

# PARA ONDE VÃO AS EMENDAS? ALOCAÇÃO DE EMENDAS ORÇAMENTÁRIAS E DISTRIBUTIVISMO NO BRASIL

Política multinivel y territorio en América Latina

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*Where does the pork-barrel go?  
Budgetary amendments allocation in Brazilian municipalities*

**Abstract**

Pork-barreling is a popular practice among politicians. A lot has been said about the effects of pork on political outcomes, but little is known about its allocation. Scholars argue that either electoral connection (AMES, 2003; CARVALHO, 2003), political alignment (BAER-LOCHER; SCHNEIDER, 2021; DENEMARK, 2000; VENTURA, 2021), or local constituency demand (BAIÃO; COUTO; OLIVEIRA, 2020; AUYERO, 2000; AMES; PEREIRA; RENNO, 2011). Nonetheless, under the same institutional framework, the incentives for allocation among politicians appear to differ. In this sense, I ask how pork is distributed and what are criteria used in the allocation of this resource. Leveraging data from budgetary amendments to Brazilian municipalities between 2007 to 2014, I apply an empirical strategy based on spatial and observational statistics to answer the research questions. The results suggest that although with some importance, local vulnerability has little association with a higher proportion of pork received by municipalities; the electoral connection has a lot to do with the proportion of pork monies allocated, but it is not possible to say the same in relation to the political alignment. **Keywords:** Pork barrel, federal resource allocation, subnational politics, budgetary amendments, distributive politics.

## 1 Introduction

Pork barrel is a popular practice among legislators in many democracies around the world. Around 70% of Brazilian Congresspeople believe that pork is a powerful tool for electoral success (Power and Zucco, 2011). In Australia, \$ 2,8 million are allocated for 11 projects seeking reelection purposes by the Coalition cabinet<sup>2</sup>. In United States, \$4,7 billion were allocated to Michigan's spending for infrastructure<sup>3</sup>. Meanwhile in Spain, the central government

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<sup>2</sup>"How \$2.8 billion of your money is spent — it grossly favours Coalition seats". Available at <<https://www.smh.com.au/interactive/2021/electorates-government-grants/index.html>>. Access 29 June 2022.

<sup>3</sup>"Whitmer signs \$4.7 billion supplemental spending plan for infrastructure, housing". Available at <<https://eu.detroitnews.com/story/news/local/michigan/2022/03/30/michigan-governor-gretchen-whitmer-signs-spending-plan-targeting-infrastructure/7207071001/>>. Access 29 June 2022.

allocated 2,8 millones of euros to the Basque Country as payment for support on the independentist basque party on the aprovement of the Federal Budget<sup>4</sup>.

Much has been said about its effects on voting behaviour and political support, but little agreement has been made on its drivers and local distribution. If legislators were universalists, this resource would be distributed equally among all represented units. Recent subnational research findings suggest that public goods are unevenly distributed within countries (LUNA; SOIFER, 2017; GIRAUDY; MONCADA; SNYDER, 2019; GIRAUDY; PRIBBLE, 2020; HARBERS; STEELE, 2020) and so is pork, by nature - as it is a non-programmatic and geographically determined distribution of federal resources (STOKES; DUNNING; NAZARENO, 2014).

Several pieces of evidence suggest that there is an unequal distribution of this resource and a tendency of concentration in some locations, either by electoral connection criteria (AMES, 2003; CARVALHO, 2003), political alignment (BAERLOCHER; SCHNEIDER, 2021; DENEMARK, 2000; VENTURA, 2021), or local constituency demand (AUYERO, 2000; AMES; PEREIRA; RENNO, 2011). In this sense, how its allocation happens among subnational units and which criteria matter to doing so? In this paper, I aim to analyse how congresspeople allocate pork-barrel resources and while doing so they made it uniformly or whether they take into account the level of local vulnerability, electoral support, or political alignment issues. The results suggest that although with some importance, local vulnerability has little association with a higher proportion of pork received by municipalities; the electoral connection has a lot to do with the proportion of pork monies allocated, but it is not possible to say the same in relation to the political alignment.

To do so, I use an empirical strategy that combines descriptive, multivariate and spatial statistics to examine a database created from secondary sources (IBGE, SICONV, CD, SF and TSE). To understand the distribution of tax amendments throughout the national territory, I use descriptive statistics and representation on maps. The results suggest the prevalence of a pattern of concentration of budget amendments within the federation units. On the other hand, to understand the relationship between this allocation pattern and the proposed criteria, I use Ordinary Least Squares (OLS) models and Spatial Error Model (SEM) regressions to encompass the spatial nature of the dependent variable. The findings indicate

The remaining of the paper is divided as follows. In the next section,

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<sup>4</sup>"Sánchez paga a Bildu los 28 primeros millones por su apoyo a los Presupuestos". Available at: <<https://www.eldebate.com/espana/20211119/sanchez-paga-bildu-28-millones-apoyo-presupuestos-seremos-insaciables.html>>. Access 29 June 2022.

I analyse the institutional incentives that guides to distributivism in the legislative arena. I then point out the characteristics that affect legislative behaviour – with an emphasis on municipal vulnerability, electoral distribution and political connections. This is followed by the institutional framework. In the fifth section, I present the data and methods, followed by the results. Finally, I present the main conclusions and discussion of the findings.

## **2 Redistributivism, electoral gains, and political alignment shaping pork-barrel allocation.**

The allocation of public resources is always a concern for both public opinion and political scientists, and it would not be different with pork-barrel monies. Although being legal, the practice of pork barrelling has been demonised due to its allegedly inefficient spending (Shesple and Wringast, 1981) that brings costs to all electorate despite only benefiting part of it (Baton, 1991), and its possible usage in the construction of clientelist and corruption nets (SODRÉ; ALVES, 2010). If politics is about "who gets what, where and how" (LASWELL, 1936), the concern to understand the distribution and reasons for allocating a public resource transforms the argument into "who gets what, when, how and where" (LOBÃO; BOOKS; TICKAMYER, 2007). Therefore, the question revolves around understanding which subnational units hold the resource and what are the characteristics necessary to obtain it. In this sense, understanding the subnational variation of the pork barrel contributes to the understanding of politics as a whole.

Unlike other fiscal transfers, pork does not have a strict rule that delimits the decision-making process as to where should the money go. On the contrary, it empowers the legislator to play a fundamental role in directing resources within the national territory. This discretionary feature of the pork barrel allows a local, uneven and non-programmatic delivery. It is at this point that we find the "black box" on how legislators become points of distortion in the allocation of these resources. The drivers might vary among congresspeople, even when they are under the same institutional framework because legislative behaviour incentives do not occur unevenly in the political class (POWER, 2000).

If legislators were universalists, they would allocate this resource evenly. But that is the moment when congresspeople can make a unilateral decision regarding the allocation of federal funds – they might follow a distributive logic to benefit some allocation at the expense of others (KRINER; REEVES,

2015; MESQUITA et al., 2014). In that sense, pork evolves the pure nature of distributive politics: as a highly individualised decision of allocating resources (LOWI, 1964, 1972). Individual characteristics may be behind this since, under a set of institutional rules, legislative behaviour varies – which is constrained and stimulated by a diverse set of political processes (ZUCCO, 2009).

The drivers of allocation may vary from electoral returns and credit claiming (AMES, 1995; MAYHEW, 1974), partisanship ties (VENTURA, 2021), future political ambitions (SAMUELS, 2002), fiscal necessity (BAIÃO; COUTO; OLIVEIRA, 2020) and birthplace favouritism (CAROZZI; REPETTO, 2019; ??). In this sense, it is reasonable to think that the direction of amendments occurs through several mechanisms. Here, I propose the analysis of three of them: redistribution, distributivism and political connections.

Subnational research scholarship suggests that public goods are unevenly distributed within countries (GIRAUDY; LUNA, 2017; GIRAUDY; PRIBBLE, 2019, 2020; ??), which generates inequality in the level of citizenship experienced in the national territory (O'DONNELL, 1999). Regarding pork barrel, and considering its supply side, we should consider that the issues to which legislators direct their attention matter because it generates implications for the kind of goof that the political system creates – whether public or private (BAGASHKA; CLARK, 2016). Also, the congresspeople allocations' preference is a product of their strategies to guarantee, build, and maintain political support during the mandate (MAYHEW, 1974). In that regard, the allocation of pork barrel is not random. On the contrary, legislators have incentives to deliver resources to their constituency for many reasons (either fiscal, electoral or partisan reasons).

More than being a tool for political survival, the exchange of votes for geographically delimited resource is a usual and useful practice for the constituency (AUYERO, 2000). The pork's local feature and its local appeal could generate accountability and enhance ties of representation, consequentially making that the electorate demand for pork affects its allocation between the subnational unities (AMES; PEREIRA; RENNO, 2011). In this sense, the electorate and the mayors lay down together on the demand side. Distant of being a passive agent in this relation, both has incentives to demonstrate interest in the distribution of pork barrel. Also, in small and more vulnerable districts, the constituency is more aware of the need for schools and health centres instead of a change in the national public health and education policies – in this way, the constituency tend to demand more geographical benefits (AMES, 1995; DESPOSATO, 2001; KITSCHOLT, 2000). Therefore, the constituency claims for a redistributive effect – where pork would seek to balance the locality (municipality or count) revenue through the receipt of

this resource. Thereby, despite its discretionary nature the most desirable way of delivering the pork would be to the most needy municipalities in the district (BAIÃO; COUTO; OLIVEIRA, 2020).

On the other hand, local mayors are also active demanding agents. It is not uncommon for Mayors to travel to the National Congress for meetings with legislators to ask for resources from federal transfer of parliamentary amendments with the objective of accelerating specific projects<sup>5, 6, 7</sup>. Similarly, they participate in complementary training offered by groups and associations of city halls that aim to learn how to request and use parliamentary amendments to the budget<sup>8, 9</sup> - this specific demand means everything for the local financial reality, since it allows to fund public policy, good and services (BUENO, 2018) that weren't forecast in the previous budget, in addition to assisting the implementation of local demands such as the construction of hospitals, health centres, and implementation or expansion of the municipal sewage network (CHIAVEGATI, 2006). Besides that, with the local election lenses and considering pork's effects on election and re-election, local incumbent mayors could demand pork money to deal with competitive elections (FERRAZ; FINAN, 2011; FERRAZ, 2007)

Regarding the purpose of the electoral gain, the argument is widely known: representatives drown strategies to seek reelection (WEINGAST, 1979) and electoral support (SAMUELS, 2002). The electoral connection thesis argues that incentives from the electoral arena affect the decision-making process of congresspeople into concentrating benefits for a share of the electorate, to claim credit for it later (Mayhew, 1974, Cain, Ferejohn e Fiorina, 1987; Fenno, 1978). Consequently, the geographical distribution of votes affects the delivery of goods – high levels of concentration and dominance in some districts lead the congressperson to direct the constituency's attention to specific achievements (AMES, 1995, 2003). Similarly, since every Member of Parliament are aware of how close they were to not getting their seat, they

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<sup>5</sup>“Prefeito Vanderlei Markus vai a Brasília em busca de liberação de recursos”. <<https://paverama.rs.gov.br/noticia/visualizar/id/1218/?prefeito-vanderlei-markus-vai-a-brasilia-em-busca-de-liberacao-de-recursos.html>>

<sup>6</sup>“Prefeitos da Amensp fazem reunião em Brasília para lutar por emendas federais”. <<https://www.andradina.sp.gov.br/portal/noticias/0/3/2832/prefeitos-da-amensp-fazem-reuniao-em-brasilia-para-lutar-por-emendas-federais>>

<sup>7</sup>“Will DeSantis give Tampa the transportation money it's seeking?”. <<https://www.tampabay.com/news/tampa/2021/11/09/will-desantis-give-tampa-the-transportation-money-its-seeking/>>

<sup>8</sup>“CNM e Instituto Paulo Ziulkoski anunciam cursos para julho Municípios”. <<https://ama-al.com.br/cnm-e-instituto-paulo-ziulkoski-anunciam-cursos-para-julho-municipios/>>

<sup>9</sup>“Curso gratuito trata sobre gestão da saúde nos municípios”. <<https://appm.org.br/noticia/curso-gratuito-trata-sobre-gestao-da-saude-nos-municipios>>

tend to work harder to build support for the next elections and, therefore, tend to increase the amount of recourse and efforts geographically designated (AMES, 2003, p. 117). If this reasoning is correct, I believe that they should increase the effort to allocate pork-barrel monies.

While the electoral connection thesis is based on the idea that the personal vote is the electoral equilibrium strategy (NETO; SANTOS, 2003, p. 676), there are other reasons that can affect the supply of pork-barrel politics. Considering office-seeking behaviour, legislators would not deliver pork barrel to benefit the constituency, but in exchange for funds that can finance their election campaign. In other words, pork is a tool to raise donations from local businesspeople, not votes (BOAS; HIDALGO; RICHARDSON, 2014; SAMUELS, 2002).

Partisan ties could also be a shortcut for deciding where to deliver the pork. At this point, it is conventional wisdom that higher levels of government favour co-partisans and punish opponents in lower levels of government with distributive politics (BAERLOCHER; SCHNEIDER, 2021; BROLLO; NANNICINI, 2012; BUENO, 2018; DENEMARK, 2000), and there is no secret that mayors can act as political brokers in the context of implementing the resource at the local level (BAIÃO; COUTO, 2017-Sep-Dec). Therefore, mayors are of great value to the electoral success of legislators who run for national elections. To use municipal managers as a key players in the strategy of claiming credit, one way to recruit and compensate them would be by sending pork to aligned municipalities (BAERLOCHER; SCHNEIDER, 2021; DENEMARK, 2000; VENTURA, 2021). In this way, legislators running for re-election can use such mayors as their “spokespersons”, in exchange for sending a benefit.

Besides the three main mechanisms discussed in this section, the scholarship on pork-barrel allocation suggested that other features could affect the decision-making process on allocation. Legislators can direct the allocation of pork barrel money based on her birth town. Besides the absence of consensus between scholars about the mechanisms behind the aim, the fact is that congresspeople can concentrate the delivery of federal money to its birth town. Either because they have personal connections in their hometown (CAROZZI; REPETTO, 2016) or because they want to benefit this constituency in order to claim credit in a future electoral run – aiming at a post-congressional career at the local level (MATTOS; POLITI; MORATA, 2020).

Meanwhile, considering the institutional incentives, the multinomial districts (where more than one representative can claim credit for local projects) the threat of the free-riding problem is real: due to the lack of acknowledgement of the legislative production by the electorate and the difficulty of correctly attributing the generation of the particularised benefit, the pos-

sibility of correctly rewards decreases (ASHWORTH; MESQUITA, 2006; LANCASTER, 1986). If this logic is correct, the ability to claim credit is a function of the election in which the incumbent is running: whether with too many or too few seats. At the individual level, experience is an important factor to ensure survival in the National Congress and also for distributive behaviour. In this sense, it is reasonable to think that experience with previous terms also matters for the allocation of parliamentary amendments to the budget. More experienced legislators are more knowledgeable about the expected results of their actions, particularly with regard to building grassroots support. Finally, the electoral cycle can influence the distribution of budget resources over time, since we can expect greater commitment to the distribution of resources on the bases of budgets in election years.

Besides the absence of enough empirical evidence to signalise which set of variables explains the allocation of pork barrel by legislators, all incentives that I discussed here indicate that there is a common pattern: the concentration of pork in some localities. In other words, any of the mechanisms presented in this section could, theoretically, act as an incentive to allocating pork to a locality (or a set of localities).

### 3 Institutional framework

Brazil is a three-layered federal country with 5,570 municipalities, 26 states, and 1 federal district. Since the 1988's Federal Constitution, the National Congress has guaranteed an increase in its role in formulating the federal budget, where while creating the annual budget, each Brazilian congressperson can allocate 25 budget amendments to their represented district<sup>10</sup>.

These numbers are considerable: in 2022, R\$ 16,5 billion were earmarked for budgetary amendments subjected to an allocation by the "relator", while in 2021 R\$ 7,3 billion were allocated by political parties' benches and other R\$ 9,6 billion were available to individual parliamentary amendments. Although in its fiscal nature, the Brazilian amendments are nothing more than a fiscal transfer from the Federal to Local Government (basically indistinguishable from rule-based or constitutional transfers, for example), one main feature stands out: the receipt of the budgetary amendment is not conditional to any individual support or allocation rules. In other words, this is a resource that allows congresspeople to benefit one or more municipalities within the represented electoral district – acting as a distortion point on its allocation.

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<sup>10</sup>Senado Federal. "Emendas ao orçamento". See: <<https://www12.senado.leg.br/noticias/glossario-legislativo/emendas-ao-orcamento>>. Access 29 june 2022



Among the legislators themselves, there is a consensus that the budget amendments are a fundamental tool – according to data from the Brazilian Legislative Survey (BLS) around 70% of the parliamentarians believe that the amendments matter for future electoral success. In 2021, each member of the National Congress had 25 individual budget amendments, which are subject to a value defined preliminary<sup>11</sup>. This is a small number of amendments to benefit the electorate, especially in states with a greater number of municipalities (MESQUITA et al., 2014).

Concerning individual amendments to the tax code between the years 2016 to 2018, the values vary between years, ranging from the maximum of more than 4 billion (in 2016) to almost 2 billion passed on in 2017<sup>5</sup>. These values, however, are not allocated among the 5,570 municipalities in the federation. Taking into account the municipalities that received at least one transfer of the tax budget amendment in the years analyzed, the number of municipalities varies between 3033 and 2,347 benefited between the years 2014 to 2017.

I argue that the budgetary amendments can be considered pork barrel , once it (i) allows the benefit of geographic delimited groups, (ii) the credit claiming for having met the demands of the constituencies, (iii) and it is not based on individual political support (Stokes et al., 2013). In short, Brazilian budgetary amendments might help to further the knowledge and understanding of the puzzle proposed in this paper, as they're the distributive tools *par excellence* (LIMONGI; FIGUEIREDO, 2005) and they have been used as a proxy for pork barrel by several scholars .

## 4 Data and empirical strategy

Where does the pork-barrel go, and which are the criteria used by legislators to allocate it? To answer these questions, I leverage data from impositional budgetary amendments from Brazilian federal budget<sup>12</sup> allocated

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<sup>11</sup>"Comissões sugerem R\$ 29,3 bilhões em emendas ao Orçamento; prazo termina na terça-feira". See: <https://www12.senado.leg.br/noticias/materias/2021/11/12/comissoes-sugerem-r-29-3-bilhoes-em-emendas-ao-orcamento-prazo-termina-na-terca-feira>. Access 26 jun. 2022.

<sup>12</sup>The approval of Constitutional Amendment No. 85/2015 made it mandatory for individual parliamentary amendments to be executed in up to 1.2% of net current revenue for the previous year - half of this percentage destined for the execution of amendments related to the health area. My choice to only analyse the impositional budgetary amendments is based on the reliability of the data - since the information about them is clearer, more reliable and understandable than those of amendments in general – which is essential for the allocation analysis of this resource.

by Federal Deputies between 2014 and 2017. This time horizon encompasses Dilma Rousseff’s second term (2014-2016) and part of Michel Temer’s (2016-2018)<sup>13</sup>. I consider that this is enough time to identify the covariation between the dependent and independent variables, since preliminary studies suggest that the effect of the amendments lasts, at least, at least two years in social welfare indicators (ALSTON et al., 2006; BERTHOLINI; PEREIRA; RENNO, 2018). More specifically, I use only the amendments where a municipality was a receptor.

I choose to analyse only the House of Deputies (*Câmara dos Deputados*) allocations, to dialogue with the scholarship that looks at lower chamber incentives and political distributive behaviour. To do so, I propose a strategy that combines both geographical and non-geographical statistics. First, to determine how systematically the relationship between the characteristic of the geographic space (in this case, the municipalities of each Brazilian state) occurs and the flow of resources allocated by the Federal Deputies (Rodrigues-Silveira, 2013). Second, to find out which characteristics are associated with the recipient of pork on a larger scale, I propose an application of a regression analysis relating the proportion of budget amendments received and the political-electoral characteristics of the municipalities. To do so, I implement two sets of regression models: two beta regression, and two spatial autoregressive models, to take into account the characteristics of each dependent variable. Considering both that I want to access the variation within States and that is very unlikely that any legislator distributes amendments to a municipality outside its represented state (BAIÃO; COUTO; OLIVEIRA, 2020), I use fixed effects by State.

#### 4.1 Dependent variable: pork

In order to identify the allocation of resources by Brazilian representatives, I use the per capita value of impositional amendments received by the municipality as a proxy to pork-barrel. The values are deflated by the IPCA index for December 2020. To do so, I use impositional budgetary amendments whose recipient is a municipality, removing from the analysis all amendments directed to States, Public Companies, Public Consortium or Civil Society Organizations. The choice is justified by the focus of the research, which seeks to analyse the local characteristic of this type of pork.

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<sup>13</sup>Given the choice to analyse only impositional amendments, only the years after the implementation of EC86/2015 were used. For this reason, only the years after 2014 entered the analysis. The choice of the years 2016 to 2018 is justified by the availability of electoral and economic information at the municipal level.

Also, to measure pork concentration, I chose to operationalise it as a proportion – what should be a measure that at the same time relativizes and compares municipalities within each state. Then, the proportion of impositional budgetary amendments is the amount received by the municipality  $m$  in relation to the total budgetary amendments received by all the municipalities in the state  $s$ .

## 4.2 Independent variables: vulnerability, electoral connection and political alignment

In section 2 I have drawn attention to the incentives that motivate legislators to target specific shares of the constituency, and to the mayors and electorate to demand pork benefits. Here, I distribute those incentives in three groups of variables that could help to explain the pork’s concentration variation between municipalities: (a) municipal vulnerability, (b) electoral incentives, and (c) political connections.

To measure the level of local vulnerability I use three variables: municipal Gross Domestic Product, the child mortality rate, and the number of families benefiting from the *Programa Bolsa Família*. Together, these variables should capture social, economic, and human vulnerability. To measure electoral incentives, I use three variables: electoral concentration, operationalised by the G index, electoral dominance, operationalised by the Ames (1997, 2003) index, and the mean vulnerability index from the legislators that have sent pork for these municipalities, measured by the Strong preferential intra-party vulnerability index<sup>14</sup>. Lastly, I measure political connections through political alignment variables, which indicate whether the mayor is affiliated with the presidential party or coalition, and a dummy variable for the local electoral cycle<sup>15</sup>.

## 4.3 Control variables

To ensure the robustness of the result, I include some control variables in the models. Experience is an important factor for political survival in the National Congress, and for legislative behaviour. So, more experience congresspeople should have more knowledge about what to expect as a result of their action - especially regarding building support with the electorate, as

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<sup>14</sup>Index proposed by (ANDRÉ; DEPAUW; MARTIN, 2015) and operationalised from the formula:  $IDep = 1 - (\text{Number of votes of the candidate} - \text{Number of votes of the first loser}) / \text{Number of votes in the party list}$ .

<sup>15</sup>Being 1 when it is an election year for the local executive, and 0 otherwise.

well as more resources to form alliances with political peers (NETO; SANTOS, 2003; PEREIRA; RENNO, 2003; PEREIRA; MUELLER, 2003; RICCI, 2003).

I am also controlling by the number of seats in state for the Lower Chamber, considering that the district magnitude summed up to a large number of political parties, forces candidates to differentiate themselves from each other – and the way that Congresspeople find to differentiate themselves is through the distribution of particularised benefits (BAGASHKA; CLARK, 2016). I also control by the state, considering that congresspeople have major incentives to target municipalities belonging to the state that they represent – although it is possible to send resources to municipalities that are not located in the represented municipality, the frequency of this type of allocation is low or non-existent.

## 5 Results

### 5.1 Where does the pork go, anyway?

Figure 1 shows the allocation patterns of pork-barrel in the national territory, grouping the municipalities into quintiles, where each one of them holds 20% of the total cases. The darker the colour of the municipality, the greater the average per capita amount of amendments it received<sup>16</sup>. In a glimpse, the lighter colours seem to dominate in almost every state, indicating lower levels of per capita pork-barrel receipt by municipalities.

Figure 1 also suggests that most Brazilian municipalities are in the groups that receive up to 133 Brazilian Reais per inhabitant, although there is reasonable variation within the districts. The exceptions were some states of North region, namely: Tocantins, Roraima, Amapá and Acre (where the dark blue appears more confidently). Although, it is very unlikely that we can infer a more equal distribution of pork-barrel among the municipalities of those states. A possible explanation for this result seems to relate to two characteristics: (i) these are the states with a lower number of municipalities, and (ii) lower number of representatives in the *Câmara dos Deputados* (Chamber of Deputies)<sup>17</sup>.

Since the map suggests a concentration of pork barrel in some municipalities, I analyse the proportion of pork barrel receipts by municipalities within

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<sup>16</sup>The values are represented in Brazilian Reais (BRL) and deflated by the Consumer Price Index (IPCA) of December 2020.

<sup>17</sup>According to article 2 of Complementary Law 78/1993, "None of the member states of the Federation will have less than eight federal deputies". Thus, less populous states have a fixed number of 8 Federal Deputies. For more information, see: <[http://www.planalto.gov.br/ccivil\\_03/leis/lcp/lcp78.htm](http://www.planalto.gov.br/ccivil_03/leis/lcp/lcp78.htm)>. Access. 04 july, 2022.

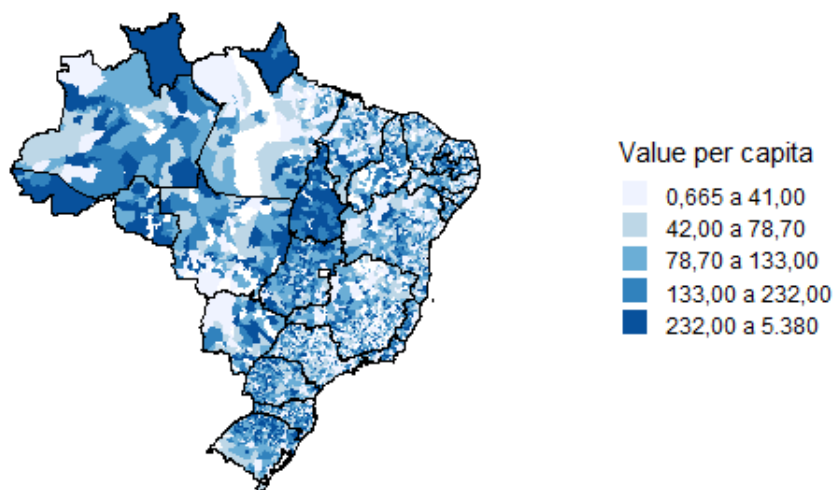


Figure 1: Per capita value of impositional budgetary amendments received by municipalities (2014-2017)

Brazilian states from 2014 to 2017. Figure 2 helps to access the variation within the national territory by presenting the change overtime of pork-barrel delivery. The first graph shows the measure of the proportion of pork. We can learn from the two graphs that, measured, either way, there is subnational variation in pork-barrel delivery across municipalities. Despite this, it is not a constant variation, with peaks between the years 2016 (as shown in chart 1) and 2015 (as shown in chart 2) – this finding may suggest some relationship between pork delivery and the local electoral cycle, since the mayoral elections would take place in October 2016. Figure 3 shows that this variance also occurs within states over time. In other words, the uneven distribution of pork-barrel within states is a fact in Brazilian municipalities.

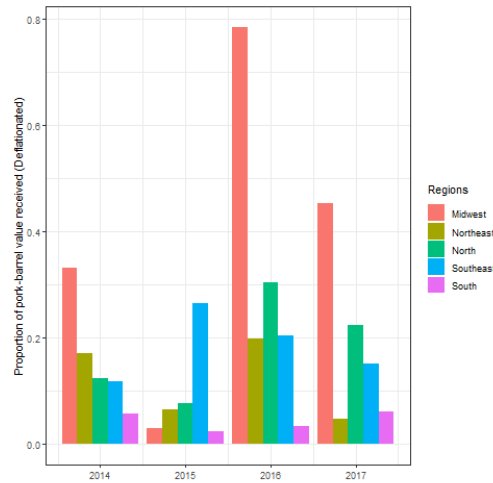


Figure 2: Proportion of pork-barrel received by region (2014-2017)

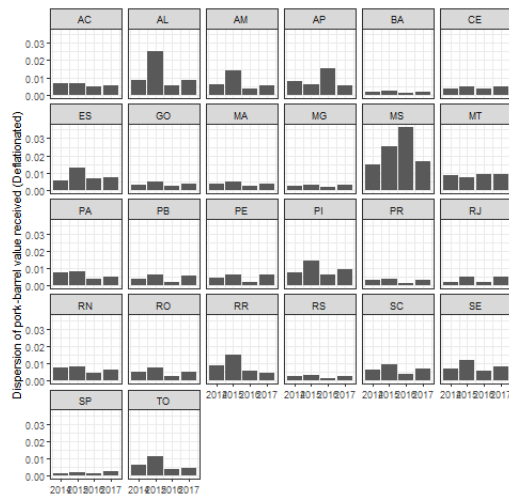


Figure 3: Proportion of pork-barrel received by state (2014-2017)

Taken together, the results of figures 1, 2 and 3 suggest the existence of groups of municipalities clustered according to the amount of pork received, mainly in states in the Northeast, South and Midwest. I perform a spatial auto-correlation test on pork-barrel data in Brazilian municipalities, and the visually identified clusters remain (Moran I = 0,22, p-value < 0,01), suggesting that there is spatial auto-correlation.

Figures 4 indicates the per capita values of the pork received by municipalities between 2014 and 2017, presenting the values from municipalities  $m$  and their neighbours. Figure shows that there is a concentration of cases in the first and third quadrants, which presents *high-high* and *low-low* levels –

suggesting that the municipalities have neighbours with similar and dissimilar values to theirs, respectively. Similarly, the upward-sloping line suggests that there is an overall positive auto-correlation, measured by the Moran I index. In other words, empirically, municipalities that receive higher values of pork per inhabitant are close to each other. Therefore, there is an indication that the proximity between the municipalities matters and should be taken into account during the analysis.

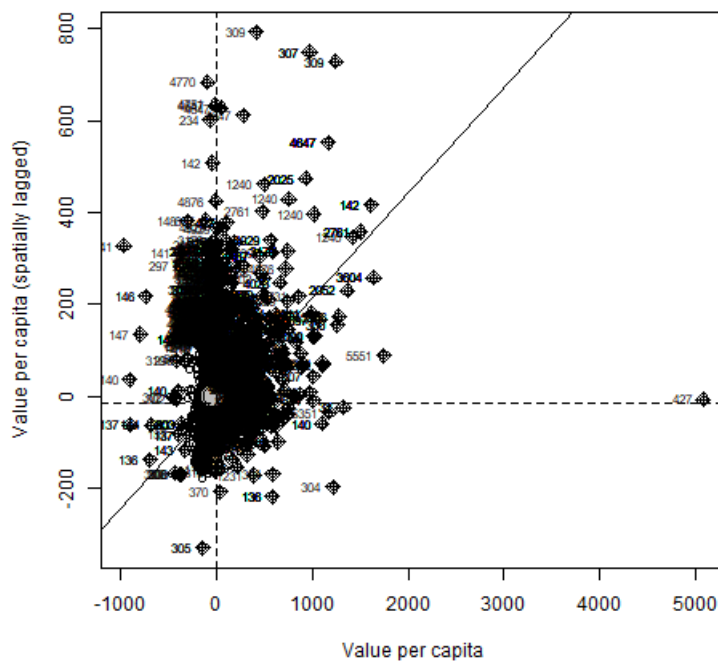


Figure 4: Scatterplot of the weighted neighbour mean of pork-barrel allocated by Federal Deputies to municipalities (2014-2017)

With these previous analyses we can learn that (i) there is a tendency towards concentration in the allocation of pork-barrel in Brazil, and that (ii) municipalities that receive a higher average value of budget amendments are clustered within states. However, we can learn nothing about the criteria that lead to similar levels of concentration. Thus, a question remains unanswered: what criteria matter for the allocation of pork-barrel?

## 5.2 What criteria are used in pork allocation?

The factors by which legislators decide on the allocation of resources within their constituencies are diverse. But, as previously presented, I propose the identification of allocation incentives through three of them: the (i) redistributive, which considers the vulnerability of the benefited municipalities; (ii) the distributive, which considers the electoral gains generated by the delivery of pork-barrel and, finally, (iii) the political connections criterion, which contemplates party relations and alignment between the legislator and other representatives.

I am measuring the concentration of pork-barrel as proportion and dispersion of impositional budgetary amendments to Brazilian municipalities, and both variables have a specific structure: varying from zero to one, assuming any value between that interval, and presenting a beta distribution (as can be seen in appendix A and B). Then, the assumptions to running a linear regression are broken due threat of heteroscedasticity, and the most suitable way of modelling continuous variables as rates, proportions, and concentration are the beta regression model (CRIBARI-NETO; ZEILEIS, 2010, p. 5)<sup>18</sup>.

Thus, table 1 presents two regressions: a beta regression model and a spatial error model to deal with the dependent variable (i) distribution and (ii) the spatial autocorrelation while trying to understand the effect of vulnerability, electoral connection, and political alignment in pork-barrel allocation within states.

Model 1 presents the beta regression, and its results suggest that within Brazilian states, the odds of a municipality receiving a bigger proportion per capita of pork-barrel increases by 17% with the GPD, but decreases by 0,8% with the infant mortality rate, and 0,6% with families in the *Programa Bolsa Família* rate. The electoral connection theory variables are the ones that seem to influence the most variation in pork concentration, with electoral dominance and vulnerability being determinants for receiving a lower per capita proportion of pork (keeping other variables constant), meanwhile, the electoral dominance increases it in 34%. In other words, legislators send pork monies to municipalities where they have some votes but not where they're too close to losing their seat nor where they have lots of chance of winning. Referring to the local and federal ties, subnational electoral year, being part of the president coalition and political alignment with legislators do not reach statistical significance. No political alignment variable was significant in the relationship. However, having a previous mandate in the National Congress increases the chance of receiving concentrated pork by 5,9%.

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<sup>18</sup>For further information on beta estimators, see: Paolino (2001) and Kalina (2020)



Table 1: Allocation of imposition amendments (2014-2017): Beta regression and spatial error models

	<i>Dependent variable:</i>	
	Proportion Pork-Barrel	
	<i>beta</i>	<i>spatial error</i>
	(1)	(2)
Infant Mortality rate	-0.009*** (0.001)	-0.0001 (0.0001)
GDP (Log, per capita)	0.159*** (0.030)	0.006*** (0.001)
<i>PBF</i> rate	-0.007*** (0.0005)	-0.0002*** (0.00002)
Electoral vulnerability	-15.420*** (4.893)	-0.813*** (0.298)
Electoral concentration	5.015*** (0.245)	0.311*** (0.016)
Electoral dominance	-0.421*** (0.086)	-0.015*** (0.004)
Election year (Dummy, Mayor)	-0.018 (0.028)	0.001 (0.001)
Coalition	0.005 (0.036)	0.001 (0.001)
Political alignment (Mayor)	0.037 (0.029)	-0.0002 (0.001)
District magnitude	0.006 (0.010)	0.001 (0.001)
Experience	0.058* (0.033)	0.004** (0.001)

Fixed effect by state	Yes (0.528)	Yes (0.034)
Constant	10.720** (4.884)	0.789*** (0.298)
Observations	4,367	4,367
R <sup>2</sup>	0.522	
Log Likelihood	15,247.000	8,854.000
$\sigma^2$		0.001
Akaike Inf. Crit.		-17,631.000
Wald Test		479.300*** (df = 1)
LR Test		427.400*** (df = 1)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

Model 2 presents the regression to test the role of spatial features in the allocation of pork, as suggested by the spatial autocorrelation analysis in the previous subsection. Also, the residual analysis shows spatial dependence (Moran I = 0,29, p-value <0,01), implying that the OLS model is not reliable in that case. In other words, the relationship between the allocation criteria and the variation in the average value of pork barrel depends on the location of the municipality. And since the amount of pork can be different in every location, we need a model that can take into account the spatial feature in the relationship.

To do so, I implement a Spatial Error Model to analyse the same set of variables. Its results indicate that, when the spatial dependence of the dependent variable is taken into account, the results of model 1 are maintained. This means that municipalities that are close to others that have high levels of GDP will receive a higher proportion of pork. The same is true for electoral concentration, which corroborates Ames (2003) findings. In a diametrically opposite way, the increase in the infant mortality rate, families benefiting from the Bolsa Família Program, the average level of dominance and electoral vulnerability disperse the allocation of pork barrel among the municipalities of the same Brazilian state.

Taken together, the results of both analyzes suggest that: (i) although the vulnerability of the municipality has some effect on allocation, we cannot affirm the existence of a redistributive effect for the neediest municipalities;

(ii) in line with the electoral connection thesis (MAYHEW, 1974; AMES, 1995) the pork-barrel allocation appears to be deeply related to the electoral characteristics of the legislators and, finally, (iii) it is not possible to draw any inference to regarding the relationship of political alignment and the variation of pork-barrel concentration in Brazilian municipalities with the evidence generated in this article.

## 6 Discussion and conclusions

In this work, I aimed to identify how the pork barrel allocation took place and what criteria matter for the legislators' decision-making process in delivering pork monies. In other words, I aimed to identify the existence of a pork-barrel allocation pattern and the relationship between redistributive, distributive and political characteristics of the municipality and the members of the national congress. To do so, I used data from tax amendments to the Brazilian budget between the years 2014 (year and its implementation) to 2017, relating it to the level of municipal vulnerability, electoral characteristics that lead to distributivism, as well as political connections with different levels of government.

Pork barrel is a popular practice among legislators in many democracies around the world. Much has been said about its effects on voting behaviour and political support, but little agreement has been made on its drivers and local distribution. Several pieces of evidence suggest that there is an unequal distribution of this resource and a tendency of concentration in some locations, either by electoral connection criteria (AMES, 2003; CARVALHO, 2003), political alignment (BAERLOCHER; SCHNEIDER, 2021; DENEMARK, 2000; VENTURA, 2021), or local constituency demand (AUYERO, 2000; AMES; PEREIRA; RENNO, 2011). In this sense, I analyse how congresspeople allocate pork-barrel resources and while doing so they made it uniformly or whether they take into account the level of local vulnerability, electoral support, or political alignment issues. The results of the descriptive analysis and spatial auto-correlation suggest a concentration of the per capita values of the amendments in some municipalities.

Although the scholarship on pork barrel is robust, little is know about the way in which the heterogeneity between legislators affects the distribution of these resources. In this paper, I propose three hypotheses of allocative criteria. First, the redistributive criterion recognizes territorial and fiscal inequality between municipalities and considers that, although there is discretion in sending resources arising from budget amendments, there may be incentives for delivery to the most vulnerable municipalities. Second, the distributive

criterion takes into account the electoral incentives (and possible gains) that come from the delivery of local benefits, and the argument is well-known: representatives design strategies to win elections. Finally, political connections with the different levels of government can also matter for the allocation decision, comprising the participation of local governments as political brokers in the implementation of amendments and membership of the federal coalition shapes legislative behaviour, allowing greater engagement in the concentration pork benefits.

To analyze this relationship, I used data referring to the tax amendments delivered to Brazilian municipalities and municipal information between the years 2014 and 2017, in addition to data from the federal elections of 2010 and municipal elections of the years 2012 and 2016. To identify the distribution of the amendments, I used statistics descriptive analysis and representation on maps, in addition to the analysis of spatial autocorrelation. In an attempt to relate the allocation criteria to the per capita value of amendments, I used beta regressions and autoregressive regression models to encompass the proportion nature and spatial characteristics of the dependent variable.

In short, the results suggest that: first, the concentration of vulnerable municipalities is little associated with a higher proportion of pork received by municipalities - only increasing when there is an increase in municipal GDP. Secondly, the electoral dominance of the votes legislators is associated with a lower average value received by municipalities (also, when they are nearby) – the same happens when the candidate suffers from electoral vulnerability. And, finally, it was not possible to draw conclusions regarding the political alignment criteria that, although they presented the expected direction, did not reach statistical significance. Finally, with this work I sought to contribute to the understanding of the pork barrel distribution in general and the impositional amendments in particular.

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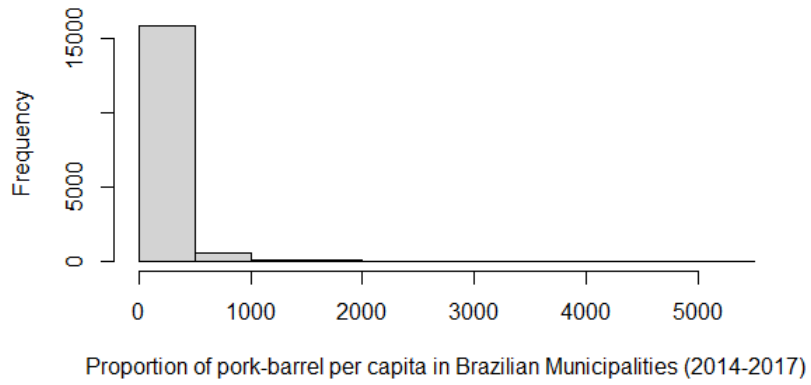


Figure 5: Histogram of pork-barrel proportion in Brazilian municipalities (2014-2017)

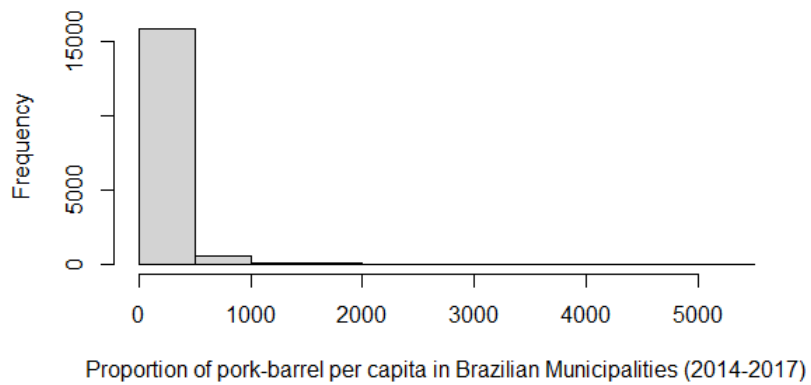


Figure 6: Histogram of pork-barrel dispersion in Brazilian municipalities (2014-2017)

## A Appendix

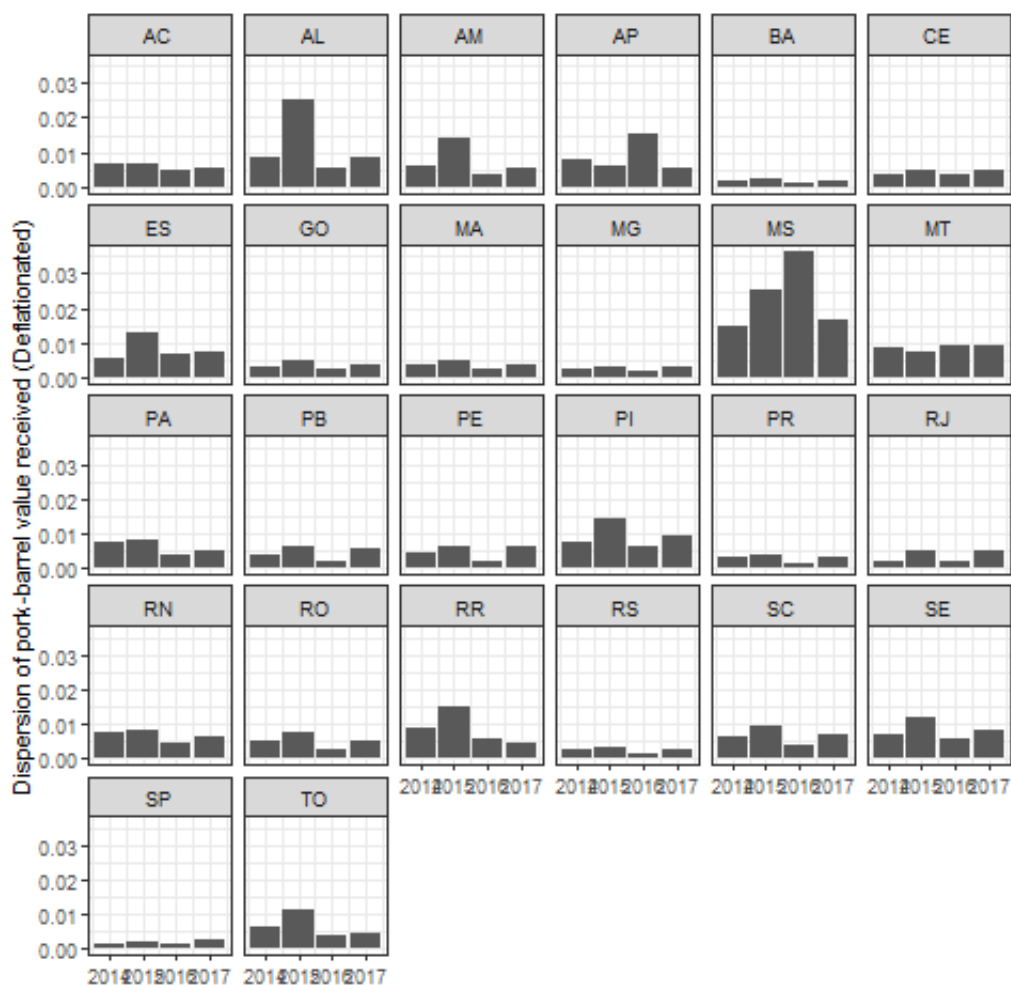


Figure 7: Dispersion graph of pork-barrel concentration by state (2014-2017)

Table 2: Allocation of pork barrel in Brazilian municipalities (2014-2017): OLS models with proportional dependent variable

	<i>DV:</i>	
	Pork ( <i>percapita</i> ) (1)	Pork ( <i>percapita</i> ,log) (2)
Infant mortality rate	-0.0001** (0.00005)	-0.018*** (0.001)
GDP (log, <i>percapita</i> )	0.007***	0.207***

	(0.001)	(0.034)
<i>PBF</i> rate	−0.0001*** (0.00002)	−0.005*** (0.001)
Electoral vulnerability	−1.137*** (0.314)	−1.804 (8.369)
Electoral concentration	0.368*** (0.015)	11.710*** (0.413)
Electoral dominance	−0.017*** (0.003)	−0.668*** (0.092)
Coalition	0.002 (0.002)	0.009 (0.040)
Alignment (Mayor)	0.002 (0.001)	0.031 (0.033)
District magnitude	0.0004 (0.0005)	−0.004 (0.013)
Election year (dummy, Mayor)	0.001 (0.001)	−0.097*** (0.031)
Experience	0.004** (0.001)	0.020 (0.038)
Fixed effects by state	Yes (0.012)	Yes (0.307)
Constant	1.090*** (0.314)	−3.773 (8.364)
Observations	4,367	4,367
R <sup>2</sup>	0.417	0.560
Adjusted R <sup>2</sup>	0.413	0.557

Residual Std. Error (df = 4331)	0.034	0.895
F Statistic (df = 35; 4331)	88.640***	157.500***
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

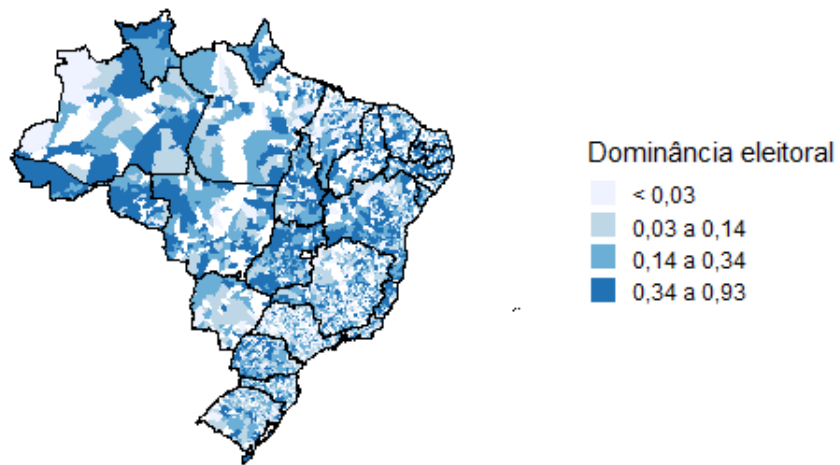


Figure 8: Electoral dominance (2014-2017)

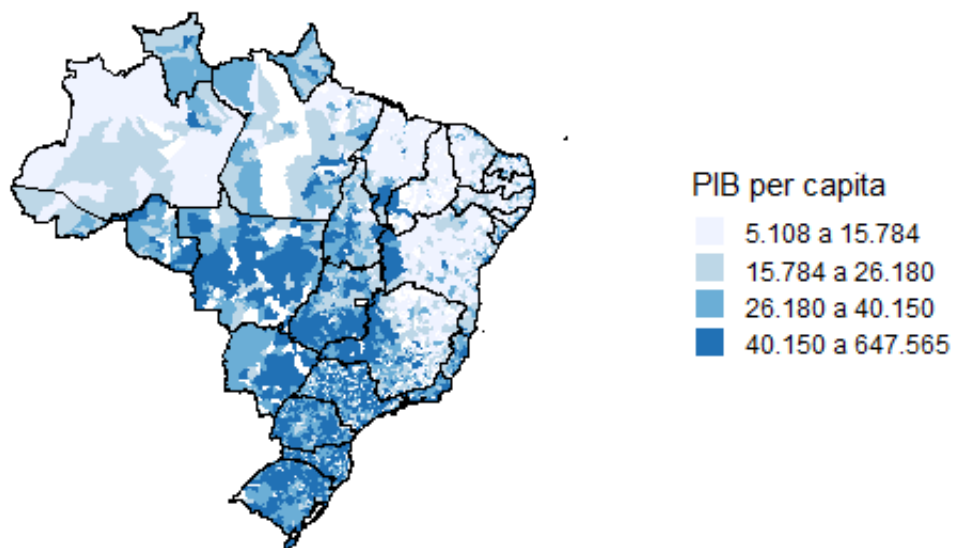


Figure 9: GDP per capita (2014-2017)

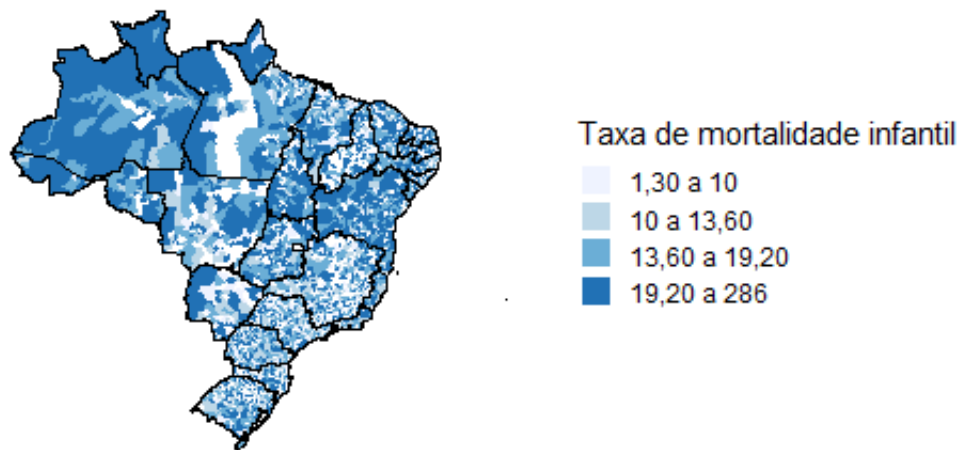


Figure 10: Infant mortality rate (2014-2017)



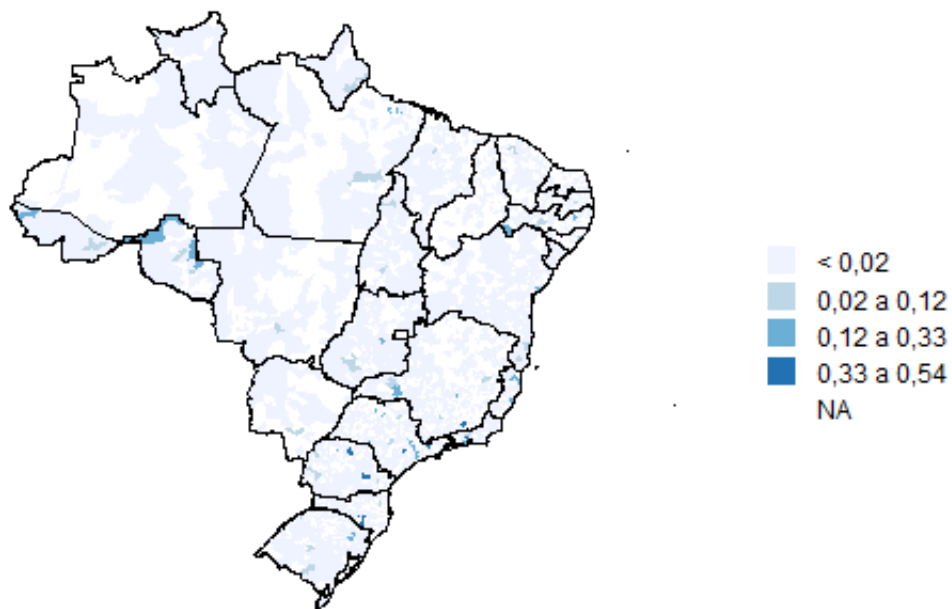


Figure 11: Electoral concentration (2014-2017)