



THE ALLOCATION OF INDIVIDUAL AMENDMENTS TO THE BUDGET BY THE LEGISLATIVE ASSEMBLIES OF PARAÍBA AND MINAS GERAIS BETWEEN 2011 AND 2018

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Abstract: This paper aims to investigate the existence of a relationship between the electoral performance of state deputies, presentation, and the direction of individual amendments to the state budget. For this, data were collected from the individual amendments to the budget of the Legislative Assemblies of Minas Gerais and Paraíba, in the last two Legislatures (2011-2014 and 2015-2018). From the data collected, it was identified the vote of each deputy in each municipality, and the direction of the amendments, then we produced maps to illustrate the electoral vote and the allocation of resources, which allow the characterization of types of "informal districts" where the vote of deputies is predominantly in groups of contiguous municipalities. Moreover, the statistical tests allowed to adopt and measure whether variables such as concentration and electoral dominance have statistical significance in the destination of the amendments, as well as whether the amendments have an impact on the electoral success of deputies.

Keywords: executive-legislative relationship; vote geography; parliamentary behavior.

1. Introduction

The Brazilian member states, as autonomous federative units, have their own budgets, with a procedure similar to that established in the Federal Constitution for the Union since the budget rules are a mandatory reproduction by the states of the Federation. In this sense, state parliamentarians have the prerogative to amend the annual budget due to the competent jurisdiction established in a mandatory manner by state constitutions.

According to part of the literature, the importance of individual amendments to the budget lies in the expectation of electoral return since parliamentarians believe that the execution of these amendments can guarantee their re-election (PEREIRA; MUELLER, 2002). The importance of parliamentary amendments is also highlighted by Lima Baião, Couto, and Oliveira (2019) in another bias. The authors emphasize that the allocation of the amendments in the territory represents an excellent opportunity to assess how public spending is done in the country. Thus, they conclude that since most of the individual amendments are aimed at specific municipalities, it is possible to verify to what extent those with the greatest need within the state

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are prioritized by the respective deputies.

Therefore, the presentation and possible execution of the amendments would be part of the strategy to ensure the maintenance of votes in upcoming elections. Each parliamentarian has the right to propose 25 individual amendments to the budget within the framework of the Chamber of Deputies. In the constitutions of the member states, this arrangement is generally repeated in line with the principle of constitutional symmetry. It should be noted that the possibility of parliamentarians acting in the allocation of resources to states and municipalities through amendments to the budget, allowing changes to the text of the proposition itself, would be a way for the 1988 Constitution to rehabilitate the participation of the Legislative Branch after a dictatorial period in which only the Executive defined public spending (LIMA BAIÃO; COUTO; OLIVEIRA, 2019).

Preliminarily, there is divergence in the literature addressing the subject regarding the parliamentary behavior in the distribution of its amendments. Most understand that parliamentary amendments redirect public resources to interests other than those technically planned and can be an instrument for capturing the public budget for private purposes, which would generate parochialist-type behavior (*pork barrel*) of the incumbent. It is a fact that parliamentary amendments have been at the center of several corruption scandals reported in the country over the years, such as the case of the "Anões do Orçamento" (Budget Dwarfs) and the "Máfia das Sanguessugas" (Leech Mafia) (CARNUT *et al.*, 2021).

In contrast, diverse current indicates, in summary, that individual parliamentary amendments to the budget are an efficient mechanism in promoting social welfare. In this sense, in research on the topic, Almeida (2021) seeks to demonstrate that, in an environment characterized by uncertainties and information asymmetry, the allocation of resources via parliamentary amendment promotes greater welfare compared to the allocative decision of the central government. Therefore, despite its asymmetries, the author concludes that the decentralization of resources made possible by the amendments can promote substantial gains for society.

Citing the various forms to glimpse the theme, the primary objective of this work is to verify whether state deputies have used this mechanism to benefit their electoral strongholds to attract votes for future elections. In this sense, we seek to investigate the existence of the relationship between the electoral performance of state deputies and the presentation and direction of individual amendments to the state budget, as suggested by a part of the literature on legislative studies. Additionally, the predominance in voting in certain groups of municipalities, configuring "informal districts", could create patterns in parliamentary behavior concerning the allocation of budget resources. For this purpose, data were collected from the individual amendments to the budget of the Legislative Assemblies of Minas Gerais and Paraíba, in the last two legislatures (2011-2014 and 2015-2018). It should be noted that we

initially intended to also analyze the Legislative Houses of the states of Rio Grande do Sul, Mato Grosso do Sul, and Amazonas, thus encompassing state parliaments of the five regions of the country. However, operational difficulties that will be discussed later contributed to further delimit the empirical field.

In this sense, the Assemblies of Minas Gerais and Paraíba were chosen due to the ease of access and completeness of the data in the websites for both legislatures analyzed in the research. We believe that the scarcity of studies on state legislatures is due to the difficulty of accessing data. The Legislative Assemblies presenting a database with information on legislative production are limited. The analysis made it possible to approach the same analytical categories (budget amendments and electoral performance) in two states of different socioeconomic and demographic realities to thus find parameters for comparison.

Preliminarily, several limitations emerged during the elaboration of the database that restricted the investigative capacity to produce more comprehensive results. The primary limitation was due to the reduction of the universe of analysis initially proposed. The proposed steps made it possible to collect data from at least two legislatures to better understand parliamentary behavior over time. However, the data regarding the state amendments are not consolidated in spreadsheets, as in the Siga Brasil portal³, in which detailed and comprehensive information on the Federal Public Budget can be obtained. Thus, in the cases excluded from the analysis (Rio Grande do Sul, Mato Grosso do Sul, and Amazonas), it was impossible to obtain all the data regarding the amendments presented in the 2011-2014 legislature.

The voting of each deputy in each municipality and the direction of the amendments were identified based on the data collected, and maps were produced to identify the electoral district and the allocation of resources⁴. Statistical tests also made it possible to verify the degrees of association between the amendments presented by the deputies and the dominance index (AMES, 1995).

The maps gained notoriety in the research since they allow us to characterize types of "informal districts" where the voting of deputies is predominant in groups of contiguous municipalities. In addition, it allows us to verify the percentage distribution of the vote of each parliamentarian throughout the three consecutive elections (2010, 2014, and 2018) in each municipality and the fate of the amendments of 2012-2014 and 2016-2018. This methodological procedure aimed to verify the existence of voting patterns and the allocation of resources to municipalities through parliamentary amendments to the state budget. Furthermore, the statistical tests allowed the adoption and measurement of whether variables such as concentration and electoral dominance have statistical significance in the fate of the

³ Website: <https://www12.senado.leg.br/orcamento/sigabrasil>

⁴ The complete maps of all the deputies analyzed in this survey can be viewed from the following link: https://drive.google.com/file/d/1_yi7TETkgzIQ6UjsjSiY4CVEzQ7tRbq9g/view?usp=sharing

amendments and whether the amendments have an impact on the electoral success of the deputies. The data were treated with descriptive and inferential statistics.

The literature on legislative studies in Political Science presents controversy when assessing the effective degree of electoral connection of individual amendments to the budget. In this sense, this research seeks to contribute to the discussion regarding the articulation between the electoral arena and the parliamentary arena, clarify the extent to which the interaction between incumbents and voters is directed in the election results, and understand the process of presenting amendments at the state legislative level.

The provision of individual amendments to the budget is significant because it is a bargaining tool that expands the political capital of the parliamentarian and asserts the expectation of electoral return. In this sense, the study performed by Pereira and Mueller (2002) ensured that amendments have a high probability of guaranteeing parliamentary re-election. Therefore, the analysis of the relationship between voting and amendment may indicate some patterns that assume a double direction. In these terms, there is *ex ante and ex post* movement. In other words, if the predominance of voting in contiguous municipalities causes the deputy to strive to reward his/her voters by allocating resources to these municipalities and guaranteeing their re-election; the other possibility is that the presentation of amendments for low-voting municipalities would be part of the strategy to guarantee predominance of votes in future elections.

2. Presentation of the database and methodological aspects

The database was formatted with the individual amendments presented in two different periods, between 2012-2014 and between 2016-2018. Amendments from the first year of each legislature were excluded since their presentation takes place in the last year of the previous legislature (after the October election) and with a composition of parliamentarians different from that used in the universe of analysis.

The data come from secondary sources and were formatted through the information contained in the amendments published on the websites of the respective Assemblies⁵. The data repository of the Superior Electoral Court (TSE, In Portuguese) was used⁶ as a source of data from the 2010, 2014, and 2018 elections to organize information on the electoral results of all candidates for state deputy in all municipalities of the states of Paraíba and Minas Gerais. It should be noted that the data of the alternates who assumed the mandate were also used since they presented individual amendments during the legislature, also constituting a relevant part of this analysis.

⁵ Websites for data collection https://www.almg.gov.br/acompanhe/planejamento_orcamento_publico/loa/index.html; <http://www.al.pb.leg.br/>

⁶Website: <http://www.tse.jus.br/eleitor-e-eleicoes/estatisticas/repositorio-de-dados-eleitorais-1/repositorio-de-dados-eleitorais>

One issue to be considered is the choice of the number of amendments presented by each deputy throughout the legislatures investigated, to the detriment of the significant value of the resources that would be allocated to the municipalities, as part of the literature suggests (MESQUITA, 2008; PEREIRA; RENNÓ, 2001; SAMUELS, 2002; SANFELICE, 2010). There is a large percentage of amendments aimed at municipalities classified by the “Meta” typology, especially in the case of Paraíba. In this type of amendment, the parliamentarian does not assign a specific amount to be executed but only allocates the inclusion of a specific goal to be achieved by the budget unit specified in the amendment. Many parliamentarians use this type of amendment to allocate resources. In the case of Paraíba, 47.2% of the amendments are of this type for both periods analyzed, and the vast majority are intended directly for the municipalities. Therefore, removing these amendments from the model would entail a great loss of explanatory value since the universe of analysis would be greatly reduced. In addition, the number of amendments is also used by part of the literature as a unit of analysis, including this is the unit used by Ames (1995, 2003).

Finally, it should be noted that the executed values of the amendments were not used due to the lack of availability of detailed information from the websites of the state parliaments and in the portals of the Executive Branch of both states. Unlike the tax budget (which was not the case in the member states analyzed at the time of the research), the approval of the Annual Budget Law (LOA, in Portuguese) does not bind the Government to execute the specific goals and values in the fiscal year in which the budget is in force. There is also no specific control of the legislative assemblies mentioned above over the execution of individual amendments.

The typology developed by Ames (2003) was adopted regarding the model used to measure the relationship between amendments and votes. According to this author, politicians with certain voting patterns are more inclined to carry out parochialist and patrimonialist policies (*pork barrel*). Ames employs two dimensions to classify candidates' voting bases: one dimension varies according to the “vertical political penetration” of the candidate, measured by the percentage of votes obtained in a given municipality or set of municipalities, and that informs its dominance in that geographical space; and the other dimension depends on the geographical distribution of the municipalities where the candidate obtained his/her vote, revealing the degree of concentration or dispersion of his/her electoral base.

The first dimension aims to identify how much dominance the parliamentarian has in the municipality, indicate the dynamics of competition, and express if other politicians also receive many votes in the same area. The second aims to measure the spatial concentration of the votes received by the parliamentarian, that is, if the vote extends over the territory or if it is circumscribed to a region. Thus, the higher the average vote in the municipalities in which it has the most contribution, the greater the dominance. Considering this typology, the deputies are classified by the author according to Chart 1:

Chart 1 – Ames taxonomy of spatial patterns

State patterns of spatial distribution			
% of total votes in primary municipalities			
		Low	High
Spatial distribution of primary municipalities	Dispersed	Dispersed-shared	Dispersed-dominant
	Contiguous	Concentrated-shared	Concentrated-dominant

Source: reproduced by the authors from Ames (2003, p. 65).

Ames (2003) states that the distribution pattern of the vote characterized as concentrated-dominant generates greater incentives for parochialism and reflects clientelistic relationships between the candidate and his/her support base. This author's study is adopted as a parameter to answer whether state deputies with a specific electoral district have a pattern of allocating resources to those municipalities in which they have better electoral performance and, thus, ensure the connection with their voters. Individual amendments to the budget are used to estimate the candidate's effort to secure votes and attract new electoral strongholds. Therefore, it should be verified whether the spatial distribution of a deputy's vote influences the allocation of individual amendments to the budget and if the more concentrated and dominant the vote in the electoral district, the more the deputy tends to present policies of a particularist nature (pork barrel).

In the search for indicators that express electoral dominance, the unit of analysis was the vote of each deputy in each municipality in the universe of the municipalities of Minas Gerais (853) and Paraíba (223), which make up a total of 1,076. In this sense, we seek to apply the model proposed by Ames (2003), using the “Ames Index” as an indicator of electoral dominance (AVELINO; BIDERMAN; SILVA, 2011). The index has the following equation:

$$D_D = \sum_m \frac{V_{Dm}}{V_m} \frac{V_{Dm}}{V_d}$$

Onde,

D_D = *Dominância do Deputado*

V_{Dm} = *Votos do deputado no município*

V_m = *Soma dos votos de todos os deputados no município*

V_d = *Votos do deputado no estado*

Note: Where, DD = Deputy dominance, VDM = Deputy votes in the municipality, VM = Sum of the deputy votes in the municipality, VD = Deputy votes in the state.

Statistical tests are conducted to measure this relationship to verify whether the allocation of individual amendments to the budget will depend on the voting pattern of the deputy.

3. Individual amendments and spatial distribution of the vote in the Legislative Assemblies of Minas Gerais and Paraíba

It is necessary to point out some important elements regarding the demographic aspects of both federative units analyzed to highlight the differences between the member states, which also serve as the geographical limit of the electoral district for the analyzed position (state deputy). The data referring to the general elections of 2010, 2014, and 2018 should also be explored as they will serve to better understand the universe of analysis.

There are major socioeconomic differences between the two states in addition to the distinct magnitude of both electoral districts. Some of the literature states that these differences may be important to observe different forms in the pattern of parliamentary behavior, according to the relationship type of voting and presentation of amendments. When addressing issues such as the discontinuity between urban and rural areas, Carvalho (2003) places the impact of demographic differences on the representative system. Table 1 summarizes some demographic elements of Minas Gerais and Paraíba.

Table 1 – Demography and socioeconomic indicators of the states of Minas Gerais and Paraíba

DEMOGRAPHIC SUMMARY	INDICATOR	MINAS GERAIS	PARAÍBA
POPULATION	RESIDENT POPULATION	19,597,330	3,766,528
EDUCATION	IDEB - ELEMENTARY EDUCATION	6.30	4.70
WORK AND INCOME	MONTHLY HOUSEHOLD INCOME	BRL 1,322.00	BRL 898.00
ECONOMY	HDI	0.73	0.66
TERRITORY	AREA (Km ²)	586,521,121	56,467,239

Source: elaboration of the authors according to IBGE data (2020)⁷.

With a population of almost twenty million inhabitants⁸ (according to the 2010 census), Minas Gerais is the second most populous state in the country, with a population density of 33.41 inhabitants/Km². Despite having a smaller resident population, Paraíba has a demographic density of 66.70 inhabitants/Km², also due to a smaller territory.

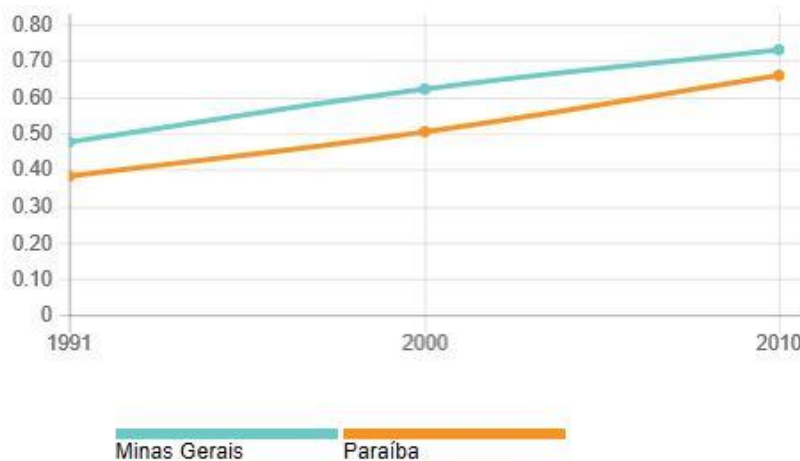
⁷ Website: <https://www.ibge.gov.br/cidades-e-estados/pb.html>

⁸ According to IBGE data, Minas Gerais currently has a projected population of 21,160,005.

The education indicators represented by the Basic Education Development Index (IDEB, in Portuguese) were taken to measure the level of development of the surveyed states, more specifically, the data on the initial years of elementary school (public school system). The IDEB gathers the results of the school flow and the performance averages in the evaluations in a single indicator⁹. In this case, Minas Gerais has better performance, with an index of 6.30 (2nd in the country), while the index in Paraíba is 4.70 (21st in the country). The nominal monthly household income *per capita* was used in relation to the data on work and income of the population. Again, Minas Gerais showed better performance, presenting a monthly income of BRL 1,322.00 (10th in the country), while the monthly income in Paraíba is BRL 898.00 (18th in the country).

Finally, the Human Development Index (HDI) of each analyzed state is also highlighted as an expression of socioeconomic conditions. According to the United Nations Development Programme (UNDP) in Brazil¹⁰, the HDI expresses a summary measure of long-term progress based on three basic dimensions of human development: life expectancy, income, education, and health. Again, Minas Gerais presents a better result in this aspect with an index of 0.731 (9th in the country), while Paraíba has an index of 0.658 (23rd in the country). Graph 1 shows the evolution of HDI in both states over time.

Graph 1 – HDI of Minas Gerais and Paraíba



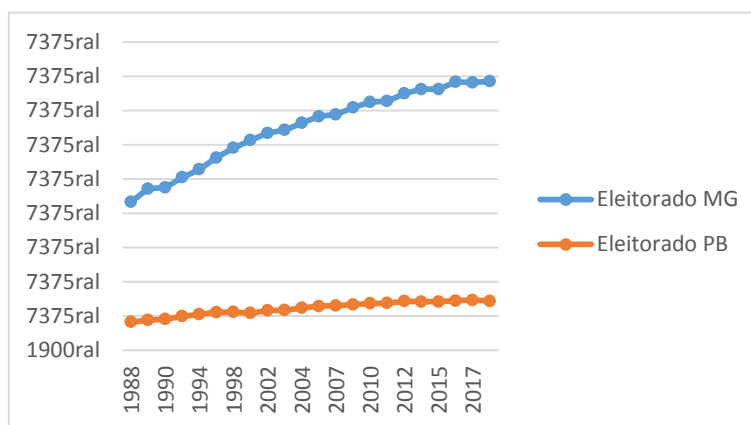
Source: elaboration of the authors according to IBGE data (2020).

⁹ Source: <http://portal.inep.gov.br/ideb>

¹⁰ Source: <http://www.br.undp.org/content/brazil/pt/home/idh0.html>

Minas Gerais and Paraíba have diverse characteristics that will be reflected in the election numbers. In this sense, Minas Gerais currently corresponds to the second-largest electoral college in the country, with 15,700,966.00 voters. Paraíba, with a much smaller population, has an electorate of 2,867,649¹¹. Graph 2 shows the evolution of the electorate in both electoral colleges from 1988 to 2018.

Graph 2 – Evolution of the Minas Gerais and Paraíba electorate



Source: elaboration of the authors according to TSE data (2020).

The magnitude of both electoral districts also assumes a great difference in elections for state deputy¹². In this sense, the Legislative Assembly of the state of Paraíba (ALPB) has 36 seats in the state parliament, while the Legislative Assembly of the state of Minas Gerais (ALMG, in Portuguese) has 77. The three general elections analyzed (2010, 2014, 2018) presented a total of 3,684 candidates in Minas Gerais and 1,174 candidates in Paraíba, with increased competition between the three elections for state deputy, as shown in Table 2 and Graph 3.

Table 2 – Number of candidates for state deputy

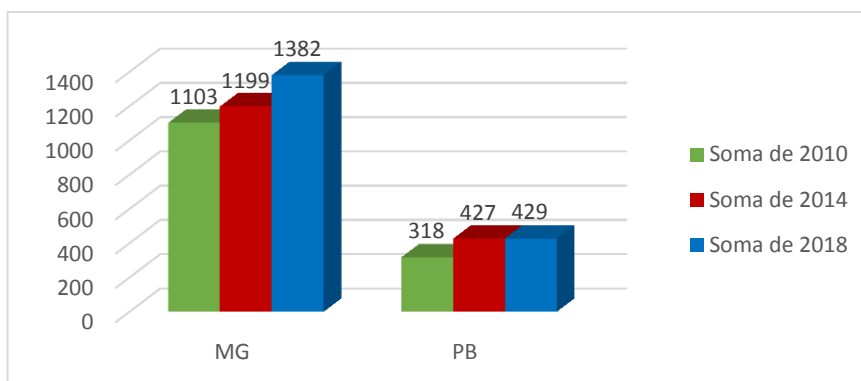
	ELECTION YEAR	ELECTION YEAR	ELECTION YEAR	
State	2010	2014	2018	Nº of candidates
MG	1103	1199	1382	3684
PB	318	427	429	1174
Nº of candidates	1421	1626	1811	4858

Source: elaboration of the authors according to TSE data (2020).

¹¹ Source: TSE

¹² According to Jairo Nicolau (2004, p.13), the district corresponds to the territorial unit where the votes are counted to distribute the seats in dispute.

Graph 3 – Candidates for state deputy in the 2010, 2014, and 2018 elections

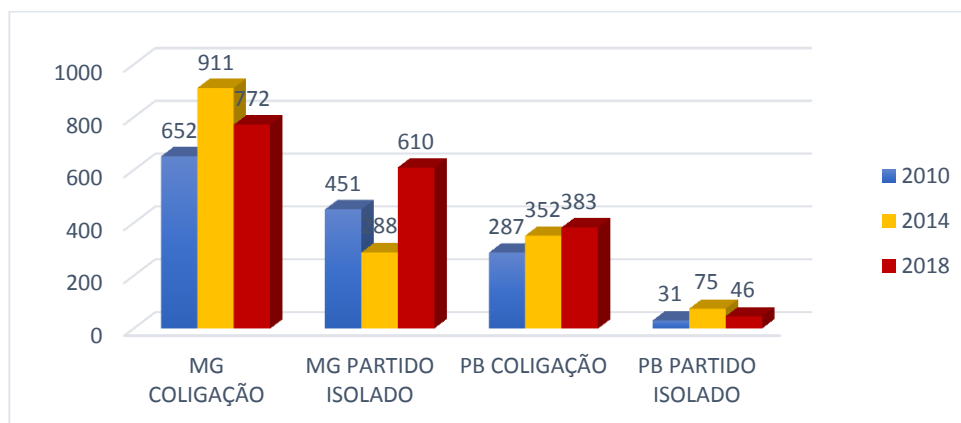


Source: elaboration of the authors according to TSE data (2020).

Note: Sum of 2010; Sum of 2014; Sum of 2018.

Graph 4 shows the data on combined and isolated candidates in the three elections.

Graph 4 - Number of candidates by coalition and isolated candidacy



Source: elaboration of the authors according to TSE data (2020).

Note: MG coalition; MG isolated party; PB coalition; PB isolated party.

The coalitions assume importance in the three elections analyzed in both states. However, Paraíba stands out for presenting a very small number of isolated applications. In Minas Gerais, in 2018, 610 candidates ran for isolated parties, in the same election in Paraíba, only 46 candidates fell into this category.

3.1 General chart for the presentation of amendments

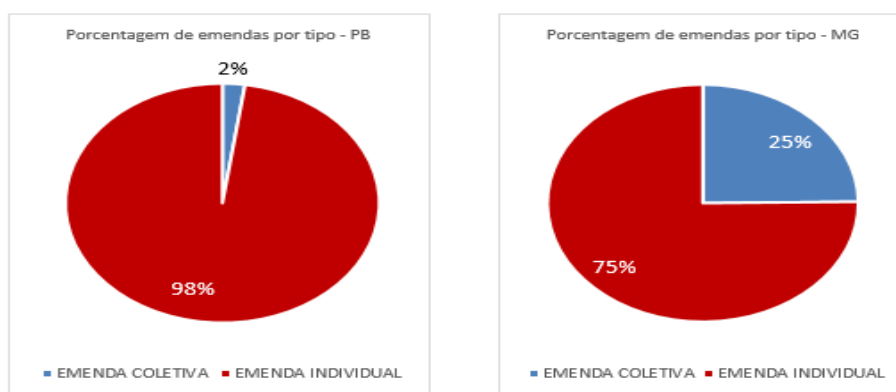
Any state deputy, whether incumbent or alternate, has the prerogative to amend the annual state budget. It is only necessary that they are in full exercise of their mandate to present the amendments. In addition, as already pointed out, during a legislature, incumbent deputies often step away from their mandates for various reasons. Therefore, the alternates who assume

the mandate and present amendments are also part of the universe of analysis.

During both legislatures analyzed in the survey, 5,724 amendments were presented, of which 4,792 were individual amendments, which corresponds to 83.71%. In Minas Gerais, 3,554 amendments were presented, of which 2,672 were individual and 882 collective. 2,120 amendments were presented in Paraíba, of which only 50 were collective.

The ALMG shows a greater role of collective authors in the presentation of amendments (committees, parliamentary blocs, etc.), corresponding to 24.8% of the amendments. On the other hand, the parliamentarians in ALPB, as a rule, seek to act individually (97.7% of the amendments), with only 2.3% of the amendments presented were collective (see Graph 5). In conclusion, the deputies try to highly value participation in the budget, a fact even verified by the literature on the subject (MESQUITA, 2008).

Graph 5 – Percentage of individual and collective amendments

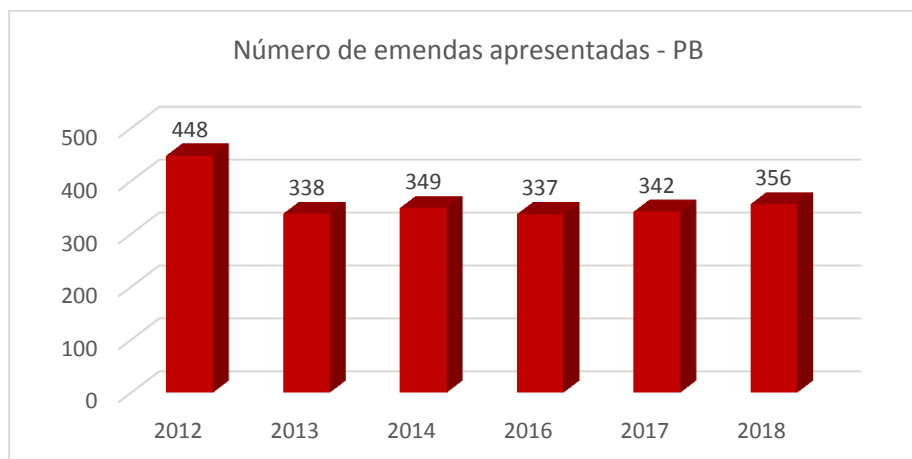


Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Note: Percentage of amendments per type – PB; Collective amendment; Individual amendment. Percentage of amendments per type – MG; Collective amendment; Individual amendment.

When the amendments presented by year are disaggregated, there is no great variation in the number per year (2012-2014 and 2016-2018) in the case of Paraíba, presenting, on average, 362 amendments per year, according to Graph 6. ALMG, on the other hand, presents a different standard, with a minimum number of 412 and a maximum of 849 amendments per year analyzed, as shown in Graph 7.

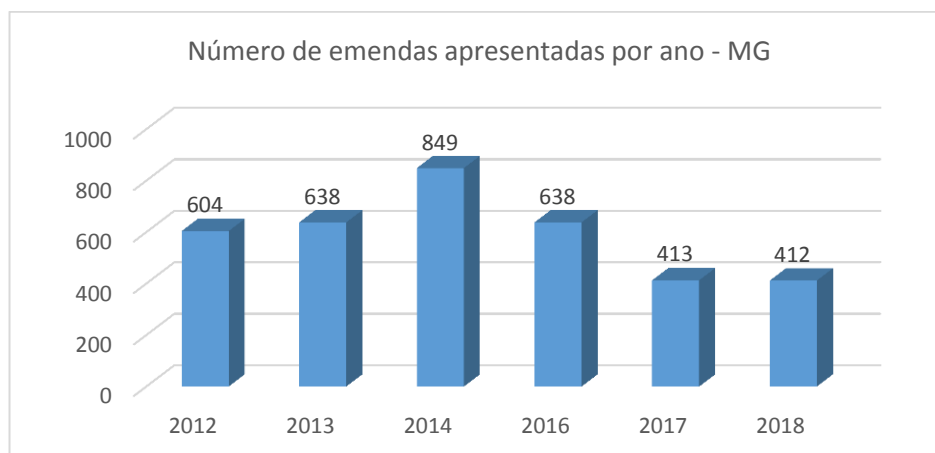
Graph 6 – Number of amendments - PB



Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Note: Number of amendments presented - PB

Graph 7 – Number of amendments - MG



Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

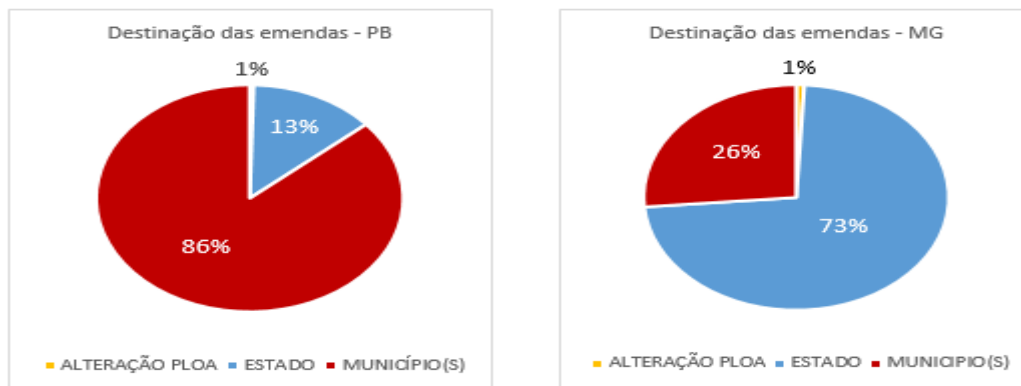
Note: Number of amendments presented per year - MG

The individual amendments are often associated by the literature as if they had the municipalities as their sole destination. However, this is not the exclusive destination of the amendments, which can be directed to state agencies, secretariats, and foundations to cover pre-established programs. There is also a great discrepancy in the destination of the amendments in the universe analyzed.

The data point to a diverse behavior among the Legislative Assemblies, according to Graph 8. Most of the amendments in the ALMG are destined directly to Government secretariats, organs, and entities (72.82%). the inverse occurs in the ALPB, with 86.3% of the amendments being destined directly to the municipalities. Therefore, individual amendments are not always allocated to the electoral strongholds of the deputies, and the only amendments

capable of fulfilling the assumptions of the distributivist current (MAYHEW, 1974) are those destined directly to the municipalities. In this case, the deputies of Paraíba were in more favorable conditions to allocate resources in the municipalities. Thus, it remains to be seen what incentives the Paraíba parliamentarians had to perform such feats.

Graph 8 – Allocation of amendments in percentage - Total



Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Note: Amendment destination - PB/MG; Alteration PLOA; State; Municipality.

Carvalho (2003) concludes regarding this discrepancy between the Minas Gerais and Paraíba deputies regarding the allocation of amendments. When studying how competition occurs in electoral districts, the author concludes that, in metropolitan districts and with better socioeconomic indicators, there is a tendency in which the policies proposed by parliamentarians are more often universalist, while in locations with worse indexes and characterized as regions of little urbanization, there is a tendency to offer individualized policies to the districts to raise new strongholds since electoral competition is lower in these cases.

On the other hand, Lima Baião, Couto, and Oliveira (2019) seek to demonstrate that, in addition to the distributivist nature, parliamentarians also consider the capacity of the municipality to receive resources and execute them appropriately since municipalities submit to a series of requirements to receive transfers from the government. Therefore, this institutional factor would make municipalities with a deficit structure less capable of receiving resources, which is also corroborated by Bertholini, Pereira, and Rennó (2018).

Tables 3 and 4 show data on the type of destination of the amendments for both federal units.

Table 3 – Destination of amendments per year - MG

Year			Frequency	Percentage
2012	Valid	ALTERATION PLOA	16	2.6
		EST-ÓRGÃO	468	77.5
		MUNICIPALITY(IES)	120	19.9
		Total	604	100.0
2013	Valid	ALTERATION PLOA	5	.8
		EST-ÓRGÃO	436	68.3
		MUNICIPALITY(IES)	197	30.9
		Total	638	100.0
2014	Valid	ALTERATION PLOA	5	.6
		EST-ÓRGÃO	739	87.0
		MUNICIPALITY(IES)	105	12.4
		Total	849	100.0
2016	Valid	EST-ÓRGÃO	331	51.9
		MUNICIPALITY(IES)	307	48.1
		Total	638	100.0
2017	Valid	ALTERATION PLOA	1	.2
		EST-ÓRGÃO	325	78.7
		MUNICIPALITY(IES)	87	21.1
		Total	413	100.0
2018	Valid	ALTERATION PLOA	3	.7
		EST-ÓRGÃO	289	70.1
		MUNICIPALITY(IES)	120	29.1
		Total	412	100.0

Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Table 4 – Destination of amendments per year - MG

Year			Frequency	Percentage
2012	Valid	ALTERATION PLOA	4	.9
		EST-ÓRGÃO	46	10.3
		MUNICIPALITY(IES)	398	88.8
		Total	448	100.0
2013	Valid	ALTERATION PLOA	3	.9
		EST-ÓRGÃO	15	4.4
		MUNICIPALITY(IES)	320	94.7
		Total	338	100.0
2014	Valid	ALTERATION PLOA	2	.6
		EST-ÓRGÃO	37	10.6
		MUNICIPALITY(IES)	310	88.8
		Total	349	100.0
2016	Valid	EST-ÓRGÃO	95	28.2
		MUNICIPALITY(IES)	242	71.8
		Total	337	100.0
2017	Valid	EST-ÓRGÃO	49	14.3
		MUNICIPALITY(IES)	293	85.7
		Total	342	100.0
2018	Valid	EST-ÓRGÃO	46	12.9
		MUNICIPALITY(IES)	310	87.1
		Total	356	100.0

Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Another aspect in which there is a difference in the presentation of the amendments concerns the classification of each legislative house to the type of amendment. While the ALMG divides its amendments simply into expenditure and text amendments, the ALPB divides them into amendments to the annex, goal, text, appropriation, and relocation. According to Paludo (2017, p. 82), the classification typology of amendments to the LOA can be of three types: text, income, and expenditure. Text amendments are those used to change provisions of the LOA Project. Revenue amendments, on the other hand, aim to change the collection estimate and may even propose a reduction¹³. Paludo (2017, p. 82) also mentions the division of expenditure amendments into three subtypes: relocation, appropriation, and cancellation. The first proposes the addition or inclusion of allocations and, at the same time, as a source of

¹³ Source: <https://www12.senado.leg.br/noticias/glossario-legislativo/emendas-ao-orcamento>

resources, proposes the equivalent cancellation of other allocations. The appropriation amendments propose the addition or inclusion of allocations and, simultaneously, as a source of resources, the annulment of resources that are part of the contingency reserve or the annulment of another allocation. Finally, the cancellation amendment only proposes the cancellation of an allocation contained in the LOA project.

In the universe of analysis in Paraíba, 1,978 amendments are of goal or appropriation, corresponding to 47.2% and 43.9%, respectively. On the other hand, almost all amendments in Minas Gerais are of expenses (99.2%), with only 30 amendments presented in the analyzed period to change the LOA Project. Data are available in Tables 5 and 6.

Table 5 – Amendment classification - PB

Classification	Frequency	Percentage
Valid TO THE ANNEX	4	.2
APPROPRIATION	953	43.9
GOAL	1025	47.2
RELOCATION	179	8.2
TEXT	9	.4
Total	2170	100.0

Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Table 6 – Amendment classification - MG

Classification	Frequency	Percentage
EXPENDITURE	3524	99.2
TEXT	30	.8
Total	3554	100.0

Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Finally, another element to be highlighted is the variation in values presented in the amendments. The text amendments and the annex, whose purpose is only to change the text of the draft LOA, do not present values to be budgeted in their body. As already highlighted, the parliamentarian does not set a specific value to be executed in the goal amendments but only allocates the inclusion of a specific goal to be achieved by the budget unit specified in the amendment. In the other amendments, parliamentarians place the budget allocation to be executed. In this case, the amounts range from BRL 5,000.00 to BRL 100,000,000.00 in

Paraíba, and BRL 1,000.00 to BRL 150,000,000.00 in Minas Gerais (see Tables 7 and 8). The universe of analysis also shows that 1,144 amendments have a specific budget allocation in Paraíba; in Minas Gerais, there are 3,521.

Table 7 – Number of amendments with specified budget allocation in total years analyzed - PB

Descriptive Statistics				
	N	Minimum	Maximum	Mean
Value to be executed	1144	BRL 5,000.00	BRL 100,000,000.00	BRL 1,170,688.18
N valid (listwise)	1144			

Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

Table 8 – Number of amendments with budget allocation specified in total years analyzed - MG

	N	Minimum	Maximum	Mean
Value to be executed	3521	BRL 1,000.00	BRL 150,000,000.00	BRL 1,255,042.65
N valid (listwise)	3521			

Source: elaboration of the authors according to data from the Legislative Assemblies of PB and MG, 2020.

3.2. The overlap between individual amendments and votes

After exposing the individual amendments and being armed with electoral data from the 2010 and 2014 elections, it became possible to elaborate maps in which the percentage of deputy votes per municipality and the allocation of individual amendments are superimposed in layers. We sought to verify how the fate of individual amendments presented by the deputies is configured and the relationship with the vote of each deputy in each municipality. The purpose of this stage of the investigation comprises the identification of patterns in the relationship between voting and the presentation of amendments to the budget. The complete maps of all the deputies analyzed can be viewed in the annexes of this survey from the following link: https://drive.google.com/file/d/1_yi7TETkgzIQ6UsjSiY4CVEzQ7tRbq9g/view?usp=sharing

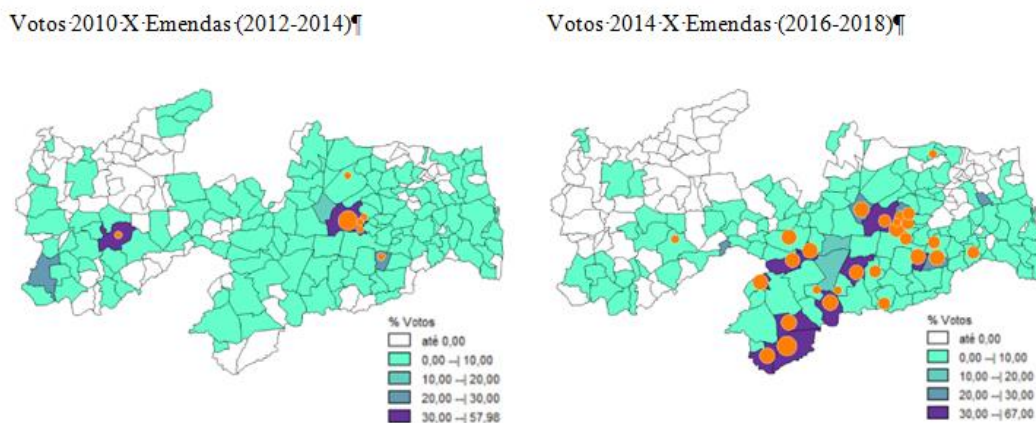
The literature, especially the distributive current, indicates that deputies who have a concentrated-dominant vote in a municipality or groups of municipalities tend to take the resources to their electoral strongholds. The data from the 2010 and 2014 elections in both federative units analyzed show candidates who have high votes in some municipalities. In the 2010 elections in Paraíba, one can cite, for example, the case of candidate André Gadelha (PMDB), who obtained 76.4% of the votes in the municipality of Poço Dantas. In 2014, also in

Paraíba, the largest vote was in the municipality of Bernardino Batista for candidate Ricardo Barbosa (PSB), who obtained 71.4% of the valid votes. In Minas Gerais, there are cases of municipalities with an even more concentrated-dominant vote in a single candidate. One can mention, in the 2010 election, the municipality of Andradas that allocated 83.82% of valid votes to candidate Carlos Mosconi (PSDB). In 2014, the municipality of Araxá allocated 81.96% of its votes to candidate João Bosco (PT do B).

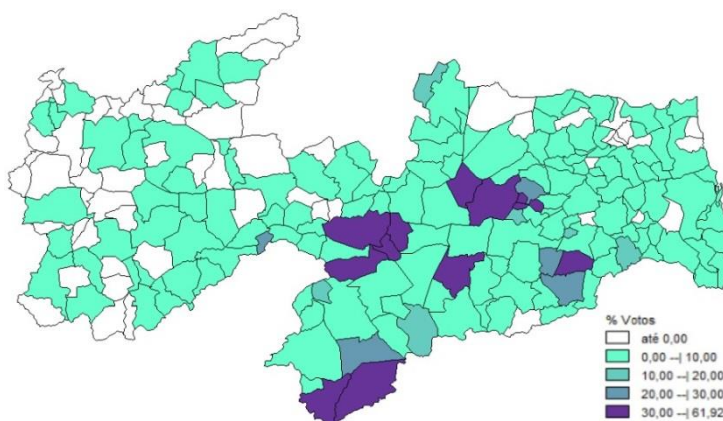
In the maps produced using the Tabwin program, the orange circumferences in the municipalities indicate the number of amendments intended by the parliamentarian for that municipality. The larger the circumference, the more that deputy allocates amendments to that municipality. The darker the color of the municipality on each deputy's map, the greater the vote for that candidate in that municipality (in percentage). It should be noted that maps will be included with the percentage of votes per municipality for the deputies who ran for the same office in the 2018 election and presented amendments in the previous election as a form of verifying the distribution of the parliamentary vote over time.

Thus, it is possible to visually verify the behavior of each parliamentarian in relation to the amendments they send to the municipalities, whether they forward to their electoral stronghold or not. Thus, the analysis of all the maps of the deputies who presented amendments directly to the municipalities in Paraíba and Minas Gerais in the 2011-2014 and 2015-2018 legislatures show, in summary, three different types of behavior: 1. The deputy allocates budgetary resources in his/her electoral strongholds, according to the distributive perspective; 2. The deputy allocates resources in his strongholds but also seeks to direct them to other municipalities in search of new supporters, which is also supported by the literature; 3. There is no relationship between the allocation of resources, which is done diffusely by the district, and the voting of the deputy. As an example, the maps of one deputy from each member state analyzed by type of behavior cited are used to visualize each type of behavior.

Figure 1 – Maps with the overlap between voting and amendments for Deputy Adriano Galdino (PSB) PB



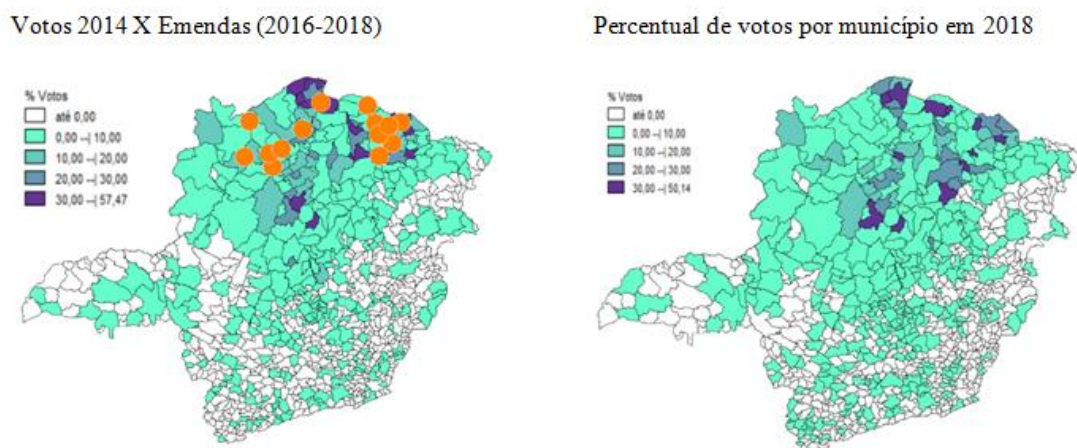
Percentage of votes per municipality in 2018



Source: elaboration of the authors according to data from the TSE and the Legislative Assemblies of PB and MG, 2020.

Note: Votes; Amendments; Up to 0.00%.

Figure 2 -- Maps with the overlap between voting and amendments for Deputy Arlen Santiago (PTB) MG



Source: elaboration of the authors according to data from the TSE and the Legislative Assemblies of PB and MG, 2020.

According to the maps in Figures 1 and 2, there are examples of two deputies who sought to allocate budget resources, to a large extent, to the region where they had a better electoral performance. It is interesting to note the allocation pattern of Deputy Adriano Galdino (PSB) since he seeks to allocate most of the resources in both legislatures, where he obtained the best electoral performance. This deputy presented different voting patterns in the 2010 and 2014 elections and chose, in both legislatures, to allocate budget resources according to the spatial distribution of his votes, contemplating the municipalities in which he had the best electoral performance.

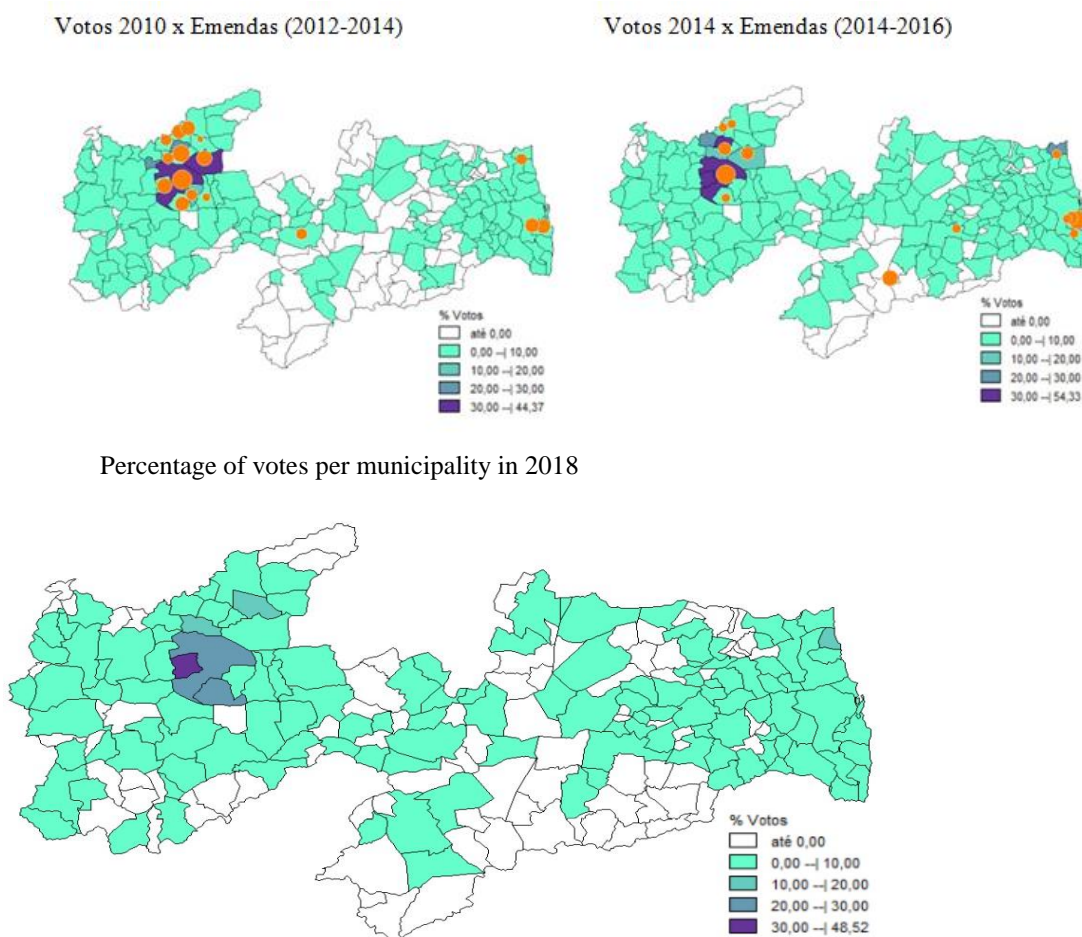
In 2010, Adriano Galdino (PSB) obtained 21,330 votes, the vast majority being restricted to only eight municipalities in which he obtained 84.14% of his votes (Pocinhos, Areal, Montadas, Piancó, Puxinanã, Conceição, Fagundes, and Campina Grande). Within this universe, the deputy allocated most of his amendments, not allocating amendments to only two municipalities, Campina Grande and Conceição, in which he obtained 6.30% and 22.81% of the valid votes, respectively. For the municipality of Pocinhos, where he obtained his highest percentage of votes (57.98%), the deputy allocated 50% of his amendments in the analyzed period.

In 2014, the deputy's voting pattern and his behavior in relation to the allocation of resources changed. He obtained 36,150 votes, an increase of 59% over the previous election and a greater dispersion of the vote in terms of relevant municipalities. He won more than 20% of the municipal votes in twenty municipalities in the state, responsible for 80.07% of his votes in this election. He obtained his highest municipal percentage in São João do Tigre, with 66.98% of the votes. This time, most of these municipalities were contemplated with amendments, and only two among the twenty locations in which the deputy received the most votes received no amendments, the municipalities of Marutéia and Cuité de Mamanguape, in which he obtained respectively 24.77% and 21.84% of the votes. In addition, the allocation took place without a large concentration of amendments in a single municipality, unlike what occurred previously with the municipality of São João do Tigre, where he received the highest vote in percentage terms, contemplated with the largest number of amendments, corresponding to only 7.2% of the amendments. Finally, in 2018, the deputy managed to increase his vote again, obtaining 39,763 votes. More than 20% of the votes were obtained in 18 municipalities and more than 10% in 24 municipalities. These municipalities were responsible for 85.04% of the deputy's votes. As per the map visualization, he obtained a similar vote dispersion to the 2014 election.

Deputy Arlen Santiago (PTB) has better electoral performance in the north of Minas Gerais (Figure 2). In 2014, the deputy obtained 86,387 votes, 79.73% of which were concentrated in municipalities where the candidate obtained more than 10% of the votes (43 municipalities), noting that Minas Gerais is the state of the federation that has the highest number of municipalities in the country (853). In addition, the deputy allocated 78.57% of his

amendments to municipalities in which he obtained at least 5% of the votes and none of the amendments went to municipalities in which he obtained less than 1.5% of the valid votes. The municipalities in which he obtained the best electoral performance and allocated budget amendments were Matias Cardoso, Vargem Grande do Rio Pardo, Santo Antônio do Retiro, Fruta de Leite, and São João do Paraíso, with 43.47%, 37.65%, 37.58 %, 33.38%, and 30.88% of valid votes, respectively. The map shows his higher electoral performance in the north of Minas, a performance that was repeated in 2018, as the composition of the maps in relation to the percentage of votes practically remains unchanged when we compare both elections (Figure 2).

Figure 3 – Maps with the overlap between voting and amendments for Deputy Janduhy Carneiro (PTN) – PB



Source: elaboration of the authors according to data from the TSE and the Legislative Assemblies of PB and MG, 2020.

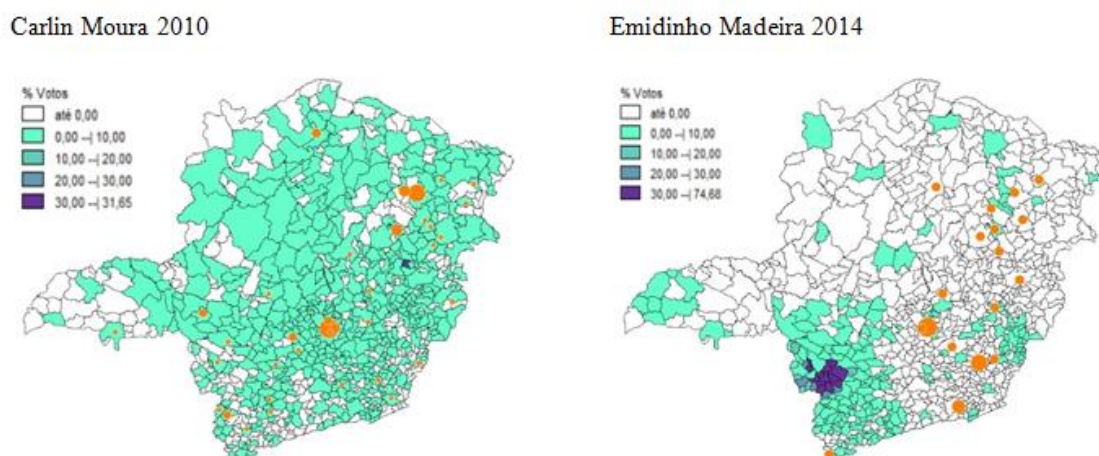
Figure 3 shows a case of a deputy who allocates resources in his strongholds but also seeks to direct them to other municipalities. Part of the literature understands that this type of strategy is carried out to gain access to new electoral strongholds. It should be noted that the deputy was not reelected in the 2018 election, remaining as an alternate.

In the case of deputy Janduhy Carneiro (PTN), the maps in Figure 3 show that, despite

allocating most of his amendments in the Sertão Paraibano region, where he has better electoral performance, he also allocated amendments on a different spatial basis than can be considered its primary stronghold. This behavior is intensified when verifying the differences between the voting and allocation of amendments in the 2010 and 2014 elections, the latter highlighting a visual decrease in the number of amendments allocated in his primary strongholds and an increase in the regions in which he initially (2010 election) allocated fewer amendments.

In the 2010 election, the deputy obtained 14,646 votes, 84.54% of which originated from just ten municipalities. In addition, the parliamentarian allocated 59.15% of his amendments to these municipalities, showing a certain propensity to allocate resources where he has the best performance. However, it should be noted that the parliamentarian also allocated resources where he obtained a very weak vote, such as in Lagoa, Mataraca, Bom Sucesso, Taperoá, and Riacho dos Cavalos, where he obtained, respectively, 0.95%, 0.71 %, 0.11%, 0.03%, and 0.61% of the votes. He allocated 18.3% of his amendments to these municipalities in the period. In the 2014 election, the deputy obtained 15,797 votes, 84.89% of which were in twelve municipalities, practically repeating the scenario of the previous election. The pattern of amendment allocation remained the same. The deputy allocated 58.3% of his amendments to the 12 municipalities where he received the most votes but sought once again to allocate amendments where he received low votes, such as the municipalities of Conde (0.65%), Catolé do Rocha (0.54%), Brejo dos Santos (0.25%), and Campina Grande (0.19%). The parliamentarian even allocated amendments in a municipality where he received no votes (São Domingos do Cariri). It should be noted that the deputy was not reelected in the 2018 election, remaining as an alternate, presenting the same spatial pattern of voting seen in the 2018 election.

Figure 4 – Maps with overlapping between voting and amendments for deputies Carlin Moura (PC do B) and Emidinho Madeira (PT do B)



Source: elaboration of the authors according to data from the TSE and the Legislative Assemblies of PB and MG, 2020.

As examples of diffuse allocation of resources by the electoral district, we can mention the cases of deputies Carlin Moura, from PC do B (2010 votes and 2012-2014 amendments) and Emidinho Madeira, from PT do B (Votes of 2014 and amendments 2014-2016), both from Minas Gerais. As can be seen in Figure 4, both parliamentarians allocated the amendments diffusely in the electoral district. Here, the difference between the two deputies regarding the allocation of amendments is highlighted. While Carlin Moura, who had a dispersed vote throughout the electoral district, also distributed the amendments in a dispersed way, deputy Emidinho Madeira, despite having a vote concentrated in the south of Minas de Gerais, chose to allocate the vast majority of amendments to other regions of the state.

Carlin Moura (PC do B), in the 2010 election, obtained 19,086 votes, and it took 70 municipalities to obtain 79.83% of that amount, thus showing a very dispersed vote across the state. Regarding the allocation of amendments, he allocated only 23.52% to municipalities where he obtained more than 1% of the votes, thus privileging locations where he obtained low votes. The congressman even stopped allocating amendments in municipalities where he obtained a relevant vote, such as the case of Virgolândia, in which he obtained 31.65% of the valid votes. Deputy Emidinho Madeira (PT do B) obtained 65,677 votes, with 82.79% of that number in municipalities where he obtained more than 10% of valid votes. However, he did not allocate amendments, in the period, to the 22 municipalities in which he obtained the most votes. Regarding the allocation of amendments, the congressman allocated 70.83% to municipalities in which he did not obtain any votes, showing a total disconnect between his voting pattern and the allocation of amendments directly to the municipalities.

After presenting the empirical universe and identifying different types of parliamentary behavior in relation to the allocation of amendments, it is necessary to carry out statistical tests. It seeks to verify, more specifically, whether the spatial pattern of voting is capable of influencing the distribution of budget resources by state parliamentarians in Minas Gerais and Paraíba in the analyzed period.

4. The effect of voting geography on resource allocation

The research proposal was to study the possibility of using the electoral connection as an explanatory key to parliamentary behavior and whether the allocation of budgetary resources has relevance in the electoral success of state deputies in the states of Minas Gerais and Paraíba.

Data on voting patterns and the geographic distribution of votes of state deputies from both states will be presented and analyzed. In this sense, the voting patterns are analyzed from the "dominance" vector using the index already described in the methodology of this work. Next, the relationship between the voting pattern, through the dominance index, and parliamentary behavior regarding the allocation of budget amendments to municipalities was analyzed. It is a question of whether and to what extent the different types of voting motivate

different strategies in the actions of ALMG and ALPB deputies. Thus, the object of analysis of this work is well outlined. Therefore, its results cannot be generalized to the set of state parliaments in the country, although they indicate possible research agendas in this sense.

4.1. Relationship between amendments and electoral dominance

We analyzed the dominance patterns between the state deputies of the two states in the 2010 and 2014 elections and the interaction between voting and the allocation of individual amendments to the budget in the 2011-2014 and 2015-2018 legislatures. We decided to include all municipalities in the calculation to avoid establishing a discretionary cut-off point, which could bias the analysis.

The first term of the index measures the level of dominance of the deputy relative to his competitors in each municipality and not the level at which the municipality is or is not dominated by one or more deputies. Therefore, the deputy is the unit considered for calculating the index, not the municipality. Thus, once the deputy calculations are made for each municipality, the values must be weighted by the importance of the municipality's vote in the total vote of the candidate in the state, thus obtaining the deputy index for the entire state. Thus, the more a deputy "dominates" the municipalities that contribute the most to his vote, the higher their dominance index (DI).

Table 9 shows that the average dominance index for both states was 0.19, indicating a high vote dispersion and low dominance in the municipalities in the 2010 and 2014 elections since the closer the DI value is to zero, the less dominant the deputy's vote will be¹⁴. In this sense, according to Ames (2003), the deputies would have as standard a dispersed non-dominant or dispersed dominant vote. In the first case, the vote is spread over many districts, while none of these districts is dominant; that is, the deputy does not present a majority vote in the municipalities in which they are voted. In the dominant dispersed vote, the deputy presents geographical dispersion of their votes but manages to be a majority in a considerable number of municipalities where they effectively receive the votes.

¹⁴ The Ames index varies between 0 and 1. The closer to 1, the more dominant the candidate's vote.

Table 9 - Overview of the Dominance Index (DI) variable

		Value
Standard attributes	Position	20
	Label	Dominance Index
N	Valid	71,644
	Silent	0
Dispersion and central tendency	Mean	.19
	Standard deviation	.11
	25th percentile	.09
	50th percentile	.19
	75th percentile	.27

Source: elaboration of the authors according to TSE data (2020).

A significant number of cases were analyzed in the joint assessment of the states (N = 71,644). When federal units disaggregate the analysis, the largest magnitude of the electoral district of Minas Gerais is noticeable since it corresponds to 78.8% of the data set (N = 56,480). On the other hand, Paraíba was responsible for 15,164 cases due to a smaller number of municipalities (223). Concerning the average DI, the values of both states were very close, with Paraíba presenting an average of 0.20 and Minas Gerais with an average of 0.19. Regarding the maximum values, Minas Gerais presents a higher DI, reaching up to 0.59, while, in Paraíba, the maximum value is 0.42 (see Tables 10 and 11).

Table 10 – DI in Minas Gerais

	N	Minimum	Maximum	Mean	Standard deviation	Variance
	Statistics	Statistics	Statistics	Statistics	Statistics	Statistics
Dominance Index	56,480	.01	.59	.19	.118	.014
N valid (listwise)	56,480					

Source: elaboration of the authors according to TSE data (2020).

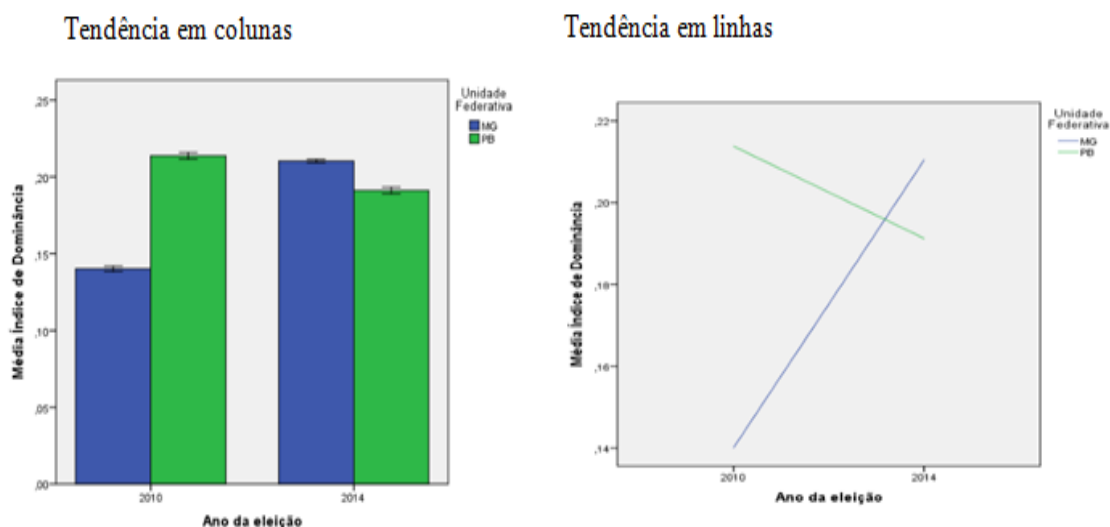
Table 11 - DI in Paraíba

	N Statistics	Minimum Statistics	Maximum Statistics	Mean Statistics	Standard deviation Statistics	Variance Statistics
Dominance Index	15,164	.01	.42	.20	.107	.010
N valid (listwise)	15,164					

Source: elaboration of the authors according to TSE data (2020).

We verified whether there was a variation in the average between states in both analyzed elections (2010 and 2014). There is a different pattern of evolution for the member states in both elections when comparing the columns and trend lines for the two states in Graph 9. In the case of Minas Gerais, the average DI increased from 0.14 in 2010 to 0.21 in 2014. On the other hand, there were a decrease from 0.21 in 2010 to 0.19 in 2014 in Paraíba, very close values. In terms of the variable analysis, the increase in data in Minas Gerais does not represent a marked trend of greater dominance by the deputies since even the highest average of 2014 still represents a low value of the DI.

Graph 9 – Change in the DI averages between 2010 and 2014



Source: elaboration of the authors according to TSE data (2020).

Note: Trend in columns; Trend in lines; Dominance index mean; Year of election.

We chose the inferential statistical method of *Spearman* correlation (nonparametric test) to interpret the relationship between amendments and DI in the 2011-2014 and 2015-2018 legislatures, considering the 2010 and 2014 elections as a reference. This test was selected because none of the variables analyzed presented normal distribution. The following parameter was used to classify the degree of correlation, that is, the strength between the variables: weak correlation when $0 < r < 0.4$; moderate correlation when $0.4 < r < 0.7$; strong correlation when $0.7 < r < 1.0$. Correlations with statistical significance were those with $p < 0.05$ and a moderate or strong degree of correlation¹⁵. The same classification is used for negative values up to -1 ¹⁶.

Initially, an association test was performed between the variables for the entire data set. Subsequently, we sought to disaggregate the data by state and election year to understand if there is a significant change between the two periods analyzed.

Table 12 – Correlation coefficient of *Spearman* ($r\hat{o}$) between the variables of the number of amendments and DI

		Total		
		Dominance Index	amendments	
<i>Spearman</i> $r\hat{o}$	Dominance	Correlation coefficient	1.000	.003
	Index	Sig. (bilateral)	.	.352
		N	71,644	71,644

Source: elaboration of the authors according to data from the TSE and the Legislative Assemblies of PB and MG, 2020.

The data in Table 12, which includes the entire analysis universe, indicate a very weak positive correlation (0.003) between the variables and has no statistical significance. This result can be observed from the p-value (sig) of 0.352, therefore higher than 0.05. Thus, it can be admitted that for the States analyzed within the period; the DI is not enough to explain the pattern of amendment allocation since it was expected that the parliamentarians with the highest DI would also take the amendments to the municipalities in which they have a greater dominance in the vote.

¹⁵ Siqueira AL, Tibúrcio JD. Statistics in health: concepts, methodology, applications, and computational practice. Belo Horizonte (MG). Coopmed. 2011.

¹⁶ This coefficient varies between -1 and 1. The closer to these extremes the coefficient is, the stronger the association between the variables. A value of zero means that there is no correlation.

Table 13 – Correlation coefficient of *Spearman* ($r\hat{o}$) between the variables of the number of amendments and DI for MG

Federative unit = MG, year of election = 2010

			Dominance Index	Total amendments
<i>Spearman</i> $r\hat{o}$	Dominance Index	Correlation coefficient	1.000	.014
		Sig. (bilateral)	.	.093
		N	14,683	14,683

Federative unit = MG, year of election = 2014

			Dominance Index	Total amendments
<i>Spearman</i> $r\hat{o}$	Dominance Index	Correlation coefficient	1.000	-.004
		Sig. (bilateral)	.	.383
		N	41,797	41,797

Source: elaboration of the authors according to data from the TSE and the Legislative Assemblies of PB and MG, 2020.

The test result in Table 13 showed a difference in the sign of the correlation between both variables. In 2010, the correlation coefficient was 0.14, showing a weak positive correlation between DI and amendments. In 2014, the negative value of the correlation coefficient indicated an inverse statistical relationship between the variables. Moreover, it is concluded that the correlation has no statistical significance, presenting a p-value greater than 0.05 for 2010 and 2014 (0.09 and 0.38).

Table 14 – Correlation coefficient of *Spearman* ($r\hat{o}$) between the variables of the number of amendments and DI for the PB

Federal unit = PB, year of election = 2010

			Dominance Index	Total amendments
<i>Spearman</i> $r\hat{o}$	Dominance Index	Correlation coefficient	1.000	.050**
		Sig. (bilateral)	.	.000
		N	6,690	6,690

** . The correlation is significant at the level of 0.01 (bilateral).

Federal unit = PB, year of election = 2014

			Dominance Index	Total amendments
<i>Spearman</i> $r\hat{o}$	Dominance Index	Correlation coefficient	1.000	-.024*
		Sig. (bilateral)	.	.029
		N	8,474	8,474

Source: elaboration of the authors according to data from the TSE and the Legislative Assemblies of PB and MG, 2020.

Note: *. The correlation is significant at the level of 0.05 (bilateral).

Table 14 shows the data from Paraíba, where the only values with some statistical significance were found since the significance (p-value) for 2010 and 2014 is less than 0.05 (0.00 and 0.02, respectively). However, the significance of this type of correlation may have its value relativized. Having a value lower than 0.05 only indicates that the correlation is not equal to 0, and it may still be a weak correlation. It is precisely what happens in this case since the correlation coefficients are 0.05 for 2010 and - 0.02 for 2014. As already pointed out, a moderate correlation is only considered when its coefficient is more significant than 0.4 and strong when greater than 0.7.

The expectation is that the higher the DI, the more the deputy directs resources through amendments to the municipalities in which they have the highest vote. If this were the case, and the correlation between the variables was moderate or strong, one could invest in an econometric model through regression to predict trends. However, in this case, the weak correlation between the variables does not allow us to refine this analysis further. Thus, based on the data analyzed, the DI is not enough to explain the pattern of amendment allocation since it was expected that the parliamentarians with the highest DI would also take the amendments to the municipalities in which they have a greater dominance in the vote. The maps presented show how this occurs. There is no definite pattern of behavior considering only the spatial

component of voting. There are cases in which parliamentarians allocate the amendments predominantly where they have the most significant vote. However, there are also cases where they distribute the amendments to their strongholds and disseminate them throughout the electoral district. There are even those in which there is no standardization between the allocation of amendments and votes.

5. Final remarks

The research sought to investigate whether there is a relationship between the electoral performance of state deputies and the presentation of individual amendments to the state budget in the states of Minas Gerais and Paraíba in the last two legislatures. In this sense, the research began with the following research problem: are individual amendments to the budget an essential part of the deputies' strategy to reward the regions where the parliamentarian obtained the best electoral result and guarantee support for future elections?

The study presented the following main hypothesis to answer this question: parliamentary amendments are an important political strategy state parliamentarians use to maintain and win electoral bases during two consecutive legislatures.

Part of the literature (AMES, 2003; PEREIRA; MUELLER, 2002; PEREIRA; RENNÓ, 2001) indicates that the use of amendments, even in a limited way, is a primary variable in understanding the causes of reelection in Brazil. Other authors (LIMA BAIÃO, 2016; MESQUITA, 2008; SANFELICE, 2010) found no significant effect of the amendments on voting in their empirical studies. This effect would have a clear tendency to dissipate in the most rigorous models.

Maps constructed in the *Tabwin* program were used to superimpose in layers amendments and the percentage of votes of each deputy in the municipalities to verify the allocation of the amendments of each one in contrast to its voting pattern. Subsequently, statistical tests showed whether the spatial distribution of the votes of a deputy could influence the allocation of individual amendments to the budget. These data refer to the 2010 and 2014 elections and amendments to the legislatures that follow those elections.

The occurrence of divergences between both states regarding the form of allocation of the amendments was initially verified based on this methodology. The ALMG showed a more significant role of collective authors in the presentation of amendments (committees, parliamentary blocs, etc.), corresponding to 24.8% of the amendments. In the ALPB, as a rule, parliamentarians seek to act individually (97.7% of the amendments). Although the amendments are associated in the literature as if they had the municipalities as their sole destination, this is not their exclusive destination. Amendments can be directed to state agencies, secretariats, and foundations to cover pre-established programs. In the case analyzed, there is a significant discrepancy in its destination. The data indicate a diverse behavior between states. While in

ALMG, most of the amendments are destined directly to government secretariats, organs, and entities (72.82%), in ALPB, we have an inverse situation, with 86.3% of the amendments destined directly to the municipalities. Therefore, individual amendments are not always allocated to the electoral strongholds of deputies.

Carvalho (2003) concludes that amendments can be vital in interpreting these data. By studying how competition occurs in electoral districts, the author concludes that there is a tendency in metropolitan districts and those with better socioeconomic indicators in which the policies proposed by parliamentarians are more universalist. At the same time, in municipalities with worse indexes and characterized as regions of little urbanization, there is a tendency to offer policies specific to the districts to raise new strongholds since electoral competition is lower in these cases. An alternative to this behavior is that the parliamentarians also consider the capacity of the municipality to receive the resources and execute them appropriately since the municipalities submit to a series of requirements to obtain transfers from the government. Therefore, this institutional factor would make municipalities with a deficit structure less able to receive resources (BERTHOLINI; PEREIRA; RENNÓ, 2018; LIMA BAIÃO; COUTO; OLIVEIRA, 2019).

With the analysis of the maps constructed for each deputy, it is visually possible to verify the behavior of each parliamentarian concerning the amendments they send to the municipalities in contrast to the percentage of their votes. Thus, the maps of the deputies who presented amendments directly to the municipalities in Paraíba and Minas Gerais, in the analyzed legislatures, showed, in summary, three different types of behavior: 1. The deputy allocates budgetary resources in their electoral strongholds, according to the distributive perspective; 2. The deputy allocates resources in their strongholds but also seeks to place them in other municipalities in search of new supporters, which is supported by the literature; 3. There is no relationship between the allocation of resources, which is done diffusely by the district, and the voting of the deputy.

Statistical tests were performed regarding the primary research hypothesis after presenting the empirical universe and identifying the types of parliamentary behavior regarding the allocation of amendments. We sought to verify, more specifically, whether the spatial pattern of voting, investigated through the dominance index of each deputy (DI), could influence the distribution of budget resources by the state parliamentarians of Minas Gerais and Paraíba. The average dominance index for both states was 0.19, which indicates a high dispersion in the vote and low dominance in the municipalities in the 2010 and 2014 elections since the closer the DI value is to zero, the less dominant the deputy's vote will be. When we disaggregated the analysis by the federative units concerning the average DI, the values of both states were very close, with Paraíba presenting an average of 0.20 and Minas Gerais with an average of 0.19. Regarding the maximum values, Minas Gerais presents a higher DI, reaching

up to 0.59, while, in Paraíba, the maximum value is 0.42.

We chose the inferential statistical method of *Spearman* correlation (nonparametric test) to interpret the relationship between amendments and DI in the course of legislatures. This test was selected because none of the variables analyzed presented normal distribution. The data, which includes the entire analysis universe, indicates a very weak positive correlation (0.003) between the variables and has no statistical significance. This result can be observed from the p-value (sig) of 0.352, therefore higher than 0.05. Thus, it can be admitted that for the states analyzed within the period, the DI is not enough to explain the pattern of amendment allocation since it was expected that the parliamentarians with the highest DI would also take the amendments to the municipalities in which they have a greater dominance in the vote. When disaggregating the analysis by states, it was verified that the correlation coefficient in the case of Minas Gerais in 2010 was 0.14, showing a weak positive correlation between DI and amendments. In 2014, the negative value of the correlation coefficient indicated an inverse statistical relationship between the variables. Moreover, the correlation has no statistical significance, presenting a p-value greater than 0.05 for 2010 and 2014 (0.09 and 0.38). The data from Paraíba show only values with some statistical significance since the significance (p-value) for 2010 and 2014 is less than 0.05 (0.00 and 0.02, respectively). However, the significance in this type of correlation may have its value relativized, given that a value lower than 0.05 only indicates that the correlation is not equal to zero and may still be a weak correlation. This is precisely what happens in this case since the correlation coefficients are 0.05 for 2010 and - 0.02 for 2014.

Thus, the data presented show that the DI is not enough to explain the pattern of amendment allocation since it was expected that the parliamentarians with the highest DI would also take the amendments to the municipalities in which they have a greater dominance in the vote. The maps show that there is no defined pattern of behavior when considering only the spatial component of the vote. There are cases in which parliamentarians allocate the amendments predominantly where they have the largest vote. However, there are also cases where they distribute the amendments to their strongholds and disseminate them throughout the electoral district. There are even those in which there is no standardization between the allocation of amendments and votes.

There is a weak correlation between amendments and votes for both states. This dissipation of the effect between amendments and votes has been identified in the literature (BAIÃO, 2016; MESQUITA, 2008; SANFELICE, 2010). Lima Baião, Couto, and Oliveira (2019) highlight that a possible research agenda is a possibility that the amendments do not only aim at votes in the beneficiary municipality and that, even when this electoral purpose exists but the connection with the voter also occurs indirectly and mediated by the mayor.

However, one caveat must be made. The distributive component of the Brazilian

political system should not be refuted as a whole. In this sense, in recent research on the amendments from the Chamber of Deputies, Mattos, Politi, and Morata (2021) identified that in addition to the distributive component, the birthplace of the incumbent also matters, being a driver of behaviors of localized favoritism to a certain extent since the incumbent aims to run for municipal executive elections.

Carvalho (2003), in an important caveat, states that there are multiple incentives in the electoral arena in Brazil that generate multiple behaviors in the legislative arena. Parliamentarians can move towards universalism and parochialism by having a multifaceted electoral connection with the issuance of the party and distributive incentives.

In conclusion, this study presents limited results since proof of a subnational pattern in the relationship between amendments and votes would require a broader evaluation that incorporates a greater number of legislatures analyzed and a higher number of legislative assemblies.

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