

# The impact of territorial fragmentation on electoral engagement and public finance

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## Abstract

In recent decades, territorial reforms have shown contrasting trends globally. Developed countries have focused on consolidating local governments into larger units for economies of scale and efficiency, while developing countries have opted for fragmentation to enhance political representation and resource allocation. This essay investigates how territorial divisions impact local governments in Brazil, focusing on their effects on political engagement and fiscal sustainability. We analyze Brazilian electoral data from 1988 to 2018, covering 621 areas affected by municipal splits, provided by the Regional Electoral Courts (TREs) and the Superior Electoral Court (TSE). Our methodology employs a difference-in-differences estimator that is robust to group and time heterogeneity, using municipalities that attempted to split but were unsuccessful as a control group. Our study highlights an increased political engagement increased following the implementation of administrative divisions in both municipal and general elections. However, it becomes non-significant after ten years.

**Keywords:** *Territorial fragmentation. Decentralization. Voter. Turnout. Difference-in-differences.*

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# 1 Introduction

In recent decades, we have seen contrasting trends in territorial reforms around the world. Developed countries have mostly focused on consolidating local governments into larger administrative units to benefit from economies of scale and enhance efficiency. In contrast, several developing countries have opted for territorial fragmentation, creating smaller administrative units to enhance political representation and better allocate resources to meet local needs. Recent quasi-experimental studies on reform efforts have largely focused on the effects of government mergers in developed nations, while there is a notable lack of research on the economic impacts of territorial splits in developing countries (Gendźwiłł, Kurniewicz, & Swianiewicz, 2021). Understanding these differing approaches is essential for comprehending the broader implications of decentralization on economic development, public finance, and political dynamics.

This essay examines how territorial divisions affect local governments in Brazil. It specifically investigates whether these divisions enhance political engagement among voters and how they impact the fiscal sustainability of local governments. To address these questions, we analyze data from 1988 to 2019, covering 621 areas affected by municipal splits across nineteen Brazilian states<sup>1</sup>. Brazil is a compelling case for studying territorial reforms due to its unique context. The 1988 Federal Constitution marked a shift towards decentralization by granting municipalities greater autonomy and encouraging the establishment of new ones through increased vertical transfers (Tomio, 2002). As a result, the number of municipalities grew from 4,491 in 1991 to 5,569 by 2013. This growth provides a valuable context for examining the effects of these reforms on local governance, fiscal sustainability, and economic development.

A key challenge in this literature is endogeneity, as decentralization is often linked to unobserved factors like subnational political power and resources, leading to reverse causality (Besley & Case, 1995; Rodden, 2019). Recent studies have explored territorial reforms as a source of exogenous variation in decentralization and have used two-way fixed effects (TWFE) regression to assess the impact of these reforms on local economies. However, advancements in difference-in-differences methods suggest that TWFE can yield biased estimates due to group or time heterogeneity. To overcome this issue, we utilize the difference-in-differences estimator proposed by Callaway and Sant’Anna (2021) to evaluate municipal fragmentation effects. This method accommodates treatments across multiple time periods while relying on the assumption of conditional parallel trends, and we apply it alongside the inverse probability weighting matching method (Abadie, 2005).

We gathered data on requests for municipal splits from regional electoral courts (TREs) and legislative assemblies spanning from 1988 to the early 2000s. This allowed us to create

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<sup>1</sup>North region: Amapa, Para, Rondonia, Roraima, and Tocantins; Northeast region: Bahia, Maranhao, Pernambuco, and Piaui; Southeast region: Espirito Santo, Minas Gerais, Rio de Janeiro, and Sao Paulo; South region: Parana, Rio Grande do Sul, and Santa Catarina; Central-West region: Goias, Mato Grosso, and Mato Grosso do Sul.

a control group comprising municipalities that attempted to split but were unsuccessful, serving as a more appropriate comparison for the newly formed municipalities. We collected voter turnout data from TREs and the Superior Electoral Court (TSE) since 1988 to assess how municipal splits impact voter engagement. Additionally, we gathered local public financial data from 1991 to 2019 from the Public Sector Accounting and Tax Information System (Siconfi), which is managed by the National Treasury Secretariat (STN). Due to the unavailability of municipal GDP data, we used spatial data on nighttime luminosity as a proxy for economic activity. This dataset, provided by Li, Zhou, Zhao, and Zhao (2020), allows us to evaluate the effects on local economic activity.

Our study presents two key findings. First, political engagement increased following the administrative division. The voter turnout rate rose by approximately 1.5 percentage points; however, the increase in valid votes was only weakly significant. This may be attributed to social pressure to vote and voter indecisiveness, given the discrepancy between turnout and valid votes, especially in municipal elections. Moreover, this increase in electoral participation is temporary, as levels of engagement declined ten years after the division. Furthermore, there was no overall increase in the electorate, indicating that there was no more increased voter participation among optional voters, such as illiterates and youths aged 16 and 17.

Secondly, the fragmentation of territories significantly affected public finance, particularly in relation to transfers from the Municipal Participation Fund (FPM). As a result, there was an increase of R\$149.81 per capita and a 4.45 percentage point rise in the fund's share of total revenues. This change also led to a corresponding increase in expenses for daily public operations, highlighting a greater reliance on intergovernmental transfers for the provision of public services. Likewise, capital expenditures rose by approximately R\$44.77 per capita, mainly due to increased capital grants from higher levels of government. These findings indicate that the administrative division increased the size of government and led to greater reliance on vertical transfers, but did not foster positive economic growth.

We contribute to two main areas of economic literature. The first one is the voting behavior in the political economy literature, which employs the rational voter model (Downs, 1957) to analyze voter turnout. According to this model, voters consider the costs of voting, the probability of a vote being pivotal, and the expected benefits of their preferred candidate or policy winning the election. Changes in municipal boundaries can influence governance by altering the size of the electorate and fostering closer connections between officials and constituents. In smaller municipalities, individual votes carry more weight, enhancing the perceived benefits of voting and potentially increasing turnout and political engagement. There are few studies that have utilized territorial reforms to examine voting electoral participation. To date, few studies have examined the effects of territorial reforms on electoral participation. Most existing research has focused on the amalgamation of subnational governments in developed countries, which has typically resulted in decreased turnout following a merger (Koch & Roachat, 2017; Lapointe, Saarimaa, & Tukiainen, 2018;

Roesel, 2017).

Our research expands this perspective by investigating the opposite policy in a developing country where voting is mandatory. Our findings align with rational choice theory, as voter turnout increased in smaller jurisdictions. Interestingly, attendance also rose during general elections, even though the importance of votes at the state and federal levels did not change. This finding may suggest the development of voting habits or indicate an impact on voters' emotional benefits, such as a sense of duty, social approval, and personal satisfaction (Riker & Ordeshook, 1968). After ten years, this increase in voter engagement becomes insignificant.

We also contribute to the literature on the fiscal effects of decentralization. The traditional fiscal decentralization literature advocates for delegating responsibilities and resources from central to local governments to better meet local preferences, allocate resources more efficiently and limit the government size (Brennan & Buchanan, 1980; Oates, 1972; Tiebout, 1956). Fiscal problems in decentralized nations prompted the development of a modern strand to address the fiscally irresponsible behaviors<sup>2</sup> associated with local administrations' overreliance on intergovernmental transfers (Oates, 2008).

While most quasi-experimental studies on the fiscal impact of territorial reforms focus on mergers, two studies examine the establishment of new Brazilian municipalities in the 1990s. Lima and Silveira Neto (2018) found that decentralization did not limit the government size, as evidenced by increases in both capital and current expenditures. Dahis and Szerman (2024) revealed that while the economic activity and municipal revenues grew, tax revenues did not increase. Our main contribution to this area is methodological. Unlike the previous studies, which employed a difference-in-differences approach with two-way fixed effects (TWFE) regression, we apply an estimator robust to heterogeneous effects. We highlight the overreliance of local governments on vertical transfers and find that economic activity did not experience significant changes due to the territorial reform, mainly after analyzing nighttime lights data to account for the blooming effect.

This study is organized as follows. Section 2 outlines the mechanisms and processes of territorial emancipation to provide context for the Brazilian institutional environment in the 1990s. Section 3 discusses potential biases in the two-way fixed effects (TWFE) estimation and presents the estimator developed by Callaway and Sant'Anna (2021), which was applied in this study. Following this, Section 4 covers the sample construction and the variables used, along with descriptive statistics. Finally, the results are discussed, and the study's conclusions are presented in the last two sections (5 and 6) of this chapter.

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<sup>2</sup>Flypaper effect, common pool problem, soft budget constraints, and fiscal competition.

## 2 Institutional background

After Brazil’s re-democratization, there was a significant movement toward political and administrative decentralization, transferring power from the federal government to the municipalities. As a result, the 1988 Federal Constitution (CF/88) elevated municipalities to the status of entities within the Federation, alongside the Federal government and the States. This change ensured greater decision-making autonomy for municipalities, increased resources from the Municipal Participation Fund (FPM), and facilitated territorial reforms. Consequently, the number of municipalities grew from 4,490 in 1991 to 5,569 in 2013.

### 2.1 Municipal Participation Fund (FPM)

The Municipal Participation Fund (FPM) was established in 1965, directing 10% of the revenue collected by the federal government from Income Tax (IR) and the Tax on Industrialized Products (IPI). This percentage was later increased to 22.5%<sup>3</sup> in the 1988 Constitution (CF/88). Municipalities were classified into three categories: Capitals, Reserve, and Interior, which receive 10%, 3.6%, and 86.4% of the total resources allocated to the fund, respectively. The first group includes 27 state capitals, while the second group consists of non-capital municipalities with a population of 142,633 or more. Both groups allocate a higher percentage of the fund to municipalities that have larger populations and lower state income per capita<sup>4</sup>.

The FPM Interior is allocated to all non-capital municipalities, including those that receive resources from the FPM Reserve. The sole criterion for distributing these resources is the population-based coefficients (refer to the gray line in Figure 1). Before 1990, the FPM Interior was distributed among all non-capital municipalities, which received funds based on population-related coefficients:

$$\text{FPM}_i = \frac{\text{coef}_i}{\sum_m^M \text{coef}_m} \times \text{FPM}_{\text{total}},$$

where  $M$  is the total number of non-capital municipalities,  $\text{coef}_i$  denotes the coefficient assigned to municipality  $i$ , and  $\text{FPM}_{\text{total}}$  refers to the total resources allocated to FPM Interior.

In the 1980s, the municipal splits were concentrated in a few states, resulting in both losses and gains across states. This likely prompted congressmen to adjust the criteria for the fund’s distribution as they established coefficients for each state<sup>5</sup>. With this adjustment, each state began to receive a fixed share of the FPM Interior, which is then allocated among

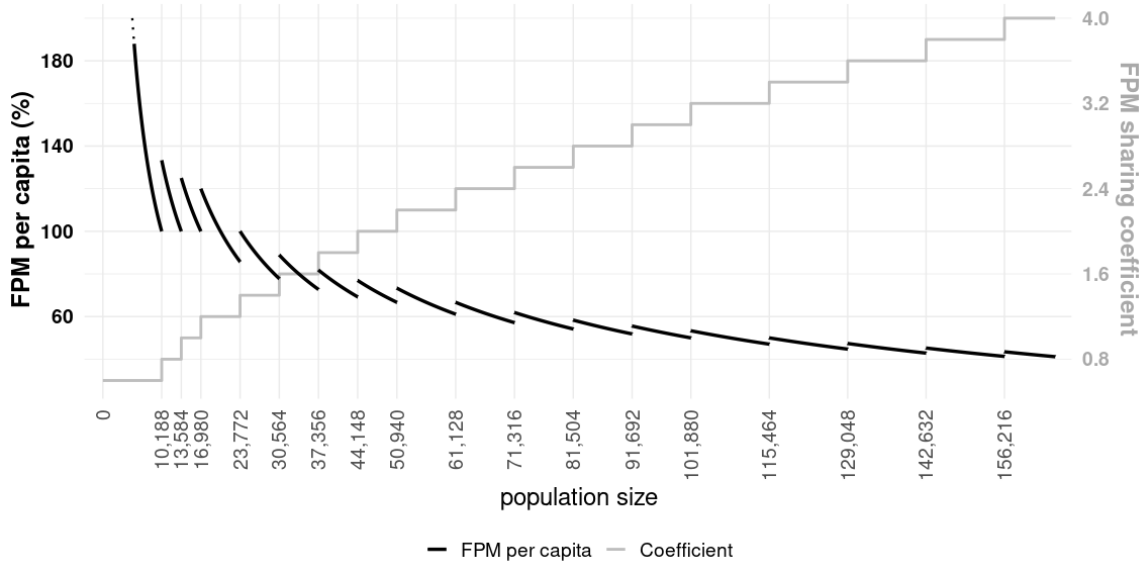
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<sup>3</sup>This percentage was raised by 1 percentage point in 2007, 2015, and 2022, reaching a total of 25.5%.

<sup>4</sup>For more information on how the coefficients are calculated, refer to Table 5.

<sup>5</sup>See Table 6 for the state coefficients.

Figure 1: FPM Interior per capita and sharing coefficients by population size



Sources: Boueri, Monasterio, Mation, and Silva (2013) and Decree-Law 1,881/1981. Notes: The black lines represent the per capita transfers from the FPM received by municipalities based on their population size. The per capita value for a municipality with 10,188 residents is established at 100%. The gray line indicates the sharing coefficient (or weight) used for distributing FPM resources among the municipalities within a state.

its municipalities based on their respective coefficients:

$$FPM_i = \frac{coef_i}{\sum_{m \in UF_i} coef_m} \times (share_{UF_i} \times FPM_{total}),$$

where  $UF_i$  denotes the state to which municipality  $i$  belongs, and  $share_{UF_i}$  indicates the state share of the FPM interior. This ended the interstate competition for federal resources, as the establishment of a new municipality began to affect only the FPM transfers received by municipalities within the same state (Tomio, 2002).

The FPM Interior was designed to allocate larger per capita amounts to smaller municipalities, as those with higher populations receive smaller overall transfers. Municipalities within the same population range receive the same fixed amount of FPM resources; therefore, per capita transfers decrease as the population grows within that range. However, it is important to note that per capita transfers do not consistently decrease with population increases (as indicated by the black lines in Figure 1). Discontinuities occur during transitions between population ranges, as municipalities start receiving a higher fixed fund amount, which in turn increases the per capita transfers.

Establishing a new municipality can be an effective strategy for securing a larger share of the FPM resources. For example, consider a municipality with a population of 13,500 that currently receives the second-lowest per capita transfers with a coefficient of 0.8. If a district with 3,000 residents becomes independent and forms a new municipality with a coefficient of 0.6, the original municipality will maintain its coefficient but will see an increase in its per capita transfer due to the reduction in population size. As a result,

the total combined coefficient for the entire territory will be 1.4, leading to an increase in per capita FPM transfers. However, this new arrangement will also decrease the resources available for other municipalities within the same state (“zero-sum game”).

The increase in revenue received by municipalities is cited as a primary reason for the establishment of small municipalities in the 1990s (Boueri et al., 2013; Gomes & Mac Dowell, 2000). Some researchers argue that increasing per capita transfers to smaller municipalities was essential for their operations and for meeting citizens’ needs (Afonso & Araújo, 2000; Bremaeker, 1993), particularly following the decentralization of some public services such as basic education, primary healthcare, sanitation, and garbage collection. Some studies argue that the redistribution of resources from larger municipalities to smaller ones was regressive and inefficient (Gomes & Mac Dowell, 2000). This is due to the fact that the average income in newly formed small municipalities tends to be significantly higher than the Brazilian average (Boueri et al., 2013). This suggests that wealthier areas were more likely to seek emancipation, a phenomenon observed in Sweden (Brink, 2004).

## 2.2 Municipal splits

In Brazil, the 1988 Federal Constitution’s institutional arrangement, along with the distribution mechanism of the FPM, facilitated the creation of new municipalities. Before 1988, the minimum criteria for municipal split were largely uniform across all states. These requirements included geographic contiguity and minimum levels of population, urban development, and share of state government revenue. After, each state began to establish its own criteria through complementary laws. As a result, some states modified their requirements by either relaxing or tightening them, while also introducing new criteria, such as the age of the emancipatory district and its distance from the municipal seat<sup>6</sup>.

According to Tomio (2002), the permissiveness level of state regulations does not fully explain the rise of new jurisdictions, as demonstrated by Sao Paulo and Amazonas states. Both eased their criteria, yet experienced only small relative increases in new local governments. Political factors, such as the governor’s ideology and his/her relationship with the legislative assembly, also significantly influenced the establishment of new municipalities. Both Executive and Legislative branches had the authority to stop the emancipation process, which typically followed these steps:

1. local leaders requested an emancipation plebiscite from the state legislative assembly;
2. state deputies voted on a bill to authorize the plebiscite;
3. governor decided to veto the bill or to sign it into law;
4. plebiscite was conducted by the state electoral court with potentially affected voters;
5. state deputies voted on a bill to create the new municipality;
6. governor decided whether to veto or approve the emancipation; and

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<sup>6</sup>Refer to Table 8 for further details for municipal splitting.

7. municipality would be established in the year following the municipal elections.

The governor had two opportunities to stop the process by vetoing the bills related to the plebiscite and the creation of the new entity. However, the legislative assembly could override these vetoes, allowing the bills to become law. Consequently, state deputies held significant power in both approving and vetoing legislation during the emancipation process, as they were also responsible for voting on these bills. Lawmakers typically supported the preferences of local leaders and voters, as opposing these measures could result in negative electoral consequences for them. Therefore, a split request rejection only occurred when the Executive opposed the creation of a new municipality and there was a strong political coalition with the Legislative branch (Tomio, 2002).

In 1996, Constitutional Amendment 15 was enacted to address the rapid creation of new municipalities. This amendment required the establishment of a federal law to regulate the processes of emancipation and set a limited period for their occurrence. In practice, the amendment halted the process of municipal emancipation, as no complementary law has been enacted to regulate the creation of new municipalities to this day. Consequently, only a few municipalities were established after 2000. Some of these splits were based on processes that had already been initiated earlier; others are subjects of legal conflict and have even been deemed unconstitutional by the Brazilian Supreme Court (Acayaba, 2008; Rollsing, 2021).

### 3 Empirical strategy

In this study, we examine the creation of new municipalities in Brazil, which primarily took place in the 1990s as a means to promote fiscal decentralization to local governments. To assess the impact of territorial splitting on the local economy, we employed a difference-in-differences approach. This method is commonly used in recent literature concerning territorial reform, particularly for mergers that have occurred in developed countries (Gendźwiłł et al., 2021).

Research in this field has applied two-way fixed effects (TWFE) regression to assess the impact of territorial reforms, including those in the Brazilian context (Dahis & Szerman, 2024; Lima & Silveira Neto, 2018; Mattos, Rocha, & Arvate, 2011). However, recent literature on difference-in-differences (DiD) has shown that this regression approach raises concerns regarding the validity of the earlier findings. This bias occurs because, in addition to comparing treated and untreated (or not yet treated) units to calculate the average treatment on treated (ATT), the TWFE regression also compares two treated units that have already received the treatment (“forbidden comparisons”) (De Chaisemartin & D’Haultfoeuille, 2023; Goodman-Bacon, 2021; Roth, Sant’Anna, Bilinski, & Poe, 2023).

In recent years, new DiD estimators have been proposed to address potential heterogeneity bias in staggered treatment designs (Borusyak, Jaravel, & Spiess, 2024; de Chaisemartin



& d’Haultfoeuille, 2020; Sun & Abraham, 2021). In this type of design, a unit becomes treated once and remains treated for the duration of the analysis period. In this study, we employed the estimator developed by Callaway and Sant’Anna (2021). This approach addresses the potential bias caused by heterogeneity by estimating multiple disaggregated effects, denoted as  $ATT(g, t)$ . These represent the average treatment effects on the treated at time  $t$  for groups who were first treated at time  $g$ , where  $g \leq t$ . By doing this, we can carefully select appropriate comparisons and then aggregate them into a single average treatment effect on the treated (ATT). Moreover, we may also aggregate the  $ATT(g, t)$  by group, time, or event study to enable further analysis.

This framework relies on parallel trends to identify the average treatment effect on the treated (ATT). However, this assumption may not be valid if the pre-treatment characteristics that influence outcome dynamics are not balanced between the treatment and control groups, leading to potential selection bias. Therefore, to strengthen the credibility of the parallel trends, one may apply a parametric or semi-parametric approach to adjust for potential differences between these groups using time-invariant covariates.

Callaway and Sant’Anna (2021) suggests three approaches. The first one is the outcome regression (OR) (Heckman, Ichimura, & Todd, 1997), which models the control group’s outcomes based on their covariates, allowing us to estimate an adjustment on the treated unit’s counterfactual based on their baseline characteristics. The second method is the inverse probability weights (IPW) (Abadie, 2005), a matching method that reweights the control units to make their characteristics similar to those of the treatment group. The doubly robust (DR) (Sant’Anna & Zhao, 2020) approach combines both previous methods, providing increased robustness since the estimate is unbiased if either the propensity score model or the outcome regression model is correctly specified. Due to the observation of unstable estimations associated with the DR approach when utilizing unbalanced panel data, we decided to implement the IPW method. This choice was influenced by the considerable amount of financial data that is missing in the 1990s.

To strengthen the parallel trends assumption and minimize potential selection bias, we used only municipalities that requested for territorial split but were unsuccessful as controls. This could either be due to their requests being rejected during the emancipation process or being suspended after the implementation of the Constitutional Amendment 15/1996. We refer to these jurisdictions as “almost-treated” (Dahis & Szerman, 2024; Lima & Silveira Neto, 2018). These units are arguably more suitable as control groups since they “selected themselves” to be affected by the splitting policy. Additional information about these units is discussed further in Section 4.

## 4 Data

Since territorial splits modify municipal borders, this study uses the minimum comparable area (MCA) as the unit of observation, which refers to an area that maintains its

boundaries over two periods. For example, if Municipality A is divided to form a new Municipality B, the MCA includes both A and B. In a case where Municipalities C and D transfer areas to a new Municipality E, the MCA encompasses C, D, and E. If Municipality F has not experienced any territorial changes, it will be the only municipality in the MCA. We used Ehrl’s (2017) dataset to aggregate municipal-level into MCA-level data for the period from 1991 to 2019.

#### 4.1 Elections and political parties

Elections in Brazil take place every two years. Municipal elections are held every four years, starting from 1988, while general elections for federal and state governments occur every four years, beginning in 1990. The only exception to this schedule is the presidential election, which took place in 1989. Until 1996, the country used paper ballots for voting, and local election information was not centralized in the Supreme Electoral Court (TSE). As a result, we collected municipal data from 21 out of the 26 Regional Electoral Courts (TREs) for the 1988 and 1992 elections<sup>7</sup>. For the general elections and from the 1996 municipal elections onwards, voting information was collected from the TSE.

To assess voter engagement in local politics, we used the *turnout rate* (calculated as votes divided by the electorate), which is a commonly employed metric in this field. In Brazil, voting is mandatory for citizens over 17 years old, and failing to vote without justification can lead to a fine and certain restrictions<sup>8</sup>. Therefore, we used the *valid vote rate*, defined as valid votes divided by the total electorate, which excludes null and blank votes<sup>9</sup>, often seen as protest votes or indicators of indecision. Furthermore, as the voter base may grow with increased political engagement, this can negatively affect both turnout and valid vote rates. Therefore, we also examine the split effect on the *electorate*.

Governors and state deputies play crucial roles in the process of territorial division. This is particularly the case for state deputies, who have political motivations to support these divisions and can potentially override the governor’s veto. We included two covariates in our analysis: a dummy variable indicating whether the *mayor is part of the governor’s political coalition*, and the *share of the governor’s political coalition in the legislative assembly*.

#### 4.2 Local finance

The analysis of local financial data from 1991 to 2019, provided by the National Treasury Secretariat (STN). To ensure consistency, monetary values were adjusted to reflect the price levels of the year 2019, using the Extended National Consumer Price Index (IPCA). To

<sup>7</sup>Refer to Table 9 for further information.

<sup>8</sup>These restrictions may include limitations on obtaining a passport, securing public sector jobs, participating in government auctions, and receiving government loans.

<sup>9</sup>A blank vote happens when a voter does not select any candidates. Previously, this meant leaving the ballot unmarked. Now, on electronic voting machines, voters choose the ‘blank’ option and confirm their selection. A null vote is when a voter enters a non-existent candidate number, such as ‘00’.

account for the varying number of municipalities and different population sizes among the the minimum comparable areas (MCAs), fiscal variables were standardized as proportions of total public expenditures or revenues, or expressed in per capita terms.

To assess how municipal divisions impact the fiscal sustainability of municipalities, we utilized the *operating surplus* metric. It assesses the government’s capacity to finance daily operations through recurring revenues, offering insights into debt repayment capacity and potential for new capital investments. Additionally, we included the variable *borrowing*, which represents the flow of resources obtained through loans, to examine the impact of territorial reform on local indebtedness.

The changes in the FPM transfers were analyzed to assess local dependence on vertical transfers for fiscal sustainability. High reliance on these transfers can indicate fiscal balance issues due to the flypaper effect and rent-seeking behaviors. To evaluate the impact of new municipalities on government size, we examined *personnel expenditures* (salaries, charges, and third-party contracts) as a percentage of total current expenditures. These costs are mandatory and reflect budget rigidity, which significantly contributes to local fiscal challenges, as payroll and pension adjustments are difficult during low-revenue periods (Mendes, 2020). We also examined *tax revenues*, which indicate the government’s ability to collect money from its citizens and businesses within its jurisdiction. A decline in these revenues may suggest increased fiscal competition to attract residents and companies due to greater territorial fragmentation.

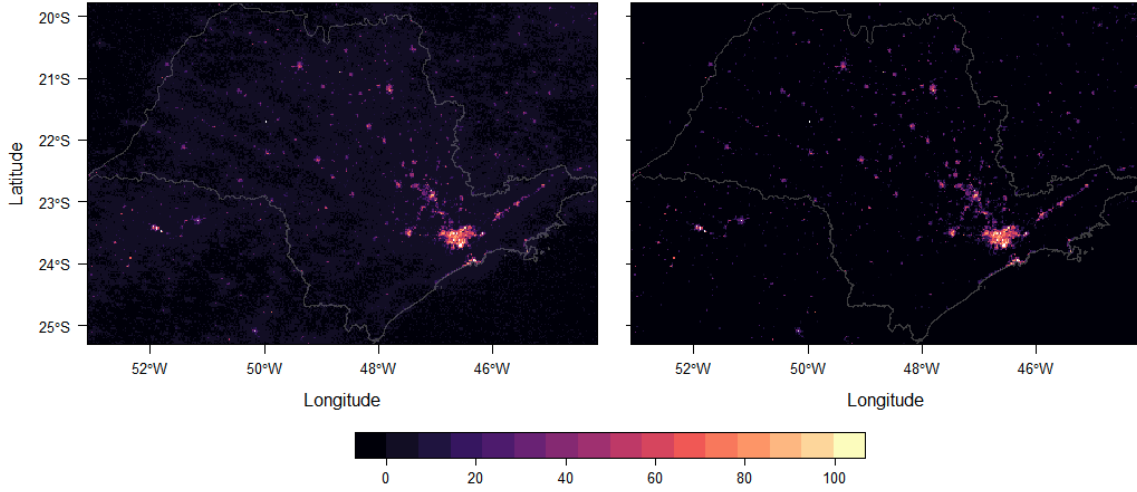
### 4.3 Night lights

To complement the financial outcome analysis and due to the lack of municipal-level GDP data in Brazil until 1997, we utilized satellite-captured nighttime lights as an indicator of economic activity (Henderson, Storeygard, & Weil, 2011). Nighttime luminosity is generally more effective in measuring economic activity in urban areas, as it reflects activities in the service and industrial sectors (Gibson, Olivia, & Boe-Gibson, 2020), compared to rural areas. In urban settings, there is a strong correlation between light and GDP (Chen & Nordhaus, 2019; Keola, Andersson, & Hall, 2015). However, in rural regions, this relationship is often weak or even negative (Gibson, Olivia, Boe-Gibson, & Li, 2019), which may not accurately capture changes in agricultural value added.

The data was harmonized by Li et al. (2020) using both the Defense Meteorological Satellite Program (DMSP) dataset (1992-2013) and the Visible Infrared Imaging Radiometer Suite (VIIRS) dataset (2012-2024). This unified dataset spans from 1992 to 2020 and includes consistent digital number (DN) values. One limitation of the DMSP portion of this dataset is its blooming effect, where light from bright areas spills into nearby darker regions, distorting the true light distribution (see Figure 2). To address measurement errors in low-light areas, researchers often concentrate on nighttime lights with DN values exceeding a specific threshold (Coetzee & Kleynhans, 2021; Omar & Ismal, 2019). In line

with this approach, we aggregated lights with a DN greater than 7 at the MCA level.

Figure 2: Comparison between the original nighttime lights and considering only DN greater than 7



Note: To the left, we have plotted the original night lights over Sao Paulo, which range from 0 (black) to 100 (light yellow). A blurring effect is noticeable in areas of high light intensity (purple), including beyond the southeastern boundary, which is adjacent to the Atlantic Ocean. On the right, we have plotted only the night lights with a digital number (DN) greater than 7.

#### 4.4 Descriptive Statistics

In Table 1, we present descriptive statistics for fiscal, political, and socioeconomic variables across three groups of MCAs for the year 1992, prior to any administrative divisions being implemented. The treated group includes MCAs that comprise both the original municipalities and the newly established jurisdictions. The almost treated group consists of municipalities that requested a territorial split but were unsuccessful in their efforts. Finally, the untreated group comprises single municipalities that did not experience any territorial reform, including those from the almost treated group.

Based on the observable variables, it is unclear whether the almost treated group is a more appropriate control group compared to the the untreated group, as many of the differences between this group are statistically significant at the 5% level, with some indicators showing even greater discrepancies. This highlights the importance of including covariates to strengthen the parallel trends assumption, suggesting that the territorial reform in Brazil was not implemented randomly.

The treated group had similar turnout and valid vote rates compared to the almost treated group. However, political engagement was significantly higher in the untreated group, with voting rates about 2% higher. The division occurred in states where the governor had slightly less political support in the legislative assembly. Moreover, being part of the mayor's coalition does not appear to have a significant influence on the emancipation process.

Table 1: MCA baseline descriptive statistics (1992)

Variables	treated	almost	diff.	untreated	diff.
<b>Political variables</b>					
Turnout (% of electorate) <sup>+</sup>	89.0	89.5	0.5	91.2	2.2***
Valid votes (% of electorate) <sup>+</sup>	76.3	75.9	-0.4	78.2	1.8***
Electorate <sup>+</sup>	25,539	38,657	13,118	17,221	-8,318
Governor's coalition in assembly (%)	25.9	27.7	1.8***	23.9	-2.0***
Mayor in governor's coalition (%)	29.8	28.2	-1.5	27.4	-2.3
<b>Financial variables</b>					
Total Surplus <sup>×</sup>	-23.6	-13.1	10.5**	-23.5	0.1
Operating Surplus <sup>×</sup>	18.5	20.8	2.3	23.9	5.4
Total Expenditures <sup>×</sup>	306.2	240.5	-65.7***	333.2	27.0**
Capital Expenditures <sup>×</sup>	60.4	47.3	-13.0***	64.1	3.8
Current Expenditures <sup>×</sup>	245.8	193.2	-52.6***	269.1	23.3**
Total Revenues <sup>×</sup>	283.2	227.4	-55.8***	311.7	28.5***
Tax Revenues <sup>×</sup>	21.3	14.9	-6.4***	18.7	-2.6
Fees <sup>×</sup>	4.1	3.0	-1.1**	3.5	-0.6*
Property Tax (IPTU) <sup>×</sup>	4.4	2.8	-1.6**	3.7	-0.7
Services Tax (ISSQN) <sup>×</sup>	5.9	4.4	-1.5	5.3	-0.7
Total Transfers <sup>×</sup>	217.7	187.8	-29.9***	258.8	41.1***
VAT Share (ICMS) <sup>×</sup>	87.6	65.5	-22.0***	83.4	-4.2
Municipal Fund (FPM) <sup>×</sup>	114.7	100.0	-14.7***	150.2	35.5***
Capital Transfers <sup>×</sup>	12.3	10.8	-1.5	12.2	-0.1
Borrowing	3.4	1.5	-1.9***	1.9	-1.5***
<b>Socioeconomic variables</b>					
Nighttime luminosity <sup>×</sup>	23.5	25.0	1.5	24.1	0.7
Population	52,730	75,603	22,873	32,726	-20,004**
Income <sup>×</sup>	736.1	681.1	-55.0**	717.1	-19.0
Gini Index (×100)	55.0	53.9	-1.1***	53.3	-1.7***
Rural households (%)	45.3	44.7	-0.6	43.0	-2.3**
Literacy (%)	76.9	72.2	-4.7***	76.6	-0.3
Working age population (%)	59.0	58.0	-1.0***	59.4	0.4*
Age	25.4	25.4	-0.0	26.2	0.7***
Observations	621	413		2,936	

Notes: <sup>×</sup> per capita. The table presents average statistics for treated, almost treated, and untreated groups in states with recorded failed split requests. In the “diff.” columns, we observe the differences between the treated group and the other groups, along with the significance levels of these differences: \* $p < 10\%$ , \*\* $p < 5\%$ , \*\*\* $p < 1\%$ . The plus sign (+) indicates that we used 1988 electoral data, as the 1992 municipal elections already determined the officials for the new municipality.

In general, the MCAs affected by the territorial reform already had a larger government size in terms of per capita spending and revenues. Moreover, while they have a smaller population size, their income levels, inequality rates, literacy rates, and working population percentages are slightly higher compared to the group that was almost treated.

## 5 Results

We utilized Callaway and Sant’Anna’s (2021) difference-in-differences estimator with IPW matching method (Abadie, 2005) to assess the impact of territorial splits on local voter engagement, economic activity, and fiscal sustainability.

For our analysis, we employed three model specifications regarding the control groups. In Model I, we included all minimum comparable areas (MCAs) that did not undergo

any administrative divisions between 1991 and 2019. Model II, which is our preferred specification, focuses solely on MCAs that requested a territorial split but were unsuccessful (almost treated) in the states from which we gathered this information (see Table 10). Model III takes a stricter approach by including only states that did not see an increase of more than 25% in the number of municipalities as controls. This is to address a potential violation of the Stable Unit Treatment Value Assumption (SUTVA), as the establishment of new local governments redistributes the FPM transfers among municipalities within the same state (Subsection 2.1).

## 5.1 Voter engagement

We estimated the effects on votes separately for general and municipal elections, as these involve different political positions (mayor and local councilmen  $\times$  governor/president and state/federal deputies), and they have distinct historical levels of turnout and valid votes. Elections for a new municipality occur 2 to 3 months before the municipality is officially established. Consequently, the electoral process is already influenced by the municipal split, as voters are casting their votes for their officials. Therefore, for municipal elections, the voting baseline is set at four years prior to the election, while for general elections, it is two years before.

The results indicate an increase in political engagement following the administrative division, which aligns with the rational choice theory, as the likelihood of a vote being pivotal increases with a smaller electorate. Interestingly, the number of votes cast in general elections also increased, despite the fact that the decisive nature of these votes remained unchanged, as their weight was the same at both the state and federal levels. This observation may imply the development of voting habits or suggest that voters experienced emotional benefits, such as a sense of duty, social approval, and personal satisfaction (Riker & Ordeshook, 1968). The turnout rate increases by approximately 1.5 percentage points, although the rise in valid votes is only significant at the 10% level or non-significant. This could be attributed to an increased social pressure to vote, which did not reduce the electorate’s indecisiveness regarding the candidates. Consequently, the share of blank and null votes may have increased, highlighting the gap between the effects on turnout and valid votes, mainly in the municipal election.

These increases appear to be temporary. An analysis of the event study effects (see Figure 6) shows that the impact on voter turnout is both positive and significant during the first three municipal elections and the first three general elections, extending up to 10 years after the municipal split. Voter engagement tends to decrease after that as the effects become non-significant. The dynamic effects on valid votes are similar but lower, and are mostly significant only at the 10% level, becoming insignificant after 6 years.

Additionally, there was no increase in the electorate. While voting is mandatory in Brazil, it is optional for youth aged 16 and 17, as well as for illiterates. The findings

Table 2: Municipal split effects on electoral variables

Outcome variables	(I)	(II)	(III)
<b>Municipal elections</b>			
Turnout rate (%)	1.14 (0.7)	1.45*** (0.6)	2.14*** (0.6)
Valid votes rate (%)	1.41* (0.8)	0.97 (0.8)	2.09* (1.1)
log(Electorate) ( $\times 100$ )	-3.11 (3.9)	2.39 (3.6)	-1.48 (6.2)
<b>General elections</b>			
Turnout rate (%)	1.30 (0.7)	1.66** (0.6)	0.98 (0.6)
Valid votes rate (%)	1.33* (0.7)	1.47* (0.8)	1.52* (0.8)
log(Electorate) ( $\times 100$ )	-4.21 (3.4)	2.93 (3.7)	-1.11 (6.7)
<b>Specifications</b>			
Almost treated as control	No	Yes	Yes
Only weakly affected states	No	No	Yes
Observations	3,557	1,034	557

Notes: \* $p < 10\%$ , \*\* $p < 5\%$ , \*\*\* $p < 1\%$ . Bootstrapped standard errors in parentheses.

indicate that these groups did not become more engaged, as there was no growth in the number of eligible voters.

## 5.2 Economic activity

The findings indicate that municipal splits do not significantly impact nighttime luminosity, which serves as a proxy for economic activity, particularly for the industrial and service sectors. In Table 3, we present the results using the complete dataset of night lights (full), as well as a refined analysis that focuses only on night lights with a digital number greater than 7 ( $DN > 7$ ) to account for blooming effects (Subsection 4.3). In both cases, the effect is statistically null, regardless of the model used.

Table 3: Municipal split effects on nighttime luminosity

Outcome variables	(I)	(II)	(III)
Night light intensity ( $DN > 7$ ) <sup>×</sup>	-1.02 (1.5)	1.42 (1.5)	2.74 (3.1)
Night light intensity (full) <sup>×</sup>	0.38 (1.7)	2.73 (1.6)	5.01 (3.8)
<b>Specifications</b>			
Almost treated as control	No	Yes	Yes
Only weakly affected states	No	No	Yes
Observations	3,557	1,034	557

Notes: \* $p < 10\%$ , \*\* $p < 5\%$ , \*\*\* $p < 1\%$ . Bootstrapped standard errors in parenthesis. <sup>×</sup>per capita values.

Upon analyzing the dynamic effects (see Figure 3), we observe a positive effect that is significant at the 10% level immediately following the establishment of the new municipality. However, this effect gradually diminishes and becomes negligible in the following years

when we analyze the night lights with NC over 7. When we also consider low-intensity nighttime luminosity, the initial effects are somewhat higher, but they also become statistically insignificant after a few years at a slower pace. Therefore, while the reform does have some impact on local economic activity, this impact is relatively small and short-lived.

### 5.3 Fiscal sustainability

Table 4 presents the effects of municipal splits on financial outcome variables, organized into fiscal balance, expenditures, and revenues, with additional subcategories under each. Notably, the most significant impact of this policy is observed in FPM transfers. This finding reinforces the notion that the creation of new municipalities was a strategy for increasing their share of federal transfer resources (Boueri et al., 2013; Bremaeker, 1993; Tomio, 2002), suggesting the presence of a common pool problem. The effect is approximately R\$150 per capita, resulting in an increase of 4.45 percentage points in the share of this transfer within total revenues. This finding is similar to those reported by Dahis and Szerman (2024). This suggests that the affected MCAs became more reliant on federal transfers, indicating a greater vertical fiscal imbalance in local governments. The event study on FPM transfers reveals a trend of increasing effects over time (Figure 4). Specifically, the affected AMCs began to receive a larger proportion of resources as the amount of FPM funding grew as a result of the country’s economic development and increases in the percentage of federal revenues distributed to subnational governments. Moreover, this increase in FPM transfers seems to correspond with a rise in current expenditures that finance the daily operations of local government, thereby expanding its scope.

In line with Lima and Silveira Neto (2018) and Dahis and Szerman (2024), our findings show a positive impact on capital expenditures of approximately R\$ 44.77 per capita, which may have slightly increased its share of total expenditures (not statistically significant). When analyzing the event studies, we observe a consistent positive effect on per capita income that persists for up to 10 years after the split. It is essential to highlight that the dynamic effects on capital expenditure patterns closely resemble those of capital transfers, which are mandatory grants used for investments. This suggests that intergovernmental transfers made through agreements play a significant role in driving local investments, even in the context of substantial increases in local revenues. However, one exception to this trend is the year of establishment, which shows no significant impact on capital transfers but is associated with a considerable rise in capital expenditures. This discrepancy likely arises from the entry costs (Lima & Silveira Neto, 2018) and the lack of intergovernmental agreements for the newly formed jurisdictions in the establishment year.

The VAT share (ICMS) is a state grant that is distributed among municipalities primarily based on their value added. As a result, the non-significant impact on this grant further supports the findings related to nighttime luminosity, indicating that the creation of a new municipality did not significantly affect economic activity.



Table 4: Municipal split effects on public finance

Outcome variables	(I)	(II)	(III)
<b>Fiscal balance</b>			
Total Surplus <sup>×</sup>	21.03 (15.8)	38.05** (18.1)	51.11* (25.9)
Operating Surplus <sup>×</sup>	-5.34 (9.8)	58.61*** (17.0)	71.07*** (24.9)
<b>Expenditures</b>			
Capital Expenditure <sup>×</sup>	40.95*** (13.6)	44.57*** (11.3)	47.27*** (15.3)
↳ (% of Total Expenditure)	1.55* (0.8)	1.26 (0.8)	2.09* (1.2)
Current Expenditure <sup>×</sup>	65.22** (30.2)	143.95*** (33.2)	191.31*** (48.4)
<b>Revenues</b>			
Tax Revenues			
Fees <sup>×</sup>	0.10 (1.6)	0.72 (1.4)	2.61 (3.0)
Property Tax (IPTU) <sup>×</sup>	0.51 (4.6)	2.57 (4.1)	5.91 (9.1)
Services Tax (ISSQN) <sup>×</sup>	-7.97 (6.6)	-5.41 (3.5)	-7.59 (5.6)
Transfers			
VAT Share (ICMS) <sup>×</sup>	-9.89 (14.9)	5.97 (17.3)	35.15 (31.0)
Municipal Fund (FPM) <sup>×</sup>	80.36*** (15.4)	149.81*** (12.7)	170.92*** (22.8)
↳ (% of Total Revenue)	4.88*** (1.1)	4.45*** (0.9)	5.22*** (1.3)
Capital Transfers <sup>×</sup>	17.56*** (5.9)	24.72*** (4.7)	25.41*** (7.4)
Borrowing <sup>×</sup>	0.50 (2.9)	1.65 (1.2)	3.29 (1.9)
<b>Specifications</b>			
Almost treated as control	No	Yes	Yes
Only weakly affected states	No	No	Yes
Observations	3,557	1,034	557

Notes: \* $p < 10\%$ , \*\* $p < 5\%$ , \*\*\* $p < 1\%$ . Bootstrapped standard errors in parenthesis. <sup>×</sup>per capita values.

The results indicate that greater territorial fragmentation did not significantly impact tax revenues, which primarily derive from the services sector, real estate properties, and fees. Since the economic activity did not improve as a result of the reform, it is likely that local governments did not adjust their tax rates to attract factors of production such as labor and capital. Additionally, there was no significant change in population size, suggesting that individuals did not "vote with their feet" (Tiebout, 1956). This may be due to a lack of incentives, such as lower tax rates or improved public services.

The fiscal balance improved as a result of territorial reforms, which led to increased financial surpluses at the local level. This improvement occurred because the rise in transfer revenues outpaced the growth in expenditures. Furthermore, local indebtedness was not significantly affected by the municipal split, since no additional borrowings were incurred. It is important to highlight that during the 1990s, when many new municipalities were formed, subnational indebtedness was already high, prompting the federal government to

implement measures to prevent further borrowing. As a result, it remains uncertain whether this positive outcome would have continued in a scenario without restrictions on credit operations.

The results indicate that the establishment of municipalities in Brazil has led to a greater vertical fiscal imbalance, characterized by a considerable increase in the FPM and capital transfers. This expansion in local government size is reflected by the rise of both revenues and expenditures. While the affected areas have improved their fiscal balances and increased their spending, including investments, there has been no observed impact on economic growth. This situation raises concerns about the effectiveness and efficiency of resource allocation after the reform, suggesting the occurrence of flypaper effect (Gramlich, 1969). This phenomenon occurs when an increase in intergovernmental grants overstimulates local public spending compared to an equivalent rise in own revenues. This effect has been widely observed in Brazil (Cossio & Carvalho, 2001; Guedes & Gasparini, 2007; Sakurai, 2013), including instances where public resources are captured by political agents and interest groups (Brollo, Nannicini, Perotti, & Tabellini, 2013). It emphasizes the challenges in ensuring that increased financial transfers result in real improvements in local economies.

## 5.4 Robustness check

For our robustness check, we assessed the stable unit treatment value assumption (SUTVA) and applied other recent difference-in-differences (DiD) estimators for both binary and staggered treatment designs.

In our first robustness check, we limited our sample to states that had only a small increase in the number of new municipalities (up to 25%). This approach was intended to reduce the impact of the decrease in FPM transfers for untreated jurisdictions that served as controls. The results from this analysis were presented as Model III, along with the findings from our preferred model discussed in the previous subsections. The effects observed in both models are comparable. Therefore, while we cannot completely rule out the possibility of violating the SUTVA, the impact on the control group appears to be minimal.

The results using the estimators from Sun and Abraham (2021) and Borusyak et al. (2024) are presented along with the event study effects in Appendix B.2. For comparison, we also included the two-way fixed effect (TWFE) estimates, as these were used in previous studies. In general, the estimates from the methods are similar, demonstrating the robustness of the results. However, some confidence intervals differ significantly. Both Borusyak et al. (2024) and Sun and Abraham (2021) rely on the parallel trends assumption and make linear adjustments for covariates. However, Borusyak et al. (2024) applies this assumption to all pre-treatment periods, which can enhance efficiency but may also lead to larger biases if the parallel trends assumption is only approximately valid (Roth et al., 2023). In contrast, Callaway and Sant’Anna (2021) uses a weaker assumption of conditional parallel trends and considers more flexible adjustments for covariates, including outcome

regression, inverse probability weights, and doubly robust approaches. If the estimates from these three methods differ significantly, it suggests that the parallel trends assumption used by Borusyak et al. (2024) and Sun and Abraham (2021) may be violated (De Chaisemartin & D’Haultfœuille, 2023).

## 6 Conclusion

This study provides a comprehensive analysis of the impacts of territorial fragmentation on local governance and fiscal sustainability in Brazil. By analyzing data from 1988 to 2019, covering 621 areas affected by municipal splits across nineteen Brazilian states, we aimed to shed light on the broader implications of decentralization on political engagement among constituents and how they impact the fiscal sustainability of local governments.

Our findings reveal that political engagement initially increases following administrative divisions, as evidenced by a rise in voter turnout rates. However, this effect is temporary and does not translate into sustained voter participation over the long term. Moreover, there is no significant overall increase in the electorate. This suggests that while territorial fragmentation may temporarily boost political engagement, it does not lead to lasting changes in voter behavior.

On the fiscal side, the fragmentation of territories significantly affects public finance, particularly through increased transfers from the Municipal Participation Fund (FPM). This results in a rise in both current and capital expenditures, highlighting a greater reliance on intergovernmental transfers for the provision of public services. However, this increased financial support does not necessarily foster positive economic growth, indicating potential inefficiencies associated with decentralization. The reliance on vertical transfers raises concerns about the long-term fiscal health of newly formed municipalities, as they become more dependent on external funding sources.

While the study provides valuable insights into the impacts of territorial fragmentation, it has some limitations that policymakers should consider when interpreting the results. First, the number of registered voters may be overestimated because it can include individuals who have passed away or duplicates of individuals who obtained a new electoral ID in another municipality. As a result, the actual voter base might be smaller, leading to an underestimation of the effect on turnout rate. While this does not change the initial positive impact, it could influence the long-term effects, which could also be positive and significant. Second, the reliance on proxy data for economic activity, such as nighttime luminosity, may not fully capture all aspects of local economic performance, mainly in the countryside. Third, the findings are specific to Brazil and may not be directly applicable to other countries with different political, economic, and social contexts. These limitations suggest that one should also consider the need for further research to address these gaps and to explore the broader implications of decentralization in diverse settings. This will help ensure that policy decisions are informed by a comprehensive understanding of the

potential benefits and challenges associated with territorial reforms.

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## Appendices

### A.1 FPM sharing rules

Table 5: FPM Capital and Reserve: Sharing criteria

Population share in FPM Capital/Reserve	Factor A	Inverse of state per capita income	Factor B
up to 2%	2.0	up to 0.0045	0.4
2% – 2.5%	2.5	0.0045 – 0.0055	0.5
2.5% – 3.0%	3.0	0.0055 – 0.0065	0.6
3.0% – 3.5%	3.5	0.0065 – 0.0075	0.7
3.5% – 4.0%	4.0	0.0075 – 0.0085	0.8
4.0% – 4.5%	4.5	0.0085 – 0.0095	0.9
above 4.5%	5.0	0.0095 – 0.0110	1.0
		0.0110 – 0.0130	1.2
		0.0130 – 0.0150	1.4
		0.0150 – 0.0170	1.6
		0.0170 – 0.0190	1.8
		0.0190 – 0.0220	2.0
		above 0.0220	2.5

Source: Law 5,172/1966. Notes: The FPM Capital/Reserve coefficient for a municipality is determined by multiplying two factors (A and B) regarding the population share of the municipality's FPM group and the inverse of the per capita income of its state. Municipalities with larger populations and lower state per capita incomes receive more resources from the FPM Capital/Reserve.



Table 6: FPM Interior: Share of each state in the total distribution

State	Share of FPM Interior
<b>North</b>	
Acre	0.3%
Amapa	0.1%
Amazonas	1.3%
Para	3.3%
Rondonia	0.8%
Roraima	0.1%
Tocantins	1.3%
<b>Northeast</b>	
Alagoas	2.1%
Bahia	9.3%
Ceara	4.6%
Maranhao	4.0%
Paraiba	3.2%
Pernambuco	4.8%
Piaui	2.4%
Rio Grande do Norte	2.4%
Sergipe	1.3%
<b>Southeast</b>	
Espirito Santo	1.8%
Minas Gerais	14.2%
Rio de Janeiro	2.7%
Sao Paulo	14.3%
<b>South</b>	
Parana	7.3%
Rio Grande do Sul	7.3%
Santa Catarina	4.2%
<b>Central-West</b>	
Goiias	3.7%
Mato Grosso	1.9%
Mato Grosso do Sul	1.5%

Source: Complementary Law 62/1989 and TCU Resolution 242/1990.

Notes: These percentages represent fixed shares of the FPM Interior allocated to the states before distribution among municipalities within each state. These values have remained unchanged since their establishment.

Table 7: FPM Interior: Municipal coefficients by population size

Population size	Coefficient	Population size	Coefficient
up to 10,188	0.6	50,941 – 61,128	2.2
10,189 – 13,584	0.8	61,129 – 71,316	2.4
13,585 – 16,980	1.0	71,317 – 81,504	2.6
16,981 – 23,772	1.2	81,505 – 91,692	2.8
23,773 – 30,564	1.4	91,693 – 101,880	3.0
30,565 – 37,356	1.6	101,881 – 115,464	3.2
37,357 – 44,148	1.8	115,465 – 129,048	3.4
44,149 – 50,940	2.0	129,049 – 142,632	3.6

Source: Decree-Law 1881/1981.

## Appendix B Splitting criteria

Table 8: Minimum necessary criteria for territorial emancipation by state

State	Population/ Electorate*	District age	Share of revenue	Distance from seat	Urban buildings
<b>Brazil (before 1988)</b>	10,000 or 0.5% of state	–	5/1,000	–	200
<b>North</b>					
Acre	1,500	–	2/1,000	–	50
Amapa	948	–	–	–	–
Amazonas	965	–	–	–	–
Para	5,000	–	–	–	200
Rondonia	6,155	–	–	–	150
Roraima	2,471	–	–	–	100
Tocantins	1,200	–	0.3/1,000	–	50
<b>Northeast</b>					
Alagoas	5,500	–	1/1,000	–	–
Bahia	8,000	–	–	–	–
Ceara	10,213	5 years	10/1,000	–	400
Maranhao	1,000*	–	–	–	200
Paraiba	2,000	–	–	–	120
Pernambuco	10,000	–	–	–	300
Piaui	4,000	–	–	–	100
Rio Grande do Norte	2,558	–	–	–	–
Sergipe	6,000	–	3/1,000	–	300
<b>Southeast</b>					
Espirito Santo	8,600	–	2.5/1,000	–	200
Minas Gerais	2,000*	–	1.5/1,000	–	400
Rio de Janeiro	6,393	–	5/1,000	–	400
Sao Paulo	1,000*	2 years	–	3 km	–
<b>South</b>					
Parana	5,000	–	–	–	100
Rio Grande do Sul	1,800*	–	–	–	150
Santa Catarina	5,000	5 years	–	5 km	200
<b>Central-West</b>					
Goiias	2,000	–	0.7/1,000	6 km	133
Mato Grosso	4,000	–	–	–	200
Mato Grosso do Sul	5,781	–	3/1,000	–	–

Sources: Tomio (2002), Complementary Law 1/1967, and states' complementary laws. Notes: Until 1988, the minimum population size required for a new municipality was either 10,000 residents or 0.5% of its state population, whichever was lower. In some states, the number of eligible voters was used instead of the total population as the primary criterion for dividing municipalities. These cases are marked with an asterisk (\*). The horizontal lines (–) indicate that the corresponding criterion was not applied in the state.

## B.1 Detailed description of data sources

Table 9: Availability of the electorate and turnout data for 1988 and 1992 municipal elections

State	1988	1992	Sources
<b>Brazil (all states)</b>	19	21	
<b>North</b>			
Acre			
Amapa	×	×	Provided by TRE-AP upon request.
Amazonas	×	×	Provided by TRE-AM upon request.
Para	×	×	Provided by TRE-PA upon request.
Rondonia	•	•	Provided by TRE-RO upon request.
Roraima			
Tocantins			
<b>Northeast</b>			
Alagoas	•		Found at TRE-AL website (tre-al.jus.br).
Bahia		×	Provided by TRE-BA upon request.
Ceara	×	×	Provided by TRE-CE upon request.
Maranhao	×	×	Found at TRE-MA website (tre-ma.jus.br).
Peraiba	×	×	Found at TRE-PB website (tre-pb.jus.br).
Pernambuco	×	×	Provided by TRE-PE upon request.
Piaui	×	×	Provided by TRE-PI upon request.
Rio Grande do Norte	×	×	Provided by TRE-RN upon request.
Sergipe			
<b>Southeast</b>			
Espírito Santo	×	×	Found at 15th Electoral Museums Spring (tre-rn.jus.br).
Minas Gerais	×	×	Provided by TRE-MG upon request.
Rio de Janeiro		×	Found at TRE-RJ website (tre-rj.jus.br).
São Paulo	×	×	Found at SEADE website (produtos.seade.gov.br).
<b>South</b>			
Paraná	×	×	Provided by TRE-PR upon request.
Rio Grande do Sul	×	×	Provided by TRE-RS upon request.
Santa Catarina	×	×	Found at TRE-RS website (tre-sc.jus.br).
<b>Central-West</b>			
Goiás		×	Found at TRE-GO website (apps.tre-go.jus.br).
Mato Grosso	×	×	Found at 15th Electoral Museums Spring (tre-rn.jus.br).
Mato Grosso do Sul	×	×	Found at TRE-MS website (tre-ms.jus.br).

Notes: × both electorate and turnout data available. • missing only electorate data. For states with missing electorate data, we assumed that 1988 (1992) potential voters was 5% (2%) lower than 1989 (1994) general election, respectively. This percentage was determined by comparing the electorates of municipalities with no missing data for 1988/1989 and 1992/1994.

Table 10: Availability of failed split requests data

State	Sources
<b>North</b>	
Amapa	Decrees of the Legislative Assembly of Amapa (ALEAP) found at Leis Municipais website (leismunicipais.com.br).
Para	Plebiscite results found at Regional Electoral Court of Para's (TRE-PA) archives (atom.tre-pa.jus.br).
Rondonia	List of districts/areas that tried to emancipate received from the Regional Electoral Court of Rondonia (TRE-RO) upon request.
Roraima	List of districts/areas that tried to emancipate received from the Regional Electoral Court of Roraima (TRE-RR) upon request.
Tocantins	List of districts/areas that tried to emancipate received from the Legislative Assembly of Tocantins (ALETO) upon request.
<b>Northeast</b>	
Bahia	List of plebiscites suspended by the Regional Electoral Court of Bahia (TRE-BA), provided by Tomio (2002).
Maranhao	List of districts/areas that tried to emancipate received from the Regional Electoral Court of Maranhao (TRE-MA) upon request.
Pernambuco	List of emancipation requests in the Legislative Assembly of Pernambuco (ALEPE), provided by Tomio (2002).
Piaui	List of districts/areas that tried to emancipate received from the Regional Electoral Court of Piaui (TRE-PI) upon request.
<b>Southeast</b>	
Espírito Santo	Bills authorizing plebiscites found at Legislative Assembly of Espirito Santo (ALES) website (al.es.gov.br).
Minas Gerais	Requests for emancipation found at Legislative Assembly of Minas Gerais (ALMG) website (almg.gov.br).
Rio de Janeiro	List of plebiscites found at Regional Electoral Court of Rio de Janeiro (TRE-RJ) website (tre-rj.jus.br).
São Paulo	Resolutions authorizing plebiscites found at Legislative Assembly of São Paulo website (al.sp.gov.br).
<b>South</b>	
Paraná	Resolutions authorizing emancipation plebiscites at Legislative Assembly of Parana (ALEP) website (assembleia.pr.leg.br).
Rio Grande do Sul	List of rejected emancipation requests in the Legislative Assembly of Rio Grande do Sul (ALRS), provided by Tomio (2002).
Santa Catarina	List of rejected emancipation requests in the Legislative Assembly Santa Catarina (ALESC), provided by Tomio (2002).
<b>Central-West</b>	
Goiás	Plebiscite resolutions found at Regional Electoral Court of Goiás (TRE-GO) archives (acervo.tre-go.jus.br) and list of districts/areas that tried to emancipate received from the Legislative Assembly of Goiás (ALEGO) upon request.
Mato Grosso	List of districts/areas that tried to emancipate received from the Legislative Assembly of Mato Grosso (ALMT) upon request.
Mato Grosso do Sul	Plebiscite resolutions found at Regional Electoral Court of Mato Grosso do Sul's (TRE-MS) archives (atom.tre-ms.jus.br) and list of districts/areas that tried to emancipate received from the Legislative Assembly of Mato Grosso do Sul (ALEMS) upon request.

## B.2 Event study estimates

Figure 3: Effects on economic activity

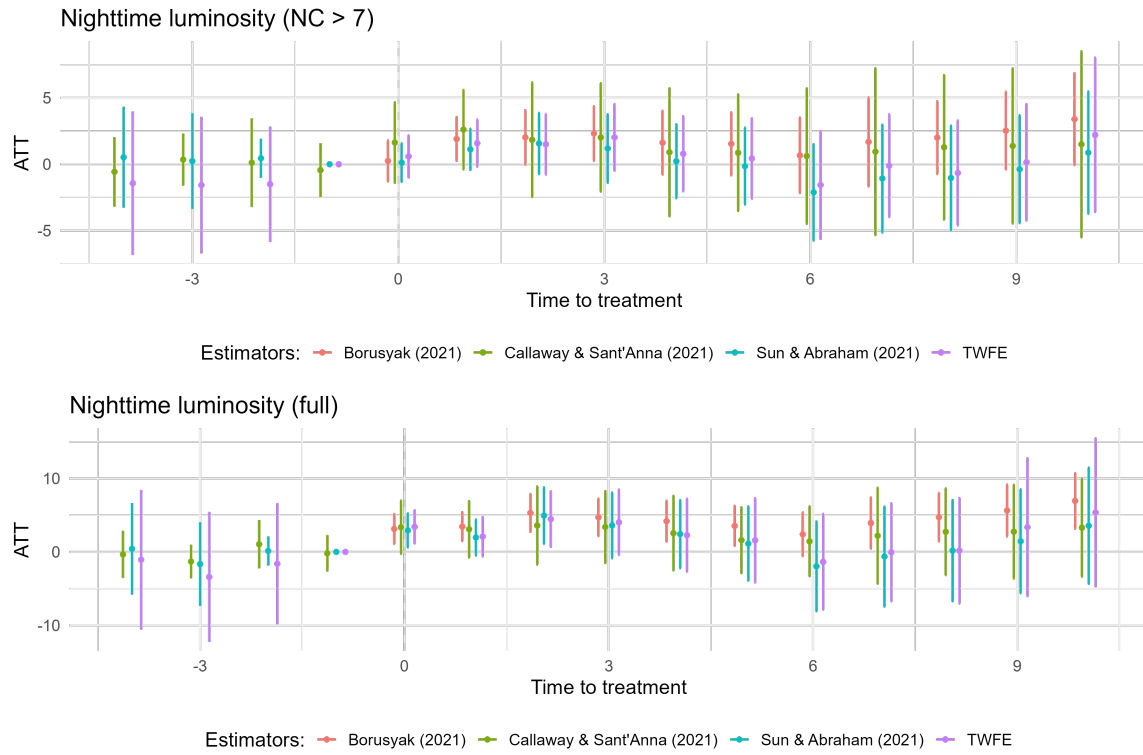


Figure 4: Effects on local public finance (part 1)

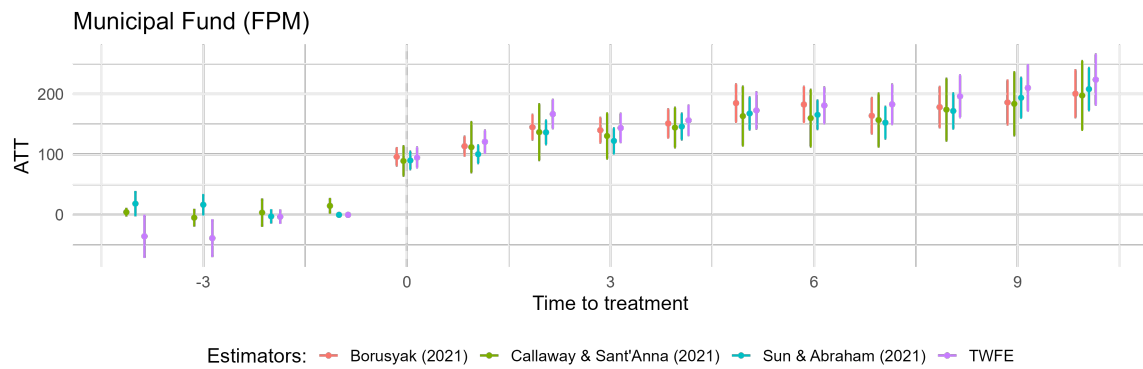
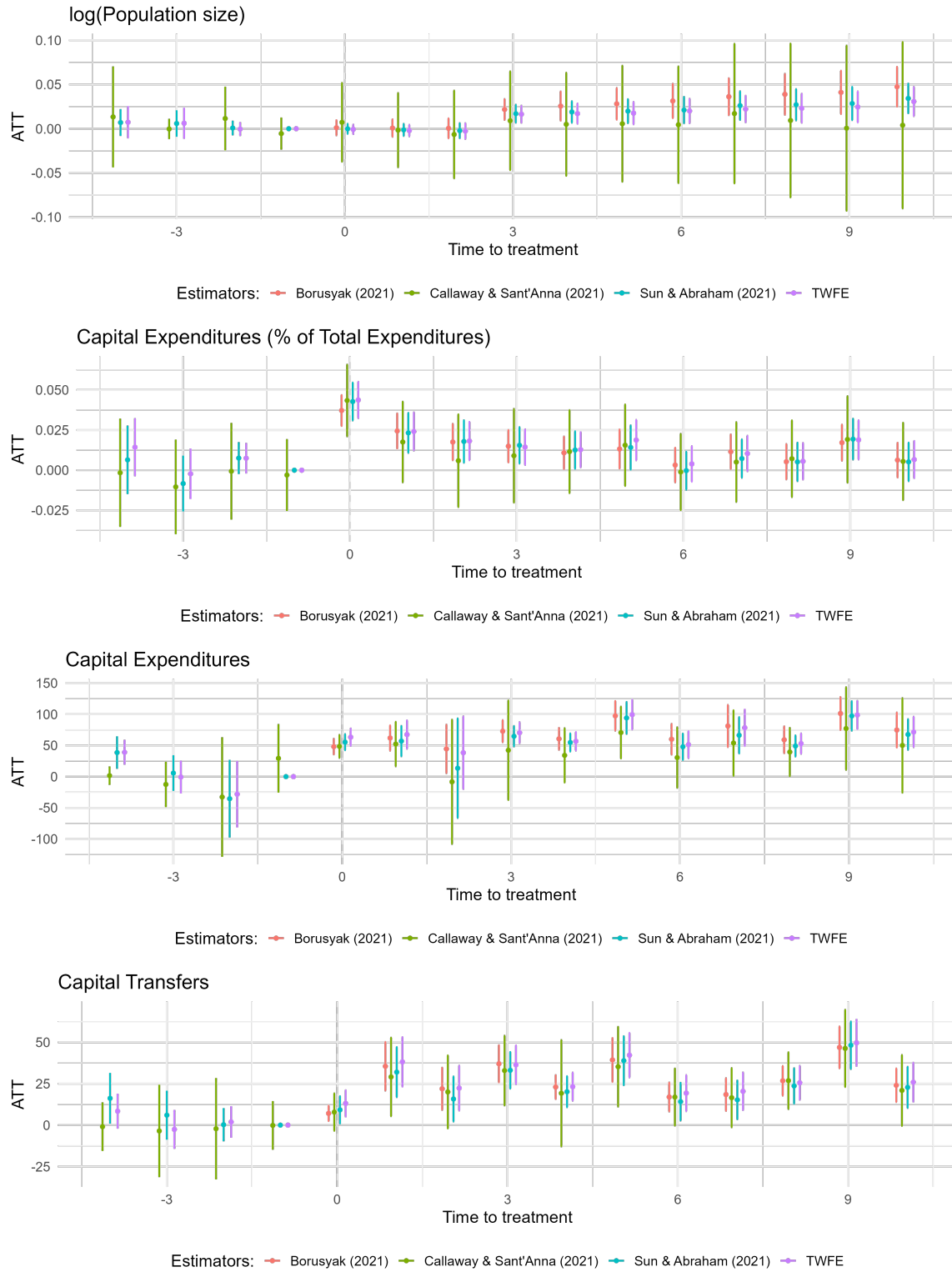


Figure 5: Effects on local public finance (part 2)



Note: the confidence intervals are at a 95% confidence level.

Figure 6: Effects on voter engagement



Note: the confidence intervals are at a 95% confidence level.