POLITICAL BUDGET CYCLE: AN ANALYSIS OF BRAZILIAN MUNICIPALITIES

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Abstract

(i) Goal: The study investigates the behavior of committed expenses, investment expenditures and loan during an election period in Brazilian municipalities with a population equal to or greater than 50 thousand inhabitants, as well as whether these same municipalities meet the legal requirements regarding the source and limit of budget resources in an election year, as established by Law No. 11,300/06, in the period 2000-2016.

(ii) Method: The research sample represents 66% of the Brazilian population. The method applied for data analysis was tobit regression on panel data, grouped by municipalities, corresponding to 353 municipalities, 5 regions and 6001 observations.

(iii) Results: The findings indicate that there are no changes in the expenses committed before, during and after the electoral period, regardless of party equality and election in two rounds. With regard to spending on investments and loan during an election period, the study suggests an average increase of 9% and 68% respectively, with greater intensity when there is party equality between municipal and state governments, especially in the process of reelection. As for compliance with legal requirements on the use of budget resources in an election year, the study indicates that local governments do not comply with current normative instructions.

(iv) Contributions: Considering that there is no consensus in the specialized literature on the behavior of public spending, this study contributes to the literature and future research because it innovates through a robust and effective statistical method, the disclosure of spending behavior in local governments in election period.

Keywords: Public expense; PBC; Election period; data panel

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INTRODUCTION

S tudies demonstrate determinant elements on the Political Budget Cycle (PBC) during electoral periods in local governments (Mendes, 2004; Sakurai & Menezes Filho, 2008). These elements are present in greater homogeneity in government structures, social policy instruments and uniformity of electoral rules (Sakurai & Menezes Filho, 2011). These elements are more noticeable in developing countries with a young democratic regime, as they are more prone to manipulation of electorally biased fiscal policies, such as spending on investment and infrastructure (Brender & Drazen, 2005). Probably because they are more flexible in fiscal maneuvers by public managers (Shi & Svensson, 2006).

Other studies suggest that the economic and political environment in developing countries is constituted by weak institutions and government agencies, with opportunistic behavior, clientelism and friendliness (Pelagidis & Mitsopoulos, 2009). Motivated by this allusion, Chortareas et al. (2016) analyzed the impact of expenditure during an election period in municipalities in Greece, through the variables total expenditure, loan, investment, GDP per capita, unemployment and political ideology, and concluded an increase in spending during an election period, regardless of whether the local government is or not running for re-election.

Considering the lack of consensus in the specialized literature on the behavior of public spending during an election period, in which governments lose votes during an election period when they increase spending (Nordhaus, 1975; MacRae, 1977), there is an increase in the transfer bills. resources between governments of the same party, and tax increases during election period (Tufte, 1978; Blais & Nadeau, 1992; Galli & Rossi, 2002; Aklmedov & Zhuravskaya, 2004), there is no relevant impact on expenditure during election period (Mendes , 2004; Sakurai, 2009; Sakurai & Menezes Filho, 2008), and expenses during the election period grow significantly (Guo, 2009; Conraria et al., 2013; Goeminne & Smolders, 2013; Gregor, 2016; Garmann, 2017; Corvalan et al., 2018; Pierskalla & Sacks, 2018), this study investigates whether there is a positive or negative influence on budget expenditures during election periods in Brazilian local governments, and whether these same governments comply with current regulations (Law no. 11.300, 2 006) in relation to the use of budget resources in electoral campaigns, from 2000 to 2016.

For this, the following variables were established as an object of study: (i) committed expenses; (ii) processed balances payable (iii); unprocessed balances payable; (iv) own revenue; (v) receipts received by transfer; (vi) financial loans; (vii) investment expenses; (viii) surplus; (ix) deficit; (x) municipal gross domestic product (GDP); (xi) municipal development index (IDHM); (xii) educational human development index (IDHME); (xiii) electoral round; (xiv) election; (xv) reelection; and (xvi) political party.

In this sense, this study is justified because (i) it contributes to the advancement of previous studies over six decades (Downs, 1957; Key Jr, 1966; Nordhaus, 1975; MacRae, 1977; Tufte, 1978; Peltzman, 1992; Blais & Nadeau, 1992; Galli & Rossi, 2002; Brender, 2003; Mendes, 2004; Sakurai, 2009; Brender & Drazen, 2005; Aklmedov & Zhuravskaya, 2004; Shi & Svensson, 2006; Brender & Drazen, 2008; Drazen & Eslava, 2010; Nakaguma & Brender, 2010; Sakurai & Menezes Filho, 2008 and 2011; Sjahrir et al. 2013; Aidt & Mooney, 2014; Balaguer Coll et al., 2015; Chortareas et al., 2016); (ii) it uses a statistical method that is little applied in studies on the proposed topic; (iii) it provides discussion on the analysis of revenues in relation to expenses during an election period, which until then was little observed and discussed in the literature; and finally, (iv) its results can contribute to the understanding of practices carried out by local governments during electoral periods, for information users, researchers and society.

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2 LEGAL ASPECTS, EMPIRICAL STUDIES ON PBC AND CON- STRUCTION OF HYPOTHESES

Complementary Law no. 101 (LC no. 101, 2000) aims at balancing public accounts, permanent fiscal adjustment, debt control, transparency and social control. Just as it protects and punishes the public manager in relation to the manipulation of budgetary resources, if not for the purpose of benefiting society.

The aforementioned CL also establishes rules on expenditures for the last year of the government's mandate, such as spending on personnel, expenses that exceed the current year, contracting credit operations, indebtedness and voluntary transfers of resources, as well as control of public assets (Fernandes & Bezerra Filho, 2016). Law no. 11.300 (2006) gives greater amplitude to CL no. 101 by permanently prohibiting the use of budgetary resources to settle electoral expenses, which do not come from a specific account of the electoral political party, under penalty of disapproval of the candidate's accountability. And if abuse of economic power is proven, the law provides for the cancellation of the registration of the candidacy or the revocation of the diploma awarded due to the election result.

In view of the above, it is expected that the politician in office will generate a larger and effective PBC. Although there has been progress in attributing administrative and criminal penalties to the public manager for the misuse of budget resources, it is possible that governments still continue to carry out media actions with budget resources to obtain votes during election periods, and thus, be reelected (Capovillla et al., 2018).

Alesina et al. (1997) offer arguments for the existence of opportunistic PBC in national and local elections in developing countries. Brender (2003), Brender and Drazen (2008), suggest that electoral deficits in old democracies reduce the chances of re-election, and in young democracies it is indifferent. And voters in developed countries are antagonistic to the production of fiscal deficits and increased expenses in an election year (Nakaguma & Brender, 2010).

 Vasconcelos et al (2013) comment that the application of control mechanisms inhibits inappropriate actions in the use of budget resources in an election year. Given the above, Silva et al. (2018) claim that there are efficient control systems that can be applied by public managers and supervisory bodies, but effective practices are limited to inquiries into legality. However, the results of this research can be used as control parameters in combating opportunistic behavior, clientelism and friendship, suggested by Pelagidis and Mitsopoulos (2009).

2.1 Political Budget Cycle (PBC)

It comprises successive budgets that are repeated over time and are fed back into each new cycle. This process, since its inception, has been understood as a political instrument for establishing parameters for the collection of taxes and setting limits for public spending - budget allocation, as well as defining political responsibilities.

Although Kalescki (1943) predicted present PBC in the future economic regime of capitalist democracies, it was Downs (1957) who, through his work Economic Theory of Democracy, developed the Political Economic Theory, which, among other competences, explains the behavior of candidates in the power to act rationally in the maintenance of their continuity and exposure of their political performance during

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an election period. In this understanding, Corvalan et al. (2018) state that these candidates, too, seek to influence the outcome of an election by distributing resources and favors to voters.

Key Jr. (1966) suggests that the voter's decision is based on recent information about the candidate's current behavior and on economic performance indices. Nordhaus (1975) confirms the statements proposed by Downs (1957) and Key Jr. (1966) by suggesting that voters have adaptable future expectations, and voting decisions based on present analysis.

MacRae (1977), aiming to expand the results suggested by Nordhaus (1975), investigated the strategy of the American voter in choosing the vote for president, in the period 1957-1972, and found that the government in power loses vote drastically when expenditure increases during election period. This result contrasts with the findings presented by Nordhaus (1975).

With the purpose of advancing the studies of MacRae (1977), Tufte (1978), investigates the behavior of expenses during an electoral period in 27 democratic countries in the period 1961-1972, through the variables transfer between governments and tax increases, and concluded that there are positive oscillations in the electoral period in these governments. Similar results are found in the studies by Blais and Nadeau (1992), Galli and Rossi (2002), Aklmedov and Zhuravskaya (2004).

Mendes (2004), Sakurai (2009) and Sakurai and Menezes Filho (2008), investigated some Brazilian municipalities in order to compare the results presented by the aforementioned authors, and concluded that there was no positive impact on expenses in an election year. Barreto (2009) advances these studies by investigating and concluding that 70% of Brazilian municipalities with a population of over 200,000 inhabitants reelect their governments regardless of whether fiscal results are positive or negative during an election period. Opposing Barreto (2009), Lee et al., (2008) state that only 40% of candidates for reelection reach the desired goal, and this is only possible because the public machine is available for use in electoral campaigns.

Since the 1990s, Peltzman (1992) has been emphatic in stating that spending on the eve of an electoral campaign is associated with inefficient and opportunistic policies. More recently, through empirical studies carried out in cities in countries in Central Europe, South and Southeast Asia, Chile, China, the United States and Australia, they indicate that public expenditures in electoral periods undergo significant increases (Guo, 2009; Conrariaet al ., 2013; Goeminne & Smolders, 2013; Gregor, 2016; Garmann, 2017; Corvalan et al., 2018; Pierskalla & Sacks, 2018).

Based on the studies presented here, resulting from research carried out in national and international literature specialized in the public area, using the ProKnow-C technique (keyword search), in the Web of Science, Google Scholar, Scopus and Spell databases, it was possible to identify a lack of consensus on the topic in question, which characterizes a research gap. It is for this purpose that this study extends and advances previous studies. Thus, perhaps the results of this research contribute to the literary consensus. Even though, it is evident that the PBC during an electoral period in Brazil diverges from other countries.

2. 2 Research Hypotheses Building

Supported by the discussions presented, and with the purpose of fostering literary discussions about the divergences pointed out by the cited authors, four research hypotheses were built. In the first hypothesis, it is expected that the election year will have a positive effect on the expenditure committed in the proposed electoral cycles (2000-2016), since Vergne (2009), using samples from some countries, finds evidence that public expenditure in a period changes to spending more visible to the voter.

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H1: expenditure committed by Brazilian municipal governments show positive changes in an election year.

Studies focusing on the analysis of local governments (Aidt & Mooney, 2014; Akhmedov & Zhuravskaya, 2004; Drazen & Eslava, 2010; Galli & Rossi, 2002) identified a reduction in the budget balance and an increase in investment in health, education and construction of roads during election periods. Investment spending is expected to show positive changes in an election year. In this understanding, the second research hypothesis arises:

H2: investment spending undergoes positive changes during election periods in Brazilian local governments.

Aidt and Mooney (2014) investigated the PBC in 28 cities in England and observed that obtaining loans for large-scale projects during an election year grew by an average of 79%, i.e., from £0.52 to £0.93 per capita. And that these projects, with great media and visual coverage to the voter, are aimed at obtaining votes. In this proposal, the third research hypothesis is created:

H3: obtaining financial loans increases during election periods in Brazilian municipal governments.

Due to the imputation of penalty on crime of fiscal responsibility and other legal charges, to governments and managers who fail to comply with the guidelines on the execution of budget expenditures during an election period, such as current expenses, credit operations and voluntary transfers, (LC no. 101 , 2000; Law 11.300, 2006). National and international studies (Ansolabehere et al., 2002; Arretche & Rodden, 2004; Cheibub et al.,. 2009; Amorim and Simonassi (2013), Kauchakje, 2017; Deda & Kauchakje, 2019) provide powerful evidence on fiscal imbalances in election period when investigating resource allocation from party electoral funds by candidates for re-election in central governments. Samuels and Snyder (2004) suggest that some Latin American countries, such as Brazil, Bolivia and Argentina, incur expenses that overcome the legal electoral limitations and the resources that come from electoral funds of the legislative power. Given the above, the fourth and last research hypothesis is formulated:

H4 – Brazilian municipal governments comply with legal norms regarding the use of budget resources during an election period.

With this hypothesis, it is expected that expenses with personnel, obtaining loans, building up indebtedness and voluntary transfer of resources do not increase during electoral periods in Brazilian municipalities.

3 METHODOLOGICAL ASPECTS

In this research, a set of data on financial, economic and social aspects in the period 2000-2016 was used, in order to verify positive or negative occurrences in committed expenses, investment expenditures and obtaining loans during an election period in Brazilian municipalities with population equal to or greater than 50 thousand inhabitants. As well as legal compliance on the use of budgetary resources defined by Law no. 11,300(2006). For this, we searched the databases of the Brazilian Geographical and Statistical Institute (IBGE), Supreme Electoral Court (STE) and National Treasury Secretariat (STN) for information necessary to carry out this study.

On IBGE, information on population, municipal gross domestic product, municipal human development indez and educational municipal human development index variables. On STE, electoral round, election, re-election, local and state government political party, election year. In the STN, specifically in the Finances of Brazil (FINBRA) and in the Accounting and Tax Information System of the Brazilian Public

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Sector (SICONFI), committed expenses, investment expenses, financial loans, processed and unprocessed payables, own income and by transfer , result of surplus and deficit, as described in Table 1.

Table 1: List of variables used

Variables	Dependent	Independent	Description
LnDemp	x		Committed expenditures
LnInv	x		Investment expenditure
LnEmprst	x		Financial loans
LnPop		X	Population
Lnrpnp		X	Unprocessed balance payable
LnRpp		X	Processed balance payable
LnRecProp		X	Own revenues
LnRecUni		X	Revenues transferred by the Union
LnRecEst		X	Revenues transferred by the State
LnSup		X	Surplus
LnDef		X	Deficit
LnPib		X	PIBM – Municipal Gross Domestic Product
Idhm		x	Municipal Human Development Index
Idhme		x	Educational Municipal Human Development Index
Turn		x	Electoral round
EleRee		x	Election/re-election
Pgov		x	Local government party
AnoElei		x	Election year

Note: (*) Development. Source: Elaborated by the authors

The choice of population range is related to the probability of greater dissemination of information on budget execution by the municipalities (Sakurai & Menezes Filho, 2011). Thus, the sample initially corresponded to 633 municipalities with a population equal to or greater than 50 thousand inhabitants. However, 280 municipalities were removed from the sample because there was no information on the dependent variables (committed expenses, investment expenditures and financial loans) in some years of the analyzed period. The remaining 353 municipalities, a valid sample, were grouped into their respective regions, as shown in Table 2. It is noteworthy that this sample represents 66% of the Brazilian population, and 6% of the total municipalities.

Table 2: Sample and population by geographic region

	Amostra			População	
Region	Municipality quantity	Municipality %	Total population	Municipality quantity	Inhabitants
North	18	4%	11,415,743	450	17,296,580
Northeast	78	4%	37,680,894	1,794	57,092,263
Southeast	114	7%	57,386,811	1,668	86,949,714
South	73	6%	19,565,666	1,191	29,644,948
Midwest	70	15%	10,478,099	467	15,875,907
Total	353	6%	136,527,213	5,570	206,859,412

Source: Adapted from IBGE (2016)

Data were organized by region, municipality and year, and the values of variables, with the exception of Turn, EleRee, Pgov and AnoElei, were decomposed into log base 10 (Ln10), whose purpose was to standardize inputs and avoid outliers. Then, they were exported to the Stata ® version 15 software.

The method applied to analyze the data for each dependent variable was tobit regression on panel data, as it allows for greater precision in the differences existing in a given phenomenon between individuals (municipalities) in various cross-sections (years). In addition to allowing a greater amount of information, greater data variability, less multicollinearity between variables, greater degree of freedom and greater efficiency when estimating its parameters.

To identify the type of data panel, the command "xtset id i" was applied in the software, and it was found to be a strongly balanced data panel (strongly balanced) for the estimative models of each dependent variable, represented by the equations (1), (2) and (3):

$$LnDemp_{it}=a_i+b_1.LnPop_{it}+b_2.Lnrpnp_{it}+b_3.LnRpp_{it}+b_4.LnRecProp_{it}+b_5.LnRecUni_{it}+ \\ b_6.LnRecEst_{it}+b_7.LnSup_{it}+b_8.LnDef_{it}+b_9.LnPibm_{it}+b_{10}.Idhm_{it}+b_{11}.Idhme_{it}+b_{12}.Turn_{it} \\ +b_{13}.EleRee_{it}+b_{14}.Pgov_{it}+b_{15}.AnoElei+(a_i-a+\varepsilon_{it}) \tag{1}$$

$$LnInv_{it}a_i+b_1.AnoElei_{it}+b_2.Turn_{it}+b_3.EleRee_{it}+b_4.Pgov_{it}+b_5.Pop_{it}+b_6.LnRuni_{it}+ \\ b_7.LnRest_{it}+b_8.LnPibm_{it}+b_9.Idhm_{it}+b_{10}.Idhme_{it}+(a_i-a+\varepsilon_i) \tag{2}$$

$$LnEmprst_{it}=a_i+b_1.AnoElei_{it}+b_2.LnInv_{it}+b_3.LnRecUni_{it}+b_4.LnRecEst_{it}+b_5.LnDef_{it}+ \\ b_6.Idhm_{it}+b_7.Idhme_{it}+b_8.Turn_{it}+b_9.EleRee_{it}+b_{10}.Pgov_{it}+b_{11}.Pop_{it}+(a_i-a+\varepsilon_i) \tag{3}$$

By analyzing the estimators (equations 1 to 3), with their respective standard errors, the comparison technique between POLS estimation - between effects, fixed effect, robust fixed effect, random effect and robust random effect was applied to identify the degree of reliability of the results.

Soon after the Breusch-Pagan LM (Lagrange multiplier) tests, Chow's F test, Hausman test, and Hausman robust test, to identify multicollinearity between variables (Hoechle, 2007; Cameron & Trivedi, 2009), were calculated the results based on tobit regression in balanced panel data grouped by municipalities, corresponding to 353 clusters (municipalities), 5 regions and 6001 observations.

The Hausman and Breusch-Pagan Lagrange tests were also applied in the estimative models, also with the purpose of identifying the best statistical significance, since the first test investigates whether the individual effects a1 of the individuals present a correlation statistically equal to zero between parameters by fixed and random effect; and the second, if the variance between individuals is equal to zero – there is no significant difference between the variables. Therefore, the test results showed Prob>chi2 = 0.0000 with statistical significance in 99%.

It is worth noting that the Tobit regression model, proposed by Tobin (1958), which describes the relationship between a non-negative dependent variable (y) and an independent variable (vector), is more appropriate, complete and robust for analyzing decomposed variables. in logarithm, as suggested by Hesketh et al., (2001).

Once the estimated results of the models corresponding to each dependent variable were known (see equations 1 to 3), the variables that did not present a 95% confidence interval were removed from each model. Then, the estimation models were recalculated, represented by equations (4), (5) and (6) for each dependent variable with their respective independent variables, and it was found that:

The estimation model for the dependent variable committed expenses (LnDemp), represented in equation (4), indicates that the degree of confidence interval is 99% (P>|z| = 0.000), and the level of explanation of the independent variables in relation to the dependent variable it is 77%.

$$LnDemp_i=a+b_1.LnPop_i+b_2.Lnrpnp_i+b_3.Lnrpp_i+b_4.LnRecProp_i+b_5.LnRecUni_i+ \\ b_6.LnRecEst_i+b_7.LnSup_i+b_8.Def_i+b_9. LnPibm_i+b_{10}.Pgov_i+(a_i-a+\varepsilon I) \tag{4}$$

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Likewise, for the dependent variable investment expenditure (LnInv), presented in equation (5), it indicates a 99% confidence interval (P>|z| = 0.000), with the degree of explanation of the independent variables in relation to the variable dependent in 78.5%.

$$LnInv_i = a + b_1.AnoElei_i + b_2.Pop_i + b_3.LnRecUni_i + b_4.LnRecEst_i + b_5.LnPibm_i + (a_i - a + \varepsilon i) \qquad (5)$$

Finally, the estimative model for the dependent variable financial loan (LnEmprst), constant in equation (6), with a 99% confidence interval (P>|z| = 0.000), and degree of explanation of the independent variables in relation to dependent variable in 84%.

$$LnEmprst_i = a + b_1.AnoElei_i + b_2.LnInv_i + b_3.LnRecEst_i + b_4.Idhm_i + b_5.EleRee_i + b_6.Pgov_i + b_7.Pop_i + (a_i - a + \varepsilon_i) \qquad (6)$$
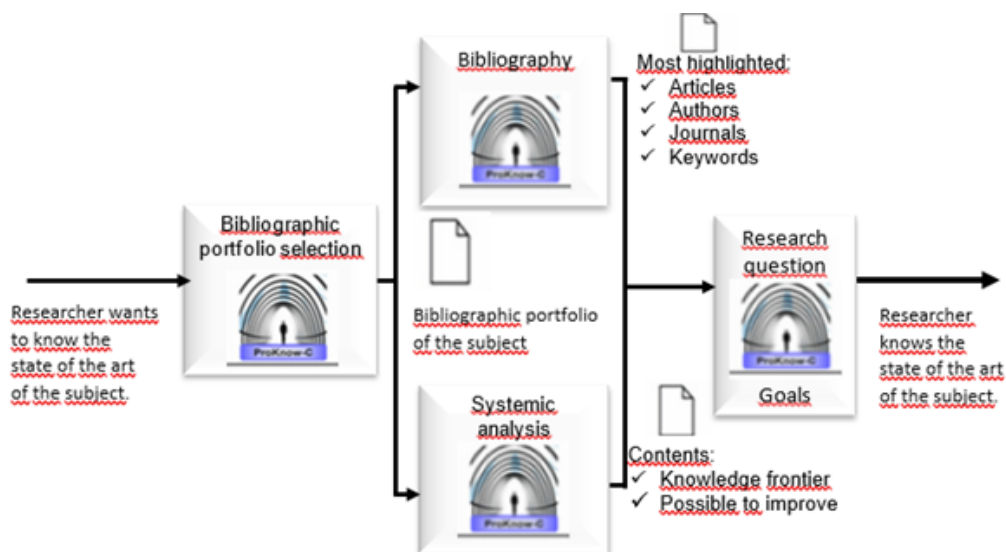
These estimative models, provided by equations (4), (5) and (6), are shown in Tables 4, 6 and 8. The variables removed for not showing statistical significance at 95% in the estimating models were:

In equation (1), Idhm, Idhme, Turn and AnaElei. In equation (2), Turn, EleRee, Pgov, Idhm and Idhme. And in equation (3), LnRecUni, LnDef, Idhme and Turn.

Finally, the method used to identify studies carried out on the subject in national and international literature in Spell, Scopus, Web of Science and Google Scholar databases was the Knowledge Development Process - Constructivist - ProKnow-C (Ensslin et al., 2012), shown in Figure 1. This method consists of four steps: selection of the bibliographic portfolio on the proposed topic, bibliography aligned with the proposed topic, systemic analysis of the bibliography aligned and framing with the research objectives.

In this way, part of the indispensable knowledge on the researched topic was built, that is, a set of articles that the authors considered relevant and aligned with the theme of this research.

Figure 1: Macrosteps of ProKnow-C

Source: Ensslin et al. (2012, p.78)

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4 RESULTS ANALYSIS AND DISCUSSION

The results shown in Tables 3 to 8, parameterized to the estimated tobit regression model for data in a balanced panel (strongly balanced), represent the findings of this study. Table 3 contains the descriptive analysis of the variables used to estimate the model provided for in equation (4).

Table 3: Descriptive statistics of tobit regression variables
with 6001 observations: Equation 4

Variable	Mean	Std. Dev.	Min	Max
LnDemp	8,200,236	,5193469	636,935	1,069,392
LnPop	5,148,502	,3734372	4,700,444	7,078,015
Lnrpnp	5,286,099	2,854,027	0	9,450,322
Lnrpp	6,594,505	1,353,579	0	9,339,387
LnRecProp	7,810,563	,6444379	5,212,273	10,577,340
LnRecUni	7,658,488	,4937606	0	9,509,854
LnRecEst	7,245,637	1,700,395	0	9,988,602
LnSup	4,879,461	3,214,785	0	9,495,585
LnDef	1,918,701	301,076	0	9,069,956
LnPibm	6,207,958	,6549734	3,395,306	8,798,005
Pgov	,1676387	,3735763	0	1

Note: Mean = average; Std. Dev. = standard deviation; Min = minimum value;
Max = maximum value. Source: Research data.

The two highest values recorded are in the variables LnRecProp and LnRecEst that correspond to the municipality of São Borja/RS. Revenues from transfers from the Union and the State amount to an average of 65% of the total revenue of that municipality. It is noteworthy that these revenues correspond to the fractional transfers of federal and state taxes, generated in the municipality itself. It is possible that this municipality will not be able to maintain itself financially with its own resources if there is a delay in the transfer of federal and state resources.

As for variables with zero value (Lnrpnp, Lnrpp, LnRecUni, LnRecEst, LnSup and LnDef), it is related to the fact that some municipalities do not present information in the STN and STE database. The maximum values of the variables LnDemp, Lnrpp and lnrpnp, also in the municipality of São Borja/RS, represent 35.4%, 29.2% and 29.3% of total revenue, respectively. Despite this, when comparing the LnDemp variable with own revenue, the representativeness drops to 106%, that is, the primary deficit. In addition, this municipality presents deficits in some years of the analyzed period.

Table 4 shows the results of the estimation model at 99% statistical significance and 77% explanation of the behavior of the independent variables in relation to the dependent variable.

Table 4: Tobit effect estimation with robust standard error grouped by municipalities

$LnDemp_i = a + b_1.LnPop_i + b_2.Lnrpnp_i + b_3.Lnrpp_i + b_4.LnRecProp_i + b5.LnRecUni_i + b_6.LnRecEst_i + b_7.LnSup_i + b_8.Def_i + b_9.LnPibm_i + b_{10}.Pgov_i + (a_i - a + \varepsilon i) \rightarrow Equação 4$		
Random-effect tobit regression	Number of obs =	6001
Group variable: Mun	Number of groups =	353
	Obs per group: min =	17
Random effect u_i ~ Gaussian	avg =	17.0
Integration method: mvaghermite	max =	17
	Integration points =	12
	Wald chi2 (15) =	77.31583

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Log likelihood =	5.884.274				Prob > chi2 =	0.0000
LnDemp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
LnPop	.2379812	.011092	21.46	0.000	.2162414	.2597211
Lnrpnp	.0048034	.0005217	9.21	0.000	.0037809	.0058259
Lnrpp	.0028183	.0009649	2.92	0.003	.0009272	.0047095
LnRecProp	.5097822	.0049385	103.23	0.000	.500103	.5194615
LnRecUni	.1280234	.0042566	30.08	0.000	.1196806	.1363662
LnRecEst	.0131525	.0007052	18.65	0.000	.0117702	.0145347
LnSup	.0082162	.0020056	4.10	0.000	.0042853	.0121472
LnDef	.0153979	.0020504	7.51	0.000	.0113791	.0194167
LnPibm	.0958164	.0050264	19.06	0.000	.0859649	.1056679
EleRee	-.0144778	.0024554	-5.90	0.000	-.0192902	-.0096654
Pgov	.0117513	.0033032	3.56	0.000	.0052771	.0182254
_cons	1.300.916	.059937	21.70	0.000	1.183.441	141.839
/sigma_u	.0613919	.0027049	22.70	0.000	.0560903	.0666935
/sigma_e	.0848461	.0008009	105.93	0.000	.0832763	.0864159
Rho	.3436379	.0205302			.30435	.3846925

Source: Research data.

It is worth noting that a robust standard error and grouping of municipalities by region were considered to calculate the results. Based on the statistical security of the proposed estimation model (see equation 4), it is possible to affirm that there was no positive change in the expenses committed in an election year. As well, the process of reelection and party equality between governments did not show statistical significance.

Therefore, it can be affirmed that the presented result does not confirm the H1, that is, the expenses committed by the Brazilian municipal governments do not present positive alterations in an election year. This result does not confirm the studies by Galli and Rossi (2002), Akhmedov and Zhuravskaya (2004), Guo (2009), Vergne (2009), Drazen and Eslava (2010), Magalhães and Soares (2013), Goeminne and Smolders (2013), Aidt and Mooney (2014), Conraria and Gregor (2016), Garmann (2017), Corvalan et al (2018), Pierskalla and Sacks (2018).

Also, through complementary results of this study, the authors suggest that, regardless of the election year, the increase in a statistical unit in the variables LnPop, LnRecProp and LnRecUni, reflects positively on committed expenditure (LnDemp) in approximately 24%, 51% and 13% respectively, in each analyzed municipality.

Table 5 shows the descriptive analysis of the estimation model presented in equation 5. This table identifies that the municipalities São Paulo/SP and Rio de Janeiro/RJ are the ones that receive the most revenue from transfers from the State (LnRecEst) and of the Union (LnRecUni). With regard to minimum values of zero, it is because some municipalities do not present information in the STN, STE and IBGE databases in some years of the analyzed period.

Table 5: Descriptive statistics of tobit regression variables
with 6001 observations: Equation 5

Variable	Mean	Std. Dev.	Min	Max
LnInv	6,994,788	,784057	0	9,714,401
AnoElei	,2941176	,4556831	0	1
Pop	261015,6	722702,2	50170	1,21e+07
LnRecUni	7,658,488	,4937606	0	9,509,854
LnRecEst	7,245,637	1,700,395	0	9,988,602
LnPibm	6,207,958	,6549734	3,395,306	8,798,005

Fonte: Dados da pesquisa

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Still on the municipalities of São Paulo and Rio de Janeiro, transfer revenues (State and Union) represent 48% and 52%, respectively, of total revenue. This expresses that a significant portion of the total revenue of municipalities is concentrated in federal and state taxes. This is a consequence of the management model practiced in Brazil, the largest share of municipal revenues concentrated in the Union.

As additional information, this study suggests that these municipalities' own revenue does not support their total expenditure. It is possible that this finding confirms the need for local governments to review the functional structure of their management, as stated by Silva et al (2018). In relation to resources for investment (LnInv), the municipality of Araraquara (SP) stands out as the largest investor in the period analyzed. This occurrence shows that the largest population cities are not always the ones with the highest proportional expenditures on investment.

Table 6 shows the result by estimating the tobit effect of equation (5) for each variable with robust standard error, grouped by municipalities. This model presents a 99% level of statistical significance, with an explanation of the behavior of the independent variables in relation to the dependent variable in 78.5%.

Table 6: Tobit effect estimation with robust standard error with municipality grouping:

$LnInv_i = a + b_1.AnoElei_i + b_2.Pop_i + b_3.LnRecUni_i + b_4.LnRecEst_i + b_5.LnPibm_i + (a_i - a + \varepsilon_i)$				$\rightarrow$ Equação 5			
Random-effects tobit regression				Number of obs		=	6001
Group variable: Munic				Number of groups		=	353
Random effects u_i ~ Gaussian				Obs per group: min		=	17
					avg	=	17.0
					max	=	17
Integration method: mvaghermite				Integration points		=	12
Log likelihood = 5942.6232				Wald chi2(10)		=	78.51535
LnInv	Coef.	Std. Err.	Prob > chi2 = 0.0000	P>|z|	[95% Conf.		Interval]
AnoElei	.0936659	.0181967	5.15	0.000	.058001		.1293309
Pop	4.74e-08	1.62e-08	2.93	0.003	1.58e-08		7.91e-08
LnRecUni	.2351563	.0240212	9.79	0.000	.1880757		.2822369
LnRecEst	-.0216743	.0050694	-4.28	0.000	-.0316101		-.0117386
LnPibm	.4819943	.0212436	22.69	0.000	.4403577		.5236309
_cons	224.421	.2345031	9.57	0.000	1.784.592		2.703.827
/sigma_u	.1820785	.0118487	15.37	0.000	.1588554		.2053017
/sigma_e	.6348309	.005974 1	06.27	0.000	.623122		.6465398

Source: Research data.

These results indicate that spending on investment in electoral periods suffers positive impacts, on average 9%. Likewise, when there is an increase in revenue from transfers from the Union (LnRecUni), on average 23%, and in municipal GDP on average 48%. This result confirms H2, that is, investment spending undergoes a positive change in election periods, as stated by Galli and Rossi (2002), Akhmedov and Zhuravskaya (2004), Drazen and Eslava (2010), Aidt and Mooney (2014), Chortareas et al (2016).

On the other hand, when there is an increase in revenue from state transfers (LnRecEst) and in the municipal human development index (Idhm), investment expenditures decrease by an average of 2% and 1%, respectively. This occurrence indicates that the increase of a statistical unit in LnRecEst, reduces 2% of that unit in investment, and in the same way with the Idhm. This means that local governments do not use the state transfer revenue plus to invest in investment during election period. The growth in investment identified comes from other sources of income.

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Table 7 shows the descriptive analysis of the estimation model represented in equation (6). The municipality of Barretos (SP) was the one that most resorted to financial loans during an election period. This municipality, over the period analyzed, resorted to a financial loan (LnEmprst), on average equivalent to 34% of total revenue and 140% of processed and unprocessed remainders payable (Lnrpp and Lnrpnp).

It is possible that the substantial impact on the remainders payable is a consequence of obtaining a loan, as stated by Aquino and Azevedo (2017). Regarding the minimum value of zero, contained in the table, it is a reflection of the municipalities that do not present information in the STN, IBGE and STE databases.

*Table 7: Descriptive statistics of tobit regression variables
with 6001 observations: Equation 6:*

Variable	Mean	Std. Dev.	Min	Max
LnEmprst	3.783.907	3.485.297	0	1.075.416
AnoElei	.2941176	.4556831	0	1
LnInv	6.994.788	.784057	0	9.714.401
LnRecUni	7.664.874	.4416382 6	.327015	9.509.854
LnRecEst	7.245.637	1.700.395	0	9.988.602
Idhm	.6307885	.0837192	.33	.82
Idhme	.4897012	.110308	.137	.746
EleRee	.4747542	.4994039	0	1
Pgov	.1676387	.3735763	0	1
Pop	260962	722706.9	36223	1.21e+07

Source: Research data.

Table 8 shows the result from the tobit regression estimation model, with robust standard error, grouped by municipalities, represented in equation 6. This estimation model analyzes the behavior of the financial loan variable (LnEmprst) in an election period.

The model assumes a 99% degree of security of the results with statistical significance, with 84% explaining the behavior of the variables. Regarding the results based on this estimative model, the financial loan variable (LnEmprst) is positively impacted in an election period by an average of 68%. This result confirms H3, that is, obtaining a financial loan substantially increases during an election period. This result confirms the studies by Aidt and Mooney (2014).

Table 8: Tobit effect estimation with robust standard error grouped by municipalities

$LnEmprst_i = a + b_1.AnoElei_i + b_2.LnInv_i + b_3.LnRecEst_i + b_4.Idhm_i + b_5.EleRee_i + b_6.Pgov_i + b_7.Pop_i + (a_i - a + \varepsilon_i)$ -> Equação 5						
Random-effects tobit regression			Number of obs	=		6001
Group variable: Munic			Number of groups	=		353
Random effects u_i ~ Gaussian			Obs per group: min	=		16
			avg	=		17.0
			max	=		17
Integration method: mvaghermite			Integration points	=		12
			Wald chi2(11)		=	83.71380
Log likelihood = 14959.567			Prob > chi2		=	0.0000
LnEmprst	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
AnoElei	.6816712	.0802492	8.49	0.000	.5243856	.8389568
LnInv	102.098	.0569398	17.93	0.000	.9093801	113.258
LnRecEst	.1807032	.0224449	8.05	0.000	.1367121	.2246943
Idhm	1.226.606	2.941.037	4.17	0.000	6.501.737	1.803.039

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EleRee	.446883	.079055	5.65	0.000	.291938	.601828
Pgov	-.4259164	.1054925	-4.04	0.000	-.6326779	-.2191548
Pop	3.52e-07	7.97e-08	4.42	0.000	1.96e-07	5.09e-07
_cons	-1.135.692	1.237.374	-9.18	0.000	-1.378.213	-8.931.713
/sigma_u	1.387.181	.0672769	20.62	0.000	125.532	1.519.041
/sigma_e	2.794.163	.0263655	105.98	0.000	2.742.488	2.845.839
rho	.1977339	.0158661			.1681292	.2302869

Source: Research data

The study also identifies that the increase in investment spending (LnInv) and revenue from state transfers (LnRecEst) reflect positively on the financial loan variable (LnEmprst) in an election period. It is possible that due to the lack of cash availability, common in most Brazilian municipalities (Aquino & Azevedo, 2017), local governments resort to financial loans to pay for works (services) on the eve of an election, with the sole purpose of obtaining votes, and that most of the time, these works are abandoned when the contestants win the elections.

The positive impact on the variables loan (LnEmprst), investment (LnInv) and balances payable (Lnrpp and Lnrpnp), verified through the results presented in Tables 4, 6 and 8, as a result of the estimation models provided in equations (5) and (6), during an election period, it makes it clear that municipal governments do not comply with the legal norms regarding the use of budget resources during election periods, a prohibition imposed by Law 11,300/2006.

Therefore, the study does not confirm H4, because it finds that local governments use budget resources during electoral periods, not complying with current legal norms. Thus, it can be inferred that Brazilian municipal governments do not comply with the legal norms regarding the use of budget resources during an election period.

The results presented in this study, using a tobit regression estimation model in panel data, are robust and complete to support the proposed hypotheses and objectives. Through the descriptive analyzes contained in Tables 3, 5 and 7, it is estimated that the municipalities are dependent on the revenues transferred by the Union and the State, under penalty of financial collapse.

Perhaps, this dependence is linked to the collection model (centralization in the Union and in the State) of federal and state taxes generated in the municipalities, such as corporate income tax (IRPJ) and tax on circulation of goods and services (ICMS).

The three estimation models used to analyze the dependent variables (i) committed expenditures (LnDemp), (ii) investment expenditures (LnInv), (iii) financial loans (LnEmprst) and (iv) compliance with legal standards, suggest that: committed expenses do not positively change in election period. Spending on investment and obtaining a financial loan, on the other hand, is strongly impacted in an election year. Finally, the current legal norms (Law no. 11.300, 2006), referring to the use of budget resources during electoral periods, are not complied with by municipal governments.

5 CONCLUSION

The study proposed to investigate the behavior of committed expenses, investment expenses and obtaining financial loans, as well as the legal compliance disciplined in Law no. 11,300 (2006) corresponding to the use of budget resources in Brazilian municipalities with more than 50 thousand inhabitants for the period of five electoral cycles (2000 to 2016).

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The results found suggest that: (i) committed expenses do not show positive changes in an election year, even in years before and after the election. Even in a scenario of party equality between governments, and in two-round elections.

This result corroborates with Beender (2003), Mendes (2004), Sakurai and Menezes Filho (2008) and Sakurai (2009), and opposes the suggestions of Blais and Nadeau (1992), Galli and Rossi (2002), Aklmedov and Zhuravskaya (2004), Sjahrir et al. (2013), Queiroz (2013), Aidt and Mooney (2014), and Chortareas et al. (2016); (ii) investment expenditures show positive changes on average 9% in the election period in municipal governments.

This increase is also a reflection of the party equality between municipal and state governments, as well as the transfer of revenue from the Union. These results partially corroborate the mention of Cavalcante (2016), "in suggesting that municipal governments concentrate more spending on public works in election periods than in other periods".

It is possible that the increase in investment spending during an election period influences voters in their choice of vote, as stated by Downs (1957), Key Jr. (1966) and Nordhaus (1975); (iii) financial loans grow an average of 68% in local governments during an election period, and candidates for re-election tend to resort to this line of credit, especially when transfer revenue and investment expenditures show growth. Perhaps, these actions contribute to the growth of deficits and the lack of cash availability in these governments, as stated by Aquino and Azevedo (2017).

Given the above, the study concludes that municipal governments with a population of over 50,000 inhabitants, contrary to some surveys, do not increase their committed expenses before, during or after the election period. And spending on investment and obtaining financial loans undergo positive changes in an election year, and with greater intensity when there is party equality between governments for reelection.

It is also concluded that the legal requirements contained in Law no. 11.300, (2006), regarding the use of budget resources in electoral campaigns, are not complied with. This non-compliance can be charged through lawsuits filed by Brazilian public prosecutors, demanding the return of funds by former mayors and other public managers.

As a limitation of the research, we can mention the lack of information in the databases used, as well as not covering municipalities with a population of less than 50 thousand inhabitants. As for future research, it is recommended to assess the efficiency of the estimation models used in studies carried out, as well as apply it in municipalities with a population of less than 50,000 inhabitants and compare them to other countries. Another recommended research possibility is to investigate the consequences of not complying with legal requirements regarding the use of budgetary resources in electoral campaigns.

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