MISS YOUR EX? CORPORATE DEPENDENCE AND ELECTORAL PERFORMANCE OF RE-ELECTION CANDIDATES (2012-2016)

Erikson Calheiros[1]
José Alexandre Silva[2]
Denisson da Silva[3]
Quemuel Baruque Rodrigues[4]

Abstract: What is the effect of corporate dependence on the electoral performance of incumbents? The objective of this paper is to estimate the effect of corporate dependence on the electoral performance of incumbents in the 2016 election. We tested the hypothesis that corporate dependence exercises a negative and significant effect on the electoral success of incumbents. To do so, we used the election data for city halls from 2012 and 2016 made available by the Superior Electoral Court (TSE) using the R electionsBR1 language package. Methodologically, linear, quantile, and logistic regression were used. The main results indicate that 1) the best voted candidates in 2012 have the greatest chance of winning the 2016 election; 2) the correlation between corporate dependency and revenue balance is close to zero; and 3) corporate dependency had no significant effect on election performance and election success of incumbents in 2016.

Keywords: Institutional Change, Electoral Performance, Municipal Elections, Incumbents.

1. Introduction

In 2015, after numerous corruption scandals involving public officials, politicians, and various companies, the Federal Supreme Court (STF) ruled that corporate funding for election campaigns was unconstitutional. Also in 2015, the Brazilian Congress approved Law 13,165/15, which prohibited corporate funding to candidates, concomitantly, establishing a spending ceiling for the election.

Therefore, the 2016 election was the first election after the sanctioned law. In thesis, the dispute would be marked by a greater equality of opportunity between competitors, especially due to an equalization of the dispute between challengers and candidates for re-election, usually the favorites of the corporate world (MANCUSO, 2017). The bet is that the loss of revenue would be stronger among incumbents and this would reduce their electoral performance. However, the literature presents arguments for every taste. Part corroborates this expectation and points to the negative and significant effect of the prohibition on the electoral success of incumbents and the consequent increase in electoral competition (PALDA and PALDA, 1985; LOTT JR. 2000). However, there are those who caution of the risk that the restrictions favor the candidates for re-election and further unbalance the disputes (JACOBSON,1978; LOTT JR.,

[1] Universidade Federal da Paraíba - UFPB. Email: ecalheiros11@gmail.com
[2] Universidade Federal de Alagoas - UFAL. Email: jasjunior2007@yahoo.com.br
[3] Universidade Federal de Alagoas - UFAL. Email: denissoncsol@gmail.com
[4] Universidade Federal de Pernambuco – UFPE. Email: quemuel.baruque@ufpe.br

1987).

Strictly speaking, the larger debate concerns the possible electoral advantage of the candidates for re-election over the challengers. We begin from this perspective but focused on the mandataries since they are the focus of the debate and traditionally attract the largest sum of corporate resources (GRIER, MUNGER and ROBERTS 1994; HART, 2001; SAMUELS, 2001; LEMOS, MARCELINO, and PEDERIVA, 2010; SPECK and MARCIANO, 2015; SPECK, 2015). We tried to estimate the effect of corporate dependence on the re-election of candidates. Therefore, we only tangent the debate about the electoral advantage of incumbents (JACOBSON, 1978; LOTT JR., 1987, UPPAL, 2008; LINDEN, 2004; BRAMBOR, CENEVIVA, 2011). Our main hypothesis is that corporate dependence exerts a significant and negative effect on the electoral performance of incumbents. To test this, we used data from the 2012 and 2016 elections.

The text is divided into four sections. The first presents a history of Brazilian electoral legislation on campaign funding. The second demonstrates the relationship between money and vote, later debating on the effect of restricting corporate funding for election campaigns. The third presents our methodology and the main results. Finally, we make the final considerations.

2. Electoral legislation: the prohibition

The first Brazilian legislation that established the rules for electoral disputes is Law nº 9,504/97, which sets dates for the contest, deadlines for accountability, forms of electoral funding, and everything else related to the electoral process.

Before the electoral reform that set the spending ceiling in elections in Brazil and prohibited corporate funding in 2015, Law nº 9,504/97 allowed each individual to donate up to 10% of their gross annual income and companies to donate up to 2% of their gross annual income before the contest (BRASIL, 1997).

In 2006, article 24 of Law nº 11,300/06 included a list of prohibitions of possible donor entities. The wording given by the law prohibited the following segments from making donations: charitable and religious entities; sports entities receiving public resources; non-governmental organizations receiving public resources, and civil society organizations of public interest. In 2009, Law nº 12,034/09 amended the previous law to include sports entities that did not receive public resources, according to article 24, item IX (BRASIL, 2009). Thus, the wording given by the law prohibits both sports entities that receive public money and those that do not. Additionally, Law nº 12,034/09 also included in the limit of donations for individuals, fixed at up to 10% of the annual gross income referring to the year before the election (BRASIL, 2009, article 24).

Law nº 13,165/15 (BRASIL, 2015) brings in its wording the spending ceiling for electoral disputes and the prohibition of corporate funding, legal entities. The motivation for the drafting of this Law was a set of investigations conducted by the Federal Police of Brazil, where more than ten thousand search and seizure warrants, temporary arrest, pre-trial detention, and coercive driving were carried out. The goal was to uncover a money laundering scheme that moved billions of reais in bribes.

According to investigations, the scheme worked in a cyclical manner, where companies financed the election campaigns and, having elected the receivers, the funding companies won bids to provide public services, which returned a percentage of the money received by the contract to parties and operators of the scheme.

In 2015, the Federal Supreme Court (STF) ruled corporate funding unconstitutional. The rule came into force from the 2016 election, allowing only resources from the party fund and individuals, including the candidate him/herself.

Furthermore, Law nº 13,165/15 fixed the ceiling of campaign spending up to R$ 100,000.00 thousand reais or this amount run by inflation for municipalities with an electorate above 200,000 thousand inhabitants. The law provides that the spending ceiling will be up to 70% of the amount spent in the previous election by the candidate who spent the most in the municipality. In other terms, the legislation provides that the limit for municipalities with less than 200,000 inhabitants is up to one hundred thousand reais, but for municipalities above 200,000 inhabitants the calculation is one hundred thousand reais corrected by the value of inflation in the period. However, the correction cannot exceed 70% of the amount spent by the candidate who spent the most in the previous election. Thus, the decision taken by the STF and subsequently materialized into law by the Legislative Branch sought to reduce the advantages of parties or individuals who received corporate funding and had high campaign expenses.

Chart 1 presents the history of changes promoted in campaign finance legislation. Our aim is to situate the reader about the period of changes in Brazilian electoral legislation.

Chart 1 – History of changes to the campaign-funding law

Theme	Law 9,504/97	Law 11,300/06	Law 12,034/09	Law 13,165/15
Donation by an individual	Allowed with a limit of 10% of personal gross income from the year before the election; Candidate's own expenses, maximum amount established by his/her party.	(UNCHANGED)	The 10% limit provided does not apply to the use of movable and immovable property of the donor provided that the amount does not exceed R$ 50,000.00.	The 10% limit is determined annually by the TSE and SRF.
Donation by a legal entity	Allowed with a limit of 2% of the gross turnover of the year before the election.	(UNCHANGED)	(UNCHANGED)	Not allowed

Prohibited donations (article 24)	I - Foreign entity or government; II - Government body or foundation maintained with resources from the Public Authority; III - Concessionaire or permittee of public service; IV - Entity governed by private law that receives, in the condition of beneficiary, a compulsory contribution by virtue of loyal disposition; V - Entity of public utility; VI - Class or trade union entity; VII - Non-profit legal entity that receives resources from abroad;	VIII - Charitable and religious entities; IX - Sports entities that receive public resources; X - Non-governmental organizations that receive public resources; XI - civil society organizations of public interest.	IX - Sports entities (not only those that receive public resources).	(UNCHANGED)
Ceiling	The spending limit per campaign is set by the parties and coalitions at each election they contest. The amounts must be communicated along with the registration of candidates to the Electoral Courts.	The Law shall fix, until June 10th of each election year, the limit of campaign spending for positions in dispute. The law is not edited until the deadline. The parties and coalitions must establish it.	(UNCHANGED)	The campaign spending limit is established, in each election year, by the TSE.

Source: Silva Júnior *et al*. (2020).

2.1 The impact of the end of corporate funding

Part of the literature advocates that the main objective of the resources destined for the campaigns is to connect the candidate to the voter. This goal can be pursued in several forms: flyers, stickers, *jungle*, TV, radio, social media such as *Facebook, WhatsApp, Twitter, Instagram*, or through hand-to-hand contact on the streets at visits and rallies. Whatever the path, it can be said that the effect of funding is not equal for everyone everywhere (NORRIS, 2005; SOUZA, 2019; PARANHOS, GUIMARÃES and SILVA, 2018; SPECK, 2017; MANCUSO, 2017; SANTOS, 2016).

Jacobson (1978) showed that the effect is different for challengers and candidates for re-election. Overall, the effectiveness of funding in obtaining votes tends to be higher for challengers (JACOBSON, 1978). The reason is simple: money is a must for this type of candidate to build or strengthen a *name recognition*[5] with the electorate. Usually, the challengers do not have space in the media, they are little known and, therefore, do not count on wide dissemination of their positions or achievements. In this sense, the type of candidate or even the presence of a candidate for re-election in the contest would significantly alter the

[5] They are names known by the population for holding elective political positions (Elizabeth, Zechmeister, 2013).

influence of money on the vote (BARBA and CERVI, 2017; DILIBERADOR and KOMATA, 2010). In summery, the diagnoses on the effect of campaign funding are based on three main points: 1) initial electoral advantage; 2) fundraising efficiency, and 3) spending efficiency (PASTINE and PASTINE, 2012; GRIER, 1989; LOTT JR., 1987).

The first element is linked to the mandate. In general, it is argued that candidates for re-election have electoral coins from the exercise of the mandate (COX; KATZ, 1996; ANSOLABEHERE et al., 2000). First, some of them have a clientele, an electoral base that is usually assisted by their actions (JACOBSON, 1978). Additionally, incumbents typically increase their electoral advantage by making the public machine work in their favor and being exposed to public opinion for longer (PASTINE; PASTINE, 2012; SMITH, 1995). To top it off, some studies point to the financier's preference for re-election candidates and the greater efficiency of campaign spending for this same group (GRIER, MUNGER, ROBERTS 1994; HART, 2001).

Not without reason, the literature on campaign finance restrictions focuses on the electoral performance of incumbents. Part of it bets that restrictions on funding sources tend to favor incumbents (BRONARS; LOTT JR., 1997; COATE, 2004). The same is said about the establishment of spending limits. Pastine and Pastine (2012) and Smith (1995) state that just banning corporate funding for all competitors does not nullify the incumbent's initial advantage. Coate (2004), in addressing the topic, argues that the prohibition of corporate funding associated with the spending ceiling can limit the information received by the voter and, consequently, his/her evaluation of the candidates. Daniel (1997) and Jacobson (1978) also argue that corporate funding restrictions and spending ceilings consolidate the incumbents' advantage over challengers. The authors argue that incumbents will have an immediate advantage since they can turn money into a vote more efficiently. At the limit, scarce money prevents the voter from having enough information to choose another candidate other than the representative (COATE, 2004; WITTMAN, 2001).

However, there are those who think differently. Stratmann and Francisco (2015) consider that restrictions on campaign funding affect incumbents and challengers alike. They place them in an equal position in the dispute. This is because both will have to deal with resource limitation. In other words, the authors deny the greater efficiency of incumbents' spending. For them, both re-election candidates and challengers will have the same difficulties in obtaining votes (GREEN; KARSNO, 1988).

On this side of the debate, the literature argues that the advantage of incumbency is more supposed than proven. Thus, the restrictions equally affect all competitors, placing them side by side in the race for office (STRATMANN; FRANCISCO, 2015). In other words, the limitations imposed by the law would increase competitiveness, causing the number of challengers to increase significantly, which would jeopardize the political survival of the competitors to re-election (PALDA; PALDA, 1985; LOTT JR. 2006, STRATMANN; FRANCISCO, 2015). Since the proxy advantage is only supposed, the competition is based only on how competitors can maximize the efficiency of funding their campaigns, more precisely, how they can turn resources into votes more efficiently than their opponents.

According to Palda and Palda (1985) and Pastine and Pastine (2012), the effect of restrictions varies depending on the degree. If moderate, they favor the probability of victory of the challengers and intensify the electoral competition (PASTINE; PASTINE, 2012). Palda and Palda (1985) argue that restrictions on amounts and sources may jeopardize the political survival of candidates for re-election. It can increase the challenger's chances without allowing the incumbent to take advantage of limitations (PALDA; PALDA, 1985). Clearly, the debate has two sides, with no consensus on which one is right.

The picture is similar in Brazil. It all begins with uncertainty about the electoral advantage of incumbents. At first, there is a strong controversy about the possibility of incumbents obtaining rewards for their benefactors (SAMUELS, 2001 a; 2001b; 2001c). The voter would have difficulty rewarding public agents in a system that does not excel for the clarity of responsibilities. However, some studies show the opposite, indicating that the Brazilian voter may not be as blind as one thinks (CAVALCANTE, 2015; FERRAZ; FINAN, 2008; SILVA *ET AL.*, 2013; CODATO, CERVI, PERISSINOTTO, 2015; LEMOS, MARCELINO, PEDERIVA, 2010; SPECK; MARCIANO, 2015). Either for the good, or for the bad of the incumbent (LIBANIO; MENEZES-FILHO, 2003). Moreover, the literature highlights the preference of funders for re-election candidates, especially corporate ones (SAMUELS, 2001; LEMOS, MARCELINO; PEDERIVA, 2010; SPECK; MARCIANO, 2015; SPECK, 2015)

Therefore, the literature is divided between pointing out the electoral advantage or disadvantage of incumbents. On the one hand, Magalhães (2012) shows the electoral advantage of incumbents in some electoral cycles. On the other hand, Brambor and Ceneviva (2011), Titiunik (2009), Júnior and Pires (2020) point evidence in the opposite direction. Magalhães (2012) uses discontinuous linear regression and points to the selection bias and the restriction in the number of cycles analyzed by the other studies as the main reasons for divergence between the results. Bambor and Ceneviva (2011) and Júnior and Pires (2020) are methodologically inspired by Levitt (1994) and Levitt and Wolfram (1997) and use the repeated-pairs approach to highlight the adverse effect of incumbency in the case of the municipal dispute. In short, the advantage of incumbents here is still an open question.

Our focus is not to estimate a possible advantage of incumbents. We pull this debate only to theoretically base the choice of our object and build our work hypothesis. According to the international debate, restrictions on campaign funding negatively affect the electoral performance of incumbents. In addition, part of it points to the preference of corporate funders for re-election candidates. Unlike the US case, reviews about these restrictions are still quite scarce around here. Avis et al. (2017) is the only work that sought to investigate this point in municipal elections. The work uses discontinuous regression and concludes that the spending limit increased the number of qualified candidates in disputes, made the election more competitive, and reduced the advantage of incumbents (AVIS et al., 2017). In theoretical terms, our bet on incumbents is an attempt to focus on the "darlings" of corporate funding. We bet that corporate dependence exerted a negative and significant effect on the electoral performance of incumbents in 2016.

3. Methodology

In this section, we describe the procedures used to facilitate the replication of its results (KING, 1995; PARANHOS *et al*., 2013; FIGUEIREDO FILHO *et al*., 2019). Our goal is to estimate the effect of corporate dependence on the electoral performance of incumbents. To this end, we work with candidates for Mayor re-election in 2016. The information was extracted from the TSE *website*, using the *EectionsBR* package and *Software* R version 4.0.2. Our research question is: what is the effect of corporate dependence on the electoral performance of incumbents? Our working hypothesis is that corporate dependence exerts a negative and significant effect on the electoral performance of re-election candidates. To test it, we use linear, quantile, and logistic regression. The Charts below summarize our research design:

Chart 2 – Research Design

Element	Description
Research question	What is the effect of corporate campaign dependence on the electoral performance of incumbents?
Hypothesis	Corporate dependence exerts a negative and significant effect on the electoral performance of incumbents.
Analysis unit	Mayor candidates
Temporal series	2012 and 2016.
Methods and techniques	Linear, quantile, and logistic regression.
Data source	TSE election data repository;
Tools	*ElectionsBR. Software* R version 3.6.3

Source: The author, 2021.

The data that served as a source for this work were extracted from the Superior Electoral Court (TSE). The data concerning campaign funding was extracted directly from the data repository of this body. The candidacy data and electoral results were collected through the *electionsBR* package[6]. All data were processed and analyzed using *Software R*[7]. As our object is

[6] Package created by Meireles, Silva, and Costa (2016).

to facilitate replicability, in addition to describing all the procedures used, we provide the basis and the *script* used[8]. Following is a list of worked variables:

Chart 3 – List of Variables

Type	Name	Description	Measurement
DV	Percentage of votes	Percentage of votes obtained in 2016.	Ratio
IV	Dependency Corporate	Percentage of revenue from corporate sources (2012)	Ratio
CV	Revenue Balance	Percentage of 2016 Revenue minus that of 2012 considering the total revenue of all candidates in the municipality.	Ratio
	Vote 2012	Percentage of votes in 2012.	Ratio
	Revenue in *2012*	Percentage of revenue considering the total revenue of all candidates - 2012.	Ratio
	Revenue in *2016*	Percentage of revenue considering the sum of revenue of all candidates - 2016.	Ratio
	Size of the electorate	Size of the electorate in the municipality.	Categorical

Source: The author, 2021.

Our dependent variable is the percentage of votes in 2016. There is a debate in the literature about the importance of this measure to assess electoral performance. Some works choose electoral success to represent this performance. We begin by focusing on the percentage since we are interested in the classic ratio of revenue and votes. However, we include an analysis of electoral success at the end. Therefore, we depend on the percentage to estimate linear and quantile regression. In the latter, the objective is to verify the variation of the effect of some independent variables over four quantiles of the dependent variable. Thus, we seek to tone our more rigorous hypothesis test (ANGRIST; PISCHKE, 2009).

In operational terms, our independent variable (IV) is the percentage of the candidate's revenue from corporate sources. We understand that this is the best indicator to measure corporate dependence. To explain, the measure corresponds to the percentage of revenue that the candidate received from companies in 2012, the last elections before the prohibition. To create this variable, we selected only the values described as originating from companies. Subsequently, we divide this amount by the total of the income received by the candidate and multiply by one hundred.

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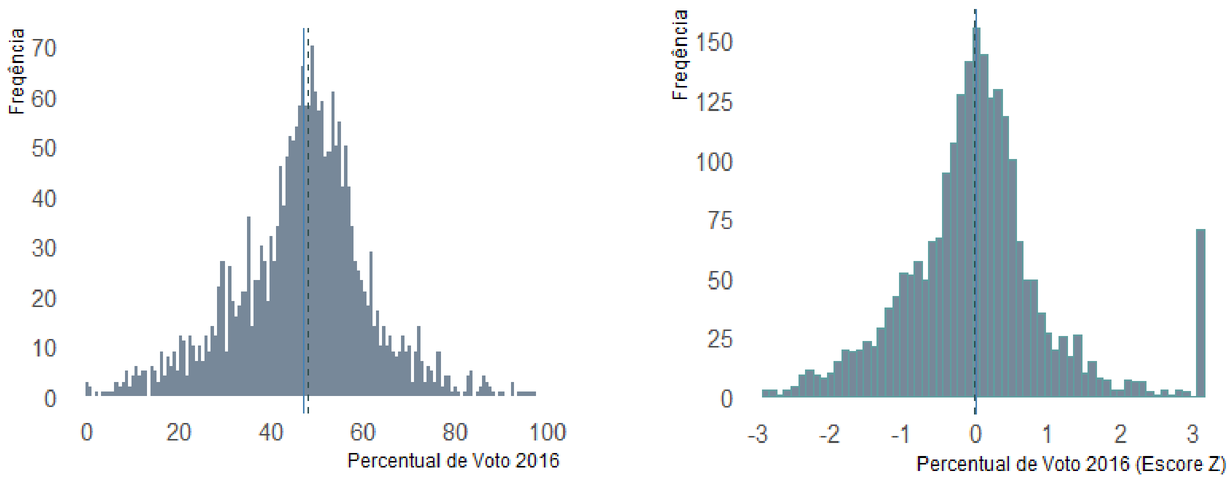
[7] Version of *software R:* Core Team, 2020 in version 3.6.3.
[8] Script: https://osf.io/kfz62/

The list of control variables (CV) shows: Vote, revenue balance, Revenue in 2012, Revenue in 2016 and, size of the electorate. The vote is the percentage of votes obtained by the candidate in the first round of the 2012 election. The revenue balance is the result of subtracting the percentage of revenue obtained by the candidate in 2016 and 2012. The calculation of this percentage corresponds to the division of the revenue received by the candidate by the sum of the revenue obtained by all candidates in each municipality times one hundred. Revenue in 2012 and 2016 are exactly these percentages. Finally, the size of the municipality is a division of the municipalities by electoral stretch (up to 5 thousand; 5,001 to 10 thousand; 10,001 to 50 thousand; 50,001 to 200 thousand; and above 200 thousand). Overall, the controls aim to include data from the previous election (2012) and exogenous variations between municipalities in the analysis.

4. Results

We begin by examining what we want to explain, namely our dependent variable. The idea is to obtain more information regarding the variation in the electoral performance of incumbents. Figure 01 and Table 01 show the results.

Figure 1 – Percentage of votes of incumbents



Source: The author based on TSE data, 2016

Table 1 - Descriptive measures of the percentage of votes

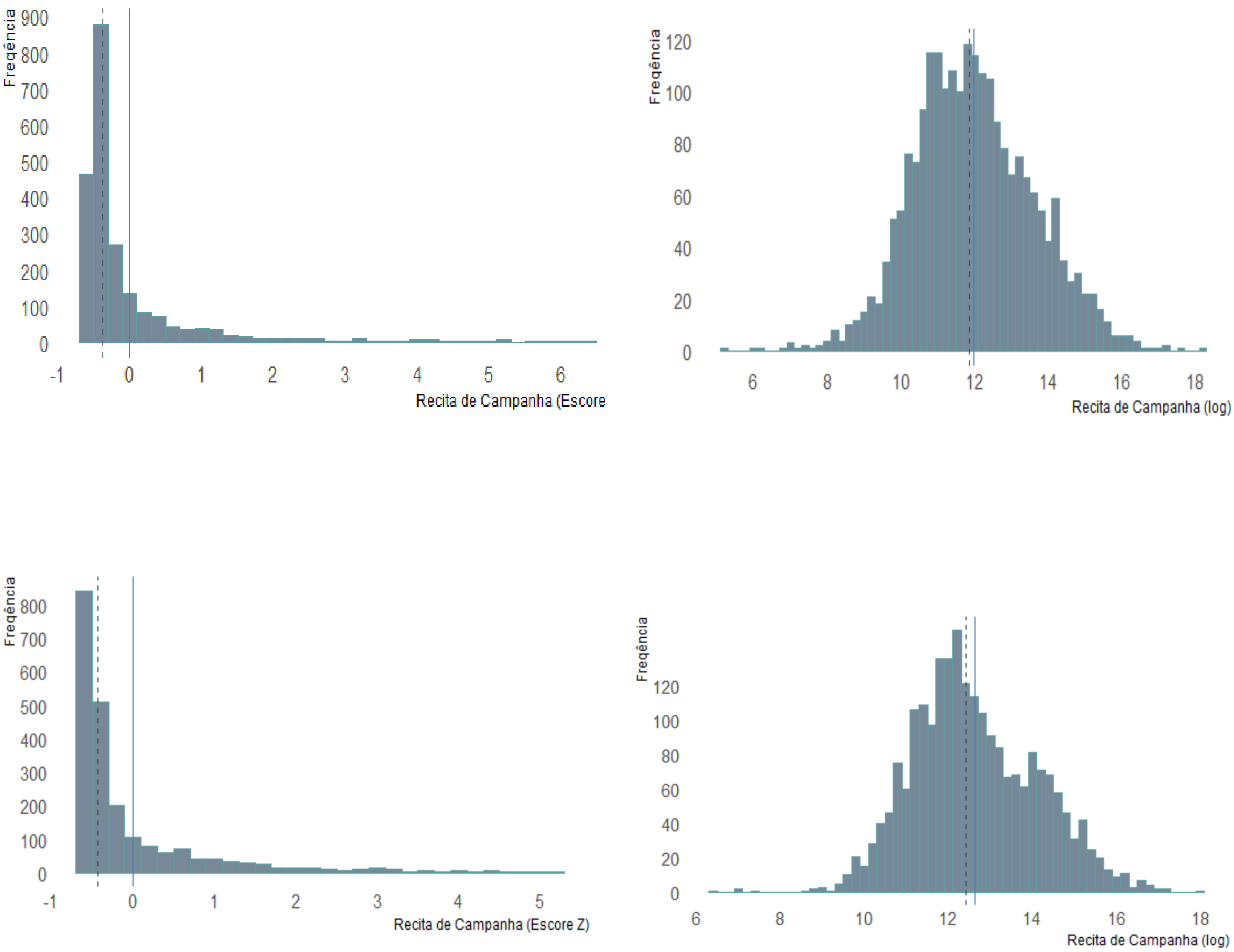
N	Mean	Standard Deviation	Median	Minimum	Maximum
2,327	51.33	29.72	50.98	0.17	100

Source: The author based on TSE data, 2016

Our dependent variable presents a distribution close to symmetric. The solid and dotted lines, representing the mean and median, respectively, appear almost overlapping. However, the Figure indicates the presence of a set of *outlier* observations, that is, situated at more than three standard deviations from the mean. The standard deviation is lower than the mean at 21.61 points, that is, the variable has a coefficient of variation of 57.89 %.

The other side of the coin is the campaign revenue of re-election candidates. To begin with, we examined the distribution of this variable before and after the prohibition of corporate campaign funding. The goal is to identify indications of the effect of corporate dependence.

Figure 2 – Incumbents' campaign Revenue in 2012 and 2016[9]



Mean ------------ Median

Source: The author based on TSE data, 2016

[9] Representation of trimmed variables in six standard deviations.

Table 2 – Descriptive measures of Campaign Revenue Per Year

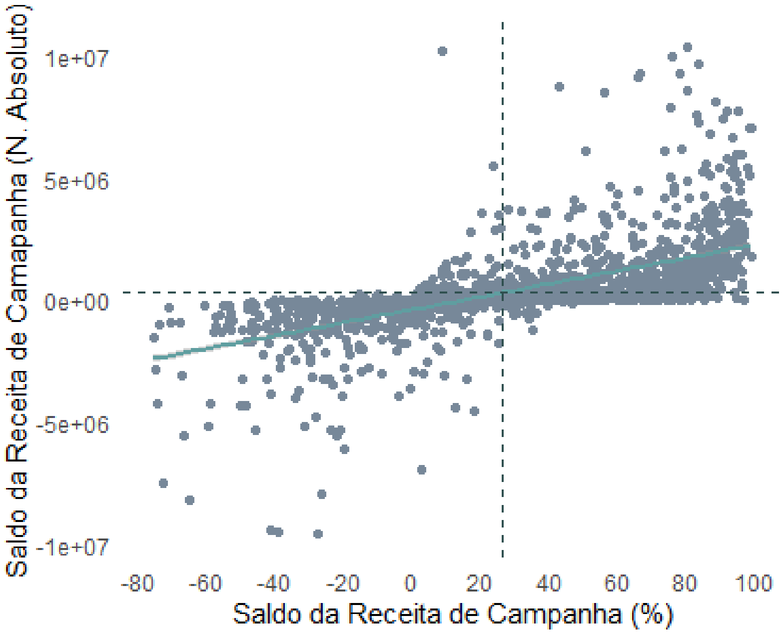
Year	N	Mean	Standard Deviation	Median	Min	Max
2012	2,183	614,889.2	2,563,675	136,466	200	81,230,735
2016	2,181	970,296.1	2,573,433	248,388	600	67,397,444

Source: The author based on TSE data , 2016.

The difference between the distributions seems to be small. Both are positive asymmetrical with a mean above their respective medians, probably pulled by extreme values, i.e., *outliers*. The Z-Score scale makes clear the presence of these observations in both elections. The graphs with logarithmic scale show the distance of the distributions from the normal. With this configuration, the most important measure becomes median. In 2012, half of the candidates spent at least R$ 136,466.00. Curiously, this amount goes to R$ 248,348.00 in the following election.[10] This data is surprising but it is necessary to control other variables, such as the number of candidates, to reach any conclusion.

To some extent, this more general picture hides some important information. For us, one of them is the difference between the candidates' campaign revenues considering the two elections. In the end, was there a drop in the candidates' campaign revenue? If so, what is the size of this decrease. Graph 01 and Table 03 help answer this question.

Graph 1 – Campaign Revenue Balance - Absolute Number and Percentage [11]



Source: The author based on TSE data, 2016

[10] The values were deflated from routine contained in the package *Dflate for R.* We would like to thank researcher Fernando Meireles for creating and maintaining the package.

[11] Real scale and statistics with trimmed variables (taken from observations at more than three standard deviations from the mean).

Table 3 - Descriptive measures of the Campaign Revenue Balance

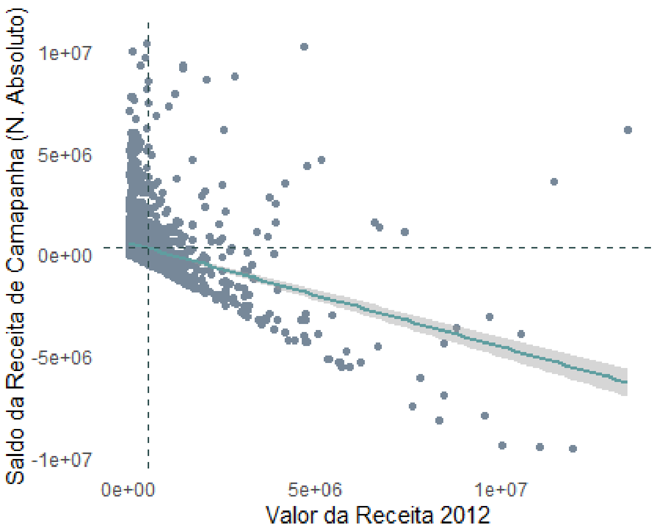
Measure	N	Mean	Standard Deviation	Median	Min	Max
Absolute Nº	2,181	354,893.7	3,366,722	66,673	-8,040,333	65,437,444
Percentage	2,181	26.79	35.91	22.81	-76.61	99.42

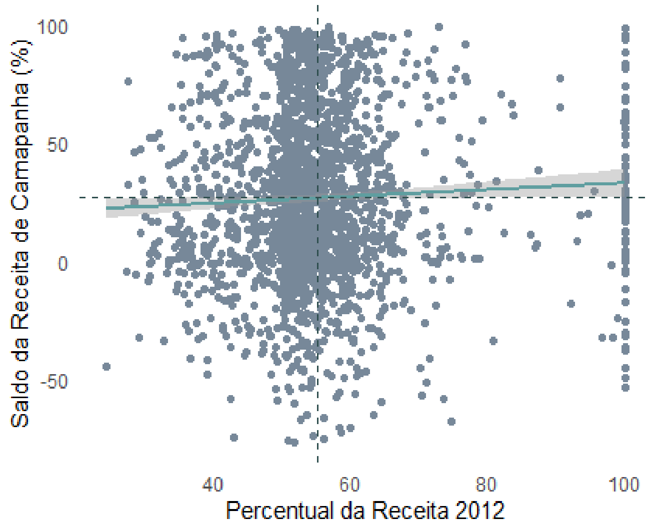
Source: The author based on TSE data, 2016

The Graph shows the balance of campaign revenue calculated in two forms. In absolute numbers, the balance corresponds to the amount collected in 2016 minus the amount received in 2012. In percentage, the calculation considers the sum of the revenue collected by all candidates in the municipality. Therefore, the measure represents the change in the incumbent's income versus the volume of resources spent in the municipality. The regression line points to a positive association between the measures but is far from the diagonal. The correlation is r = 0.41, that is, only 16% of the variance of one balance is explained by the other. This means that most oscillations in absolute numbers are not reflected in relative terms. More precisely, the set of candidates from each municipality. Additionally, both the mean and median are positive, which signals a growth in the volume spent.

One more data to explore before and after the prohibition of corporate campaign funding is the relationship between the revenue balance and campaign funding in 2012. Our goal is to know if the best funded before the end of corporate financing ended up losing more revenue. Figure 03 helps to examine this scenario.

Figure 3 – Campaign Revenue Balance and Campaign Revenue in 2012[12]





Source: The author based on TSE data, 2016

12 Analysis with trimmed variables (taken from observations at more than three standard deviations from the mean).

The ratio between the amount collected in 2012 and the revenue balance in absolute numbers is clearly negative (r = -0.61). Therefore, candidates who received the most resources in 2012 seem to have lost more revenue in the next election. However, when the measure is analyzed in relative terms, the correlation approaches zero. In short, there seems to have been a drop in revenue shared among all candidates from the same municipality.

Even more important is knowing how much this revenue balance is related to corporate campaign funding. To this end, we analyzed the relationship between the revenue balance and the percentage of corporate campaign funding received by the incumbents.

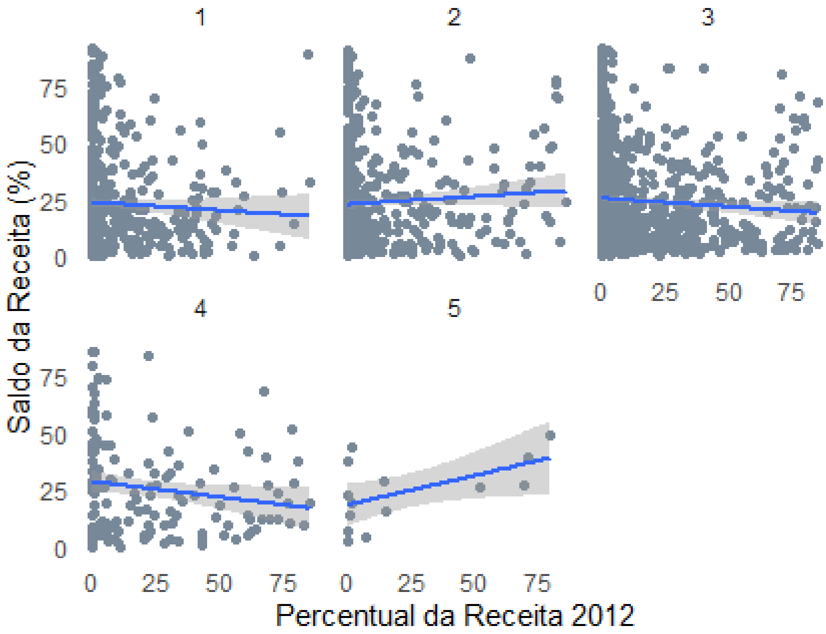
Figure 4 – Campaign Revenue Balance and Campaign Corporate Funding

Source: The author based on TSE data, 2016

Whether measured by the absolute number or by the percentage, the revenue balance has a weak correlation with corporate campaign funding. In other words, the change in revenue volume seems unrelated to the percentage of revenue from corporate sources in 2012. Even the incumbents most dependent on corporate revenues seem to have recomposed eventual revenue losses.

Before any conclusion, it is necessary to pay attention to the risk of the analyses being influenced by the size of the municipalities. To observe what difference the size of the municipalities makes, we reproduced the correlation analysis between the revenue balances with the percentage of revenue in 2012 by groups of municipalities formed from the electoral range (1 - up to 5 thousand; 2 - 5,001 to 50 thousand; 3 -10,001 to 200 thousand; 50,001 to 200 thousand; and 5 - above 200 thousand).

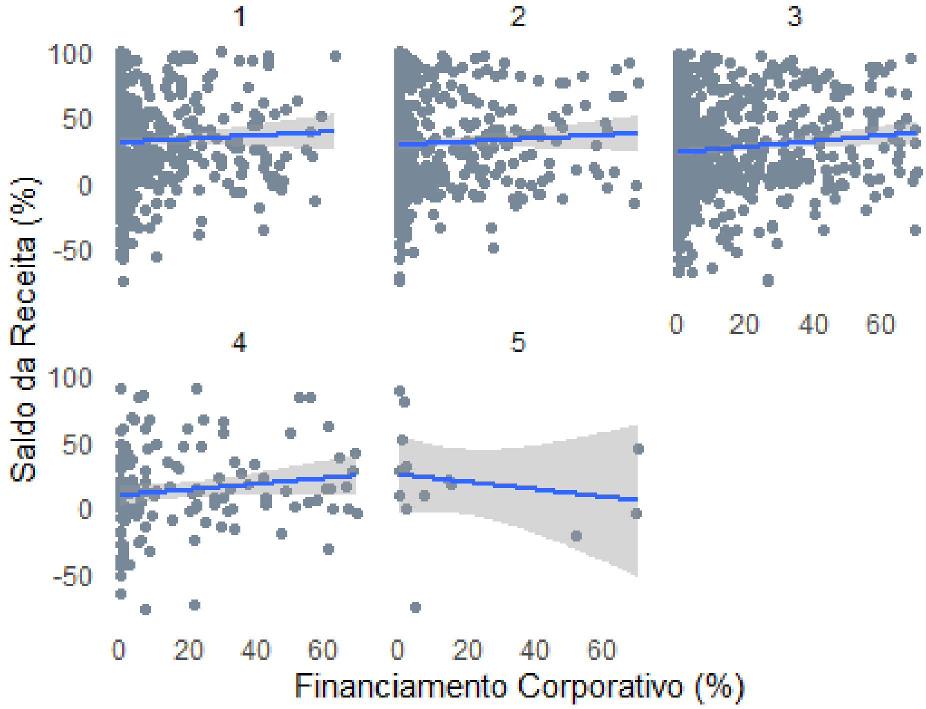
Figure 5 – Campaign Revenue Balance and Percentage of Revenue in 2012 per electoral stretch



Source: The author based on TSE data, 2016

The biggest differences appear in the last two stretches of municipalities. In them, the relationships between the revenue balance and the percentage of revenue in 2012 have opposite behaviors. In the penultimate, the line points to a negative relationship, in the last, to the opposite scenario. Therefore, the relationship between the two variables is not similar between the different groups of Brazilian municipalities. To close our descriptive analysis, we observed the correlation between the revenue balance and corporate funding by groups of municipalities formed from the electoral range (1 - up to 5 thousand; 2 - 5,001 to 50 thousand; 3 -10,001 to 200 thousand; 50,001 to 200 thousand; and 5 - above 200 thousand).

Figure 6 – Campaign Revenue Balance and Campaign Corporate Funding (%)



Source: The author based on TSE data, 2016

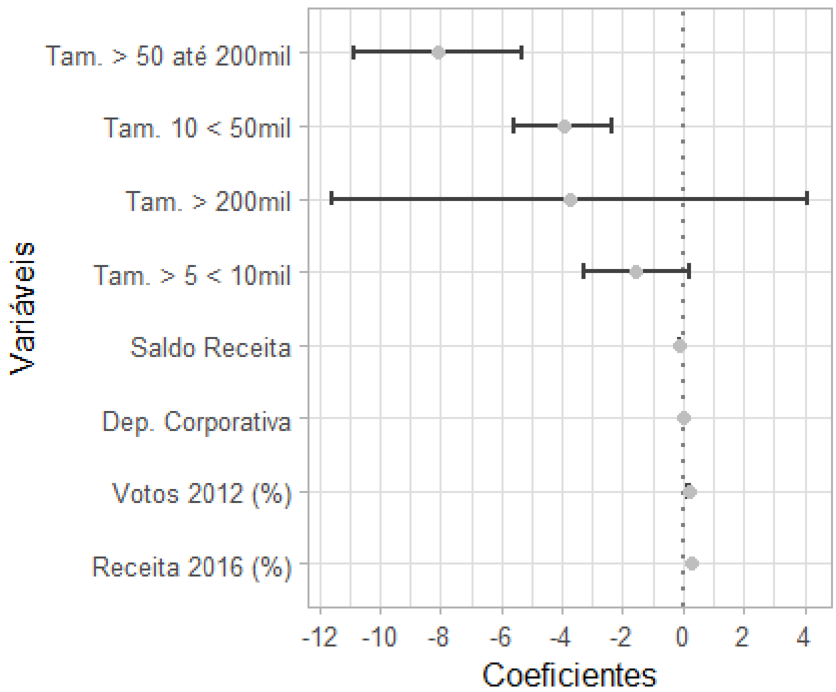
Again, the most apparent difference lies in the last stretch of municipalities. The relationship between the revenue balance and corporate funding is equally weak, but negative. Therefore, in this stretch, the largest balances are not, by far, correlated with the largest percentages of corporate funding.

In summary, the results obtained so far bring some important information: 1) there was no decrease in the mean or median revenue of the post-prohibition campaigns; 2) the most funded candidates in 2012 do not record systematic revenue losses in relative terms; 3) the candidates most funded by companies in 2012 are not the ones who record the largest revenue losses; and 4) the electoral size of the municipalities may change these findings. However, this preliminary analysis only set the stage for our hypothesis test.

Inferential Analysis

Our first step towards more robust testing is the estimation of a linear regression model by Ordinary Least Squares. Our dependent variable is the percentage of votes of incubents in 2016. The main objective is to verify if the old corporate dependency has an effect on this variable. Figure 07 presents the answer.

Figure 7 – Linear Regression Model - Vote Percentage Balance [13] [14]



Source: The author based on TSE data, 2016

Note:Adjusted $R^2 = 0.173$ $F = 94.58$ $p < 0.000$ $DW = 1.961$ $p > 0.05$
$BP = 51.742$ $p < 0.00$ $W = 0.964$ $p < 0.000$

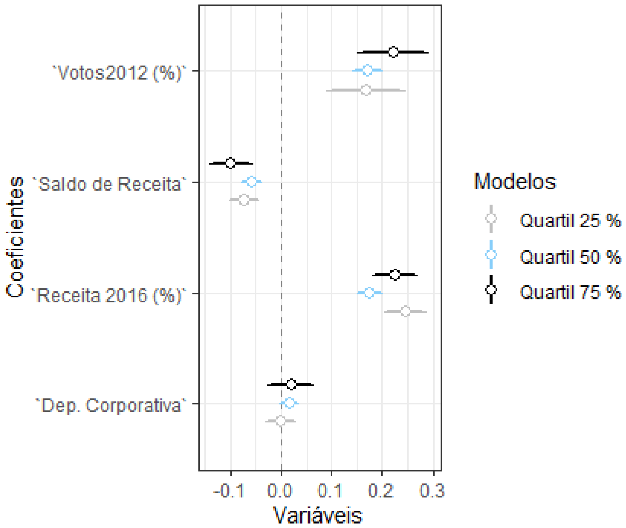
According to the results, only corporate dependence and some municipality sizes do not have significant effects. Additionally, contrary to what we expected, dependence has a positive effect. An increase of a 1% in the percentage of corporate revenue increased by 0.02% the percentage of votes of candidates for re-election in 2016. The revenue balance has a negative effect on the balance of votes. The same occurs with the size of municipalities with statistical significance. Clearly, there is no linearity between the effects of the size of municipalities, the largest of which is in an intermediate size range. The percentage of votes in 2012 has a positive effect. Candidates with the highest percentage in the last election (in the condition of a challenger) tend to obtain the highest percentages in the following election. Finally, the revenue in 2016 has a positive effect. It is important to state that, while controversial and tempting, the model results are not robust for all predicted value ranges. The BP test (Breusch-Pagan) points to the heterocedasticity of residues. Furthermore, the W test (Shapiro-Wilk) authorizes the rejection of their normality hypothesis.

We decided to estimate a quantile regression model to measure the size of this violation. More precisely, we estimate models for the 25th, 50th, and 75th percentiles. To improve the

13 We removed the variable revenue in 2012 due to multicolinearity problems with the revenue balance.
14 The graphs with the analysis of the model residues are available in the annexes.

visualization, we decided not to report the *dummies* of the municipality sizes[15]. Figure 08 shows the results.

Figure 8 – Quantile Regression Model - Percentage of Votes



Source: The author based on TSE data, 2016

Only the coefficient of the corporate dependency variable is tangential to the dotted line in all models. No other variable loses statistical significance among the models despite variations in coefficients. As for the 'Votes in 2012 (%)', the effect is greater in the third quartile of the dependent variable. The 'Revenue in 2016 (%)' has a smaller effect on the intermediate range of the dependent variable (2nd quartile). The 'Revenue Balance' approaches more than zero also in the model referring to the second quartile of the percentage of votes in 2016. Overall, the results confirm the linear model and challenge our working hypothesis. After all, in none of the analyzed value ranges corporate dependency is negative and significant as we expected.

Electoral success

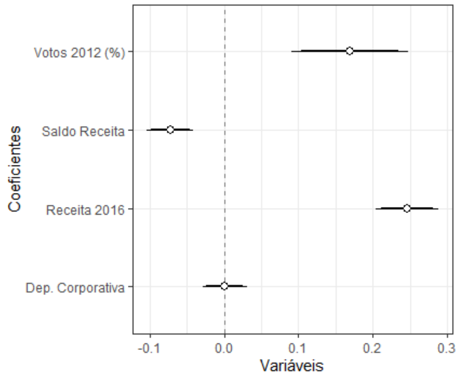
In practice, the results indicate that the percentage of revenue from the corporate world had no significant effect on the electoral performance of incumbents. As part of the literature prefers to measure electoral performance by success, we decided to estimate a logistic model whose dependent variable receives the coding (0) defeat and (1) victory in the contest for re-election. To improve the visualization, we present the model without the *dummies* of the municipality sizes. [16]

The graph shows the result of this analysis.

[15] The complete model can be consulted in the annexes.

[16] The complete model can be consulted in the annexes.

Figure 9 – Logistic Regression Model - Electoral Success[17]



Source: The author based on TSE data, 2016

Note: Cox Snell = 0.076 Nagelkerke = 0.100 AIC = 2,948.8

Similar to what happens in the linear model, the only variable whose coefficient does not present statistical significance is corporate dependency. Additionally, the coefficient presents a positive sign, contrary to what we had expected. Apparently, the percentage of revenue derived from the corporate world did not reduce the chances of victory of the candidates for re-election. The other variables also present a behavior similar to the linear model. The effect is positive for 'Votes in 2012 (%)' and 'Revenue in 2016 (%)' and negative for the 'Campaign Revenue Balance'. Overall, the model confirms the results we obtained in the linear and quantile models.

5 Final considerations

The literature on the prohibition of corporate funding presents diametrically opposite arguments. Part advocates that the prohibition has a double effect on electoral competition: 1) it horizontalizes the competition by placing the players in equal positions in the contest and 2) takes the advantage of the incumbent in the election. On the contrary, there is a current that advocates that the incumbent's advantage is decisive in the dispute and can not be nullified only with restrictions on campaign funding.

In Brazil, this topic is still little discussed and lacks further empirical investigations. In this text, we tested the hypothesis that corporate dependency had a negative and significant effect on the electoral success of the incumbent. The idea is that the electoral performance of candidates for re-election would worsen without this source of revenue. However, according to the results, this variable has no significant effect on the electoral performance of candidates. First, the correlation with the percentage of votes in 2016 is close to zero. Second, the correlation with the loss of revenue is also at this same level. In practice, this means that

[17] It is important to remember that the coefficients of the logistic model are exponentiated. Conversion is recommended to interpret them.

incumbents in 2016 who had part of their funding coming from corporate revenues have circumvented the effect of the prohibition. More than that, it shows that they were resilient and somehow managed to avoid failure and systematic loss of revenue in the general calculation (considering the total volume of revenue spent in the municipality). On average, the "darlings" of the corporate world did not suffer a drop in election performance.

Finally, it is important to recognize that this work has some limitations. First, the 2016 election was the first with a prohibition on corporate funding. It will probably take a larger temporal series to actually measure the effect of the end of corporate funding. Secondly, it is necessary to study the composition of the incumbent's revenue to know how a possible replenishment occurred. In any case, this work helps pave the way for future investigations into the end of corporate campaign funding in the Brazilian electoral system.

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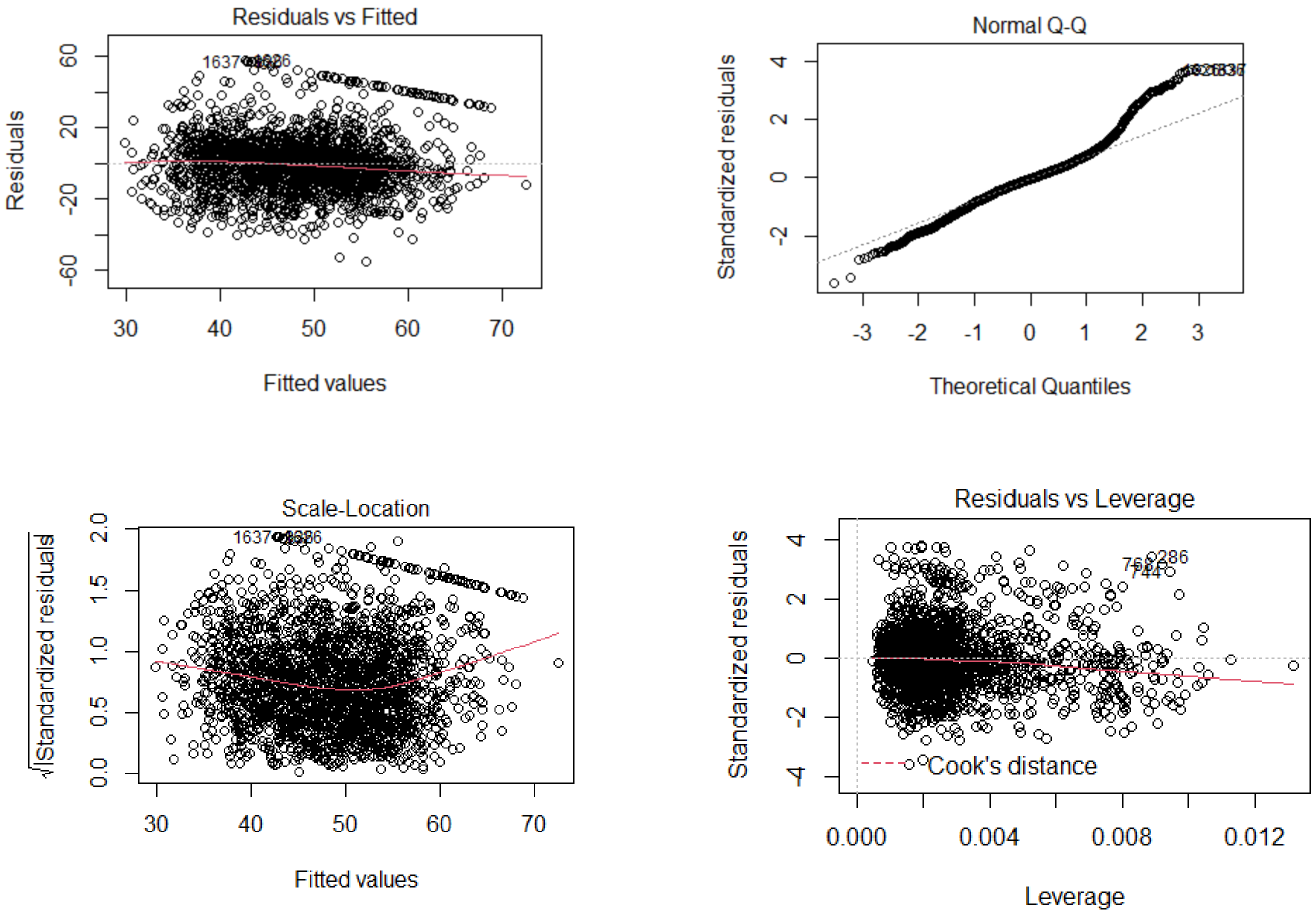
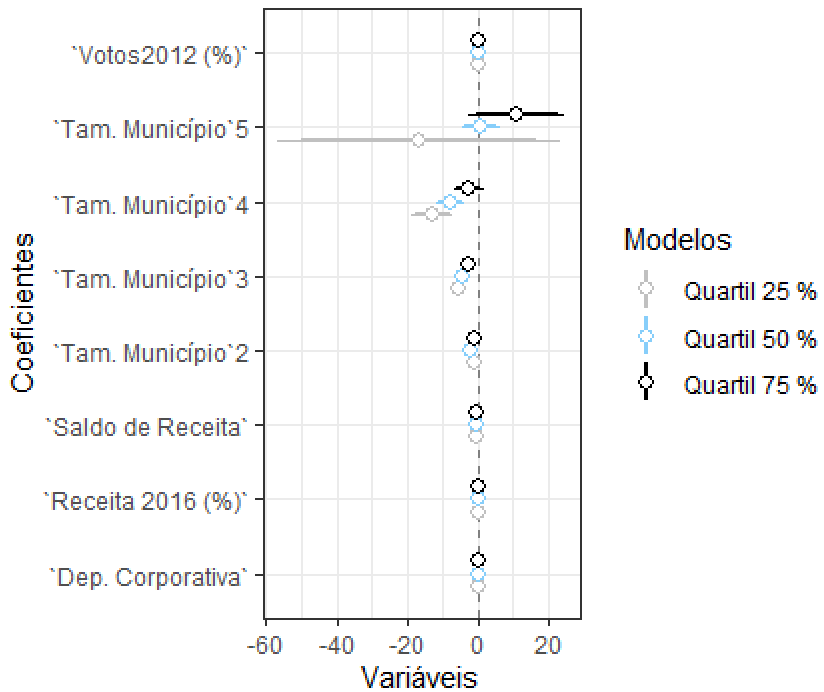
Annex I – Graphs of Linear Model Residues



Annex II – Quantile Regression Model



Annex III – Logistic Regression Model