115	1115
R^2	0.13	0.19	0.29	0.10	0.19	0.20

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

6.5. Coastal RDD - 1872

6.6. Coastal RDD - 1970

A. Figures

B. Description of Letters and Georeferencing

C. 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:

C.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.

C.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):

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