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Abstract

The objective of this paper is twofold. First, it investigates whether politicians use amendments to the federal budget as a strategy to maintain and expand their political capital. Second, we check if this strategy pays off in the sense that voters electorally reward politicians that benefit their municipalities in the federal budget. In a broad aspect, our study analyzes the politicians strategies and the voters preferences over these strategies by empirically testing the existence of a relationship between electoral performance of Brazilian deputies and authorship of past and future amendments to the federal budget. More specifically, we first analyze whether municipalities that were important in the election of a candidate are benefited with more amendments. Second, if deputies seeking re-election are supported by municipalities that were benefited by amendments in the previous term. Our results indicate that politicians tend to favor municipalities that were important in their elections and that voters vote for candidates who have brought more resources to their localities, but such a behavior of voters is not enough to increase the chances of re-election.

Keywords: voter's preference, pork barrel, politician's strategies.

Introduction

It has been well-established by the empirical literature that incumbent politicians have some advantages in elections. Fiscal policy has been typically the channel incumbents use to influence voters in elections for the executive branch. Under a district electoral system, the pork-barrel literature has documented that for legislative seats public expenditures are an important mechanism used to canvass voters. The major goal of this paper is to investigate whether fiscal policy is used as an effective strategy whereby incumbent congresspeople obtain voters' support in Brazil, a country that does not use a district electoral system for its Chamber of Deputies. In particular, we assess the relationship between amendments to the federal budget and the electoral outcomes of deputies who proposed such amendments.

A possible mechanism to influence voters investigated in the literature is through public deficits, which would result in electoral cycles on public spending. However, Brender and Drazen (2005), after analyzing a sample of 74 countries over a 43-year period, did not find evidence that public deficit in an election year or in non-electoral periods increases the chances of re-election of executive branch members. As a matter of fact, results show that in more developed democracies the effect is negative, i.e., voters punish those politicians who elevate the budget deficit. For Brazil, Sakurai and Menezes-Filho (2007) show that expenditures in an electoral year tend to reduce the chances of re-election for local executive positions, whereas expenditures in non-electoral years seem to benefit the incumbent. Thus, the increase in fiscal outlays does not appear to be an efficient mechanism for local executive positions. Nevertheless, voters may have preferences over the expenditure composition and not necessarily only over the total amount spent. In several countries, the increase of investment expenditures and the

reduction of current expenditures have a positive effect.[1] Meneguin, Bugarin and Carvalho (2005) demonstrate that voters in Brazilian municipalities tend to disapprove cost expenditures and extol investment expenditures, which are electorally visible. This way, fiscal manipulation can occur in alternative ways in order to not produce public budget deficit, since voter's choice is likely based on the composition and/or distribution of budget resources.

In the legislative branch, in which total expenditures are not so flexibly determined as in the executive branch, the use of fiscal policy for electoral purposes often occurs via distribution of resources through amendments to the budget. Congresspeople can focus on a specific group of voters, benefiting this group to the detriment of the others. In the U.S. literature, this practice, known as pork-barrel, involves funding for government programs targeted at a geographically specific group in exchange for political support for a candidate, either via campaign contributions or votes. While benefits are restricted to a specific location, costs are paid by all taxpayers.[2]

In the U.S., pork barrel usually occurs through agricultural subsidies and engineering projects (e.g., construction of roads). Most studies in that country show a connection between the benefits assigned to a region and the support for the congressperson during election.[3] As shown by Leigh (2008), a similar phenomenon is also observed in Australia. Not surprisingly, Australia is a country that has a representation system akin to that of U.S., in which only one member is chosen for each electoral district. In this system, there is a direct connection of a politician with a given region, since each location elects its representative.

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[1] See Katsimi and Sarantides (2012), Khemani (2004) and Peltzman (1992).
[2] The pork-barrel literature, started with Mayhew (1974), is quite extensive. A list with some of the most important contributions can be found in Bickers et all (2007).
[3] For example, Fiorina (1981), Cain, Ferejohn and Fiorina (1987) and Stein and Bickers (1994).

However, this connection is not well documented in countries whose election for the Legislative occurs in electoral districts with large geographical dimensions and with various parties/candidates elected in a single multimember district. The Brazilian case offers that study opportunity, as Brazil adopts a party-open-list proportional representation system for congressional elections. It is not clear in this case whether congresspeople have incentives to use the fiscal policy targeted at a geographically specific group of voters. Notwithstanding, as shown by Ames (1995a and 1995b) in his analysis of the Brazilian case, there might be informal electoral districts, smaller than the formal district, on which the politician focuses his/her efforts, and where voters eventually reward him/her for that. According to Latner and McGann (2004), two are the major reasons for candidates to seek regional representation in a system with multiple representatives per district. In terms of electoral competition, it could be advantageous for a party to have candidates running for elections in different regions, as this maximizes the total number of votes won by the party. Moreover, inner party competition can stimulate regionalization of candidates, preventing two candidates from the same party from fighting over the same voters.

In Brazil, Congress elections follow the open-list proportional representation system. Voters cast single ballots either for the party label or for individual candidates. Parties can form election party coalitions. The number of votes individual candidates receive determines the order of candidates on the party coalition list. The D'Hondt method determines the number of seats each coalition obtains. Electoral districts are constituted of the country's states, which elect representatives according to the population size of the state, although heavily populated states, such Sao Paulo, are typically underrepresented. Once elected, the key tool that a congressperson has to assign federal resources towards a specific region of electoral interest is through

amendments to the federal budget. The amendments proposed by congresspeople are concerned with changes to the Draft Budget Law (henceforth PLO) drawn up by the Executive Branch.

We could wonder why voters have a backward looking behavior, i.e., why they are worried about what a candidate did in a previous term, instead of having a forward looking behavior and look at candidate's future projects in his/her next term in office. In this respect, Drazen and Eslava (2006) support a theoretical model, in which voters try to infer what the future benefits will be, based on values transferred during the politician's term in office. In this model, it is assumed that politicians have unobservable preferences for locations and that these preferences persist over time. Therefore, a voter who believes he/she had some benefit during the incumbent's term will expect something similar in the expenditure composition after re-election. Their theoretical results indicate that, under informational asymmetry, if voters are affected by public funds, these past expenditures increase the number of votes for the incumbent, even if the electorate perceives the politician's electoral interest. In addition, results show that the incumbent should focus on the group of voters that are more easily influenced before the elections.

Some studies seek to associate the composition of the Brazilian budget with the congresspeople's political interest. More precisely, these studies try to determine the relationship between the amendments and electoral performance.[4] Nonetheless, there is no consensus agreement between the findings that amendments contribute to increasing the chances of re-election of a deputy. Furthermore, these studies, except for Ames (1995a and 1995b), assess the aggregate outcome of the candidate in the electoral district. Consequently, it is not possible to directly measure the relation between regionally assigned funds and local political returns for the deputy.

[4] Some examples are Ames (1995), Pereira and Rennó (2003), Samuels (2002) and Mesquita (2008).

Using electoral and local results for the actions of federal deputies, this paper investigates the relationship between amendments to the federal budget assigned to municipalities and local electoral outcomes of candidates running for the Brazilian Chamber of Deputies. This study comprises the 50th, 51st, 52nd and 53rd terms in office and five elections for the Chamber of Deputies (1994, 1998, 2002, 2006 and 2010).[5]

Two questions are looked into more detail in this paper. First, whether politicians tend to "bring home the bacon." We show that municipalities that are able to elect candidates that are "associated" with their voters increase their share of the federal budget.[6] That happens because deputies tend to allocate resources towards the localities that have massively voted for him/her in the previous elections. We exploit a discontinuity in the election rule for congress that guarantees an exogenous variation in the number of elected deputies that are linked to a given municipality. We show that this relationship is stronger in localities where political concentration is more pronounced. By using a regression discontinuity design, we are able to overcome the concern that unobservable characteristics of candidates and of municipalities would be systematically related to both electoral performance and the capacity of the candidate to propose amendments.

The second question assessed in this paper is whether voters support incumbent candidates who have proposed the amendments applied to their region. We look into longitudinal data in order to capture the fixed unobserved characteristics of candidates and municipalities and find evidence that those deputies who were able to "bring home the bacon" are electorally rewarded in the benefited municipalities. However, given the size of the electoral district, this

[5] The 50th, 51st, 52nd and 53rd terms of office correspond to years 1995-98, 1999-2002 and 2003-06 and 2007-10, respectively.
[6] In the following sections we provide a precise definition of association between candidates and municipalities.

local effect is not enough to increase the chances of re-election of these deputies, which is in line with previous results using aggregated data.

Therefore, the final goal of this paper is to unveil the relationship between votes and local public spending in both ways, i.e., from the voters and politicians perspectives. The empirical strategies used in this study allows us to identify, under weak assumptions, if the median voter react to public sending in his municipality and if the politicians use the electoral preference over this local public goods and services as a strategy for reelection.

The paper proceeds as follows. Next section describes the datasets used in this paper. It shows descriptive statistics of the personal, political and electoral characteristics of Brazilian Federal Deputies and also from the Federal Budget Amendments. The section Empirical Strategy discusses the identification strategies used in this paper in order to estimate the voters' preference and the politicians' reaction to those preferences. The Results section shows and interpret the results found. The last section concludes.

Data

The data used in this paper come from two different sources. The data on votes, electorate, and candidates were obtained from the Superior Electoral Court (TSE). The data on the federal budget, specifically on the implementation of amendments to the federal budget, were obtained from the Brazilian Chamber of Deputies, from which information on the political history of candidates was also collected.

The study includes four budget cycles (1995-1999, 1999-2003, 2003-2007 and 2007-2011)[7] and the Brazilian elections for the Chamber of Deputies (1994, 1998, 2002, 2006 and

[7] The budget execution for 2011 was not used.

2010). Data on the application of individual amendments to the budget proposed by deputies were collected. The destination of these funds could be national, regional, state or local programs. Special attention was paid to amendments whose geographical destination is a municipality in the candidate's electoral district.

In this paper, the realized monetary value of the amendment will be that registered in the budget data as *paid up*, adjusted accordingly so that the realized total cost does not exceed the limit established for each deputy, in compliance with the regulations of amendments to the budget.

Federal Deputies

A total of 513 seats are allocated in the Chamber of Deputies in each election. Of the deputies elected in 1994, 1998, 2002 and 2006, 75%, 73%, 77% and 73% ran for the same position in the subsequent election, respectively.[8] Table 1 shows the characteristics of federal deputies that will be analyzed in this paper.

As can be seen, around three fourths of elected deputies run for the same position in the subsequent election. This group of politicians differs, to some extent, from those who do not run for re-election, in terms of the percentage of nominal votes obtained in their electoral district and of the realized values of amendments. Deputies who do not run for the subsequent election are those who, on average, had the largest number of votes in their electoral district. This result is observed in all of the analyzed periods. Except for the 2007-2011 term, the deputies who ran for re-election had a larger realized value in local amendments. Possibly, those politicians who decide not to take part in the subsequent election are also those who are often more absent from

[8] The re-election rate calculated by the authors was based on TSE data.

the Chamber of Deputies in order to take on other positions in the political arena; therefore, they are less likely to amend the budget. A second explanation, which is not further investigated in this paper, is that, since they are not interested in getting re-elected, these deputies do not use this type of public policy for electoral purposes.

Table 1 – Characteristics of elected deputies according to election and to those who ran for re-election and those who did not.

	Elected in 1994				Elected in 1998				Elected in 2002				Elected in 2006			
	All elected	Seeking re-election	Not seeking re-election	Difference	All elected	Seeking re-election	Not seeking re-election	Difference	All elected	Seeking re-election	Not seeking re-election	Difference	All elected	Seeking re-election	Not seeking re-election	Difference
Seeking re-election	0.75	-	-		0.73	-	-		0.77	-	-		0.73	-	-	
	(0.019)				(0.020)				(0.018)				(0.020)			
% of votes in electoral district	0.03	0.03	0.04	-0.01***	0.03	0.03	0.04	-0.01***	0.03	0.03	0.05	-0.02***	0.03	0.03	0.04	-0.01***
	(0.001)	(0.001)	(0.003)		(0.001)	(0.001)	(0.003)		(0.004)	(0.003)	(0.01)		(0.001)	(0.001)	(0.003)	
Number of effective candidates	11.12	11.19	10.92	0.26	11.73	12.24	10.34	1.90*	13.95	13.79	14.51	-0.72	14.18	14.37	13.68	0.69
	(0.481)	(0.548)	-1002.00		(0.513)	(0.613)	(0.921)		(0.64)	(0.698)	(1.51)		(0.652)	(0.753)	-1302.00	
Amendment to municipality in electoral district	3.66	3.92	2.87	1.05***	4.59	4.79	4.04	0.75***	4.85	5.08	4.11	0.97**	5.47	5.53	5.30	0.23
	(0.088)	(0.095)	(0.019)		(0.107)	(0.127)	(0.193)		(0.178)	(0.213)	(0.297)		(0.254)	(0.297)	(0.489)	
Age	47.59	47.32	48.41	-1.09	48.41	48.14	49.14	-0.99	49.83	49.46	51.06	-1.60*	51.11	50.49	52.78	-2.29**
	(0.431)	(0.48)	(0.948)		(0.411)	(0.471)	(0.831)		(0.44)	(0.495)	(0.949)		(0.485)	(0.567)	(0.923)	
Female	0.06	0.06	0.06	0.00	0.06	0.06	0.06	0.00	0.08	0.07	0.13	-0.07***	0.09	0.09	0.09	0.00
	(0.011)	(0.012)	(0.021)		(0.01)	(0.012)	(0.02)		(0.012)	(0.013)	(0.031)		(0.013)	(0.015)	(0.024)	
Undergraduate degree	0.78	0.79	0.77	0.01	0.79	0.79	0.78	0.01	0.75	0.76	0.70	0.06*	0.74	0.73	0.78	-0.04
	(0.018)	(0.021)	(0.037)		(0.018)	(0.021)	(0.035)		(0.019)	(0.021)	(0.042)		(0.019)	(0.023)	(0.036)	
Number of previous terms	1.00	1.00	1.02	-0.02	1.25	1.19	1.41	-0.22**	1.39	1.34	1.56	-0.22*	1.49	1.47	1.54	-0.08
	(0.059)	(0.068)	(0.122)		(0.06)	(0.069)	(0.12)		(0.064)	(0.072)	(0.144)		(0.072)	(0.085)	(0.137)	
Dummy for having been town council representative	0.25	0.29	0.15	0.14**	0.34	0.36	0.28	0.09	0.37	0.40	0.28	0.12*	0.46	0.47	0.43	0.04
	(0.026)	(0.032)	(0.037)		(0.03)	(0.036)	(0.05)		(0.033)	(0.039)	(0.057)		(0.037)	(0.044)	(0.067)	
Dummy for having been mayor	0.23	0.20	0.33	-0.13**	0.21	0.21	0.22	-0.01	0.19	0.20	0.18	0.01	0.32	0.31	0.36	-0.05
	(0.024)	(0.025)	(0.06)		(0.022)	(0.026)	(0.042)		(0.022)	(0.026)	(0.041)		(0.031)	(0.035)	(0.062)	
Dummy for having been state deputy	0.57	0.57	0.57	0.00	0.52	0.48	0.62	-0.14*	0.58	0.59	0.56	0.03	0.64	0.64	0.62	0.02
	(0.046)	(0.054)	(0.081)		(0.044)	(0.05)	(0.092)		(0.048)	(0.056)	(0.089)		(0.046)	(0.054)	(0.089)	
Dummy for having been governor	0.05	0.04	0.10	-0.06***	0.05	0.03	0.09	-0.06***	0.05	0.04	0.11	-0.07***	0.06	0.03	0.13	-0.10***
	(0.012)	(0.012)	(0.035)		(0.011)	(0.01)	(0.031)		(0.012)	(0.011)	(0.035)		(0.013)	(0.011)	(0.038)	
Dummy for having been senator	0.02	0.02	0.03	-0.01	0.02	0.02	0.03	-0.01	0.02	0.01	0.05	-0.04**	0.04	0.03	0.06	-0.02
	(0.008)	(0.009)	(0.015)		(0.008)	(0.008)	(0.020)		(0.007)	(0.007)	(0.02)		(0.01)	(0.012)	(0.022)	
Obs	513	385	128		513	375	138		513	394	119		513	375	138	

Note: * p<0,10, ** p<0,05, *** p<0,01.

Amendments to the Budget

Deputies show interest in the funds allocated through the amendments and spend a lot of their time trying to have them approved (Samuels, 1998). However, even though PLO expenditures are authorized, this does not necessarily imply their allocation. This decision is made by the Executive branch; so, deputies are not sure of whether their amendments will be eventually approved. After 1995, institutional changes have allowed larger decentralization of the power of PLO rapporteurs. In that same year, the number of amendments was limited to 20 and the maximum value was set to R$ 1.5 million per deputy.[9] This way, it was possible to ascertain a more uniform distribution of funds among deputies (Limongi and Figueiredo, 2002). In 2010, the maximum value was R$ 12.5 million and the number of amendments was 25 per deputy per term in office.[10]

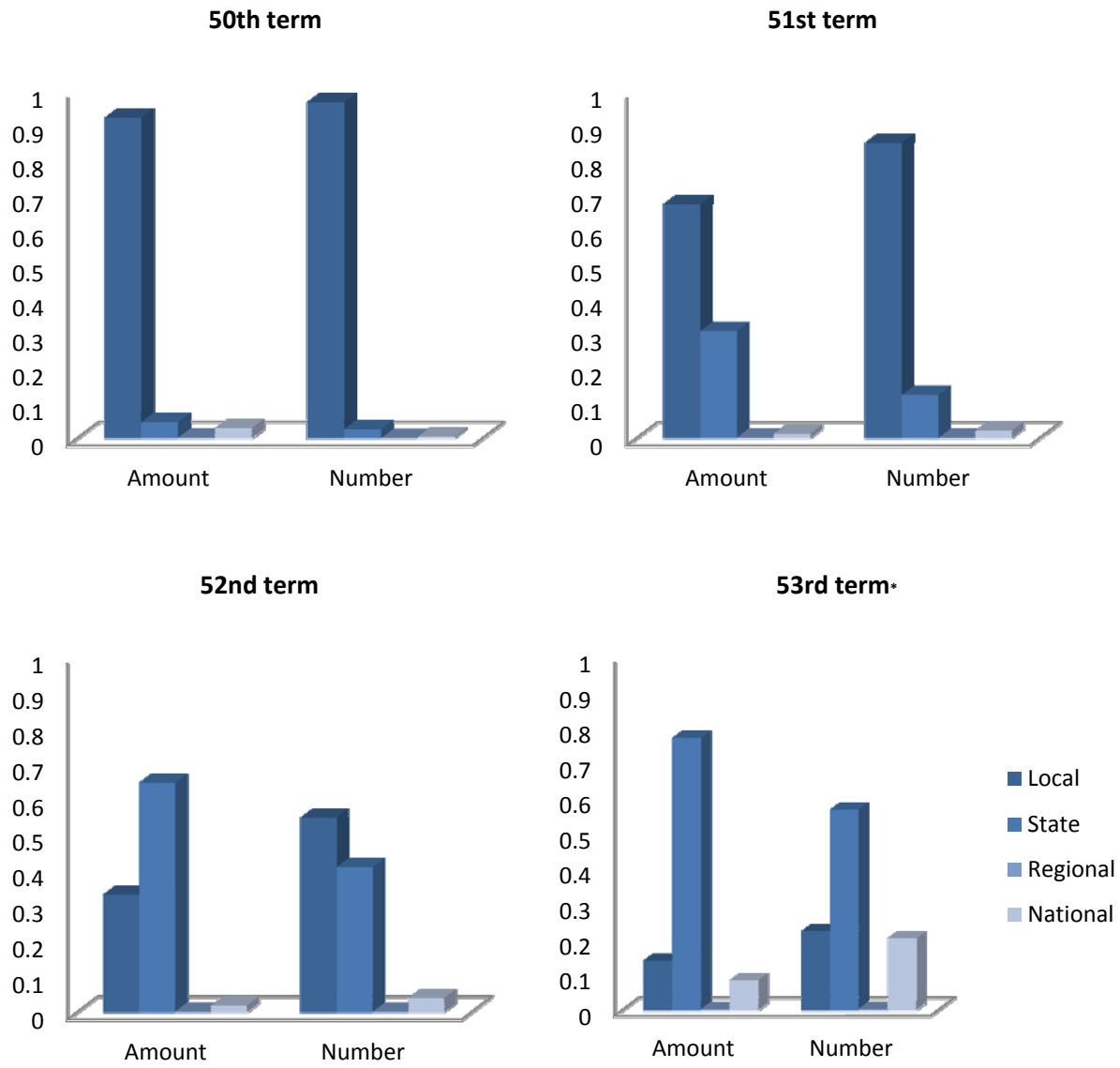
The geographical destination of individual amendments suggested by federal deputies is then investigated. The funds can be used in national, regional, state, or local projects. Figure 1 shows the percentage per value and number of allocated amendments according to geographical destination.

In the first period of budget execution analyzed, we note a large preference of deputies for local projects. The amount of funds transferred to national, regional and state programs is not significant for this period. From 1999 to 2003, the number and value of funds allocated to states went up. In the subsequent four years, individual amendments allocated to states outperformed local amendments in terms of total allocated amount. In the 53rd term, state amendments

[9] This rule came into effect in 1996 during the preparation of the budgeting plan to be executed in 1997.
[10] That value corresponds to around US$ 7.1 million PPP. The annual average exchange rate in 2010 was 1.76 BRL/USD, that is, one American Dollar would buy 1.76 Brazilian Real.

accounted for 77% of the total allocated value, whereas local amendments represented less than 20% of this value.

Figure 1 – Percentage value and number of allocated individual budget amendments by geographical destination.



*The 2011 fiscal year was not considered because the budget execution was in progress.
Note: Amount in reais with 2010 values. Value and number used - 50th term: value: 2.38 billion; number: 12,031, 51st term: value: 3.87 billion; number: 17,883, 52nd term: value: 8.24 billion, number: 20,096 and 53rd term: value: 22.27 billion; number: 44,485. The amendments were categorized by date and destination before measurements.

Although the share of local amendments fell between the 50th and 53rd terms, the value of locally allocated amendments steadily rose owed to the increase over the years in the total value available per deputy. For example, in the 1995-1999 period it reached R$ 2.2 million (in 2010 values), with individual local amendments as high as R$ 3.14 million in the last budgeting period.

There was an increase in individual amendments for national projects in the last term, which corresponded to 8% of the total allocated value. Regional amendments showed a low number and value in the four budget cycles. Naturally, politicians are expected to allocate funds to their area of influence or interest. Given that electoral districts for the election of federal representatives in the Chamber of Deputies are the Brazilian states, the preferences of politicians to allocate amendments specifically by choosing local or state programs are noteworthy, revealing that the allocation of funds is important in wooing voters.

With respect to local amendments, it is well-known that the deputy is free to allocate them to any Brazilian municipality, even if it is located outside his/her electoral district. Nonetheless, if the politician's goal is to maximize the number of votes, it would be reasonable to observe that congresspeople would rather allocate amendments to the municipalities of the state they represent. In fact, of the total number of individual amendments allocated from 1996 to 2007 only 1.29% was allocated to municipalities outside the state in which the deputy was elected. In this same period, taking into account only the local amendments proposed by deputies who are running for re-election, only 1.02% is allocated outside the states which the politicians represent. These data reinforce the idea that deputies consider budget resources to play an important role in wooing voters and, therefore, they allocate most of the amendments to municipalities of the state where their electoral district is located.

Figure 2 shows the distribution of the total allocated value in local individual amendments per deputy per term in office. The variation in the first two terms is smaller compared to the 52nd and 53th terms. In the last two budget cycles, the concentration of values below R$ 5 million is higher. Thus, while the allocation of amendments is more uniform in the 1995-1999 and 1999-2003 periods, in the last two terms, the difference between the allocated values per deputy increased.

Figure 2 – Distribution of total individual amendments allocated by deputy with value greater than zero.

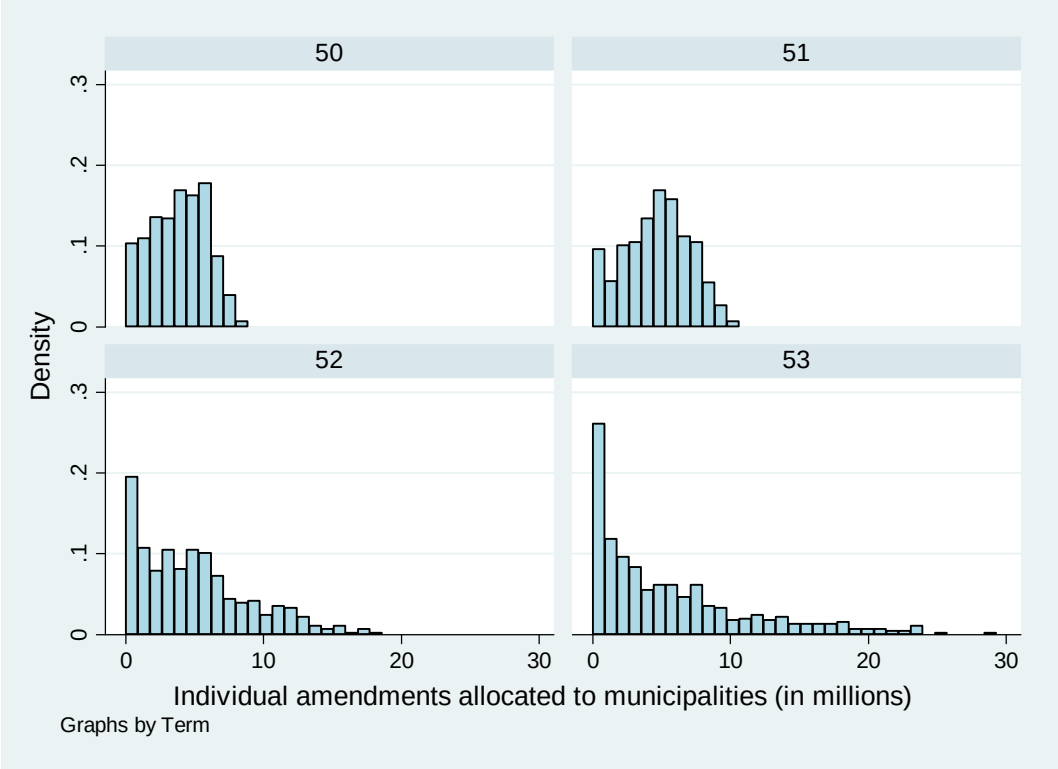


Table 2 – Statistics of the total amount of individual amendments received by municipalities.

	Median	Average	Std Dv	Min	Max	Obs
50th term	219,702.31	422,577.38	790,573.15	0.00	17,091,258.25	5019
51st term	204,901.16	471,800.41	1,101,343.12	0.00	26,022,076.19	5513
52nd term	103,528.92	491,020.14	1,634,764.97	0.00	44,197,094.63	5565
53rd term	0.00	563,935.19	3,351,993.11	0.00	150,070,329.22	5565

Note: Only municipalities in the electoral database. Amounts in reais with 2010 values.

Table 2 shows the values of allocated amendments per municipality. Even though the mean per municipality is around R$ 450,000, the standard deviation reveals that the allocation of amendments varies widely across municipalities. Note that the mean value of individual amendments per municipality remains stable in the four budget cycles analyzed. However, the distribution of funds is less uniform in the 52nd and 53rd terms. The median corresponds to half the value observed in previous terms between 2003 and 2007 and is equal to zero in the 2007-2011 term.

Empirical Strategy

Allocation of individual budget amendments

One of the goals of this paper is to assess what the allocation of local amendments is like in municipalities belonging to the deputy's electoral district. Therefore, let us consider the following equation:

$$y_{imt} = \beta_0 + \beta_1 X_{imt} + \beta_2 X_{im} + \beta_4 C_{it} + \beta_5 D_i + \beta_6 M_{mt} + c_p + c_s + c_t + c_m + c_i + \epsilon_{imt} \quad (1)$$

where *i* stands for the federal deputy, *m* indicates the municipality, *t* is a time indicator that temporally represents both the election in which the deputy was elected and the politician's term in office, *p* stands for the elected politician's party, *s* is the federated unit (Brazilian state) the politician is representing and coincides with the electoral district, *c* denotes unobservable heterogeneity (fixed effects) at the level given by the associated subscript and ϵ, is the error term. The dependent variable, *y*, is the number of individual amendments per voter in municipality *m*

of politician *i* or, later, an indicator variable equal to one if the deputy allocated amendments to the municipality and zero, otherwise.

Matrix *X* contains explanatory variables that vary jointly for deputy and municipality. However, some variables change over time, such as the percentage of nominal votes obtained in the municipality and the coincidence of the deputy's party and the mayor's party. Nonetheless, some variables do not change throughout the terms and refer to the politician's previous local political history in the municipality. Matrix *M* denotes municipality variables, such as the number of effective candidates in the municipality. Matrix *D* represents politicians' variables: deputy's characteristics such as sex and previous political experience in other positions (in the specifications that we do not include c_i) and the number of effective municipalities in which the deputy ran for elections and the number of previous terms. This variable are formulated based on the Herfindahl-Hirschman (HHI) index, as defined below:

$$MunEfet_{it} = \left(\sum_{m=1}^{\#Muni_{st}} \left(\frac{v_{imt}}{\sum_{m=1}^{\#Muni_{st}} v_{imt}} \right)^2 \right)^{-1}, \forall it \qquad (2)$$

where *i* stands for the candidate for the Chamber of Deputies, *m* is the municipality, *t* is a time indicator for the election, $\#Cand_{st}$ is the total number of candidates in the electoral district *s* in election *t*, $\#Muni_{st}$ is the total number of municipalities in the electoral district *s* in election *t* and *v* denotes the nominal votes. Equation (2) represents the number of effective municipalities (*MunEfet*) in which the candidate *i* obtained votes in that election *t*. The HHI is used in the Industrial Organization literature to measure mainly the effective number of firms. In the

Political Science literature, Crisp and Desposato (2004) use a variant of this index to measure the distribution of votes for Colombian senators.

The equation (1) is estimated using the ordinary least squares (OLS) method, the fixed-effect (FE) model and the Tobit model, by assuming that the value of the amendment per voter is censored at zero. The Probit model will be used to investigate the factors that affect the probability of a politician proposing an amendment in a given municipality.

Regression Discontinuity Design (RDD)

To specifically assess how intermunicipal and intramunicipal electoral competition affects the allocation of amendments, we use the discontinuity that arises from the open-list proportional representation rules in which candidates of the same party coalition may be elected or not by a small margin of votes. Lee (2008) applied discontinuous regression to determine the electoral advantages of incumbents in the U.S. Congress elections. In fact, most applications of the regression discontinuity design to elections that followed Lee's approach have used single-member districts, exception being the recent paper by Boas, Hidalgo and Richardson (2011), which uses the same the discontinuity as we do.

Every voter in a given federated unit vote either for one candidate or for a party for the Chamber of Deputies. However, seats are distributed to party coalitions according to a D'Hondt formula and candidates are then ranked according to their number of votes in the federated unit. Seats are then distributed to candidates within the party coalition according to that ranking. Therefore, for two candidates from the same party coalition and within a fixed and narrow margin of votes, we will have that randomness will determine that one will be elected while the other one will not.

In order to link the discontinuity that happens at the candidate level with municipalities two important measures are defined. By the nominal votes for a candidate, it is possible to have a ranking of candidates in a municipality.[11]

$$r_{imt} = \sum_{j=1}^{\#Cand_{st}} 1\{v_{imt} \leq v_{jmt}\} \qquad (3)$$

The candidate who got the largest number of votes in the municipality will rank first and so on and so forth. In addition, 'association' with the municipality is denoted as a dichotomous variable that indicates whether candidate *i* is one of the effective candidates (*CandEfet*$_{mt}$) in municipality *m.*

$$Assoc_{imt} = 1\{r_{imt} \leq CandEfet_{mt}\} \qquad (4)$$

$$CandEfet_{mt} = \left(\sum_{i=1}^{\#Cand_{st}} \left(\frac{v_{imt}}{\sum_{i=1}^{\#Cand_{st}} v_{imt}} \right)^2 \right)^{-1}, \forall mt \qquad (5)$$

Equation (5) shows the number of effective candidates (*CandEfet*) in a municipality *m* running for election in *t*, and it is similarly defined as (*MunEfet*). However it is a variable associated with the municipality.

[11] The operator 1{A} is the indicator function that equals 1 if the event A is true and 0 otherwise.

The variable $Assoc_{imt}$ allows us to identify candidates that are associated, from the voter's perspective, with a municipality *m*. We note the similarity of 'association' with Ames' (1995b) notion of 'Dominance'. Candidate *i*'s municipal dominance at municipality *m* is a continuous variable, since it is simply the candidate *i*'s share of all the votes cast in municipality *m* (Ames, 1995b). Given that municipalities may differ in terms of voting concentration, the measure of dominance depends on the municipality being observed. For example, in a given municipality, a candidate with 10% of votes could be a highly dominant candidate, whereas in other municipalities the same 10% would not have the same meaning. The difference is in the voting dispersion across candidates. However, 'Association', by its turn, is a concept that allows us to compare electoral performance of the same candidates across different municipalities, because if a candidate is said to be associated with a given municipality *m*, he/she has a relatively high share of votes in *m*.

Finally, by comparing municipalities with the same number of effective candidates, we can check whether those municipalities that had a larger number of elected associated candidates face a larger transfer of budget resources. By taking into account only those municipalities whose associated candidates won or lost[12] by a small margin of votes, we can have the randomness necessary to determine which municipality has more elected candidates associated with it and which do not have them or have them in smaller numbers. Therefore, the aim is to compare municipalities with the same number of effective candidates, and therefore, the same electoral competition structure. Note that we compare a municipality that had a candidate on the margin who ended up elected with another municipality that had a candidate on the margin who was not elected. Thus, we seek to verify whether the first municipality will obtain more transfers

[12] Surrogates are regarded as not elected, despite the possibility that these candidates will have been sworn in as federal deputies later on.

via amendments to the budget for electing its candidate, that is, if an elected candidate associated with the municipality contributes to the allocation of budget resources.

The implementation of our empirical strategy is the following. To determine the margin of votes in a proportional representation system in which each candidate is elected or not due to the total number of votes obtained by the coalition party instead of the total number of votes, the following mechanism was established: the total number of nominal votes of the candidate elected with the smallest number of votes and the votes for the candidate not elected with the largest number of votes was considered for each party coalition in each electoral district. The simple mean of the votes of these two candidates is used as reference. If the difference between the candidate's votes and the mean is smaller, in module, than a percentage of that mean, for instance, 5%, this candidate is said to be on the margin; otherwise, he/she is not. For instance, suppose two candidates of the same coalition party. One was the elected candidate with the least votes (e.g. 100,000 votes); the other was the non-elected candidate with most votes (e.g. 90,000 votes). In this case, the average number of votes of both candidates was 95,000. Therefore, the elected candidate would not be in the margin since the difference to the average (5,000) was 5.2% of the mean.

Electoral returns of individual budget amendments

The second model to be tested herein regards amendments as explanatory variable. It investigates whether pork barrel in Brazil, with the distribution of budget resources to the municipalities, is a way to woo voters. The model to be tested will be,

$$y_{im,t+1} = \beta_0 + \beta_1 X_{imt} + \beta_2 X_{im} + \beta_4 C_{it} + \beta_5 D_i + \beta_6 M_{mt} + c_p + c_s + c_t + c_i + c_m + c_{im} + \epsilon_{imt} \quad (6)$$

where *i* now refers to the federal deputy who runs for re-election and *y* represents the nominal votes obtained by deputy *i* in municipality *m*.

Note that the votes in *t+1* are observed only for deputies who run again for the subsequent re-election and that the amount of budget resources allocated to the municipality by the politician during his/her term will be one of the explanatory variables. In this case, we also include a joint deputy-municipality fixed effect (c_{im}) in the specifications that we do not include deputy or municipal fixed effects alone.

Results

Allocation of individual budget amendments

Table 3 shows that most of the amendments allocated by politicians to the municipalities with an allocated value greater than zero are allocated to municipalities with which the deputy is associated, i.e., he/she was an effective candidate in the municipality. However, we also have allocation of amendments to municipalities in which the politician is not among the most voted candidates. This way, in addition to benefiting the municipalities in which the deputy had electoral support, there is also the strategy to attract more voters. As we will see later, in terms of obtaining voting rewards, that latter strategy has a larger impact.

Table 3 – Amendments with allocated value greater than zero according to association of deputy with the municipality.

Amendments to municipalities with which the deputy is associated

	Median	Average	Std Dv
50th term	217,715.50	348,271.20	433,810.30
51st term	179,560.90	340,015.40	514,347.70
52nd term	227,250.30	471,557.80	807,359.30
53rd term	342,612.70	824,434.20	1,451,181.00
Amendments to municipalities with which the deputy is not associated			
	Median	Average	Std Dv
50th term	146,468.20	222,289.50	244,061.70
51st term	142,957.90	206,102.50	249,168.00
52nd term	185,582.10	308,634.10	440,950.90
53rd term	271,348.00	487,549.80	732,857.40

Note: Amendments were classified by author and destination. Only municipalities with allocated amount greater than zero.

Table 4 – Allocation of budget amendments to municipalities. Dependent variable: amount of locally allocated amendments per voter (denominated in reais).

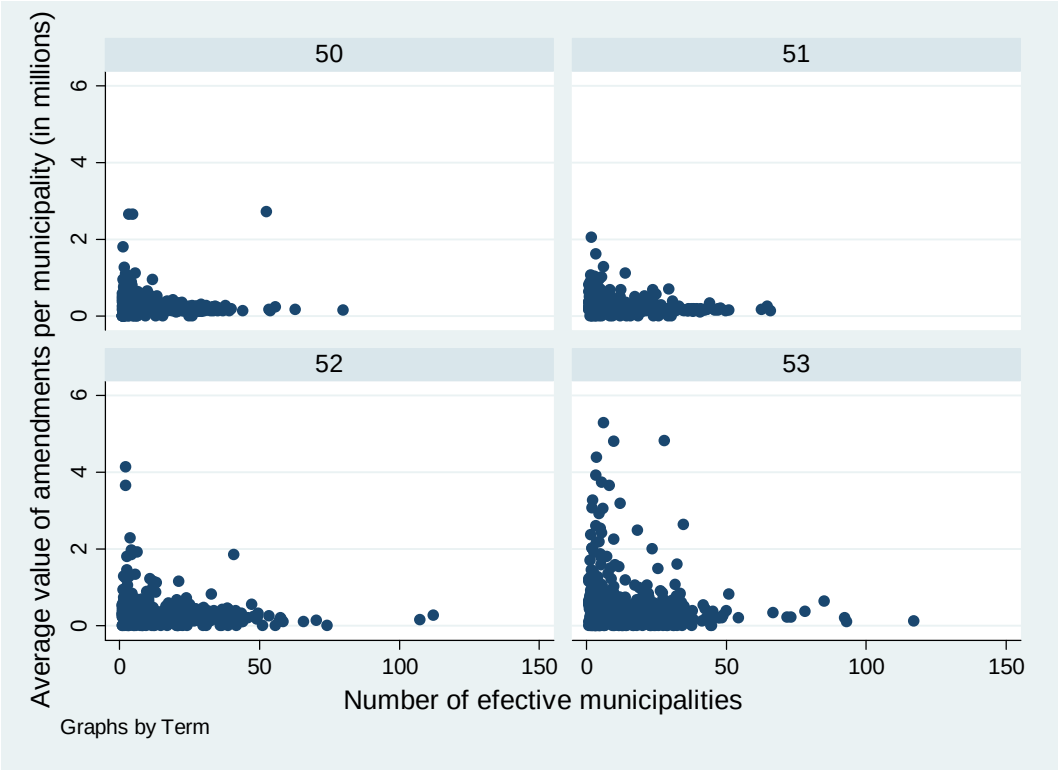
	OLS 1	OLS 2	FE 1	FE 2	Tobit†
Municipal vote share of the candidate (Dominance)	37.773***	38.134***	38.039***	38.963***	32.237***
	(0.698)	(0.704)	(0.693)	(0.706)	(0.234)
Number of effective candidates	-	-0.021***	-0.005	-0.022***	0.144***
		(0.002)	(0.003)	(0.002)	(0.006)
Number of effective municipalities	-	-0.018***	-0.018***	-0.023***	-0.035***
		(0.001)	(0.001)	(0.002)	(0.002)
Number of terms as town council representative	0.279	0.210	0.817	-0.159	1.945***
	(0.537)	(0.537)	(0.521)	(0.592)	(0.238)
Number of terms as mayor	3.317*	3.188*	3.359*	2989	0.691*
	-1539	-1539	-1499	-1541	(0.298)
Same party as the mayor's	1.174***	1.175***	1.220***	1.183***	2.961***
	(0.053)	(0.053)	(0.053)	(0.053)	(0.064)
Same party as the governor's	-0.217***	-0.203***	-0.210***	-0.203***	-0.704***
	(0.045)	(0.045)	(0.044)	(0.061)	(0.069)
Same party as the president's	0.281***	0.266***	0.266***	0.242***	1.227***
	(0.036)	(0.036)	(0.036)	(0.049)	(0.094)
Number of previous terms	0.002	0.023*	0.023*	-0.739***	0.008
	(0.009)	(0.009)	(0.009)	(0.197)	(0.018)
Number of terms as state deputy	-0.005	0.024*	0.024*	-0.597	0.002
	(0.012)	(0.012)	(0.012)	(0.382)	(0.025)
Number of terms as governor	-0.013	-0.076	-0.077	-	0.044
	(0.066)	(0.066)	(0.066)		(0.101)
Number of terms as senator	-0.128*	-0.166**	-0.165**	-	-0.064***

	(0.059)	(0.059)	(0.059)		(0.160)
Undergraduate degree	-0.161***	-0.192***	-0.189***	0.072	-0.325***
	(0.031)	(0.031)	(0.031)	(0.078)	(0.062)
Dummy for capital	-2.179***	-1.994***	-	-1.936***	4.708***
	(0.242)	(0.244)		(0.291)	(0.304)
Constant	29.648***	29.722***	1.132	7.289	-2.969*
	(0.000)	(0.000)	(0.000)	(0.000)	-1502
Fixed effect municipality	no	no	yes	no	no
Fixed effect deputy	no	no	no	yes	no
R^2	0.100	0.100	0.067	0.068	
N	683,125	683,125	683,125	683,125	683,125

Note: * p<0,10, ** p<0,05, *** p<0,01. Robust standard error in brackets.† Coefficients of the Tobit model refer to marginal effect conditional on being censored. Dummies for elections, party and state are contemplated in all models, population and GDP per capita are used as controls. Dependent variable expressed in reais with 2010 value.

According to our results in Table 4, votes obtained in the municipality have a strong effect on the politician's decision to allocate local amendments into the municipality. Increasing vote share within the municipality by one percentage point elevates the number of resources allocated via individual budget amendments by approximately R$ 38 per voter. This confirms that politicians tend to reward their voters for the votes they obtain, "bringing home the bacon."

Figure 3 – Effective number of municipalities in which the deputy ran for election and average amount received by the municipalities to which the deputy allocated amendments with value greater than zero.



The larger the number of effective municipalities in which the deputy runs, the smaller the value of the amendments allocated to the municipality, i.e., deputies who had more disperse votes often allocate smaller amounts to the municipality. These politicians' strategy might be to split the funds among a larger number of municipalities and, as a result, the value allocated to each municipality is smaller. In fact, Figure 3 shows that, with respect to the local amendments allocated by the deputies, the mean value per municipality is inversely related to the number of effective municipalities in which the deputy obtained votes. Politicians with a higher mean value of local amendments are those whose votes were more concentrated in a smaller number of municipalities.

The number of effective candidates in a given municipality seems to reduce the transfer of funds in some of our models. Nevertheless, when we take into account the fixed effect of the

municipality, the coefficient of this variable is not significant, which means that changes in local electoral competition in a given municipality does not seem to affect the amount of transfers allocated there. Finally, in the estimation by the Tobit model, when we explicitly control for the zeroes in the dependent variable, the coefficient of that variable is positive and significant. Therefore, a further investigation of the effect of electoral competition on amendments is necessary and we used a discontinuous regression whose results we discuss later.

Interestingly, variables that represent the politician's political history in the municipality are not so important for the deputy's decision. Having been a mayor appears to help with the allocation of amendments, although the coefficient is poorly significant. The effect of this type of variables must have been reduced by the inclusion in the model of the municipal vote share obtained by the candidate, since candidates are expected to obtain more votes in towns where they have already held other political positions.

Belonging to the political party of the mayor elected in the intermediate election contributes to the allocation of amendments.[13] A similar result was found by Silva (2009); however, here the impact is not very strong. Belonging to the governor's party does not yield a favorable coefficient. On the other hand, belonging to the president's party contributes, as expected, to the allocation of amendments, since the allocation of amendments depends on approval by the Executive branch at federal level.

Besides the relevance of variables used in Table 4 for the deputy's decision on the amount of funds to be allocated to a given region, it is also important to determine how strongly they influence the decision to invest or not in a municipality, regardless of the transferred

[13] By intermediate election we mean the local elections for mayors and town council members that occurred two years after the elections for the Chamber of Deputies. In our data, those local elections occurred in 1996, 2000 and 2004.

amounts. Table 5 shows the marginal effects of Probit regressions on the decision to allocate or not local amendments to a given municipality.

As we can see in Table 5, the vote share obtained in the municipality or the candidate's local dominance still has a large impact on the allocation of amendments. Again, the larger the number of municipalities in which the deputy runs, the lower the chances that he will assign amendments to a specific municipality. This means that not only does the politician reduce the mean value per municipality, as seen above, but that he also tends to allocate fewer amendments. Given that there are restrictions on the number of amendments and on the total value each politician is allowed, politicians with more disperse votes in their electoral district will have more municipalities giving them support at the ballot box.

The intramunicipal political competition, measured by the number of effective candidates that ran for elections in the municipality, has a statistically significant and positive impact on the probability of allocating local amendments, although the coefficient is not important in a substantive way: an increase in one effective candidate in a municipality increases the chance of allocating amendments in 0.1%.

The variables concerning the politician's political history in the municipality have a positive impact on the allocation of amendments. Both the number of times a deputy was a town council representative and the number of terms he served as mayor increase his/her chances of allocating amendments to the municipality.

Table 5 – Allocation of budget amendments to municipalities. Dependent variable: amendments allocated or not to municipality.

	Probit 1†	Probit 2†
Municipal vote share of the candidate	0.200***	0.201***
(Dominance)	(0.002)	(0.002)
Number of effective candidates	-	0.001***
		(0.000)

Number of effective municipalities	-	-0.000***
		(0.000)
Number of terms as town council representative	0.033***	0.033***
	(0.003)	(0.003)
Number of terms as mayor	0.019***	0.018***
	(0.003)	(0.003)
Dummy for the same party as the mayor's	0.022***	0.022***
	(0.001)	(0.001)
Dummy for the same party as the governor's	-0.004***	-0.004***
	(0.000)	(0.000)
Dummy for the same party as the president's	0.009***	0.009***
	(0.001)	(0.001)
Number of previous terms	0.000	0.000
	(0.000)	(0.000)
Number of terms as state deputy	-0.000*	0.000
	(0.000)	(0.000)
Number of terms as governor	0.000	0.000
	(0.001)	(0.001)
Number of terms as senator	-0.003**	-0.003***
	(0.001)	(0.001)
Undergraduate degree	-0.001**	-0.002***
	(0.000)	(0.000)
Dummy for capital	0.123***	0.081***
	(0.011)	(0.009)
Constant	-0.442*	-0.604**
	(0.000)	(0.000)
Pseudo-R2	0.24	0.25
N	683,125	683,125

Note: * p<0,10, ** p<0,05, *** p<0,01. Robust standard error in brackets. † Marginal effects (dF/dx) Dummies for local elections, population and GDP per capita were contemplated in all models.

The results support the idea that, in general, candidates tend to benefit municipalities where they obtained a sizeable amount of votes and with which they have some bond, e.g. having held other political positions in the past or belonging to the mayor's party. Nevertheless, this is not the only behavior demonstrated by politicians, as shown in Table 3 and which we further exploit.

The fact that deputies tend to benefit municipalities where they obtained a larger number of votes, in addition to the finding that politicians with more disperse votes reduce the value and probability of transferring amendments to a specific municipality, implies that, due to the

allocation problem faced by the politician, an advantageous strategy for the voters of a municipality would be to vote for traditional candidates locally and for those whose influence covers a smaller region. Thus, the creation of informal districts would be advantageous to voters. This suggests that Ames' (1995a) classical interpretation of politicians' lack of interest in national questions may be driven the demand side. In other words, deputies are in fact constrained by their constituents' demand for increases in their share of federal resources.

Regression Discontinuity Design

A regression-discontinuity design is used to further assess the allocation of individual amendments by politicians to municipalities in the state where the deputy was elected. First, candidates who won or lost by a narrow margin of votes are selected. Therefore, municipalities with associated candidates that fall within the margin will have a variation in the number of representatives in the Chamber of Deputies, as a result of randomness. The aim is to verify whether municipalities which, by chance, elected more candidates will be granted larger amounts of amendments.

After that, the sample used for the discontinuous regression is described. Whether candidates on the margin won or lost due to randomness, no differences in their characteristics should be observed. In fact, selected candidates (elected or not) do not differ remarkably between themselves, as the difference between the means is not significant for most variables. This can be seen graphically by Figures 4 to 7 and in Table 6. In fact, Table 6 reveals that for candidates that do not fall within the narrow margin, there are substantial differences in characteristics, but those disappear when we compare candidates within the margin.

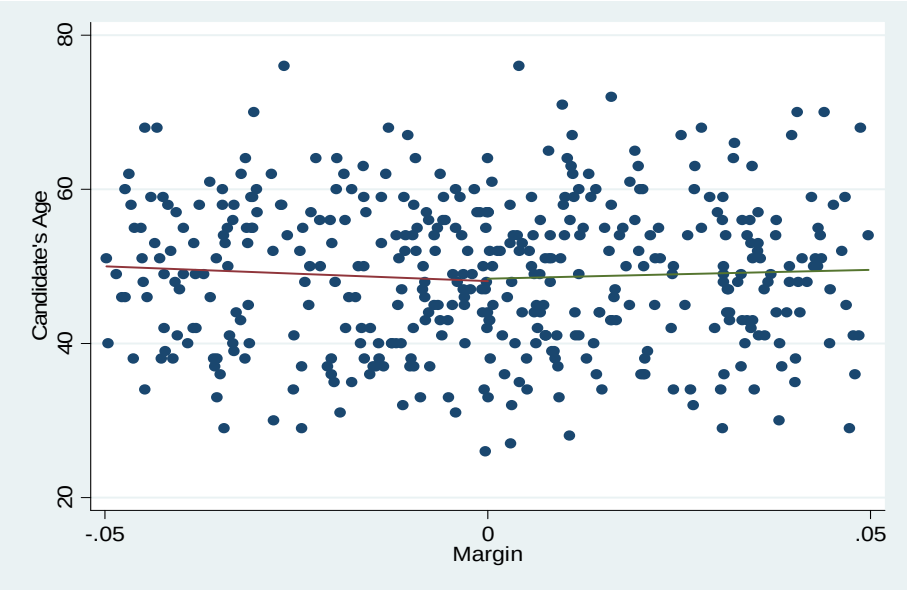


Figure 4 – Age of the candidates on the margin.

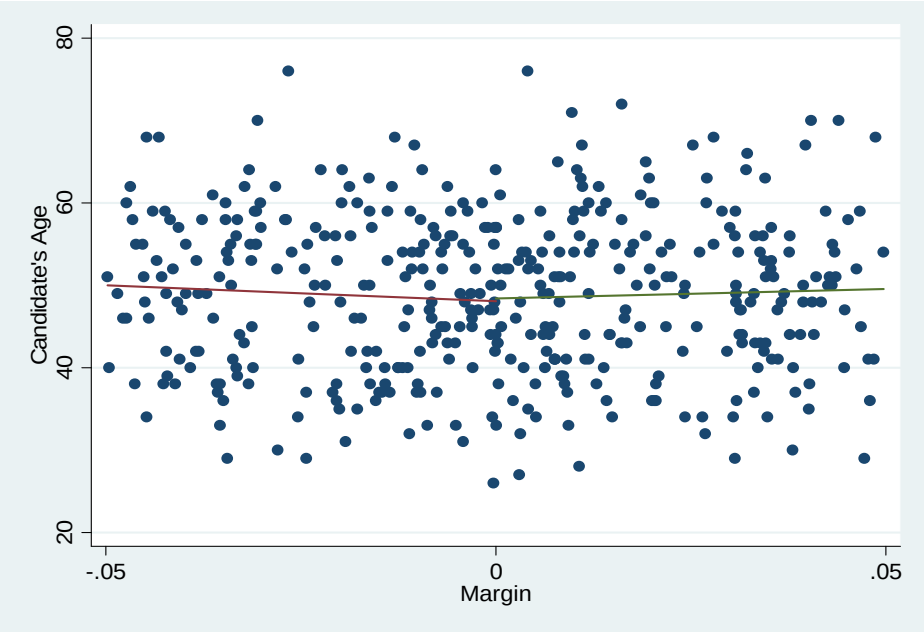


Figure 5 – Effective number of municipalities in which candidates ran for the election, candidates on the margin.

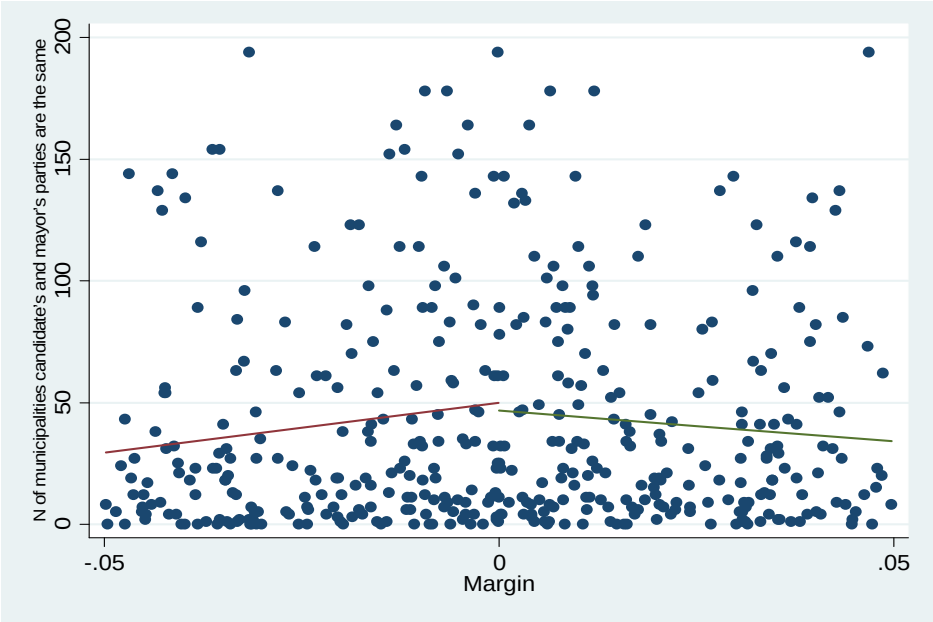


Figure 6 – Number of municipalities in which the candidate's party was the same as the mayor's, candidates on the margin.

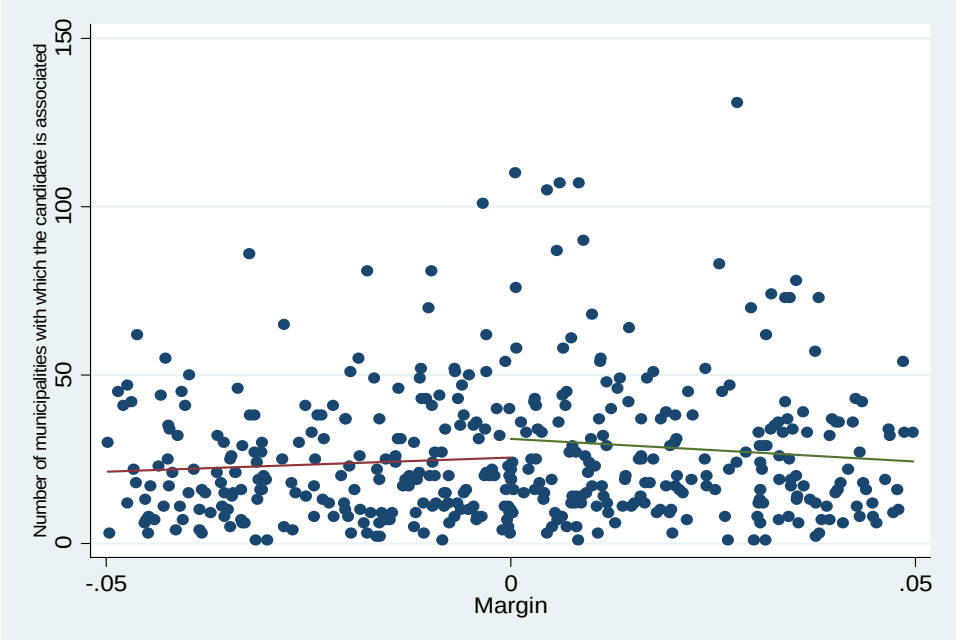


Figure 7 – Number of municipalities with which the candidate is associated, candidates on the margin.

Table 6 – Characteristics of elected and non-elected deputies.

	All candidates			Margin 5%			Margin 2.5%			Margin 1%		
	Not elected	Elected	Difference	Not elected	Elected	Difference	Not elected	Elected	Difference	Not elected	Elected	Difference
Total amount of nominal votes	7,118.27	81,022.02	-73,903.75***	43,508.82	46,328.00	-2,819.18	45,746.47	46,943.58	-1,197.11	45,907.64	48,472.92	-2,565.28
	(12,629.47)	(66,755.19)		(22,391.72)	(23,876.03)		(21,311.07)	(23,175.12)		(24,064.03)	(27,052.15)	
Age	47.01	49.53	-2.52***	48.96	48.90	0.06	48.22	48.74	-0.52	48.67	47.21	1.46
	(10.78)	(10.16)		(9.52)	(9.71)		(9.32)	(9.72)		(8.46)	(9.40)	
Undergraduate degree	0.50	0.77	-0.27***	0.74	0.75	0.00	0.72	0.76	-0.03	0.79	0.76	0.03
	(0.50)	(0.423)		(0.44)	(0.44)		(0.45)	(0.43)		(0.41)	(0.43)	
Female	0.11	0.07	0.04***	0.08	0.07	0.02	0.08	0.05	0.03	0.10	0.03	0.04*
	(0.31)	(0.26)		(0.28)	(0.25)		(0.28)	(0.25)		(0.30)	(0.18)	
Married	0.64	0.76	-0.12***	0.81	0.83	-0.02	0.75	0.85	-0.09**	0.80	0.85	-0.05
	(0.48)	(0.43)		(0.39)	(0.38)		(0.43)	(0.36)		(0.40)	(0.35)	
Number of effective municipalities	4.56	12.75	-8.19***	9.68	11.65	-1.97**	10.22	11.54	-1.32	10.16	12.69	-2.53
	(5.26)	(13.11)		(8.72)	(12.44)		(8.94)	(13.15)		(8.95)	(16.21)	
Number of associated municipalities	2.97	38.55	-35.58***	23.69	28.22	-4.53**	24.77	28.69	-3.92*	25.74	31.08	-5.34
	(7.76)	(33.91)		(17.65)	(22.64)		(18.57)	(22.81)		(19.6)	(27.83)	
Number of municipalities in which the candidate's party is the same as the mayor's	21.71	45.83	-24.12***	41.03	41.25	-0.22	44.81	42.46	2.35	49.56	50.37	-0.81
	(36.99)	(49.51)		(47.89)	(43.08)		(48.97)	(43.58)		(53.38)	(47.9)	
Obs	13457	2052		208	212		122	123		61	62	

Note: * p<0,10, ** p<0,05, *** p<0,01.

Table 7 – Descriptive statistics of municipality variables in the discontinuous regression.

	All municipalities		Margin 5%		Margin 2,5%		Margin 1%	
	Average	Std Dv	Average	Std Dv	Average	Std Dv	Average	Std Dv
Amount received in budget amendments	439,561.90	1,815,542.00	515,396.20	2,567,027.00	541,358.40	2,958,742.00	442,200.30	1,632,167.00
Total number of elected associated candidates	3.65	2.70	0.73	0.63	0.65	0.56	0.64	0.53
Number of effective candidates	5.98	4.06	7.56	4.99	7.91	5.34	8.18	5.30
N of elected associated candidates that have already been town council rep.	0.02	0.20	0.02	0.21	0.02	0.20	0.02	0.18
N of elected associated candidates that have already been mayors	0.03	0.43	0.05	0.64	0.06	0.74	0.06	0.67
N of elected associated candidates that belong to the mayor's party	4.34	4.24	4.38	3.99	4.41	4.01	4.85	3.96
N of elected associated candidates that belong to the governor's party	6.91	5.04	6.93	4.76	6.89	4.85	7.29	4.46
N of elected associated candidates that belong to the president's party	5.70	5.16	6.13	5.40	6.13	5.74	6.78	5.97
Average of effective municipalities in which associated candidates run	0.63	0.58	0.70	0.62	0.72	0.63	0.71	0.63
Electorate	20,383.77	129,712.20	26,974.31	201,765.00	30,444.74	242,071.90	30,204.24	247,825.40
Obs	21662		8160		5411		3031	

In Table 7 we show some descriptive statistics at municipal level. The municipalities with associated candidates within the margin of votes are systematically different from the universe of municipalities in some aspects. The political competition is higher in the municipalities, but the chances that an associated candidate win the election is lower for municipalities within the margin. Finally, the amount received through local amendments is higher for municipalities that have associated candidates in the margin.

The results using the discontinuity in the rules of the proportional representation system corroborate previous findings. As shown in Table 8, the larger the number of elected candidates associated with the municipality, the larger the number of projects assigned to the municipality. This is true for all margins selected, from 1 to 5 percentage points of difference. This evidence is stronger in municipalities with a smaller number of effective candidates. In a municipality with fierce electoral competition, the addition of an elected candidate does not contribute to the allocation of funds, but in municipalities where competition is milder, having an elected candidate strongly influences the allocation of amendments. In this case, having an elected candidate associated with the municipality increases the value per voter obtained from individual amendments by around R$ 14.00.

The models tested previously did not make it clear how electoral competition in the municipality affects the amount of allocated budget amendments. The results demonstrate that that depends on the effective number of candidates in the municipality. In municipalities in which intramunicipal competition is low, that is, the number of effective candidates is below 5 candidates, an increase in competition further reduces attracting budget resources. On the other hand, in municipalities whose voters systematically chose different candidates and have therefore more than 5 effective candidates, electoral competition seems to positively attract funds. We

have therefore a U-shape relationship between electoral competition and value of amendments per voter.

We conclude that there is clear evidence that elected deputies tend, in general, to bring home the bacon, especially when they have a large local dominance. Local electoral competition seems to possibly create incentives for deputies to attempt to woo new voters, as when local competition is high, municipalities tend to benefit from that fact.

Table 8 – Discontinuous Regression. Dependent variable: amount of amendments per voter (denominated in reais).

	All municipalities			Margin 5%			Margin 2,5%			Margin 1%		
		CandEfet ≤ 5	CandEfet > 5		CandEfet ≤ 5	CandEfet > 5		CandEfet ≤ 5	CandEfet > 5		CandEfet ≤ 5	CandEfet > 5
Total number of elected associated candidates	0.370	3.597***	-0.831	5.468***	13.343***	2.399	5.893***	14.443***	2.687	2.530	14.203***	-1.638
	(0.415)	(0.678)	(0.499)	(1.430)	(2.197)	(1.765)	(1.495)	(3.058)	(1.744)	(2.223)	(3.725)	(2.758)
Number of effective candidates	0.375	-7.368***	1.654***	1.159***	-7.157***	1.460***	0.533*	-8.103***	0.852**	0.730*	-7.217**	1.002*
	(0.344)	(0.832)	(0.429)	(0.254)	(1.628)	(0.277)	(0.25)	(2.021)	(0.268)	(0.366)	(2.629)	(0.411)
N of elected candidates that have already been town council	4.362***	8.235**	4.206***	3.572**	18.477**	3.213*	2.656*	21.475**	2.391*	5.192**	29.861*	4.406*
	(1.183)	(3.177)	(1.128)	(1.256)	(6.852)	(1.304)	(1.115)	(8.276)	(1.074)	(1.974)	(11.614)	(1.864)
N of elected candidates that have already been mayors	2.282	9.654**	-2.262	-0.373	-3.674	1.832	-2.005	-7.586	-0.481	-8.451***	-9.077	-7.433**
	(1.949)	(3.368)	(2.106)	(2.636)	(3.216)	(3.706)	(2.349)	(5.657)	(2.792)	(2.144)	(4.849)	(2.882)
N of elected candidates of the same party as the mayor's	-0.184	-0.002	-0.451**	-0.758***	-0.386	-0.917***	-0.497*	-0.269	-0.594*	-0.651*	-0.463	-0.749*
	(0.114)	(0.153)	(0.172)	(0.181)	(0.287)	(0.23)	(0.204)	(0.356)	(0.252)	(0.271)	(0.457)	(0.341)
N of elected candidates of the same party as the governor's	-0.580***	-0.489***	-0.898***	-1.087***	-0.188	-1.607***	-0.435*	0.124	-0.853**	-0.315	0.282	-0.784
	(0.103)	(0.123)	(0.192)	(0.195)	(0.244)	(0.273)	(0.215)	(0.322)	(0.291)	(0.351)	(0.43)	(0.504)
N of elected candidates of the same party as the president's	-1.025***	-0.237	-1.429***	-1.621***	-0.449	-1.920***	-1.192***	-0.265	-1.299***	-1.276***	-0.729	-1.296***
	(0.152)	(0.212)	(0.218)	(0.206)	(0.336)	(0.258)	(0.226)	(0.392)	(0.274)	(0.297)	(0.446)	(0.365)
Average of effective municipalities in which	-10.618***	-0.194	-16.920***	-17.404***	8.935*	-24.551***	-13.067***	17.311**	-18.857***	-18.122***	-1.845	-21.555***
	(1.114)	(1.765)	(1.698)	(2.100)	(4.069)	(2.76)	(2.411)	(5.864)	(3.082)	(3.310)	(5.195)	(4.287)
Electorate (in thousands)	-2.973***	-20.584***	-2.880***	-2.728***	-23.950***	-2.811***	-1.670***	-20.724**	-1.800***	-2.181***	-33.844***	-2.100***
	(0.578)	(2.460)	(0.509)	(0.516)	(5.519)	(0.542)	(0.396)	(6.607)	(0.400)	(0.585)	(8.574)	(0.563)
Constant	47.281***	58.202***	53.249***	54.113***	54.139***	66.206***	45.351***	49.713***	53.002***	50.241***	59.717***	56.945***
	(1.351)	(3.018)	(2.754)	(2.982)	(6.578)	(4.715)	(3.261)	(7.973)	(4.988)	(5.265)	(11.019)	(7.873)
R^2	0.009	0.014	0.020	0.025	0.029	0.038	0.013	0.029	0.023	0.019	0.037	0.025
N	21662	11297	10365	8160	2826	5334	5411	1727	3684	3031	888	2143

Note: * p<0,10, ** p<0,05, *** p<0,01. Robust standard error in brackets.

Local Electoral Returns of Individual Budget Amendments

After assessing the behavior of deputies towards the allocation of amendments, the subsequent aim is to check how these funds affect the performance of politicians as candidates for re-election. Therefore, the sample is restricted to elected federal deputies who ran for re-election in the subsequent period. The goal is to investigate the impact of individual amendments allocated by politicians to municipalities on the number of votes obtained by this politician in the municipality to which the funds were assigned. Later, the focus is on the deputy's electoral performance, i.e., whether the amendments contribute or not to his/her re-election.

As shown in Table 9, the allocation of amendments increases the number of nominal votes in the municipality obtained by the politician in charge of the budgeting project. The coefficient of the *Amendment per voter* variable, which measures the total value per voter used in amendments proposed by the deputy, throughout the budget cycle during his/her term, has a positive and significant result in all tested models. However, by adding the candidate-municipality fixed effect, the coefficient drops from nine to three votes per R$ invested by voter. The deputy's past relationship with the municipality influences the number of votes obtained by him/her, showing, among other things, that voters are faithful to the politician. Evidently, the number of votes previously obtained by the politician in the municipality explains much of the current number of votes. By not controlling for the deputy's electoral strength in the municipality, we have an omitted variable problem and, as outlined above, politicians allocate amendments to the municipalities where political support is stronger, so the role amendments play at the ballot box must have been overestimated. By controlling the deputy-municipality fixed effect, previous connections of the politician with the municipality are taken into consideration; consequently, the coefficient of the *Amendments per voter* explanatory variable

decreases, and more accurate estimates of the effect of amendments on the deputy's electoral performance are obtained.

The relevance of political bonds with the municipality is confirmed by the high coefficient of the variables that represent the number of times the deputy was a town council representative or a mayor in the municipality. Having already held local positions yields, on average, 10,000 votes. When the deputy-municipality fixed effect is accounted for, the coefficients of these variables change, especially because most of the variation is absorbed by the fixed effect, since these variables vary slightly over the years. That can be seen as the statistical significance of the estimated coefficient decreases.

The deputy's experience in previous terms is relevant in all models. Belonging to the same party as the mayor at the time of elections plays a very important role in the dispute for votes. Notwithstanding, belonging to the same party as the governor or the president does not affect the number of votes at the local level. However, whereas the coefficient related to the governor's party is positive, that of the president's party is negative.

The number of effective candidates in the municipality in the previous election increases the number of votes obtained in that municipality. Obviously, it is easier to obtain votes in regions not controlled by a restricted group of candidates. Deputies with disperse votes in the previous election obtain a larger number of nominal votes in the subsequent election. Candidates who effectively ran in a larger number of municipalities are those who, in general, obtain more votes, and this pattern must persist in the subsequent election.

By categorizing the funds used in budget amendments as those allocated to municipalities whose deputy was one of the effective candidates in the previous election and as those with which the politician has no association, it is possible to investigate further the electoral return

from amendments. Based on the coefficients obtained, it is advantageous to the politician to allocate amendments in both types of municipalities. However, the application of funds in a municipality that does not constitute the deputy's electoral district has a stronger impact on nominal votes (4.58 compared to 2.93). This means that the investment in voters that have not yet been wooed has a higher electoral return compared to the application of amendments in municipalities whose deputy has already won most of the electorate. In the theoretical model devised by Drazen and Eslava (2006), the budget and political cycle will exist if the returns from amendments vary according to the groups of voters. As shown by the results herein, the application of amendments in municipalities not yet won by the politician brings more electoral benefits.

Therefore, electoral amendments are useful for obtaining nominal votes for incumbent deputies who try to get elected, and this effect is greater when these amendments are used in municipalities that do not represent the deputy's electoral district. This way, they can be an effective tool for canvassing votes in regions where voters have not been wooed yet.

Table 9 – Impact of budget amendments on the number of votes. Dependent variable: nominal votes for deputies in the municipality.

	OLS 1	OLS 2	FE 1	FE 2	FE 3	FE 4	FE 5
Amendment per voter	9.37***	9.42***	9.81***	10.28***	3.37***		
	(1.35)	(1.36)	(1.42)	(1.46)	(0.37)		
Amendment per voter by associated deputy						2.93***	
						(0.41)	
Amendment per voter by non-associated deputy						4.58***	
						(0.82)	
Amendment per voter* number of effective candidates							0.35**
							(0.06)
Number of effective candidates		13.26***	13.33***	1.51	1.14	1.16	0.93
		(1.96)	(1.96)	(2.41)	(2.74)	(2.74)	(2.74)
Number of effective municipalities		1.10***	1.24**	1.06***	0.98***	0.99***	0.98***
		(0.14)	(0.42)	(0.14)	(0.26)	(0.26)	(0.26)
Number of terms as town council representative	11788.28***	11786.31***	11834.55***	10455.47***	48157.67*	48158.38*	48154.74*
	(1002.81)	(1002.41)	(996.96)	(897.23)	(19465.05)	(19465.00)	(19464.13)
Number of terms as mayor	10088.99***	10103.54***	10170.12***	10014.57***	-894.44***	-898.07***	-914.69***
	(1275.46)	(1276.04)	(1276.15)	(1298.65)	(87.67)	(87.71)	(87.79)
Same party as the mayor's	93.67***	94.98***	98.13***	100.92***	60.68***	60.67***	61.66***
	(9.30)	(9.31)	(9.47)	(9.33)	(9.51)	(9.51)	(9.51)
Same party as the governor's	3.66	3.93	14.74	2.55	16.87	16.88	16.68
	(7.2)	(7.19)	(12.54)	(7.02)	(9.13)	(9.13)	(9.13)
Same party as the president's	-9.25	-7.54	-30.30*	-8.01	-24.22*	-24.20*	-23.97*
	(10.53)	(10.53)	(15.05)	(10.42)	(10.34)	(10.34)	(10.35)
Number of previous terms	5.05**	4.02*	56.63	3.77*	47.46	47.33	47.59
	(1.91)	(1.91)	(49.02)	(1.86)	(45.81)	(45.81)	(45.84)
Number of terms as state deputy	-7.45***	-9.39***	-16.86	-9.24***	-37.26	-38.01	-37.51
	(2.00)	(2.02)	(71.04)	(1.96)	(57.87)	(57.86)	(57.9)
Number of terms as governor	38.34*	43.02*	-	43.92*	-	-	-
	(18.36)	(18.37)		(17.52)			
Number of terms as senator	10.27	11.93	-	11.91	-	-	-
	(15.84)	(15.84)		(14.88)			
Undergraduate degree	15.63*	17.54**	-3.74	17.41**	-10.64	-10.67	-10.4
	(6.44)	(6.46)	(26.82)	(6.33)	(21.35)	(21.35)	(21.36)
Electorate	0.01***	0.00***	0.00***	0.01	0.00	0.01	0.02
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	22.87	26.68	-498.82	26.51	-448.32	-446.61	-453.28
	(18.01)	(18.06)	(296.24)	(17.34)	(506.76)	(506.78)	(506.86)
Dummy for capital	-149.22	-260.85	-71.76	-1.04	176.53	177.04	181.05
	(138.8)	(138.96)	(58.24)	(71.71)	(102.5)	(102.52)	(102.53)
Fixed Effect							
Deputy	no	no	yes	no	no	no	no
Municipality	no	no	no	yes	no	no	no
Deputy-Municipality	no	no	no	no	yes	yes	yes
R2	0.33	0.33	0.31	0.11	0.02	0.02	0.02
N	526025	526025	526025	526025	526025	526025	526025

Note: * p<0,10, ** p<0,05, *** p<0,01. Robust standard error in brackets.

Amendments and Re-election Outcome

Given that amendments influence the local performance of deputies, it would be interesting to assess whether they are also important for the politician's final results. Thus, using aggregate data per deputy, it is investigated to what extent the allocation of amendments to the budget contributes to re-election. The aim now is to demonstrate whether amendments are

important to guarantee the politicians' careers. The dependent variable is the success or not in re-election attempts.

In line with Mesquita (2008), who recently found evidence of no relationship between amendments and the success of deputies in the subsequent election using aggregate data, our results show that although being an important tool in obtaining local dominance, amendments are not important for re-election. As shown in Table 10, few variables were relevant in explaining the politician's re-election. In the first model, the total number of locally allocated amendments had a negative and significant coefficient, i.e., amendments would reduce a politician's likelihood of re-election. However, by controlling for the level of incumbent's geographical dispersion in the previous election, local amendments are no longer significant, even though the coefficient is still negative. Amendments proposed by the deputy and allocated to national programs increase his/her chance of re-election. However, amendments allocated regionally reduce his/her success rate. Belonging to the president's party at the time of elections seems to benefit the politician, contrary to what had been observed previously.

Even though amendments are good tools to woo voters of a region, they do not seem crucial to guarantee electoral success. There are different political strategies and the candidate's profile probably has a strong influence on the success of his/her career as legislator. Our results are in line with Ames' (1995b) conjecture that re-election may not be a deputy's career goal and the running for a local executive position may be more appealing. In that sense, as amendments are an important for increasing local dominance, incumbents deputies may have a leverage.

Table 10 – Relationship between budget amendments and electoral success. Dependent variable: success or failure in re-election attempts.

	Probit 1	Probit 2	Probit 3
Local amendment per voter	-0.004*	-0.003	
	(0.002)	(0.002)	
Local amendment per voter to municipality with which the deputy is associated			-0.002
			(0.003)
Local amendment per voter to municipality with which the deputy is not associated			-0.010
			(0.009)
State amendment per voter	-0.003*	-0.002	-0.002*
	(0.001)	(0.001)	(0.001)
National amendment per voter	0.009*	0.010*	0.009*
	(0.005)	(0.006)	(0.006)
Regional amendment per voter	-0.056**	-0.051**	-0.051**
	(0.022)	(0.021)	(0.021)
Number of effective municipalities		0.005***	0.005***
		(0.001)	(0.001)
Number of municipalities in which the deputy's party is the same as the mayor's	0.001*	0.000	0.000
	(0.000)	(0.000)	(0.000)
Dummy for same party as the governor's	-0.033	-0.021	-0.020
	(0.033)	(0.032)	(0.032)
Dummy for same party as the president's	0.062**	0.07**	0.07**
	(0.03)	(0.03)	(0.03)
Number of previous terms	0.014	0.008	0.008
	(0.009)	(0.009)	(0.009)
Number of terms as town council representative	-0.002	0.008	0.008
	(0.016)	(0.016)	(0.016)
Number of terms as mayor	-0.006	0.001	0.001
	(0.021)	(0.021)	(0.021)
Number of terms as state deputy	0.005	-0.002	-0.002
	(0.012)	(0.012)	(0.012)
Number of terms as governor	-0.029	-0.022	-0.021
	(0.058)	(0.058)	(0.058)
Number of terms as senator	0.057	0.063	0.067
	(0.076)	(0.074)	(0.075)
Undergraduate degree	0.040	0.043	0.047*
	(0.029)	(0.029)	(0.029)
Female	-0.041	-0.027	-0.030
	(0.05)	(0.048)	(0.049)
Electorate	0.000***	0.000***	0.000**
	(0.000)	(0.000)	(0.000)
Constant	0.518***	0.325***	0.333***
	(0.099)	(0.106)	(0.107)
Pseudo R2	0.0174	0.0283	0.0288
N	1525	1525	1525

Note: * p<0,10, ** p<0,05, *** p<0,01. Robust standard error in brackets. Dummies for elections are contemplated in all models. Reported coefficients refer to marginal effects.

Conclusions

The major aim of this paper was to assess the factors that affect federal deputies' choice to allocate individual amendments to a municipality and to check whether the invested funds have an effect on the electoral performance of the incumbents who were running for re-election. To achieve that, several empirical strategies were adopted. First, data on all federal deputies elected in the municipalities from the electoral district where he was elected were collected. Results indicate that the previous votes obtained in the municipality have a strong impact on the amount of amendments to the budget allocated to the municipality and also on the probability that the politician will assign funds to the municipality. This is not the only strategy adopted by congresspeople, but in conclusion, we may say that politicians reward their voters.

A discontinuous regression was used to investigate further the allocation of amendments to municipalities. Results indicate that the effects depend on the level of electoral competition in the municipality. In municipalities with a smaller number of candidates with effective votes, an elected effective candidate remarkably contributes to the allocation of funds. However, this does not apply to municipalities with high electoral competition. Several deputies seem to allocate funds to towns with this characteristic, possibly as an attempt to woo new voters.

A second contribution of this paper is the analysis of possible mechanisms that influence the deputy's number of votes. As expected, amendments to the budget have a positive effect on the nominal votes obtained by the deputy who proposed the amendment in the municipality to which funds were allocated. By classifying municipalities into those in which the deputy was an effective candidate and those in which he was not, we note that amendments assigned to voters outside the politician's electoral district have a stronger impact on electoral performance.

Nonetheless, by analyzing the importance of amendments to the electoral success of federal deputies, it was not possible to confirm that the allocation of amendments to the budget help to increase the chances of re-election. Thus, the supply of funds through federal budgets is part of the relationship between the candidate and the municipality and could be an important electoral tool for canvassing votes, but it is not a determining factor for the politician's electoral success.

To conclude with, it is believed that new results were added to the discussion about the use of public policies to the politician's electoral benefit.

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