

Private Colonization and State Capacity: Evidence from the Brazilian Donatary Captaincies*

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Abstract

This paper analyzes the impact of private colonization on government size and public goods provision in the medium and long run. We focus on the Donatary Captaincy system in Brazil, which split the Portuguese colony into strips of land and granted private citizens jurisdiction, rights, and ownership of the territory. Our findings suggest that longer exposure to private colonization led to smaller governments, measured by the number of public employees and public expenditures, and lower provision of public education and health in 1920, approximately 180 years after the end of the system. While some convergence was observed in 2010, negative effects on health outcomes persist over time.

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1 Introduction

State capacity stands as a key driver of economic development, primarily through law enforcement, tax collection, and the provision of public goods (Besley and Persson, 2011; Johnson and Koyama, 2017). Despite their importance, we observe large differences in state capacity across different regions. For instance, Acemoglu (2005) documents that tax capacity varies largely in the world, and usually correlates with the countries' income. Furthermore, there is also a large inequality in the provision of public goods. Around 4 billion people have limited access to health, leaving them vulnerable to shocks (Ortiz and Behrendt, 2017), whereas 258 million children are out of school (Schmelkes, 2021).

These economic disparities can, in part, be attributed to the historical colonization process. Some studies have shown that different periods of exposure to colonization led to distinct modern outcomes (Feyrer and Sacerdote, 2009). Others have highlighted the different effects of being colonized directly by a ruler from the metropolis or the colony (Iyer, 2010). However, much less has been said about the impacts of being colonized by a government agent versus by a private citizen. For example, if private individuals are seeking personal enrichment, they might focus on short-term projects since they won't reap the rewards in the long run. This could lead to different government outcomes compared to those results from colonization by a public ruler. Hence, understanding how the nature of colonization, whether public or private, affects places over time is crucial to understanding contemporaneous regional differences.

In this paper, we estimate the impact of private colonization on government size and public goods provision in the medium and long run. We explore the Donatary Captaincy system implemented between 1534 and 1753 in Brazil. The system split colonial Brazil into strips of land, granting jurisdiction and autonomy to private citizens known as captains. These captains were responsible for implementing a government and fostering economic development within their captaincy. Exploiting the variation in exposure, we find that being exposed to private colonization for longer resulted in smaller governments, measured both in terms of the number of public employees and public expenditure, and fewer public goods provision in health and education in 1920. However, long-run results indicate some convergence by 2010, although we find persistent differences in health-related public services and outcomes.

Our argument rests on the fact that captains had nearly absolute power in their territories and, as private citizens, were looking to extract as much rent as possible. The historical evidence suggests that they nominated fewer public employees than required, potentially to conserve more power (de Saldanha, 2001). Coupled with their focus on personal enrichment, this could have led to lower public expenditure

and provision of public goods, especially considering implementation costs. Once a foundation of small government and limited public goods provision was established, this structure might have persisted over time, leading to consistent differences in government size and public goods offerings.

The empirical strategy capitalizes on two particularities of the Donatary Captaincy system. First, we explore the fact that all Donatary Captaincies were eventually returned to the Portuguese Crown. The reasons are mostly due to financial difficulties faced by the captains or due to the death of the original grantee. We rely on this variation to create a measure of years of private colonization, defined as the difference between the year the captaincy was returned to the Crown and the year of the first settlement. Second, captaincies' borders were based on the size of their coastline, such that each one had 50 leagues. This allows us to consider the placement of borders plausibly exogenous. Thus, we follow Michalopoulos and Papaioannou (2013) and use state fixed effects and geographical controls in all models, besides restricting to municipalities located up to 50 kilometres from the border.

Medium-run results suggest that an additional 100 years of exposure to private colonization led to 14% fewer public employees per 1,000 inhabitants and approximately 12% less public expenditure per capita in 1920. Similar trends are observed regarding education and health public goods. Each additional century implies a decrease of 14% and 13% in the number of education workers and schools, respectively, and 20% fewer medical doctors per capita. The results suggest that private colonization affected government outcomes even 150 years after the end of the system.

Nevertheless, the impacts seem to diminish over time. When we repeated the analysis using 2010 data, we observed some convergence in the long run. The effect of private colonization on the number of public employees decreased to 1%, whereas public expenditure is only 2.5% smaller. Similarly, there are no significant differences in the number of public school teachers and public schools. Despite that, we still observe some persistent negative effects on health. Our findings suggest that being exposed to an additional 100 years of private colonization led to 5% fewer public doctors, 4.5% fewer health centers and 6% more child mortality by 2010.

We conducted a series of robustness exercises to support our findings. First, exploiting the fact that two territories were only exposed to 1 and 2 years of private colonization, while their neighbours had around 180 years, we performed a regression discontinuity analysis. The results are similar to the ones in the main analysis, despite lacking statistical significance. Moreover, results do not change once we correct our standard errors to account for spatial correlation. Finally, when we estimate the effects using placebo Donatary Captaincies¹ we do not find any of the results, suggesting that

¹The Tordesillas Treaty divided colonial Brazil in half and assigned the right side to Portugal and

they are not driven by unobservable characteristics related to the latitude.

This article relates to various strands of the literature. We contribute to a broad literature on the historical determinants of state capacity (Besley and Persson, 2008, 2009; Dincecco and Prado, 2012; Gennaioli and Voth, 2015) and public goods provision (Banerjee et al., 2005; Wimmer, 2016; Foa, 2022). Our work relates to Dittmar and Meisenzahl (2020), although we focus on Brazil while they analyze the historical impacts on public goods provision in German cities. Their findings indicate that the introduction of institutional arrangements in the 1500s led to an immediate increase in public goods provision, and these effects persisted for over 300 years after the policy implementation, which aligns with our results.

We also add to the literature that studies the long-term impact of colonial rule (Acemoglu et al., 2001; Banerjee and Iyer, 2005; Feyrer and Sacerdote, 2009; Iyer, 2010; Acemoglu et al., 2014; Dell and Olken, 2020). Several scholars have highlighted the impact of specific colonial features, such as forced labour (Nunn, 2008; Dell, 2010; Nunn and Wantchekon, 2011; Bertocchi and Dimico, 2014; Faguet et al., 2022; Laudares and Valencia Caicedo, 2023) and institutional changes (Porta et al., 1998; Engerman and Sokoloff, 2005; Huillery, 2009; Cagé and Rueda, 2016; Lowes and Montero, 2021b), but less has been said about the different effect of public versus private colonization. In this sense, the closest article is Lowes and Montero (2021a). They find that concessions to private companies during colonial times led to worse health, education, and wealth outcomes in modern times in Africa. Even though private companies were allowed to freely extract natural resources, they did not have jurisdiction to implement new institutions and still had to answer to a colonial power. Thus, we contribute as one of the first empirical evidence of private colonization in modern outcomes.

Lastly, we contribute to the literature that studies the Donatary captaincy system. While most works focus on the description of the system (Johnson, 1972; Dutra, 1973; de Saldanha, 2001; Augeron and Vidal, 2007), discussing the location of the Donatary Captaincies borders (Gallo, 2002; Cintra, 2013, 2017), and the analysis of its jurisdiction (Cabral, 2015; Feloniuk, 2016), very few articles empirically analyzed the consequences of the system. To the best of our knowledge, Mattos et al. (2012) is the only empirical work in this context. The authors analyze how municipalities' relative age within their captaincy (e.g. how old they are compared to the newest municipality in that DC) affects inequality and institutional features in the long run. As previously mentioned, our paper takes on a different approach and contributes to the literature by providing the first evidence on the effect of years of exposure to private captains on the municipalities' government size and public goods provision

the left side to Spain. We recreated the Donatary Captaincy system, implemented on the right side, on the Spanish portion.

across Donatary Captaincies.

The rest of this paper is structured as follows. Section 2 provides an overview of the Donatary Captaincy system, followed by Section 3, which outlines our empirical strategy and data. Section 4 presents the results, Section 5 covers the robustness checks, and finally, Section 6 concludes.

2 The Donatary Captaincy System in Brazil

The first Portuguese explorers, led by Pedro Álvares Cabral, arrived in Brazil in April 1500. Originally, the expedition was organized with the intention of reaching India to establish a commercial relationship, following Vasco da Gama’s successful route through the Cape of Good Hope (Vianna, 1961a). However, they ultimately arrived in Brazil. Whether the detour was intentional remains uncertain (de Holanda, 1960; Vianna, 1961a). The following years witnessed a number of Portuguese voyages to the colony, primarily focused on the extraction of *Pau-Brasil*. The tree’s heartwood, from which a red dye could be extracted, coupled with its resistant wood made it highly valued in Europe. This was Brazil’s first commodity export.

The abundance of Pau-Brasil made the shores of Brazil attractive to other European powers despite the Portuguese monopoly on its trade. Even though Portuguese rights to Brazil had already been established in 1494 in the Treaty of Tordesillas (Vianna, 1961a; Laudaes and Valencia Caicedo, 2023), French vessels were constantly found in Brazil from as early as 1504, increasing the frequency of visits in the subsequent years (Vianna, 1961a; de Carvalho, 2015). The Portuguese Crown attempted to safeguard its colony by patrolling Brazilian waters but failed mostly due to the size of the coast.

During the first half of the 16th century, Portugal was facing financial difficulties. Decades of increasing public spending, an earthquake in 1531, and the financial pressure caused by a greater naval presence in the colonies pushed the country into a financial crisis in 1532 (Augeron and Vidal, 2007; de Freitas, 2015). Lacking financial resources and manpower to both defend the territory against foreign invasions and populate it, King D. João III (1502-1557) decided to replicate a system already in place on the Coast of Africa and Atlantic Islands, establishing a Donatary Captaincy system in Brazil (Johnson, 1972; de Carvalho, 2015).²

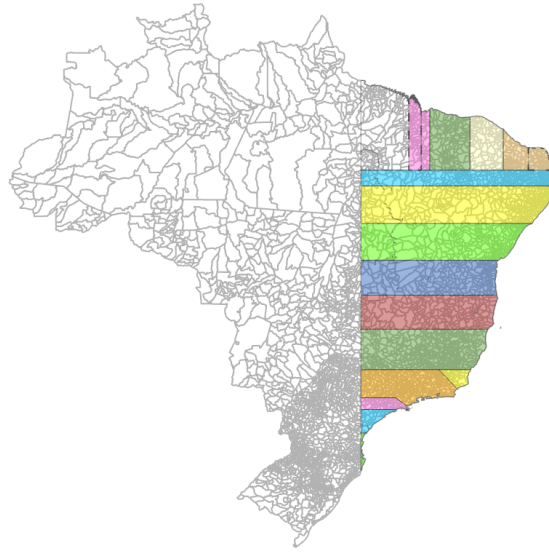
The system consisted of partitioning the colony into smaller territories, called Donatary Captaincies,³ and granting each one to a private citizen. Fifteen tracts of land were created, typically going from the coastline to the vertical line set by

²Donatary captaincies were also introduced in Angola, Sierra Leone, Cape Verde, Sao Tomé and Príncipe, Madeira Island, and Azores (de Saldanha, 2001).

³They are known as *Capitanias Hereditárias*, or Hereditary Captaincies, in Portuguese

the Treaty of Tordesillas, such that each had 50 leagues of coastline (Augeron and Vidal, 2007) as shown Figure 1.⁴ Between 1534 and 1536, King D. João III, and the Minister of Finances, António de Ataíde allocated the Donatary Captaincies to 12 Portuguese citizens. These appointed Captains constituted a mix of military veterans who had participated in the Indian and African campaigns, as well as members of the royal administration closely allied with the minister (Augeron and Vidal, 2007; Bueno, 1999; Dias et al., 1923). Table 1 presents each captain’s Donatary Captaincy, the grant date, and a summary of their background.

Figure 1: Map of the Donatary Captaincies



Notes: The non colored portion located at the top on the right side of the vertical Tordesillas Line are non-distributed lands (Cintra, 2013). Each color represents a distinct Donatary Captaincy.

Each captain and their heirs were granted jurisdiction and autonomy over the land for their lifetimes, becoming responsible for the organization of a local government, the implementation of a justice system, and collecting taxes to finance it, as described in their *Carta Foral* (de Carvalho, 2015).⁵ Despite the Crown specifying the positions that needed to be filled within the Donatary Captaincy government, the captain retained the freedom to determine the number of officers appointed to each position and whether to create new ones, as well as set their wages. However, they constantly opted not to appoint officials to every position and had other public workers accumulate offices in order to retain more power (de Saldanha, 2001).

Given the persistent threat of foreign invasions, the beneficiaries were also responsible

⁴In 1530, the King assigned his advisor and Minister of Finances, António de Ataíde with the responsibility of organizing an expedition to thoroughly survey Brazil’s shore. The analysis performed by the crew was later used to partition the colony (Augeron and Vidal, 2007).

⁵The Carta Foral, or Foral Letter, along with the Donation Letter set the rights and duties of each captain, as well as the geographical limits of their territory (de Saldanha, 2001).

for the military defence of the territory and populating the region. Captains were required to grant out part of the lands, known as *sesmarias*, to incentivize occupation and economic development. This was an occupation right, rather than a proprietary one, meaning that they could only sell or donate the land with the captain's consent. One important feature is that the Crown's donation letters had legal provisions designed to prevent excessive concentration of land. For example, Captains were prohibited from granting *sesmarias* to immediate family members (de Saldanha, 2001) or allocating more than 20% of the land to a single individual (Augeron and Vidal, 2007).

Despite the fact that the Crown still retained the trade monopoly over Pau-Brasil and that Captains were required to pay a 20% *Dízimo* tax to the Crown, local leaders had full authority and control over the land (Augeron and Vidal, 2007). There were no royal officials in the Donatary Captaincies, Captains possessed the right to overturn criminal and civil decisions, and no one, apart from nobles, was allowed to appeal a decision made by a captain-appointed judge in a royal court in Portugal (de Saldanha, 2001; Augeron and Vidal, 2007). The widespread use of violence, abuses of power, and disregard for the Crown's rules were recurring features of their governance, resulting in their widely recognized status as absolutist rulers by members of the Crown (de Saldanha, 2001). This is exemplified in a letter sent to the Portuguese King, in the early 17th century, stating that "*Donataries, Bishops, and powerful proceed in everything with absolute power and Your Majesty is King only in name*".⁶

Complete territorial control also entailed that the extensive financial obligations had to be met solely by the captain (de Carvalho, 2015). Prior to coming to Brazil, Captains had to find financiers, sell assets, and assemble a group of individuals willing to live in the colony to amass sufficient resources to initiate the colonization process. For instance, Vasco Fernandes Coutinho and Pero do Campo Tourinho liquidated all their assets before embarking to Brazil (Augeron and Vidal, 2007). In addition to the financial efforts, which remained constant through the years, the extensive territory of the DCs (some larger than Portugal), coupled with the distance to markets, posed significant challenges to the colonization process (de Carvalho, 2015).

Some Captains were unable to deal with these challenges and decided to sell their Donatary Captaincies back to the Crown. Faced with this situation, Portugal gradually started the process of reincorporating the territories. In 1549, the captain of Bahia, Francisco Pereira Coutinho, passed away, leaving the captaincy to his heirs. When they decided to sell it, the Crown repurchased it and established there the first royal captaincy (Augeron and Vidal, 2007). The captaincy of São Vicente 1 was

⁶"Os Bispos, Donatários e poderosos, procedendo em tudo com poder absolute e Sua Majestade fica só Rei em nome ...", Biblioteca Nacional de Lisboa, Coleção Pombalina, number 674, sheet 69. Authors' translation.

also incorporated in 1569. Martim Afonso returned it to the Crown likely due to the persistent incursions of French explorers (Augeron and Vidal, 2007), and in 1619, São Tomé was repurchased by the Crown from the heirs of Pêro de Gois after his death. It is important to notice that, despite the existence of royal captaincies and the presence of a general governor responsible for the administration of royal lands, private Captains kept operating independently until their territory was incorporated (de Carvalho, 2015).

It was not until the latter half of the 17th century that the criticisms of the system gained momentum among the members of the Crown. Some argued that private Donatary Captaincies were fairing worse than Royal captaincies (de Saldanha, 2001), while others voiced concerns about the Captains' inability to prevent foreign invasions (Augeron and Vidal, 2007). Faced with this pressure, the Portuguese Crown, under the leadership of Marquês de Pombal, initiated the process of dismantling the system (Carrara, 2016). By the latter half of 18th century, all the Donatary Captaincies had been bought back or confiscated and reintegrated into the domain of the Portuguese Crown.⁷

⁷Table 2 presents the incorporation dates and process on each Donatary Captaincy.

Table 1: Captains, Grant Date, and Background

Captain	Donatary Captaincy	Grant Date	Background
Martim Afonso de Sousa	São Vicente 1 and São Vicente 2	06/10/1534	Cousin of the Vedor da Fazenda, Antonio de Ataide
Pêro Lopes de Sousa	Santo Amaro, Santana, and Itamaracá	01/09/1534	Cousin of the Vedor da Fazenda, Antonio de Ataide
Pêro de Gois	São Tomé	28/01/1536	Captain the surveying expedition
Vasco Coutinho Fernandes	Espírito Santo	01/06/1534	Military that participated in Africa campaign
Pêro do Campo Tourinho	Porto Seguro	27/05/1534	Military that participated in India campaign
Jorge Figueiredo Correia	Ilhéus	26/07/1534	Secretary of the Royal Treasury
Francisco Pereira Coutinho	Bahia	05/04/1534	Military that participated in India campaign
Duarte Coelho Pereira	Pernambuco	10/03/1534	Military that participated in the conquest of Malaga in 1511
João de Barros e Aires da Cunha	Rio Grande do Norte and Piauí	08/03/1535	Treasurer of Casa da India (João) and member of the first expedition to Brasil in 1500 (Aires)
Antonio Cardoso de Barros	Ceará	19/11/1535	Purveyor general (provedor-geral) of finances
Fernão Álvares de Andrade	Maranhão	Unknown	Treasurer general of the realm

Notes: João de Barros and Aires da Cunha received two territories to split among them.

Source: Augeron and Vidal (2007), Cintra (2013), and de Saldanha (2001)

3 Empirical Strategy and Data

3.1 Empirical Strategy

The process of reincorporation of the Donatary Captaincies by the Portuguese Crown started as early as 1548 and continued until 1761. Most of the Captains opted to sell their territories due to the financial burden associated with developing and populating the region (de Saldanha, 2001; de Carvalho, 2015). For instance, in São Tomé, Bahia, and Santo Amaro, the heirs decided to sell the Captaincy back to the Crown after the death of the captain (Augeron and Vidal, 2007; Vianna, 1961b). However, there were exceptions such as Pernambuco, acquired by the Crown in a legal settlement where an illegitimate son of the captain claimed the territorial rights, São Vicente 1, ceded due to the French invasions, and Ilhéus, confiscated following allegations of the captain plotting against the king (de Saldanha, 2001; Augeron and Vidal, 2007).

Motivated by this historical account, we explore the timing each Donatary Captaincy was returned to the Crown and construct a measure of the number of years under private colonization. *Years of Private Colonization* is defined as the difference between the year the captaincy was returned to the Crown and the year that the first settlement was established for each territory after the donation. Table 2 outlines the year of the first settlement, the year that it was returned to the Crown, and describes the reincorporation processes for each captaincy analyzed.⁸

Our aim is to assess the impact of an additional year of private colonization on the state capacity of Brazilian municipalities. The first step is to match each municipality to a Donatary Captaincy based on the location of the modern municipality's centroid. We then proceed to estimate the following equation:

$$Y_{ijst} = \beta_0 + \beta_1 \text{Years of Private Colonization}_j + \Lambda' Z_{ijst} + \alpha_s + u_{ijt} \quad (1)$$

Y_{ijst} are the state capacity and public goods outcomes, both in 1920 and 2010, for municipality i , that was located in the territory of Donatary Captaincy j , in the state s , for the year t . *Years of Private Colonization* $_j$ is the number of years under private colonization in captaincy j , and Z_{ijst} is a vector of geographical controls including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall for each municipality. Finally, following Michalopoulos and Papaioannou (2013), we use state fixed effects α_s to control for any policy variation at the state level, leading to within-state estimates.⁹

⁸As explained in section 3.2, we excluded the northern captaincies due to unclear boundaries.

⁹Figure B1 presents the intersection between Donatary Captaincies historical boundaries and the 1920 state boundaries (panel A), and 2010 state boundaries (panel B). It is important to note that, although 4 states were created between 1920 and 2010, state boundaries are unchanged for all

It is possible that some unobservable geographical characteristics could affect both the duration of the private colonization period and the state capacity outcomes, possibly resulting in biased estimates. We address this concern by restricting our sample to municipalities that fall within 50 kilometres from each side of the border, following Michalopoulos and Papaioannou (2013). The idea is that the exact location of the border was defined such that each Donatary Captancy had 50 leagues of coastline, as described in section 2. Consequently, by restricting our analysis to locations near the border, we can presume that each municipality was arbitrarily situated within a specific Donatary Captancy.

3.2 Sample

Historically, there was a consensus that all Donatary Captaincies borders were horizontal, going for the coastline up to the vertical line defined in the Tordesillas Treaty (1494). This interpretation was initially influenced by the 1586 historical map drawn by Luís Teixeira (da Mota and Cortesão, 1960), which gained acceptance among various authors over time (Varnhagen, 1854; Marchant, 1943; de Holanda, 1960). The wide acknowledgment of this interpretation led to its adoption in school textbooks, as can be seen in the map extract from the Ministry of Education textbook in Figure 2a. Luís Teixeira's historical map is presented in Figure 2b.

Figure 2: Donatary Captaincies - Horizontal Borders

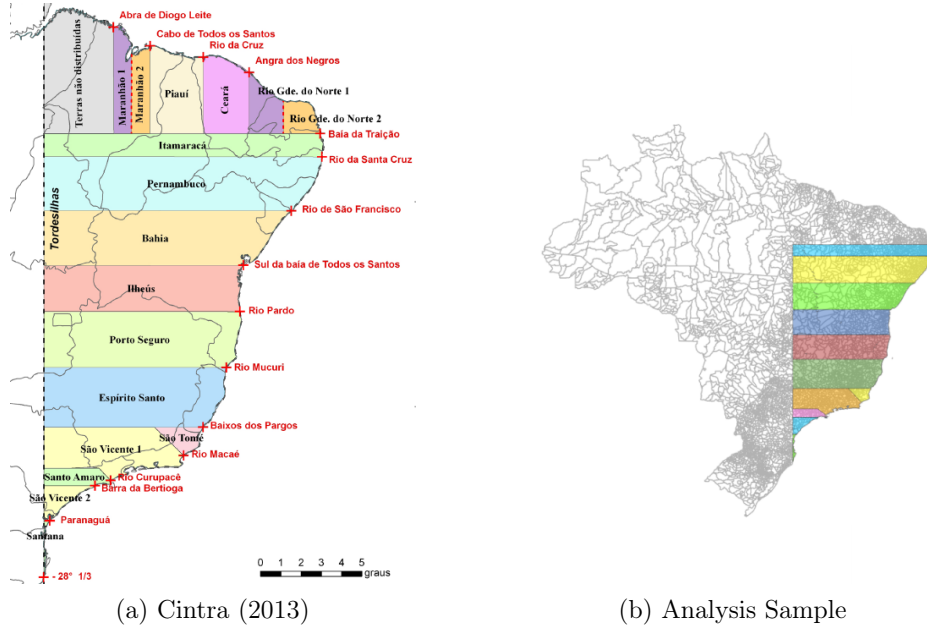


Notes: Panel A presents the map drawn by Luís Teixeira in 1586, located in da Mota and Cortesão (1960), and Panel B shows the map found in the Ministry of Education textbook (Albuquerque et al., 1977).

municipalities in our sample, with the exception of 73. Those municipalities were located in the state of Goiás in 1920 and became a part of Tocantins in 2010.

However, there is a growing literature suggesting that the historical borders are not accurate. Contrary to the established belief, the borders were actually vertical for the captaincies located in the North, and slightly different for two territories in the South (Gallo, 2002; Cintra, 2013, 2017), as shown in Figure 3a. The revised interpretation is supported by the analysis of the donation letters, the *Cartas Forais*, and the mining charters of each captain. Despite that, the exact location of some Northern boundaries is still unclear. For instance, boundaries between Maranhão 1 and Maranhão 2 were not clearly defined in their donation letters, akin to Rio Grande do Norte. Therefore, we excluded the Northern captaincies from our analysis, and focused on the Central and Southern captaincies, as shown by the painted areas in Figure 3b.

Figure 3: Donatary Captaincies - New Boundaries



Notes: The map from Cintra (2013) is shown in Panel A. Panel B shows the sample map, where painted municipalities are included in the analysis.

Table 2: Captains, Grant Date, and Background

Donatary Captaincy	First Settlement	Returned to Crown	Reincorporation Process
Santana	1549	1709	After the death of Pêro Lopes de Sousa, the heirs to Martim Afonso, his brother, also inherited Santana and Santo Amaro.
São Vicente 2	1536	1709	They decided to sell the captaincies to another private citizen after facing financial difficulties. However, the Crown, facing pressure from members of the royal administration, decided to intervene and purchase the captaincy at the same price.
Santo Amaro	1536	1709	
São Vicente 1	1565	1567	The captain decided to return the captaincy to the Crown due to constant French invasions.
São Tomé	1540	1619	In face of the great financial effort required to develop a captaincy, the son of Pêro de Gois, Gil de Gois, decided to sell the captaincy to the crown.
Espírito Santo	1535	1715	The Crown bought the captaincy back after extensive negotiations. The motivation behind the negotiation is unclear, but it was conducted by a private citizen who had previously bought the place from the original heirs.
Porto Seguro	1535	1761	The captaincy was confiscated after the captain was accused of trying to kill the King.
Ilhéus	1536	1753	Marques de Pombal, having access to public money that the Crown did not have before, decided to acquire it. It is unclear why the captain decided to sell it.
Bahia	1548	1549	After the captain's death, his heirs were not interested in staying in Brazil. The solution was to sell the captaincy back to the Crown.
Pernambuco	1537	1716	The captaincy was returned to the Crown after a judicial battle between the Crown and a claiming heir, the illegitimate son of the previous captain, in exchange for nobility titles and financial compensation
Itamaracá	1585	1753	Marques de Pombal, having access to public money that the Crown did not have before, decided to acquire it. It is unclear why the captain decided to sell it.

Notes: We excluded the northern captaincies due to unclear boundaries. More details in section 3.2.

Source: Vianna (1961b), Augeron and Vidal (2007), Cintra (2013), and de Saldanha (2001)

3.3 Balance Test

A potential threat to our empirical strategy stems from the possibility that municipalities in different Captaincies might possess distinct geographical characteristics. Such variation could potentially confound our estimated effects if these features correlate with our measure of private colonization. To address this, we estimate equation 1 to examine potential differences across municipalities using a set of land suitability measures and geographical attributes. Results are reported in Tables A2 and A3.

Although we find no statistical distinctions in terms of slope and proximity to rivers, we observe a significant difference in rainfall and sunlight among municipalities. Nevertheless, they are economically small, suggesting that places with 100 years more of private colonization have 0.6% less sunlight and 3.7% more rainfall. Furthermore, the geographical differences do not translate into differences in suitability, a critical aspect considering the predominant role of agriculture and extractivism during this period (Vianna, 1961a; de Carvalho, 2015). Once the sample is restricted to municipalities located up to 50 kilometres from the border, we observe that point estimates are not statistically significant and have a small magnitude across five suitability measures.¹⁰ In summary, our findings suggest that there are no significant geographical differences across municipalities, especially once we focus on those close to the border.

3.4 Data

The analysis uses four distinct sets of data. First, we build upon several historical sources (de Holanda, 1960; Vianna, 1961b; de Saldanha, 2001; Augeron and Vidal, 2007; Cintra, 2013) to construct our measure of years of private colonization. On average, Brazilian municipalities experienced 132 years under private colonization, spanning from 1 to 226 years. Figure B2 illustrates its geographical distribution.

The second set encompasses medium-run outcomes, carrying data from 1920.¹¹ The data on educational and health outcomes, Land Gini index,¹² the count of public employees, and demographic characteristics sourced from the 1920 Brazilian Census. Fiscal outcomes come from the 1926 *Estatística das Finanças do Brasil*, which has digitized data on municipalities' public expenditure, decomposed by expenditure category.

¹⁰Results suggest that an additional 100 years of private colonization is associated with a less than 1.5% difference in suitability, except for sugar, where we observe a 4% difference.

¹¹To maintain the same unit of observation across different periods, we map the 2010 municipalities into those in 1920. Thus, if two municipalities in 2010 coincide with the location of one municipality in 1920, we assign the 1920 value to both 2010 municipalities. Since all outcomes are measured in per capita terms, the underlying hypothesis of this approach is that those outcomes are uniformly distributed across the territory, as done by Hornbeck (2010); Maloney and Valencia Caicedo (2022)

¹²This measure was constructed using the number of farms and average size in each of the 11 land size categories found in the Census

We rely on 2010 data as our long-run outcomes. Public goods provision data comes from a variety of sources, including *Sinopse Estatística da Educação Básica* from the Ministry of Education, DataSUS from the Health Ministry, and IBGE. The public finance data for municipalities comes from FINBRA, organized by Brazil’s National Treasury. Lastly, geographical characteristics are sourced from the IBGE, with additional suitability data acquired from EMBRAPA. Table A1 outlines the summary statistics.

4 Results

4.1 Medium Run Results

The historical analysis reveals that the Captains wielded nearly absolute power in their Donatary Captaincy, often resisting sharing authority with other public officials. They often appointed fewer officials than required by the Portuguese Crown (de Saldanha, 2001). Moreover, they were responsible for the public expenditures in their territory, a financial burden that several Captains struggled to meet (de Carvalho, 2015). Given this context, it is possible that both a smaller government and lower public expenditure might have persisted across the years in privately colonized areas. We investigate this by estimating equation 1 for medium-term outcomes using 1920 data on government and public expenditure.¹³

Our quantitative evidence is shown in Table 3 and supports this interpretation. They indicate that an additional 100 years of private colonization led to 14% fewer public employees per 1,000 inhabitants by 1920. Moreover, municipalities with greater exposure to private colonization spent between 8% and 12% less on public expenditure per capita compared to less exposed municipalities within the same state. This reduction seems to be driven by lower public expenditure in education, between 16% and 29% less, and, on a smaller scale, by lower expenditure in health, although the point estimates are not statistically significant. Notably, the municipal population size in 1920 is not statistically different across observations (Table A4). These findings suggest that smaller governments, measured by the number of employees and public expenditure, persisted for at least 150 years in privately colonized municipalities.

¹³This represents the oldest available data for the number of public employees and public expenditure at the municipal level.

Table 3: Medium Run - Government Size and Public Expenditure

	(1)	(2)	(3)	(4)
	Dependent Variable:			
	Municipal Public Employees per 1,000	ln(Public Expenditure per capita)	ln(Public Expenditure in Education per capita)	ln(Public Expenditure in Health per capita)
Panel A: Whole Sample				
Years of Private Colonization (in 100 years)	-0.0605*** (0.0190)	-0.0818* (0.0469)	-0.159** (0.0808)	-0.109 (0.0879)
Observations	2,620	2,343	1,657	1,714
R-squared	0.278	0.520	0.277	0.340
Mean Dep. Var.	0.398	0.636	-2.251	-2.695
Panel B: Up to 50km of the border				
Years of Private Colonization (in 100 years)	-0.0569** (0.0231)	-0.125** (0.0514)	-0.296*** (0.0875)	-0.0339 (0.101)
Observations	1,496	1,328	960	987
R-squared	0.347	0.533	0.331	0.381
Mean Dep. Var.	0.391	0.689	-2.177	-2.596

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Clustered standard errors at the 1920 municipality level are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

We established that private colonized municipalities spent less and had fewer public employees in the medium run. Given that, the next step is analyzing whether it also impacted the provision of public goods. Our estimates in Table 4 indicate that an additional 100 years of private colonization translates into 14% fewer education workers, mostly teachers, and 13% fewer schools per 1,000 inhabitants, although this estimate is not statistically significant. Nevertheless, this negative impact on the educational inputs does not translate into worse educational outcomes. As observed in Column 3, the estimates for literacy rate are not statistically significant and are small in magnitude, suggesting a negative effect of 2%.

Regarding health-related inputs, we also observed a negative impact. Municipalities have 20% fewer medical doctors per 1,000 inhabitants when exposed to private colonization. Unfortunately, the unavailability of 1920 data on mortality hinders the analysis of health outcomes.

Table 4: Medium Run - Public Goods Provision

	(1)	(2)	(3)	(4)
	Dependent Variable:			
	Education Workers per 1,000 inhabitants	Schools per 1,000 inhabitants	Literacy Rate	Medical Doctors per 1,000 inhabitants
Panel A: Whole Sample				
Years of Private Colonization (in 100 years)	-0.153*** (0.0445)	-0.0142*** (0.00550)	-0.00440 (0.00374)	-0.139*** (0.0292)
Observations	2,620	2,620	2,620	2,620
R-squared	0.403	0.279	0.360	0.458
Mean Dep. Var.	1.060	0.107	0.180	0.700
Panel B: Up to 50km of the border				
Years of Private Colonization (in 100 years)	-0.147** (0.0640)	-0.0129 (0.00812)	-0.00513 (0.00488)	-0.143*** (0.0367)
Observations	1,496	1,496	1,496	1,496
R-squared	0.403	0.273	0.366	0.483
Mean Dep. Var.	1.077	0.101	0.179	0.696

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Clustered standard errors at the 1920 municipality level are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

Lastly, we shift our focus to GDP per capita and land inequality in the medium term. Given that Captains were private citizens seeking personal enrichment from their colonial endeavour (Augeron and Vidal, 2007), one could expect that municipalities in their captaincies were more economically developed, in terms of GDP per capita, despite neglecting the provision of public goods. However, the results in Column 1, Table 5, suggest a different conclusion. Private colonized municipalities had a 7% lower GDP per capita in 1920. At the same time, these municipalities do not exhibit higher land concentration as indicated by the land Gini index in column 2. This suggests that, as discussed in section 2, provisions outlined in the donation letters of the captaincies indeed prevented an excessive land concentration.

Table 5: Medium Run - GDP and Land Inequality

	(1)	(2)
	Dependent Variable:	
	ln(GDP per capita)	Land Gini
	Panel A: Whole Sample	
Years of Private Colonization (in 100 years)	-0.0712** (0.0318)	-0.0112* (0.00676)
Observations	2,363	2,600
R-squared	0.508	0.318
Mean Dep. Var.	-0.679	0.605
	Panel B: Up to 50km of the border	
Years of Private Colonization (in 100 years)	-0.0786** (0.0329)	-0.00963 (0.00744)
Observations	1,337	1,480
R-squared	0.529	0.311
Mean Dep. Var.	-0.671	0.614

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Clustered standard errors at the 1920 municipality level are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

4.2 Long Run Results

We provided evidence that municipalities in privately colonized areas had a smaller government, measured by the number of public employees and public spending, lower public goods provision and lower GDP per capita in 1920. Naturally, this raises the question of whether those impacts persist in the long run. Thus, we repeat the previous exercise and analyze how private colonization affected municipalities using 2010 outcomes.

The results in Table 6 indicate some convergence across municipalities in publicly and privately colonized areas. The negative estimates for the number of public employees (Column 1) and public expenditure (Column 2) suggest that, although they still have a smaller government, the difference went from 14% to 1% in the number of employees, and from 12% to 2.5% in public expenditure. Similarly, we do not observe significant differences in public expenditure on education and health.

Table 6: Long Run - Government Size and Public Expenditure

	(1)	(2)	(3)	(4)
	Dependent Variable:			
	Municipal Public Employees per 1,000	ln(Current Expenditure per capita)	ln(Public Expenditure in Education per capita)	ln(Public Expenditure in Health per capita)
Panel A: Whole Sample				
Years of Private Colonization (in 100 years)	-0.369 (0.546)	-0.0176* (0.00935)	0.00227 (0.0103)	0.00505 (0.0146)
Observations	2,619	2,597	2,593	2,587
R-squared	0.101	0.153	0.129	0.170
Mean Dep. Var.	49.69	6.856	6.198	5.892
Panel B: Up to 50km of the border				
Years of Private Colonization (in 100 years)	-0.523 (0.701)	-0.0246** (0.0123)	0.00384 (0.0146)	0.0262 (0.0225)
Observations	1,495	1,487	1,484	1,479
R-squared	0.156	0.191	0.135	0.134
Mean Dep. Var.	49.60	6.846	6.198	5.866

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

As a consequence, one would anticipate that the distinction in public goods provision would also disappear in the long run. This appears to be true for education, as evidenced in the first three columns of Table 7. The estimate for the number of public school teachers is no longer statistically significant, whereas the number of public schools is in fact higher for municipalities more exposed to private colonization. Despite being significant, the point estimate for literacy rate is small in magnitude, suggesting that 100 more years of private colonization leads to a mere 1% lower literacy rate.

Despite the convergence in public health expenditure, persistent differences in health public goods were observed in 2010. Columns 4 to 6 suggest that an additional 100 years of exposure to private colonization led to 5% fewer medical doctors in the public service (SUS)¹⁴ and 4.5% health centers per 10,000 inhabitants.¹⁵ The negative impact on health inputs also translates into worse health outcomes, with a 6% increase in child mortality for every 100 years of private colonization. Even though the difference in medical doctors decreased from 20% in 1920 to 5% in 2010, the results indicate a persistent effect on public health even after 250 years of the Donatary Captaincy system.

Although we observed a lower GDP per capita in 1920 due to private colonization,

¹⁴SUS is the *Sistema Único de Saúde*, the public health system in Brazil.

¹⁵We do not observe the same difference when we analyze non-SUS medical doctors, as shown in Table A5.

that difference vanished when we repeated the analysis using the 2010 GDP per capita. Table 8 shows that the difference, once around 7% in 1920, reduced to 0.3% in 2010, and became statistically non-significant. The results for land concentration are similar to the estimate in the medium run, suggesting that private colonization did not lead to a higher land concentration either in the medium or in the long run.

Table 7: Long Run - Public Goods Provision

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable:					
	Public School Teachers per 1,000 inhabitants	Public Schools per 1,000 inhabitants	Literacy Rate	SUS Medical Doctors per 1,000 inhabitants	Health Centers per 10,000 inhabitants	Child Mortality per 10,000 inhabitants
Panel A: Whole Sample						
Years of Private Colonization (in 100 years)	0.0994 (0.0856)	0.0440* (0.0242)	-0.0105*** (0.00140)	-0.109*** (0.0234)	-0.243*** (0.0890)	0.0694 (0.0506)
Observations	2,626	2,626	2,626	2,626	2,616	2,625
R-squared	0.245	0.389	0.754	0.273	0.180	0.074
Mean Dep. Var.	12.51	1.602	0.822	1.535	5.247	2.148
Panel B: Up to 50km of the border						
Years of Private Colonization (in 100 years)	0.131 (0.114)	0.0670** (0.0332)	-0.00818*** (0.00185)	-0.0866*** (0.0321)	-0.237** (0.116)	0.142** (0.0628)
Observations	1,500	1,500	1,500	1,500	1,497	1,499
R-squared	0.305	0.435	0.754	0.254	0.232	0.053
Mean Dep. Var.	12.69	1.659	0.818	1.533	5.355	2.130

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

Table 8: Long Run - GDP and Land Inequality

	(1)	(2)
	Dependent Variable:	
	ln(GDP per capita)	Land Gini
Panel A: Whole Sample		
Years of Private Colonization (in 100 years)	0.0194 (0.0142)	-0.00764*** (0.00244)
Observations	2,626	2,394
R-squared	0.481	0.127
Mean Dep. Var.	9.012	0.814
Panel B: Up to 50km of the border		
Years of Private Colonization (in 100 years)	-0.00343 (0.0190)	-0.00627* (0.00365)
Observations	1,500	1,356
R-squared	0.494	0.142
Mean Dep. Var.	9.017	0.812

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels..

5 Robustness Checks

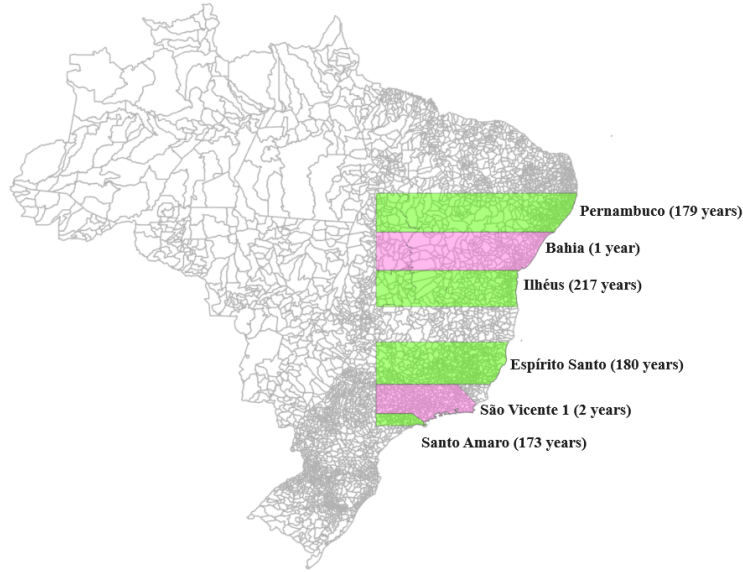
We conducted three sets of robustness exercises to check our findings in the previous section. Our initial check is a case study focused on two Donatary Captaincies that underwent 1 and 2 years of private colonization. Employing a regression discontinuity design, we compared the outcomes in these regions against neighbouring territories that, on average, experienced around 180 years of private colonization. The second set replicates our main exercises while adjusting standard errors to account for spatial correlation following Conley (1999) for various cutoff distances. Additionally, we also used a non-linear measure of private colonization to check the robustness of the results. Our third and final analysis creates placebo Donatary Captaincies on the left side of Tordesillas and re-estimates the results. The goal is to check if any unobservable characteristics, correlated with latitude, could explain our main results.¹⁶

5.1 Case Study: Regression Discontinuity Analysis

Given that two captaincies, Bahia and São Vicente 1, have only 1 and 2 years of private colonization respectively, we explore this setting and conduct a regression discontinuity analysis. The aim is to compare these territories to their neighbours Pernambuco (179 years of private colonization), Ilhéus (217 years), Espírito Santo (180 years), and Santo Amaro (173 years) and estimate the extensive margin impact of exposure to a private colonizer.

¹⁶For the ease of exposure, we repeated the analysis using a limited number of outcomes. Results for the remaining measures are available upon request.

Figure 4: Donatary Captaincies: Private and Public Colonization

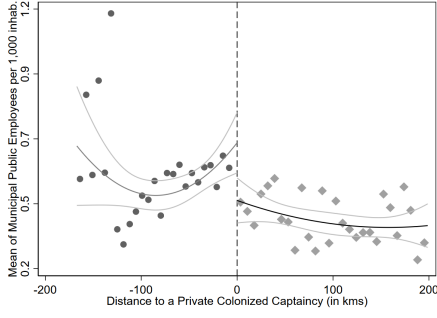


Notes: The green areas are privately colonized captaincies, and the pink areas are the public colonized ones.

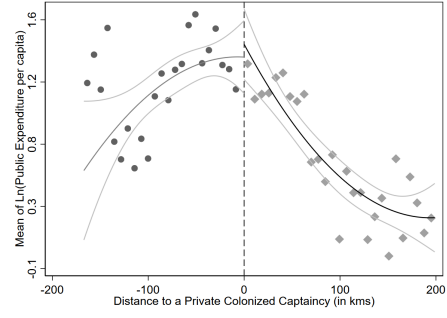
Employing a standard regression discontinuity approach with distance to a privately colonized captaincy as the running variable, we analyzed medium and long-run outcomes. Based on Figure 4, this means that we estimated the impact of moving from a publicly colonized region (pink areas) to a privately colonized one (green areas). Following Michalopoulos and Papaioannou (2013) “thick borders”, and a Donut RD approach implemented by Barreca et al. (2011) and Lowes and Montero (2021a), we used a 5-kilometre buffer around the border to exclude municipalities located on top of the frontier and restrict the sample to municipalities located up to 200 kilometres from it.

Medium-run results are reported in Figure 5 and are similar to the ones in the previous analysis. Although not statistically significant, the estimates suggest fewer municipal employees, education workers, and medical doctors in areas subjected to private colonization. However, we do not find the same effect in terms of public expenditure, which displays a null result in Figure 5b.

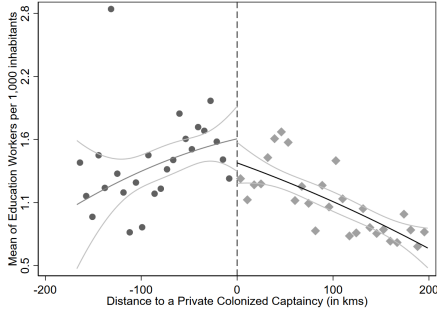
Figure 5: Medium Run Outcomes



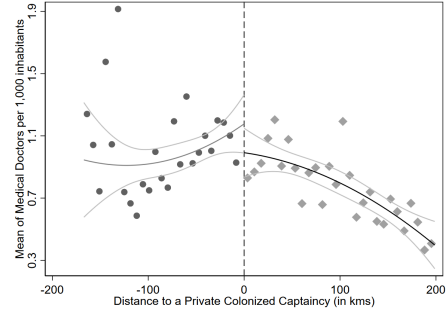
(a) Municipal Public Employees (1920)



(b) $\ln(\text{Total Expenditure per capita})$ in 1920



(c) Education Workers (1920)

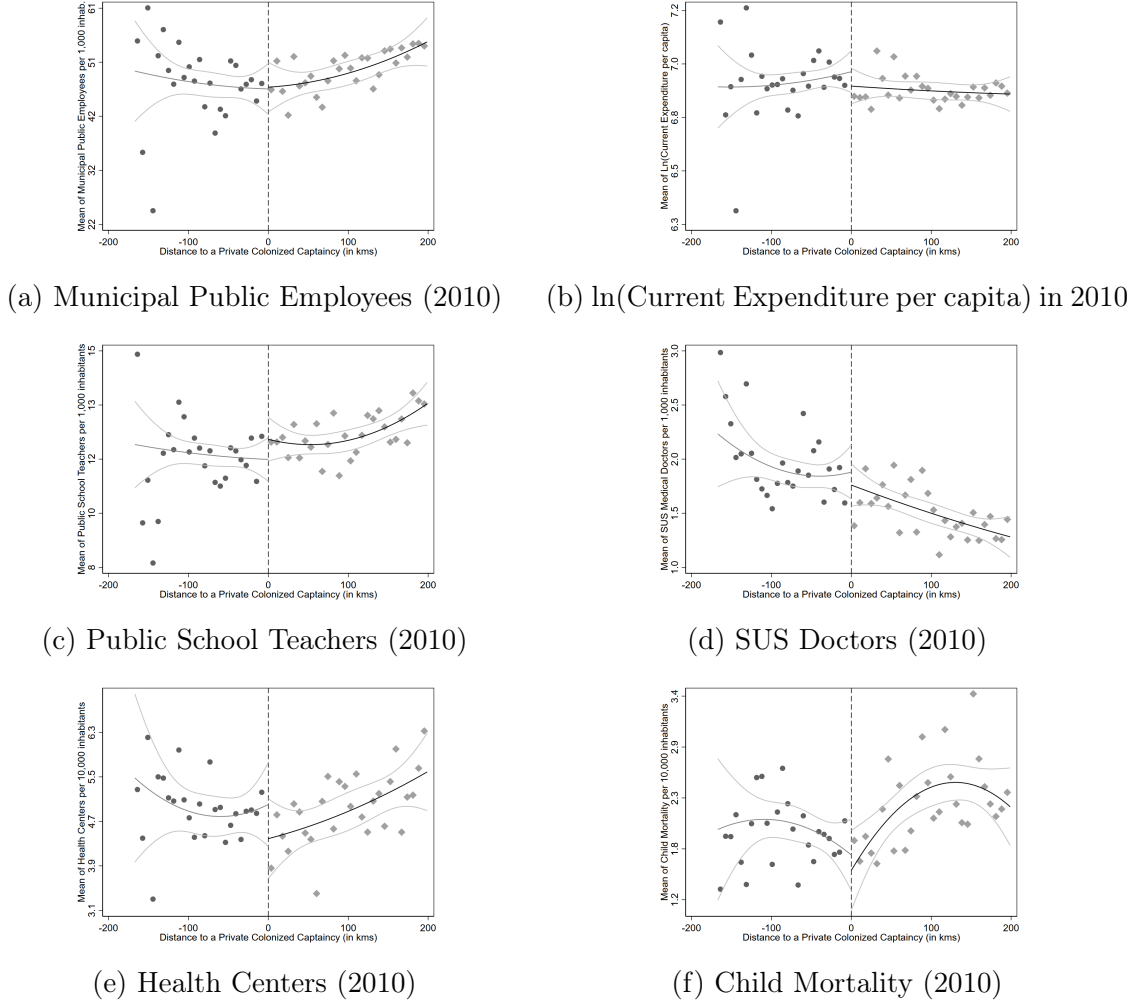


(d) Medical Doctors (1920)

Each graph displays regression discontinuity estimates using the distance to the border of a private colonized captaincy, measured in kilometres, as the running variable. Each marker represents the local average of the outcome variable, and the continuous line is a quadratic fit with a 95% confidence interval. We restrict the sample to municipalities whose centroid is located between 5 and 200 kilometres from the border. Municipal public employees, education workers, and medical doctors are measured per 1,000 inhabitants, whereas total expenditure is in per capita terms.

Similarly, the long-run analysis mirrors the previous results. It appears that there was a convergence in the number of public employees and public school teachers. At the same time, we observe the same negative estimates for public expenditure, number of SUS medical doctors, health centers, and child mortality, despite the lack of statistical significance. Cumulatively, the results suggest that having a private colonial administration led to smaller governments and lower public goods provision in the medium run. In the long run, while we observe some evidence of convergence, persistent differences in health outcomes endure.

Figure 6: Long Run Outcomes



Each graph displays regression discontinuity estimates using the distance to the border of a private colonized captaincy, measured in kilometres, as the running variable. Each marker represents the local average of the outcome variable, and the continuous line is a quadratic fit with a 95% confidence interval. We restrict the sample to municipalities whose centroid is located between 5 and 200 kms from the border. Municipal public employees, public school teachers, and SUS medical doctors are measured per 1,000 inhabitants, health centers and child mortality are measured per 10,000 inhabitants, whereas current expenditure is in per capita terms.

5.2 Spatial Correlation and Non-Linearity

It is known that standard errors might be underestimated if spatial correlation is overlooked (Conley and Molinari, 2007). This scenario occurs when two geographically close municipalities are very similar, contributing minimally to the estimate precision while decreasing the magnitude of the standard errors due to an increase in sample size. We address these concerns by estimating our main equation using Conley (1999) adjustment for standard errors. Since there is no standard procedure to select the distance cutoffs, we estimate it using 6 different distances. The results, presented in

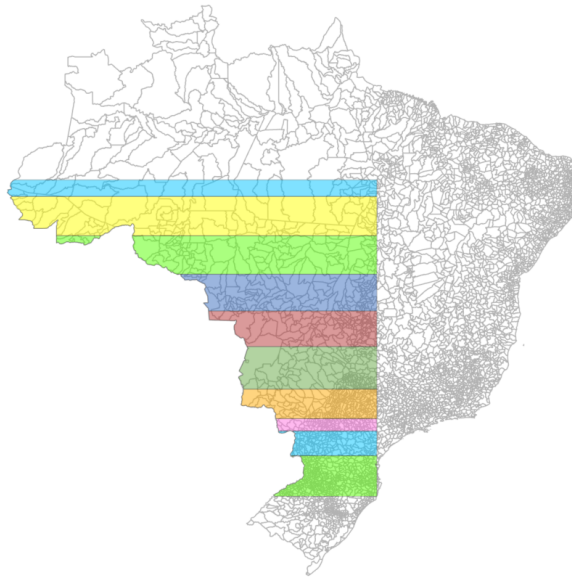
Tables A6 and A7, show that most results are robust to that adjustment, except for our measure of public expenditure in the medium-run.

Another important aspect stems from the assumption of linearity in our main analysis. Although intuitive, we cannot rule out the possibility that the impact stemming from years of private colonization is non-linear. Thus, we tested that by creating a dummy variable for *Private Colonization*. It is equal to 1 if the municipality was exposed to private colonization for 179 years (the median in our sample) or more, and 0 otherwise. The results, detailed in Tables A8 and A9, reveal that most estimates are similar to those found in Section 4.

5.3 Placebo Donatary Captaincies

As previously discussed, colonial Brazil was divided into two halves following the Treaty of Tordesillas (1494). The west side was assigned to Spain, while the east side, was assigned to Portugal and divided into Donatary Captaincies. In our final robustness exercise, we constructed artificial Donatary Captaincies on the Spanish side of the Tordesillas line, as illustrated in Figure 7. We assigned the same number of years of private colonization as their Portuguese-side counterparties and re-estimate equation 1. If unobservable characteristics correlated with latitude are driving the results, we would anticipate similar estimates to those observed on the right side of the Tordesillas line. Conversely, divergent results would suggest that those features are not the primary drivers of the effects unearthed in Section 2.

Figure 7: Placebo Donatary Captaincies



Notes: Each coloured area represents a distinct Placebo DC.

Table 9 provides evidence that unobservables characteristics are unlikely to be the main driver of the results. We do not observe differences in the number of public employees and medical doctors between municipalities in our placebo captaincies. The number of education workers is, in fact, larger for our placebo DCs with higher years of private colonization. Results on public expenditure are actually similar to those found in the main analysis, which could suggest that this effect is less robust.

Long-run results led to the same conclusion. Most estimates flip their sign once we restrict to municipalities closer to the border, which was not observed in the main analysis. Furthermore, unlike the main findings, we did not observe a negative and statistically significant difference in health outcomes. For instance, we showed that the number of health centers is larger for placebo DCs exposed to lengthier periods of private colonization. Both tables suggest that unobservables are unlikely to be the primary drivers of our main findings.

Table 9: Medium Run: Placebo DC

	(1)	(2)	(3)	(4)
	Dependent Variable:			
	Municipal Public Employees per 1,000	ln(Public Expenditure per capita)	Education Workers per 1,000 inhabitants	Medical Doctors per 1,000 inhabitants
Panel A: Whole Sample				
Placebo Years of Private Colonization	-0.00170 (0.0938)	-0.422** (0.175)	0.121** (0.0611)	0.000175 (0.0772)
Observations	1,636	1,357	1,636	1,636
R-squared	0.207	0.202	0.398	0.436
Mean Dep. Var.	0.695	1.070	1.196	1.326
Panel B: Up to 50km of the border				
Placebo Years of Private Colonization	0.00359 (0.0994)	-0.304** (0.145)	0.105* (0.0625)	-0.00160 (0.0481)
Observations	829	670	829	829
R-squared	0.227	0.225	0.388	0.203
Mean Dep. Var.	0.739	1.098	1.230	0.916

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Clustered standard errors at the 1920 municipality level are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

Table 10: Long Run: Placebo DC

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable:					
	Municipal Public Employees per 1,000	ln(Current Expenditure per capita)	Public School Teachers per 1,000 inhabitants	SUS Medical Doctors per 1,000 inhabitants	Health Centers per 10,000 inhabitants	Child Mortality per 10,000 inhabitants
Panel A: Whole Sample						
Placebo Years of Private Colonization	0.197 (0.823)	-0.00214 (0.0145)	0.209* (0.123)	0.0295 (0.0401)	0.346** (0.149)	0.108 (0.0731)
Observations	1,688	1,672	1,688	1,687	1,655	1,688
R-squared	0.100	0.172	0.127	0.133	0.217	0.132
Mean Dep. Var.	48.18	7.074	11.96	1.701	6.578	1.711
Panel B: Up to 50km of the border						
Placebo Years of Private Colonization	-1.750* (0.957)	-0.0281 (0.0172)	-0.0514 (0.144)	-0.0272 (0.0453)	0.321** (0.162)	-0.0176 (0.0916)
Observations	876	866	876	875	863	876
R-squared	0.143	0.198	0.122	0.164	0.200	0.166
Mean Dep. Var.	46.78	7.018	11.66	1.628	5.800	1.961

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

6 Conclusion

In this article, we examined the impact of exposure to private colonization on government size and public goods provision in the medium and long run in the context of Brazil. We exploit the Donatary Captaincy system, where the Portuguese Crown divided Colonial Brazil, assigning each territory to a private citizen. Based on that, a measure for years of private colonization was constructed as the difference between the year the territory was returned to the Portuguese Crown and the year of the first settlement. To alleviate endogeneity concerns, we included state fixed effects and restricted the sample to municipalities located up to 50 kilometres from the Donatary Captaincies' borders, following (Michalopoulos and Papaioannou, 2013).

The estimates suggest that more years of exposure to private colonization led to fewer public employees and lower government expenditure in 1920. Educational public goods, such as teachers and schools, as well as the number of medical doctors, were also lower the more private colonization a municipality had. However, we found evidence of convergence in 2010 both in government size and educational outcomes. The only persistent difference regards the number of public medical doctors and health centers, which is lower, and child mortality, which is higher for private colonized areas.

Our findings are robust to a series of tests. For instance, our case study, where a regression discontinuity analysis using territories with little exposure to private colonization yielded similar results. Moreover, re-estimating the results using placebo Donatary Captaincies led to null results, ruling out omitted variables explaining the results.

A possible future avenue focuses on the impacts on the municipalities' revenue both in the medium and long run. Additionally, we plan to further analyze the mechanism behind the convergence observed between the medium and long-run outcomes.

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A Tables

Table A1: Summary Statistics

Variable	N	Mean	SD	Min	Max
Years of Private Colonization	2,620	131.85	84.79	1.00	226.00
Medium-Run Outcomes: 1920 data					
GDP per capita (in 2010 R\$)	2,363	616.24	388.51	78.76	2,910.99
Land Gini Index	2,600	0.60	0.13	0.13	0.96
Public Municipal Administrators (per 1,000 people)	2,620	0.40	0.42	0.00	4.53
Education workers (per 1,000 people)	2,620	1.06	1.01	0.00	8.48
Schools (per 1,000 people)	2,620	0.11	0.13	0.00	0.97
Medical Doctors (per 1,000 people)	2,620	0.70	0.71	0.00	6.58
Literacy Rate	2,620	0.18	0.08	0.04	0.61
Public Expenditure per capita	2,343	3.57	6.48	0.05	123.80
Public Expenditure in Education per capita	2,073	0.16	0.31	0.00	4.01
Public Expenditure in Health per capita	2,073	0.17	0.39	0.00	5.16
Long-Run Outcomes: 2010 data					
GDP per capita (in 2010 R\$)	2,620	11,356.76	16,178.88	2,697.35	311,882.00
Gini Index	2,620	0.50	0.06	0.32	0.79
Public Employees (per 1,000 people)	2,613	49.73	20.37	8.65	224.54
Public School teachers (per 1,000 people)	2,620	12.52	3.48	4.91	28.11
Public Schools (per 1,000 people)	2,620	0.11	0.13	0.00	0.97
SUS Doctors (per 1,000 people)	2,620	1.53	0.97	0.12	7.71
Non-SUS Doctors (per 1,000 people)	2,620	0.12	0.29	0.00	2.98
Municipal Taxes Revenue per capita	2,619	180.98	334.88	3.50	6,381.77
Public Expenditure per capita	2,594	1,018.10	457.40	0.00	5,794.06
Public Expenditure in Education per capita	2,594	403.90	208.94	0.00	3,844.08
Public Expenditure in Health per capita	2,594	525.15	215.12	0.00	3,100.09
Geographical Characteristics					
Latitude	2,620	-15.58	5.78	-28.05	-6.68
Longitude	2,620	-42.28	3.89	-48.70	-34.84
Altitude	2,620	488.07	296.29	0.00	1,639.15
Distance to Coast (in kms)	2,620	237.36	210.96	0.00	1,032.61
Distance to River (in kms)	2,620	39.23	35.75	0.00	190.89
Coffee Suitability	2,620	28.78	13.62	0.00	76.64
Sugar Suitability	2,620	24.69	12.88	0.00	87.80
Corn Suitability	2,620	29.08	12.07	5.42	71.98
Rice Suitability	2,620	39.74	13.36	0.00	95.47
Soy Suitability	2,620	26.83	10.98	0.00	70.15

Notes: GDP per capita for 1920 is measured in 2010 reais. Public expenditure data in 1926 is measured in contos de reis. GDP per capita, and public expenditure data in 2010 are measured in 2010 reais.

Table A2: Geographical Variables

	ln(Sunlight) (1)	ln(Rainfall) (2)	Slope (3)	ln(Dist. River) (4)
Panel A: Whole Sample				
Years of Private Colonization (in 100 years)	-0.00596*** (0.00170)	-0.0269** (0.0108)	0.194* (0.104)	-0.0451 (0.112)
Observations	2,620	2,620	2,620	2,620
R-squared	0.852	0.636	0.678	0.182
State FE	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes
1920 Cluster	Yes	Yes	Yes	Yes
Mean Dep. Var.	1.636	7.022	6.279	2.788
Panel B: Up to 50km of the border				
Years of Private Colonization (in 100 years)	-0.00626*** (0.00198)	-0.0377*** (0.0114)	0.123 (0.117)	-0.0311 (0.108)
Observations	1,496	1,496	1,496	1,496
R-squared	0.864	0.678	0.655	0.253
State FE	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes
1920 Cluster	Yes	Yes	Yes	Yes
Mean Dep. Var.	1.644	6.994	5.782	2.758

Notes: Years of Private Colonization is defined as the difference between the year the captaincy was transferred to the Crown and the year of the first settlements. Geographical controls are longitude, latitude, altitude, distance to the coast, sunlight intensity, and annual rainfall, except for the case where one of the controls is used as an outcome. Robust standard errors in parentheses. If *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A3: Balance Test: Suitability

	Dependent Variable: Land Suitability				
	Coffee	Sugar	Corn	Rice	Soy
Panel A: Whole Sample					
Years of Private Colonization (in 100 years)	-0.523 (0.652)	-1.946*** (0.681)	0.318 (0.513)	0.534 (0.652)	0.275 (0.457)
Observations	2,620	2,620	2,620	2,620	2,620
R-squared	0.330	0.336	0.486	0.235	0.504
State FE	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes
1920 Cluster	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	28.78	24.69	29.08	39.74	26.83
Panel B: Up to 50km of the border					
Years of Private Colonization (in 100 years)	-0.278 (0.711)	-1.027 (0.686)	0.392 (0.564)	0.652 (0.690)	0.372 (0.508)
Observations	1,496	1,496	1,496	1,496	1,496
R-squared	0.324	0.334	0.524	0.199	0.554
State FE	Yes	Yes	Yes	Yes	Yes
Geographical Controls	Yes	Yes	Yes	Yes	Yes
1920 Cluster	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	28.72	24.79	30.62	40.95	28.37

Notes: Years of Private Colonization is defined as the difference between the year the captaincy was transferred to the Crown and the year of the first settlements. Geographical controls are longitude, latitude, altitude, distance to the coast, sunlight intensity, and annual rainfall. Robust standard errors in parentheses. If *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A4: Population 1920 and 2010

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Whole Sample						
	Ln(Population in 1920)			Ln(Population in 2010)		
Years of Private	0.0858*	0.0727*	0.0534	-0.0954***	0.0706**	0.130***
Colonization (in 100 years)	(0.0472)	(0.0398)	(0.0399)	(0.0268)	(0.0278)	(0.0287)
Observations	2,620	2,620	2,620	2,620	2,620	2,620
R-squared	0.008	0.178	0.331	0.005	0.114	0.248
Geographical Controls	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes
Panel B: Up to 50km of the border						
	Ln(Population in 1920)			Ln(Population in 2010)		
Years of Private	0.0550	0.0610	0.0199	-0.0469	0.137***	0.132***
Colonization (in 100 years)	(0.0585)	(0.0510)	(0.0506)	(0.0366)	(0.0376)	(0.0384)
Observations	1,496	1,496	1,496	1,496	1,496	1,496
R-squared	0.003	0.177	0.332	0.001	0.130	0.277
Geographical Controls	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes

Notes: Years of Private Colonization is defined as the difference between the year the captaincy was transferred to the Crown and the year of the first settlements. Geographical controls are longitude, latitude, altitude, distance to the coast, sunlight intensity, and annual rainfall. Robust standard errors in parentheses. If *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5: Long Run - Non-SUS Medical Doctors in 2010

	Dependent Variable: Non-SUS Doctors per 1,000 inhabitants in 2010			
	(1)	(2)	(3)	(4)
Panel A: Whole Sample				
Years of Private Colonization (in 100 years)	-0.0550*** (0.00747)	-0.0282*** (0.00748)	-0.00668 (0.00723)	-0.0109 (0.00772)
Observations	2,626	2,626	2,626	2,626
R-squared	0.025	0.179	0.166	0.199
State FE	No	Yes	No	Yes
Geographical Controls	No	No	Yes	Yes
Mean Dep. Var.	0.124	0.124	0.124	0.124
Panel B: Up to 50km of the border				
Years of Private Colonization (in 100 years)	-0.0555*** (0.0107)	-0.0292*** (0.0106)	-0.00799 (0.00992)	-0.0152 (0.0113)
Observations	1,500	1,500	1,500	1,500
R-squared	0.030	0.177	0.166	0.198
State FE	No	Yes	No	Yes
Geographical Controls	No	No	Yes	Yes
Mean Dep. Var.	0.120	0.120	0.120	0.120

Notes: Years of Private Colonization is defined as the difference between the year the captaincy was transferred to the Crown and the year of the first settlements. Geographical controls are longitude, latitude, altitude, distance to the coast, sunlight intensity, and annual rainfall. Robust standard errors in parentheses. If *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A6: Medium Run: Conley SD

	(1)	(2)	(3)	(4)
	Dependent Variable:			
	Municipal Public Employees per 1,000	ln(Public Expenditure per capita)	Education Workers per 1,000 inhabitants	Medical Doctors per 1,000 inhabitants
Panel A: Whole Sample				
Years of Private Colonization (in 100 years)	-0.0605	-0.0818	-0.153	-0.139
25 km	(0.0167)***	(0.0378)**	(0.0374)***	(0.0256)***
50 km	(0.0233)***	(0.0572)	(0.0466)***	(0.0335)***
75 km	(0.0253)**	(0.0690)	(0.0470)***	(0.0363)***
100 km	(0.0272)**	(0.0765)	(0.0440)***	(0.0379)***
150 km	(0.0289)**	(0.0819)	(0.0381)***	(0.0385)***
200 km	(0.0285)**	(0.0792)	(0.0293)***	(0.0353)***
Observations	2,620	2,343	2,620	2,620
R-squared	0.278	0.520	0.403	0.458
Mean Dep. Var.	0.398	0.636	1.060	0.700
Panel B: Up to 50km of the border				
Years of Private Colonization (in 100 years)	-0.0569	-0.125	-0.147	-0.143
25 km	(0.0216)***	(0.0457)***	(0.0547)***	(0.0332)***
50 km	(0.0256)**	(0.0619)**	(0.0656)**	(0.0416)***
75 km	(0.0244)**	(0.0684)*	(0.0652)**	(0.0429)***
100 km	(0.0271)**	(0.0698)*	(0.0575)**	(0.0417)***
150 km	(0.0280)**	(0.0696)*	(0.0572)**	(0.0419)***
200 km	(0.0295)*	(0.0645)*	(0.0432)***	(0.0408)***
Observations	1,496	1,328	1,496	1,496
R-squared	0.347	0.533	0.403	0.483
Mean Dep. Var.	0.391	0.689	1.077	0.696

Notes: All specifications include state fixed effects and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Clustered standard errors at the 1920 municipality level are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

Table A7: Long Run: Conley SD

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable:					
	Municipal Public Employees per 1,000	ln(Current Expenditure per capita)	Public School Teachers per 1,000 inhabitants	SUS Medical Doctors per 1,000 inhabitants	Health Centers per 10,000 inhabitants	Child Mortality per 10,000 inhabitants
Panel A: Whole Sample						
Years of Private Colonization (in 100 years)	-0.369	-0.0176	0.0994	-0.109	-0.243	0.0694
25 km	(0.634)	(0.0108)	(0.103)	(0.0267)***	(0.108)**	(0.0515)
50 km	(0.754)	(0.0132)	(0.125)	(0.0351)***	(0.151)	(0.0572)
75 km	(0.839)	(0.0145)	(0.139)	(0.0412)***	(0.179)	(0.0568)
100 km	(0.899)	(0.0156)	(0.154)	(0.0449)**	(0.200)	(0.0540)
150 km	(0.863)	(0.0155)	(0.155)	(0.0425)**	(0.206)	(0.0459)
200 km	(0.873)	(0.0157)	(0.160)	(0.0411)***	(0.213)	(0.0529)
Observations	2,619	2,597	2,626	2,626	2,616	2,625
R-squared	0.101	0.153	0.245	0.273	0.180	0.074
Mean Dep. Var.	49.69	6.856	12.51	1.535	5.247	2.148
Panel B: Up to 50km of the border						
Years of Private Colonization (in 100 years)	-0.523	-0.0246	0.131	-0.0866	-0.237	0.142
25 km	(0.789)	(0.0136)*	(0.126)	(0.0339)**	(0.134)*	(0.0612)**
50 km	(0.773)	(0.0141)*	(0.127)	(0.0411)**	(0.169)	(0.0714)**
75 km	(0.684)	(0.0132)*	(0.0976)	(0.0443)*	(0.190)	(0.0694)**
100 km	(0.633)	(0.0136)*	(0.104)	(0.0449)*	(0.208)	(0.0621)**
150 km	(0.645)	(0.0157)	(0.104)	(0.0417)**	(0.215)	(0.0450)***
200 km	(0.565)	(0.0135)*	(0.104)	(0.0403)**	(0.216)	(0.0448)***
Observations	1,495	1,487	1,500	1,500	1,497	1,499
R-squared	0.156	0.191	0.305	0.254	0.232	0.053
Mean Dep. Var.	49.60	6.846	12.69	1.533	5.355	2.130

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

Table A8: Medium Run - Non-Linear Measure

	(1)	(2)	(3)	(4)
	Dependent Variable:			
	Municipal Public Employees per 1,000	ln(Public Expenditure per capita)	Education Workers per 1,000 inhabitants	Medical Doctors per 1,000 inhabitants
Panel A: Whole Sample				
Private Colonization	-0.122*** (0.0376)	-0.00702 (0.0859)	-0.223*** (0.0655)	-0.164*** (0.0509)
Observations	2,620	2,343	2,620	2,620
R-squared	0.279	0.517	0.398	0.446
Mean Dep. Var.	0.398	0.636	1.060	0.700
Panel B: Up to 50km of the border				
Private Colonization	-0.107** (0.0421)	-0.0395 (0.0875)	-0.226*** (0.0773)	-0.133** (0.0574)
Observations	1,496	1,328	1,496	1,496
R-squared	0.347	0.527	0.400	0.468
Mean Dep. Var.	0.391	0.689	1.077	0.696

Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Clustered standard errors at the 1920 municipality level are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

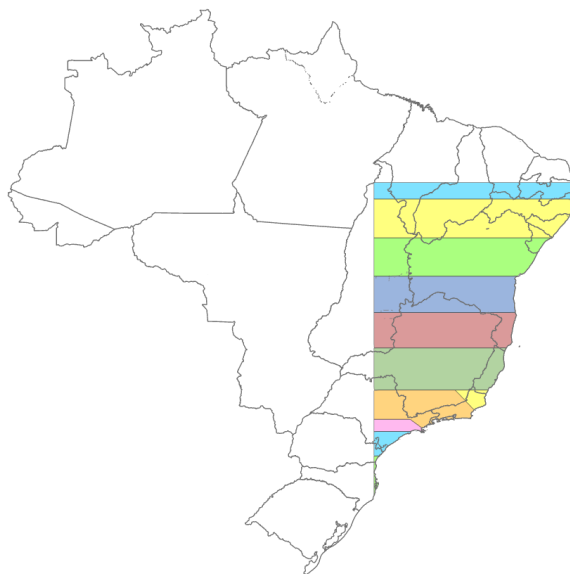
Table A9: Long Run - Non-Linear Measure

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable:					
	Municipal Public Employees per 1,000	ln(Current Expenditure per capita)	Public School Teachers per 1,000 inhabitants	SUS Medical Doctors per 1,000 inhabitants	Health Centers per 10,000 inhabitants	Child Mortality per 10,000 inhabitants
Panel A: Whole Sample						
Private Colonization	-0.666 (1.073)	-0.00700 (0.0184)	-0.147 (0.168)	-0.138*** (0.0462)	-0.853*** (0.175)	0.113 (0.0995)
Observations	2,619	2,597	2,626	2,626	2,616	2,625
R-squared	0.101	0.151	0.244	0.269	0.185	0.073
Mean Dep. Var.	49.69	6.856	12.51	1.535	5.247	2.148
Panel B: Up to 50km of the border						
Private Colonization	-0.982 (1.317)	-0.0127 (0.0231)	-0.120 (0.214)	-0.0755 (0.0605)	-0.741*** (0.217)	0.166 (0.118)
Observations	1,495	1,487	1,500	1,500	1,497	1,499
R-squared	0.156	0.189	0.304	0.251	0.236	0.051
Mean Dep. Var.	49.60	6.846	12.69	1.533	5.355	2.130

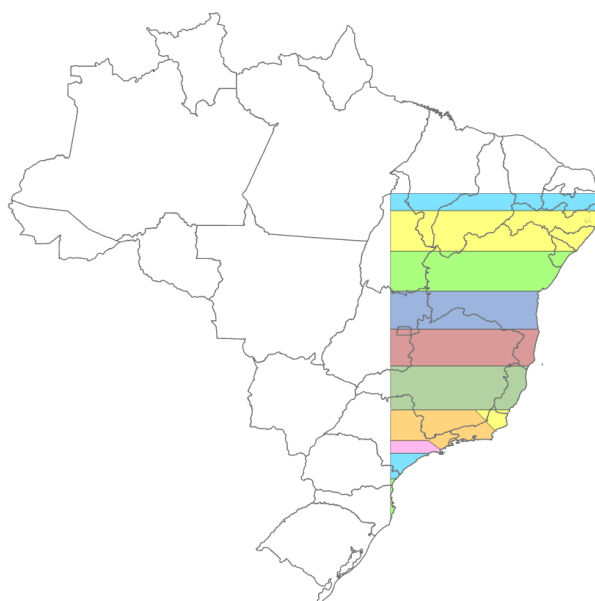
Notes: All specifications include state fixed effects, and control for a set of geographical variables including longitude, latitude, altitude, distance to the coast, sunlight incidence, and rainfall. Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels.

B Figures

Figure B1: State and Donatary Captaincies Boundaries



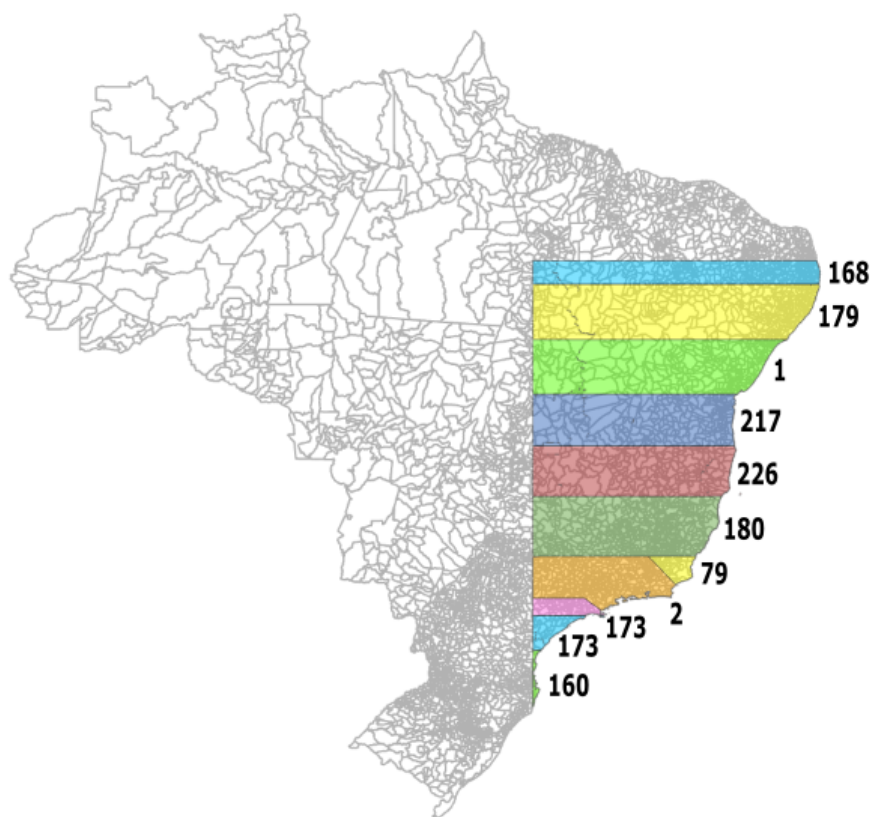
(a) 1920 State Boundaries



(b) 2010 State Boundaries

Notes: The maps present the Donatary Captaincies' historical boundaries and Brazil's state boundaries in (a) 1920 and (b) 2010.

Figure B2: Years of Private Colonization



Notes: The number next to each Donatary Captaincy represents the number of year under private colonization.