

ECONOMIC VOTING IN BRAZILIAN PRESIDENTIAL ELECTIONS: EVIDENCE WITH PANEL DATA FROM MUNICIPALITIES IN SÃO PAULO

Voto econômico nas eleições presidenciais brasileiras: evidências com dados em painel de municípios de São Paulo

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ABSTRACT

This paper uses a new data panel of 625 Brazilian municipalities over 5 election years to analyze the influence of the local level economic performance on the proportion of votes obtained by the incumbent in national elections. We examine municipalities from the State of São Paulo, the most populous Brazilian state, using fixed-effects and random-effects models. The results suggest that the performance of the local economy is relevant in the national elections. Apart from that, the results also suggest that the mayors play an important role in the national elections when it comes to transfer votes that are favorable to the coalition in power and that the richest municipalities tend to be more opposition prone.

Keywords: Elections. Voting behavior. Brazil.

RESUMO

Este artigo utiliza um novo painel de dados de 625 municípios brasileiros em 5 anos eleitorais para analisar a influência do desempenho econômico no nível local na proporção de votos obtidos pelo candidato incumbente nas eleições nacionais. Examinamos municípios do estado de São Paulo, o mais populoso estado brasileiro, usando modelos de efeitos fixos e aleatórios. Os resultados sugerem que o desempenho da economia local é relevante nas eleições nacionais. Além disso, os resultados também indicam que os prefeitos desempenham um papel importante nas eleições nacionais ao transferir votos favoráveis à coalizão no poder, assim como os municípios mais ricos tendem a ser local mais propenso a um voto de oposição.

Palavras-chave: Eleições. Comportamento eleitoral. Brasil.

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1. INTRODUCTION

This paper analyzes the relation between the local level of economic growth and the proportion of votes obtained by the presidential incumbent. The literature in the area has different conceptual definitions for economic voting – it can mean votes for the chief executive, government, cabinet or coalition, opposition, parties or volatility across elections (DUCH; STEVENSON, 2008). Here, we define economic voting as the vote choice for the reelection of president or for the designed candidate for succession. We also investigate the main municipal public expenditures that have an electoral impact on the incumbent votes and how these relations are affected by the political alignment between the president and mayors. More important than controlling for confounding factors, we want to understand how the municipality and mayors affect the propensity of incumbents receiving votes.

The municipality is the most local political administrative unit that has elections in Brazil and it is administered by a single mayor and a municipal council, and normally, mayors are the main representatives of higher level governments (governors and presidents) at the local level. Besides, analyses of Brazilian presidential elections are of special interest per se, even though we are only analyzing presidential elections in municipalities in the State of São Paulo's. Since the election of President Luiz Inacio Lula da Silva, the determinants of voting for incumbents in Brazil have been exhaustively discussed (HUNTER; POWER, 2007; NICOLAU; PEIXOTO, 2007; SINGER, 2009, 2012; ZUCCO, 2008).

While the analysis of Brazilian elections per se is of great importance, there is an additional factor of relevance in this paper, due to the relative absence of studies about the impact of local level variables in national elections. The main hypothesis is based on the economic voting theory, which suggests that incumbents have more chances of being re-elected, or of ensuring the election of their successor, when the economy is going through a favorable period (ANDERSON; MORGAN, 2011; DUCH; STEVENSON; 2008).

As indicated by Fernandes and Fernandes (2017), local economic factors tend to be perceived by voters in a more intense way than the growth of the economy as a whole. This is a real phenomenon in the Brazilian experience due to its large territory and the size of the population, where the huge distances make economic expansion a phenomenon that is necessarily local, even if we take into account only the votes in São Paulo, which is the most populous state, with 43 million people – the same as Argentina – and whose territory is larger than the United Kingdom. For example, the growth of an industrial cluster in the Brazilian Midwest may be the result of the closure of industrial plants in some areas of Sao Paulo. At the state level, the aggregate impact can be positive or negative, but in a disaggregated way, these are very different local economic experiences.

Therefore, we intend to contribute to this emerging literature introducing a new dataset to analyze whether local level economic and expenditure variables are determinants of support for the incumbent candidate. We analyze a sample of 625 municipalities in the state of São Paulo, the most populous Brazilian state, using panel data taken from the presidential elections of 1994, 1998, 2002, 2006, and 2010.

We bear in mind the fact that in our analysis we are taking into account the economic effects that most closely impact the voter's life. In doing so, we examine whether the

economic effects that are closest to the daily life of the voters are important when it comes to defining their broader electoral preference in the national election. We use data of the municipal growth in energy consumption *per capita* as a measure of economic growth in order to test the hypothesis that voters tend to reward the incumbent party that had a good economic performance. We prefer to use energy consumption as a proxy of the real economy scenario because we have more reliable data on energy than on municipal Gross Domestic Product (GDP).

The article is divided in six sections, including this one. In the next section we present the literature about the determinants of the vote and succinctly present our theoretical framework. Also, we look at some of the main contributions that discuss voting determinants in Brazil. The third section describes the panel data methodology. In the fourth, we present our data. The econometric evidence found is the object of analysis in the fifth section, while in the sixth, and last, section we present our main conclusions.

2. DETERMINANTS OF THE VOTE

Attempts to explain how and why individuals vote have encouraged a robust research field that seeks to understand the motivation of the vote throughout the democratic world. There are three main schools of analysis of the electoral behavior: the sociological, psycho-sociological and economic. The sociological school started with studies carried out by Lazarsfeld, Berelson and Gaudet (1944) and Berelson, Lazarsfeld and MacPhee. (1954) that had found that few voters changed their preference during campaigns. This relative absence of change was due to some voter's structural characteristics: socio-economic position, religion and an urban-rural dichotomy.

This research program was criticized by Campbell *et al.*, (1960) because it did not capture time variation in voter preferences. Instead, they proposed a socio-psychological analysis that, without denying the importance of macro-factors, showed the existence of individual intervening factors which better explained the voting decision, paying more attention to voter attitudes than to permanent social characteristics. Campbell *et al.*, (1960) emphasize how the affective ties of voters with regard to the parties influence the voting decision. The main empirical finding was that the stability of party identification, as changes in candidates or political platforms had little impact on the vote choice (PIMENTEL JR, 2007).

2.1 THE ECONOMIC VOTING THEORY

The economic school analyzes the behavior of voters from the point of view of the rational choice theory. Downs (1957) introduced the notion that individuals make vote choices based on their comparisons of expected utilities for each of the competing parties; here the citizens behave as consumers in a political market situation. Voters maximize their satisfaction having in mind government action and the parties achieve satisfaction from their electoral success. The interest calculation of the voter is carried out in accordance with the expected utility differential between the parties based on what the government in power

offers in comparison with what would be obtained if the opposition were there. Fair (1978) provided a formal statement of how economic performance enters the voter utility.

Fiorina (1981) updates the argument analyzing how voters act rationally when facing scarcity of information. Fiorina's main argument is that voters, regardless of their degree of information, are sensitive to the impact of government activities for improvements in their well-being and use it as a guide for their vote. Thus, future expectations are, for most of the voters, simple extrapolations from current trends. The model is the workhorse of voting choice due to the fact that it demands very little from the average voter, as it does not require a high level of political sophistication for vote choice.

A key assumption lies in the understanding that the government has direct influence on the country's economic performance, leaving aside other factors that may have an impact on it, and that economic factors play an important role in electoral behavior. Therefore, an improvement in economic conditions increases the probability of a vote for the party that is perceived as responsible for the change. Also, better economic performance tends to indicate an administrative capacity of the party in power, in addition to positively affecting the votes of those who do not identify with any party (VIRMANI, 2004; ANDERSON; MORGAN, 2011).

The economic voting theory also suggests that the retrospective vote, based on economic results, allows voters to demand a degree of responsiveness from their elected politicians in managing the economy. Indeed, the mechanisms that connect the economic performance with the voting behavior can be a sanctioning process for bad economic performance (KRAMER, 1971; FAIR, 1978, 1996a, 1996b) or the use of past economic outcomes as informational clues to assess how competing potential parties might perform in the future (DOWNS, 1957; STIGLER, 1973).

Powell and Whitten (1993) demonstrated that sanction models of economic voting should explain variations in sanctioning behavior in terms differences in the clarity of incumbents' economic responsibilities. At those cases where there is no clarity of who is the main political agent in charge for economic policy, and consequently the country's economic performance, the effects of economic variables on election results should be minor or even completely absent. In other words, less or no political dynamic between economic performance and electoral support to the incumbent

Duch and Stevenson (2008) carried out an important study involving 18 democracies and showed that there is a significant relationship between economic perception and voting choice, above all in systems that concentrate the political decision power. They organized the literature around three important themes: the sanction and selection models and the context of voting (the strategic setting of economic decision making).

The sanction model requires that voters have retrospective information of the macroeconomy and that they punish/reward incumbents in a fashion that credibly signals to candidates the electoral costs of shirking and rent seeking. More important than rewarding good performance is to punish poor economic performance as a way to establish a threshold performance level that prevents the incumbent from shirking her responsibilities.

The selection model is future oriented and entails that voters choose the most competent candidates, using information about past economic outcomes to assess the future

competencies of competing candidates. As information about the candidates' competence plays a crucial role in vote choice and governments differ in their competence, the economic outcomes are then important because they provide clues about it (CUKIERMAN; MELTZER, 1989),

Finally, the context is given by economic and political institutions and structures that can alter the effects of economic growth on the voting behavior of citizens, as they alter how economic policy decisions can really shape and impact the economic situation of the country. The more dispersed the economic policy decision making, for example, independent central bank or open economy countries, the less pronounced the economic voting effect.

Duch and Stevenson (2008) analyze this variation using 163 election surveys on western countries, estimating a different measure of economic voting for each party and analyzing the variation of the estimates across two decades and eighteen countries. They show that the proportion of decisions affecting economic outcomes taken by non-electorally accountable decision-makers declines the overall effect of growth on the election result. Also, the more dispersed the power after election results, meaning widely shared decision making power, the smaller the economic voting effect.

2.2 LOCAL LEVEL ECONOMIC VOTING

One of the main contributions of our research is that most of the studies on economic voting focus on data on regional or national levels and not on municipal or local data. In addition, most of these studies that look for local variables are concerned with the effects of fiscal manipulation or performance and not with economic performance. Sakurai and Menezes (2008) used panel data from more than 2,000 Brazilian municipalities over 13 years and showed the positive influence of public expenditures on the probability of mayors' reelection. Veiga and Veiga (2007) show that increases in investment expenditures and changes in the composition of spending favoring visible items are positively associated with vote percentages of incumbent mayors seeking re-election using data of all Portuguese mainland municipalities. Brender (2003), on the other hand, finds evidence that the fiscal performance of mayors positively impact their chances of re-election only in some of the Israeli local elections. Finally, Drazen and Eslava's (2010) is the unique study of electoral manipulation of municipal expenditures that includes GDP growth as one of the control variables and they find that it has a positive coefficient in most regressions using data from all Colombian municipalities; however, they do not include measures of local economic performance, instead, they just use national economic variables.

In sum, to the best of our knowledge, there are almost no studies that test the effect of the municipal economic performance on national elections. The only exceptions are the studies made by Pattie and Johnston (2001), Martins and Veiga (2013), Oliver and Ha (2007), and Elinder (2010). Pattie and Johnston (2001) showed the importance of the local economy in understanding voters' electoral behavior in the general elections of 1997 in the United Kingdom. Even though they had used individual level data, they found that local economic prosperity play a greater role in vote choice than both the improvement in the individuals' own economic well-being as well as the perception of changes in national economic prosperity.

Martins and Veiga (2013) find a positive relation between the effects of national and local economic performance on the percentage of votes obtained by the party of the incumbent mayor in Portugal. Oliver and Ha (2007), using survey data of over 1,400 voters in 30 different US suburban communities concluded that better local economic conditions or local government performance is positively related with incumbent support. Finally, Elinder (2010) found that local economic conditions – economic growth and unemployment – affect the electoral performance of candidates in local counties in Sweden.

2.3 VOTING DETERMINANTS IN BRAZIL

Throughout the last decades various studies focused on the Brazilian electoral behavior. Simão (1956) analyzed the vote of the working classes in São Paulo in the 1940s and showed that there was a relationship between the proportion of workers within the city districts and the proportion of votes for the main left parties: the PCB (the Brazilian Communist Party) and the PTB (the Brazilian Labor Party). Simão also observed that the PCB voters were qualified industrial workers who had been living in the capital for a long time, while the PTB voters were largely migrants from rural areas with poor qualifications.

Ferreira (1960; 1962) analyzed the correspondence between socio-economic position and the party vote in the state of São Paulo, showing that voters from highly industrialized regions tended to vote for labor reform parties, while the less industrialized regions voted for traditional conservative parties. Using survey data, Soares (1965) found a correlation between the socio-economic situation and the presidential vote in the 1960 elections.

Cintra (1968) observed that political parties were relevant players in the Brazilian political scenario and showed that there was a correlation between votes of non-manual workers for the UDN (the National Democratic Union) and of manual occupation workers for the PTB. Along the same lines, Lamonier (1980) observed that around 70% of the electorate of São Paulo identified with a party, a very high number and comparable to the consolidated democracies of the time. Similar findings were found by Reis (1978) and Fleisher (1981).

However, with the end of the two-party politics of the military regime and the expansion of the democratic multiparty system in the 1980s, these high levels of party identification disappeared (BALBACHEVSKY, 1992; SINGER, 1999). As a result, studies on voting behavior in Brazil started to look for other determinants. Castro (1994) observed that, given the little sophistication of voters, most of them ended up voting for personalities and not parties. They argued that the results do not contradict the rationality assumption because popular and less sophisticated votes were being cast for those that presented themselves as *'defenders'* of the popular interests. On the other side of the knowledge continuum, Kinzo (2005) and Carreirão and Kinzo (2004) showed that a significant part of the electorate that identified with a party was connected due to their level of education. Carreirão (2002) observed that an expressive component in the vote in Brazilian presidential elections was the retrospective vote, which was anchored in an assessment of the overall performance of the government in power, based mainly on the country's economic situation.

Simoni (2017) proposes that since the 2006 elections there have been two great debates about Brazilian presidential elections. First, the re-election of Lula is considered as a moment in which a regional electoral realignment occurred. The electoral bases of the then president and leader of the PT (the Workers' Party) would have undergone an important inversion (HUNTER; POWER, 2007; NICOLAU; PEIXOTO, 2007). The PT and Lula would have lost strength at their old electoral base in the metropolises of the South and Southeast and began to receive support in the small municipalities of the North and Northeast (HOLZHACKER; BABALCHEVSKY, 2007; SINGER, 2012; ZUCCO; POWER, 2013). An analogous realignment occurred at the individual level. Less educated and poorer voters, who once were averse to the PT, became the core of Lula's electoral base from 2006 onwards. The literature is methodologically heterogeneous using individual, municipal and state level data.

The second proposition is that one of the main determinants of the presidential realignment, perhaps the most important one, was the expansion of the federal conditional cash transfer program, the *Programa Bolsa-Família* (PBF) (ZUCCO; POWER, 2013). The literature debates its electoral impact both at the individual and local economic levels. Renno and Cabello (2010) have found evidence that the highest electoral gain of Lula's 2006 reelection was in those regions that receive most of the PBF resources.

Hunter and Power (2007) have a very critical view of the regional realignment. They observe that the realignment was produced by a political usage of social policy. Nothing more than the "*old history of using the government to build clientelistic support*" (HUNTER; POWER, 2007, p. 9). In this direction, Zucco (2013) found a similar effect of similar conditional cash transfers programs promoted by Fernando Henrique Cardoso's government on the votes of the PSDB (the Brazilian Social Democracy Party) in 2002 – the *Programa Bolsa Escola* and *Bolsa Alimentação*.

Soares and Terron (2008) also show that most of the municipal votes for the PT from 2006 onwards have come from small and poor cities in the Northeast. On the other hand, Simoni (2017) shows with both individual level and local aggregated data that there was no realignment on the 2006 presidential elections and that the changes perceived by the media and the literature at large are just a reflection of the electoral behavior of swing-voters and not the realignment of any electoral base. Besides that, the PBF had improved the electoral performance of the PT with more impact in the Southeast than in the Northeast. Limongi and Guarnieri (2014; 2015), using aggregated data, have also proposed that the realignment was less relevant, highlighting the importance of a long-term vision of the electoral fluctuation in Brazilian presidential elections and also emphasizing the stronger effects of the PBF in the Southeast than in the Northeast.

Others researchers have found evidence that the electoral alignments of 2006 were maintained during the elections of 2010 and 2014 (MARZAGÃO, 2013; PEREIRA *et al.*, 2015; MAGALHÃES; SILVA; DIAS, 2015). They found evidence that the municipalities that voted for the PT in 2010 were the ones that had voted in the PT in 2006.

Another possible interpretation for the results of 2006 onwards was put by Ribeiro (2014), Canêdo-Pinheiro (2015) and Zucco (2008; 2010). They have argued that the results are driven by a manifestation of the Brazilian "*governism*". In other words, the

tendency of poor municipalities which are dependent on the public sector, to always support the incumbent, regardless of the party in charge¹.

3. METHODOLOGY

Given the nature of the research object, we will analyze the effects of the electoral performance on the proportion of votes obtained by the incumbent in municipalities in the state of São Paulo using a panel data framework. According to Hsiao (1986) and Cameron and Travedi (2005) panel models offer a series of advantages over cross-section models because they allow control over the idiosyncratic heterogeneity present in each individual in the sample and they also increase estimation accuracy and precision.

In this manner, three different estimates will be carried out, to check the effect of the variables of interest. First, we estimate using a *pooled regression model (POLS)*. Then we use the *random effects model (RE)* and finally the *fixed effects model (FE)*, which allows consistent estimation of the coefficients of interest even in the presence of unobservable idiosyncratic heterogeneity correlated with other regressors. We then check which model is the most suitable for our data, maximizing efficiency and the consistency of the coefficients.

In the basic *POLS* model, the estimator considers all the information as cross-section units, ignoring the temporal aspect of the data. The random and fixed effects models take into consideration the presence of idiosyncratic heterogeneity, which are considered to be part of the intercept in the former and of the error in the latter. Both require a strict exogeneity assumption. This implies that the error term must be uncorrelated with any of the regressors in any period of time. In other words, both assume that the error has a conditional mean of zero in past, present and future values of the regressors (CAMERON; TRAVEDI, 2005). The random effects model deals with the unobservable idiosyncratic heterogeneity correlated (*ci*) as a random variable that is distributed regardless of the regressors and with homoscedastic variance. The random effects model will be estimated by *feasible generalized least squares (FGLS)* due to the fact that the variance-covariance matrix is unknown.

Random Effects Model:

$$Y_{it} = \alpha + X_{it} \beta + v_{it} = \alpha + X_{it} \beta + (c_i + \varepsilon_{it}) \quad (1)$$

where v_{it} is the compound error given by $c_i + \varepsilon_{it}$

$$E(v_{it} / X_{is}) = 0; \forall t \neq s; v_{it} \sim N(0, \sigma^2)$$

Finally, the *fixed effects* model considers different intercepts for individuals, assuming that the inclinations and variance are constant. The unobservable idiosyncratic heterogeneity, *ci*, is no longer dealt as a random variable but as a parameter to be estimated.

1. This result is confirmed once again in our analysis – see section 5.

So, unlike random effects, the fixed effects model allows consistent estimation even in the presence of c_i correlated with the regressors. Estimation of the fixed effects requires the strict exogeneity assumption. To estimate the fixed effects model, we use *within transformation* techniques, since it is more efficient when t is greater than 2 (WOOLDRIDGE, 2002).

Fixed Effects Model:

$$Y_{it} = \alpha + c_i + X_{it} \beta + \varepsilon_{it} \quad (2)$$

Transformation:

$$Y_{it} - Y_m = (X_{it} - X_m) \beta + (\varepsilon_{it} - \varepsilon_m)$$

$$E(\varepsilon_{it}/X_{is}, c_i) = 0; \text{ for } \forall t \neq s$$

$$\varepsilon_{it} \sim \text{IID}(0, \sigma^2)$$

After estimating the three models, we shall carry out the necessary tests to elucidate the consistent estimators and, among those, which one is the most efficient. In this fashion, we use the *Breusch-Pagan Test* to check for the presence of idiosyncratic heterogeneity by analyzing the existence of self-correlation on the unobservable heterogeneity and the *Hausman Test* to check for the correlation between the idiosyncratic heterogeneity and the regressors (GREENE 2000; HAUSMAN, 1978).

São Paulo economic voting model:

The sample analyzed covers 625 of the 645 municipalities in the State of São Paulo, between 1994 and 2010. The dataset includes five types of variables: political, economic, fiscal, demographic and geographic, the last three being used as controls in the estimations. The basic equation to be estimated can be summarized as follows:

$$votes_{it} = \alpha + c_i + \beta_1 encons_{it} + \beta_2 control\ variables_{it} + \lambda geographic\ dummies_{it} + \varepsilon_{it} \quad (3)$$

where i refers to the municipality, t to the year, and α , c_i and ε_{it} are, the constant, municipal idiosyncratic heterogeneity and the error term, respectively; *encons* is the independent variable of interest and *votes* the dependent one. *Votes* indicates the percentage of valid votes (excluding blank and void votes) that the incumbent presidential candidate obtained in each municipality in São Paulo.

The incumbent candidates were the PSDB [the Brazilian Social Democracy Party] candidate, Fernando Henrique Cardoso, in 1994 and 1998, the PSDB candidate, José Serra, in 2002, the PT [the Worker's Party] candidate Luiz Inácio Lula da Silva in 2006 and the PT candidate, Dilma Rousseff in 2010. The *encons* regressor is the rate of growth

in total energy consumption *per capita* in the municipality², which, given our theoretical and methodological framework, is used as a measure of economic growth in the year of the presidential elections.

Table 1 - Elections results in Brazil and in São Paulo (1994 - 2010)

Candidate	Party	Brazil		Sao Paulo	
		Votes	%	Votes	%
1994 Election					
Fernando Henrique Cardoso*	PSDB	34,314,961	54.2%	8,679,287	55.7%
Luiz Inacio Lula da Silva	PT	17,122,127	27.1%	4,205,530	27.0%
Eneas Ferreira Carneiro	PRONA	4,671,457	7.4%	1,380,690	8.9%
Orestes Quercia	PMDB	2,772,121	4.4%	895,318	5.8%
Leonel Brizola	PDT	2,015,836	3.2%	247,152	1.6%
Esperidiao Amin	PPR	1,739,894	2.8%	67,747	0.4%
Others	-	625,935	1.0%	94,599	0.6%
1998 Election					
Fernando Henrique Cardoso*	PSDB	35,936,382	53.1%	9,736,728	59.9%
Luiz Inacio Lula da Silva	PT	21,475,211	31.7%	4,688,677	28.8%
Ciro Gomes	PPS	7,426,187	11.0%	1,208,718	7.4%
Eneas Carneiro	PRONA	1,447,089	2.1%	389,592	2.4%
Others	-	1,437,434	2.1%	235,103	1.4%
2002 Election					
Luiz Inacio Lula da Silva	PT	39,455,233	46.4%	9,106,914	46.1%
Jose Serra*	PSDB	19,705,445	23.2%	5,633,365	28.5%
Garotinho	PSB	15,180,097	17.9%	2,781,712	14.1%
Ciro Gomes	PPS	10,170,882	12.0%	2,087,617	10.6%
Others	-	440,855	0.5%	139,795	0.7%
2006 Election					
Luiz Inacio Lula da Silva*	PT	46,662,365	48.6%	8091867	36.8%
Geraldo Alckmin	PSDB	39,968,369	41.6%	11927802	54.2%
Heloísa Helena	PSOL	6,575,393	6.8%	1558639	7.1%
Cristovam Buarque	PDT	2,538,844	2.6%	385119	1.8%
Others	-	251,762	0.3%	31,477	0.1%
2010 Election					
Dilma Rousseff*	PT	47,651,434	47.0%	8,740,949	37.3%
Jose Serra	PSDB	33,132,283	32.7%	9,524,050	40.7%
Marina Silva	PV	19,636,359	19.4%	4,865,828	20.8%
Plinio de Arruda Sampaio	PSOL	886,816	0.9%	239,173	1.0%
Others	-	150,682	0.1%	56,299	0.2%

* The incumbents are the candidates with names in bold and shaded line

2. Total energy is the sum of all energy consumed by the municipality by residences, industry and commerce, in rural and urban areas and is measured in terms of megawatt hour (MWh).

In Table 1, we present all main candidates of the Brazilian presidential elections from 1994 to 2010, with their respective votes both in Brazil and just in the state of São Paulo. As expected, the main candidates are those from the PSDB and the PT. In all elections, the PSDB candidates have performed better in São Paulo than in Brazil, whereas just the contrary happened to the PT.

4. DATA

The political variables were collected from the electoral base of the Brazilian Superior Electoral Court (TSE). We obtained information about all the 645 municipalities in São Paulo. However, as some municipalities were created after 1995, we decided to analyze just those that had been emancipated before 1994. Therefore, the sample analyzed comprised 625 municipalities in five subsequent electoral periods, thus constituting a balanced panel.

Table 2 - Description of the variables

votes	proportion of valid votes obtained by the incumbent in the municipality
encons	rate of growth of total energy consumption per capita in the municipality in the election year
lencons	log of the total energy consumption of the municipality (MWh)
fpop60	proportion of the population over 60 in the municipality
lrim	log of the rate of infant mortality in the election year (per 1,000 live births)
ltotalexp	log of total municipal expenses per capita in the election year, measured in R\$ 2010 million
linvestexp	log of municipal expenditure on investments per capita in the election year, measured in R\$ 2010 million
lstaffexp	log of the municipal expenses on staff per capita in the election year, measured in R\$ 2010 million
colmayor	dummy relating to the party of the mayor that is a member of the electoral coalition of the incumbent (1-member; 0-non-member)
d94/98/02/06/10	dummies for year
drsi ... drsxvii	dummies for mesoregions (Regional Health Divisions)
metrop	municipality belonging to a metropolitan region in São Paulo (1-belonging; 0-not belonging)

The economic, demographic and fiscal variables were obtained from the State Data Analysis System Foundation (Seade). Among them we included the variable of interest, *encons*, the economic size of the municipality (measured by the log of the total energy consumption), the proportion of the population over 60, the logarithm of the infant mortality rate, and finally the logarithms of total municipal expenses *per capita*, municipal spending on investments *per capita* and municipal expenses on staff costs *per capita*.

In addition to the fiscal, demographic and economic information, we also controlled for the role played by the mayor, at the municipal level, in the election. To do so, we built a dummy variable that indicates whether the mayor belonged to a party of the incumbent coalition³. We obtained data about the mayor's party affiliation from the results of the municipal elections immediately prior to the national election⁴.

Moreover, we also controlled for possible macro-economic shocks by creating dummies for year and also dummies for the state's meso-regions in order to control any regional factors that might interfere in the incumbent capability of obtaining votes in certain regions⁵. Finally, we created another dummy variable to indicate whether the municipality belongs to one of the three metropolitan regions in the State of São Paulo, namely: Greater São Paulo, Greater Campinas and the Baixada Santista. In Table 2 there is a description of the variables and in Table 3 their respective descriptive statistics.

Table 3 - Descriptive statistics

Continuous variables	Mean	Median	Standard deviation	Min.	Max.
votes	46.590	44.584	16.063	12.981	85.462
encons	0.034	0.030	0.099	-0,611	3.029
lencons	9.870	9.547	1.790	5.609	16.960
Fpop6	10.820	10.690	2.849	3.410	22.380
Irim	2.920	2.905	0.584	0.693	5.116
ltotalex	7.350	7.323	0.417	6.014	9.766
linvestexp	5.160	5.122	0.737	2.254	8.142
lstaffexp	6.410	6.411	1.673	0.476	13.630
Dummy variables	Frequency	0	1		
colmayor		2008	1117		
Metrop		2790	335		

5. RESULTS

In this section, we present the main results. First we examine the electoral performance of the incumbent in São Paulo by the *POLS* and after by *RE* and *FE*, all with robust standard errors. The coefficients of the variables that are constant over time are only shown in the estimations by *POLS* and *RE*, since one of the limitations of the *FE* estimation is that it is not suitable to analyze variables that are constant over time. In the first three columns of

3. The five coalitions are: 1994 - PSDB / PFL / PTB; 1998 - PSDB / PFL / PTB / PPB; 2002 - PSDB / PMDB; 2006 - PT, PRB, PCdoB; 2010 - PT, PMDB, PDT, PC do B, PSB, PR, PRB, PTN, PSC and PTC. The incumbent parties are, PSDB from 1994 to 2002, and PT in 2006 and 2010.

4. The data for the municipal elections of 1996, 2000, 2004 and 2008 were collected from the STE, while the data for 1992 were kindly provided by Sérgio Naruhiko Sakurai.

5. To analyze São Paulo's meso-regions we decided to use the administrative division adopted by the State Department of Health, which divides the State of São Paulo into 17 regional health departments.

Table 4, we have included all the variables of the model, with the exception of the dummies for year and region. In the last columns, we present the estimated coefficients of the models including the dummies for year. The dummies for region were removed because they did not affect the coefficients of interest.

Table 4 - Proportion of votes for the incumbent

votes	OLS	RE	FE	OLS_year	RE_year	FE_year
ncos	10.777**	10.777**	14.952***	4.010*	4.007*	4.357*
	3.945	4.019	4.621	1.581	1.586	1.979
lencons	-2.409***	-2.409***	-9.766***	-1.446***	-1.447***	-2.789**
	0.209	0.198	1.428	0.142	0.142	1.559
fpop60	-1.288***	-1.288***	-6.087***	0.095	0.096	0.046
	0.108	0.116	0.362	0.082	0.082	0.375
colmayor	6.720***	6.720***	6.187***	1.800***	1.805***	1.908***
	0.561	0.556	0.586	0.409	0.409	0.458
Irim	5.066***	5.066***	4.457***	0.157	0.155	0.169
	0.487	0.518	0.619	0.327	0.327	0.424
ltotalex	-9.129***	-9.129***	2.703	-1.693*	-1.731*	-4.420*
	0.909	0.966	2.063	0.702	0.701	1.753
linvestex	2.659***	2.659***	-0.5	0.515	0.524	0.889*
	0.464	0.437	0.538	0.325	0.325	0.426
lstaffex	-0.385	-0.386*	3.730***	0.017	0.019	1.297
	0.211	0.192	1.007	0.127	0.127	0.881
metrop	-1.121	-1.122		1.169*	1.176*	
	0.992	0.993		0.536	0.536	
d1994				20.704***	20.692***	19.298***
				0.748	0.747	2.026
d1998				25.724***	25.718***	24.847***
				0.642	0.642	1.388
d2002				-4.023***	-4.03***	-4.846***
				0.602	0.602	1.143
d2006				-2.743***	-2.745***	-3.065***
				0.349	0.348	0.56
_cons	122.690***	122.69***	152.465***	60.221***	60.449***	84.873***
	6.433	7.288	13.294	4.906	4.894	20.59
N	2922	2922	2922	2922	2922	2922

Note: * < 0,05 / ** < 0,01 / *** < 0,001

As expected, the *Breusch-Pagan Test* showed that the *POLS* method is unsuitable. Besides that, the *Hausman Test* rejected the hypothesis that there is no correlation between

the idiosyncratic heterogeneity and the regressors. Therefore, the appropriate model that produces consistent and unbiased estimators is the fixed effects model.

The main conclusion we draw from the analysis is that the relationship between economic growth and the votes obtained by the incumbent in the municipality is both positive and significant. Independent of the model, all columns show that economic growth is an important determinant of the incumbent electoral support. These findings confirm the results presented by Fernandes and Fernandes (2017), that used data of real municipal GDP *per capita* for a small period of time. The result is connected with the theoretical expectations due to the fact that, from the population's point of view, the responsibility for the economic performance of the country lies heavily on the Brazilian presidents. Besides, our results indicate that even the local economic perception affects how people evaluate the political national scenario⁶.

The three first columns of coefficients in Table 4 indicate that growth in energy consumption *per capita* in the municipality (*encons*) bears a positive and significant relationship with the percentage of votes obtained by the incumbent. The coefficients of the estimates by *FE* are greater and have the same significance as the coefficients of the estimates by *POLS* and by *RE*, indicating that economic voting is present in Brazilian presidential elections at the municipal level in the State of São Paulo. Column 4 indicates that an increase of 10 percentage points on the growth of total energy consumption *per capita* increases the incumbent electoral support in 1.49 percentage points.

In addition to this strong evidence of the relationship between growth in energy consumption *per capita* and the vote obtained by the presidential incumbent, the first three columns in Table 4 also have a series of other interesting results that are worth discussing.

Among them, we would draw attention to the fact that in all the models the coefficients of the level of energy consumption and the proportion of the elderly population were negative and significant, suggesting that the smaller the local economy of the municipality, the greater the tendency of votes going for the incumbent.

These findings confirm the argument made by Ribeiro (2014), Canêdo-Pinheiro (2015), and Zucco (2008; 2010) that there is a strong manifestation of “*governism*” in Brazilian elections. On one hand, these results should be taken with caution as we are not analyzing the role of the conditional cash transfer programs, which was the main preoccupation the literature. On the other hand, there is strong evidence that even in São Paulo there is a tendency for municipalities with smaller economies to give more support to the incumbent.

Another result that appears to go in the same direction is the coefficients of the infant mortality rate in the election year, which had positive and significant correlations with electoral performance. To understand this finding, it is important to consider that local, state and federal levels share responsibilities as providers of health care in Brazil. Consequently, the interpretation we place on this result is that the rate of infant mortality not only captures the performance of the government in the health area, which has blurred shared responsibilities among federal members, but it also is an important indicator that municipalities which

6. Further research should test whether the effects of local economic growth on incumbent electoral performance are valid at both mayors and governors' elections, besides presidents (see FERNANDES; FERNANDES, 2014).

suffer from poorer socio-economic conditions, as reflected in a higher mortality rate, tend to have a more incumbent-oriented electorate.

Zucco (2008) shows that since 1994 all incumbents have done better on impoverished areas, as the negative result between incumbent performance and the municipal human developed index (HDI) indicates. The author also indicated that all the parties that gained power after the redemocratization process – chronologically, the PMDB, PSDB and PT – were at first supported by larger cities and more developed areas. After the party became the chief of the federal executive power, its electorate gradually rearranged toward the less developed areas – the so called *grotões*. Zucco's (2008) and our results indicate that independently of what the party stands for, the federal government tends to have a better electoral performance in the poorest regions of the country, while the opposite holds for the main opposition parties⁷.

It is worth remembering that the poorest municipalities tend to have a greater percentage of revenue coming from federal coffers, hence the voters in these locations might be more sensitive to the incumbent. This way, the federal government has a strong hand in the countryside, since it is the main entity with resources and capabilities do undertake the task of large scale poverty alleviation and infra-structure investments. Furthermore, in the municipalities we analyzed, the elderly population might reflect an income potential that is associated with retirement. On the one hand, populations with an older age structure are richer, which makes it clearer that the weight of economic growth is a contrary factor. However, it must be emphasized that the amounts paid in pensions are defined by the federal government and the period analyzed was characterized by various attempts of reforming the social security system. In order to reduce the heavy deficit of the sector, the proposed reforms always consisted in reducing the benefits of the general population. Therefore, the retired people group in the elderly population can be seen as a segment that is contrary to the Brazilian incumbent. These results indicate an interesting field for future research⁸.

There are no studies in the literature on age and voting that found a similar result about the anti-incumbency bias of the older population, neither in Brazil nor abroad. The general debate since Cumming and Henry (1961) is on the disengagement theory: the elderly gradually become less involved in society. As indicated by Glenn and Grimes (1968) if the theory is correct, one of its manifestations would be a decline in political interest and the participation of the elderly as individuals would become less attuned to some important societal issues. Hence, it is expected that the older-aged group have a substantially lower turnout than middle-aged or younger groups. Bhatti and Hansen (2012) have found

7. It is worth noting that the 'governmentism' argument highlights that incumbents tend to electorally do better in the most impoverished regions of the Northeast and North of Brazil. Our results are circumscribed to the richest state of the country, indicating that this argument operates within the different regions across all the country, as São Paulo would be the worst case scenario for governmentism to work as an electoral pattern.

8. An important methodological question is that as we are dealing with aggregate data, we are not able to say which type of specific individual is voting for or against the incumbent. All the relations that we found are about the municipality aggregate measures. So, we cannot affirmatively say that elder people are more prone to be against the incumbent. What we found is that the municipalities with a bigger proportion of elder people are less oriented to vote with the incumbent. Hence, we can just speculate about the mechanisms that explain our results. By itself, the aggregate results do not make it possible to assert on individuals – a typical case of ecological fallacy (KRAMER, 1983).

a similar result analyzing individual level data on Danish elections: older retired people tend to participate less frequently on elections. They explain this pattern with a different set of *rationales*. Besides health motives, retired people tend to feel less mobilized to vote due to the disruption of social ties and less contact with other people that could encourage political participation. Unfortunately, we could not find any discussion about the political participation of Brazilian elders⁹.

The dummy variable relating to the incumbent candidate being allied to the mayor shows the importance of the role of the mayor in the national elections. The relation is positively and robustly significant in all models. Moreover, it has a strong partial effect, since its coefficient indicates that, on average, those mayors who are members of the electoral coalition increase the vote for the incumbent by around 6.1 percentage points. The results indicate that the mayors are one of the most important electoral brokers of incumbent presidents at the local level. An argument made by the former governor of São Paulo, Orestes Quércia at an editorial note on the front page of a local newspaper in the year of 1984 – during the democratization process - highlights this rationale:

In political practice, municipal authorities are fundamental to the parties. They are ultimately responsible for the election of governors, state deputies, federal deputies, and senators. Mayors, deputy mayors and city councillors are decisive electoral canvassers. It is, therefore, natural for these politicians to act as intermediaries between voters and their representatives (QUÉRCIA, 1984)¹⁰.

These positive results of the alliance between presidents and mayors had already been perceived by Ames (1994) who showed that the presidential candidates of the 1989 elections did significantly better in municipalities where the mayor represented their party. Actually, the results of Ames's study are more generalizable than ours, due to the fact that the role of mayors is not just related to retrospective alliances, as it is our case, but also to prospective alliances between mayors and the presidential candidates.

These special relations between mayors and presidents in Brazilian presidential elections are not a specific trait of Brazilian politics. The literature is full of examples of how local political organizations deliver blocks of votes to candidates that the local leadership prefer. Buitrago and Davila (1990) studied this relation in Colombia, and Coppedge (1993) presents evidence in Mexico and Venezuela. Chubb (1982) indicates how the Christian Democratic power in the major southern cities of Italy had been based on the control of the municipalities, before the collapse of the Italian party system.

9. Goerres (2007), on the other hand, presents different rationales of reasons why elder people could vote more frequently than young cohorts, such as *sense of duty, duration of residence, political interest and mainly social norms that generate a civic duty to vote*. Both Goerres (2007) and Gleen and Grimes (1968) present data from comparative country analysis and from the US, respectively, that diverge from the disengagement theory. In both studies, older-aged groups participate less than middle-aged ones, but more than younger.

10. “Na prática política, as autoridades municipais são fundamentais aos partidos. Elas, em última instância, são as responsáveis pela eleição de governadores, deputados estaduais, deputados federais e senadores. Os prefeitos, vice-prefeitos e vereadores são cabos eleitorais de importância decisiva. Nada mais natural, portanto, que esses políticos funcionem como intermediários entre os eleitores e seus representantes.” (QUÉRCIA, 1984).

Ames (1994) proposes that endorsement seeking by Brazilian mayors is related to the fact that strong local machines have the tools to influence the choice of voters. As an anecdotal case, Ames highlights the failure of Leonel Brizola to get votes in Sao Paulo. Despite the fact that he had strong political support in both Rio Grande do Sul and Rio de Janeiro, he was unable to get more than 1,5% of votes in the state of São Paulo. The failure of Brizola highlights the importance of local organizations, as his party – the PDT – controlled just few municipalities in the state of São Paulo¹¹.

On the other hand, Zucco (2008) tested whether political alliances between the federal government and both governor and mayors in the 2006 presidential elections improved the performance of the incumbent, also using municipal level data. His results were on the opposite direction than ours. He found that alliance with governors and mayors did not improve the electoral performance of the incumbent candidate at presidential elections. Actually, they reduced his overall performance. He tested both whether governor and mayor were from the PT – Lula was the 2006 running president – or whether they were elected by a coalition of parties that included the PT. He explained this odd result with the following argument: “[...] the negative coefficients on the political variables simply reflect the fact that part of his old voting base abandoned Lula” (ZUCCO, 2008, p. 40).

With regard to the municipal fiscal variables, total municipal expenses *per capita*, municipal spending on investments *per capita* and municipal expenses on staff costs *per capita*, only the latter was significant in the *FE* model. However, its sign, like the sign of the other expenses, changed with the different models, indicating that the relationship between municipal expenses and a pro-incumbent electorate in presidential elections is not clear. Anyway, it is important to take into account the fact that municipal spending is directly related to those services provided by the local government. With respect to political attribution, this result suggests that the local electorate seems to identify who is responsible for the menu of public policies. Growth and the size of the local economy are factors that are related to the federal government. However, local education or infrastructure is more connected to local politicians. As a result, the share of votes of the local incumbent should not be sensitive to the municipal expenditures.

To analyze those relations in greater depth we decided to retest the estimates by introducing dummies for year among the regressors. The results of this analysis, shown at the three last columns of Table 4, were surprising, but they kept their sign and the statistical significance of the main regressor of interest, in addition to also maintaining the significant effects of the mayors and the economic potential of the municipality. The coefficients of the rate of growth in energy consumption *per capita* were positive and significant, reaffirming the evidence of the presence of economic voting in presidential elections in municipalities in São Paulo. The level of energy consumption also remained negative and statistically significant, reflecting the anti-incumbent nature of richer cities. On the other hand, the dummy indicator, whether the municipality belongs to a metropolitan region, which was insignificant in the first two models, is now positive related to voting for the incumbent. This finding contradicts the anti-incumbent bias of more developed regions of the state. In the same direction, the

11. There is strong evidence for the failure of Brizola in the state of São Paulo in the 1989 election. Ames (1994) had shown that Brizola had support in Sao Paulo only in the municipalities closest to the border with the state of Rio de Janeiro. Electoral support to Brizola fell rapidly, as the analysis moves away from that border.

positive coefficient of infant mortality rate loses significance and the signal is inverted, while insignificant, for the fraction of elderly people in the municipality.

As expected, all the dummies for year were significant, while with regard to the variables of municipal expenses, only total municipal expenses were significant in the three models. However, unlike what we had been expecting, its signal was negative, indicating that voters do not reward the presidential incumbent when there is greater spending by the municipality. Expenses with personnel, on the other hand, were not significant in any model and investments were significant only in the fixed effects model, where it had a positive sign.

6. ROBUSTNESS CHECKS

In this section we verify if the growth in energy consumption *per capita* is a good proxy of the municipalities' economic performance. In order to do that, we remake previous analyses using the growth rate of real municipal GDP, the most appropriate way to measure economic performance. Unfortunately, we only have data for the years 2002 and 2006.

Table 5 - Robustness check

votes	OLS	RE	FE
encos	3.529	3.529	6.729
	2.209	2.247	4.756
gdpg	3.877*	3.877*	8.125**
	1.727	1.741	3.086
lencons	-1.556***	-1.556***	-4.421
	0.238	0.166	4.417
fpop60	-0.249*	-0.249**	0.380
	0.124	0.088	1.163
colmayor	0.967	0.967	1.361
	0.601	0.606	1.144
Irim	-0.211	-0.211	-1.367
	0.519	0.493	1.012
ltotalex	0.555	0.555	10.610
	1.232	0.869	7.090
linvestexp	0.779	0.779	1.712
	0.573	0.502	1.274
lstaffexp	-0.048	-0.048	1.889
	0.210	0.136	1.859
metrop	2.162	2.162***	-
	1.154	0.547	-
_cons	45.085***	45.085***	-21.078
	8.771	5.666	48.884
N	1160	1160	1160

Note: * < 0,05 / ** < 0,01 / *** < 0,001

With a view to do this, in Table 5 we reran the analyses made in Table 4 with the inclusion of the new variable: the growth rate of real municipal GDP (*gdpr*). If the growth in energy consumption *per capita* is a good proxy, it is expected that its effect disappears once the true variable is included in this model¹². And this is exactly the result that we have found, demonstrating that the findings of the previous section are robust and significant and that the rate of growth in total energy consumption *per capita* in the municipality is a good proxy for municipal economic growth in the election year. Furthermore, the only variable that is significant and positively related to the proportion of votes obtained by the incumbent in the most appropriate model, the fixed effects, is the variable of interest *gdpr*. On the other hand, in the other models (*POLS* and *RE*), both the level of energy consumption and the proportion of the elderly population were negative and significant in relation to the proportion of valid votes obtained by the incumbent.

7. CONCLUSIONS

The purpose of this paper was to analyze whether the economic growth has an effect on the proportion of votes obtained by the incumbent in a sample of the population of the municipalities of the state of São Paulo for the presidential elections of 1994, 1998, 2002, 2006 and 2010. As a measure for economic growth, the rate of increase in energy consumption *per capita* was used. Other variables of interest were also analyzed, particularly those relating to the role of the mayor as a member of the incumbent's party coalition, municipal expenses, the elderly fraction of the population, the level of total energy consumption (which served as control for the level of income) and the rate of infant mortality.

The main results confirm that there is strong evidence of a relationship between economic growth and the votes obtained by the presidential incumbent in all the models we estimated. We also saw that the level of energy consumption and the proportion of elders was negative and significant, suggesting that the greater the economic potential of the municipalities, the greater the tendency to vote against the incumbent.

Another important finding was the role that mayors play within the incumbent's electoral coalition when it comes to transfer votes that are favorable to the party in power. The relationship between the presence of an allied mayor and the votes transferred to the incumbent in all the models proved to be statistically significant and with a fairly relevant positive effect. Also, we observed that a higher infant mortality rate tends to favor the incumbent, which seems to indicate that worse socio-economic conditions tend to result in a more government-oriented electorate.

We reaffirmed those results by modeling the same variables using additional dummies for years as control for external shocks and confirmed the main results, except for the effects of municipal expenses, which presented very unstable coefficients throughout the whole of the modeling exercise.

12. Wooldridge (2002) presents two formal requirements for a proxy variable. The first, and most important, is that the proxy variable z should be redundant in a structural equation. In other words, a good proxy must be irrelevant for explaining the dependent variable y once controlled for the true explanatory factor x . The second requirement is that the correlation between the omitted variable x and each other regressor be zero once we partial out z .

Finally, some important topics were highlighted and must be addressed by future research. First, the fact that the proportion of elderly citizens in a municipality demonstrated to be related to lower incumbent support must be analyzed with care because, as we are dealing with aggregate data, we cannot affirm with certainty that the elderly people are opposition prone or that other segments of the population are activated against the incumbent when there are more elderly people in a town. Second, the positive impact of infant mortality rate in the election year can be an indicator that municipalities suffering from poorer socio-economic conditions tend to have a more government-oriented electorate. We claim that other research strategies can be used to illuminate whether this hypothesis is true or not. And, finally, the role played by the mayors in an electoral coalition must be studied so that we can improve our understanding of the relations between national and local politics in Brazil.

In short, this paper has produced evidence that is favorable to the hypothesis of economic voting in presidential elections in the State of São Paulo by indicating a positive and significant impact between growth in energy consumption *per capita* and the votes obtained by the presidential incumbent, while at the same time indicating that the mayor plays a key role in these same national elections.

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