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BRAZILIAN JOURNAL OF PUBLIC ADMINISTRATION

Does public investment influence re-election? An empirical study of the municipalities of the state of Espírito Santo

Bruno Pires Dias[1]
Valcemiro Nossa[1]
Danilo Soares Monte-Mor[1]

[1] Fucape Business School / Programa de Pós-Graduação em Ciências Contábeis, Vitória / ES — Brazil

The economic literature has discussed the effects of public spending on the probability of re-election, pointing out that voters tend to evaluate the performance of politics based on the pre-election period (political myopia). In this context, this study investigates the influence of public investments on the re-election of municipal mayors in the state of Espírito Santo, Brazil, between 2001 and 2012. Using Logistic regression, we find that voters from the State of Espírito Santo, in general, reward the mayors who promote increments related to public investment in the period surrounding the elections, which is consistent with results in the political cycles and electoral behavior literature, although no empirical evidence was found that those voters are conservative in a fiscal perspective.

Keywords: political cycles; public choice; public investment; regional elections.

O investimento público influencia na reeleição? Um estudo empírico nos municípios do estado do Espírito Santo

A literatura econômica tem debatido os efeitos dos gastos públicos sobre as chances de recondução dos governantes, apontando que os eleitores tendem a avaliar com um maior peso a performance dos políticos tendo por base seu desempenho no período pré-eleitoral (miopia política). Nesse contexto, este trabalho investiga a influência dos investimentos públicos sobre a recondução dos prefeitos dos municípios do estado do Espírito Santo, entre 2001 e 2012. Por meio da metodologia de regressão logística, os resultados sugerem que os eleitores capixabas, de modo geral, premiam os prefeitos que promovem incrementos relativos de investimentos públicos no período próximo às eleições, o que se mostra consistente com a literatura mais recente de ciclos políticos e de comportamento eleitoral, embora não tenha havido a comprovação empírica de que os eleitores sejam conservadores sob a ótica fiscal.

Palavras-chave: ciclos políticos; escolha pública; investimentos públicos; eleições regionais.

La inversión pública tiene influencia sobre la reelección? Um estudo empírico em los municipios del estado del Espírito Santo

La literatura económica ha discutido los efectos del gasto público sobre las posibilidades de reelección de los gobernantes, y señaló que los votantes tienden a evaluar el desempeño de los políticos en función de su rendimiento en el período pre-electoral (miopía política). En este contexto, este trabajo investiga la influencia de la inversión pública sobre la reelección de los alcaldes de los municipios en el estado de Espírito Santo, entre 2001 y 2012. A través de la metodología de regresión logística, los resultados sugieren que los votantes del Espírito Santo en general recompensan a los alcaldes que promueven incrementos en la inversión pública en el periodo cercano a las elecciones, que parece consistente con la literatura más reciente de los ciclos políticos y comportamiento electoral, aunque no había ninguna evidencia empírica de que los votantes son conservadores en el punto de vista fiscal.

Palabras clave: ciclos políticos; la elección pública; las inversiones públicas; elecciones regionales.

DOI: http://dx.doi.org/10.1590/0034-7612172594
Article received on November 25, 2016 and accepted on June 05, 2018.
[Translated version] Note: All quotes in English translated by this article's translator.

1. INTRODUCTION

Various studies have proposed studying the determinant factors in voting and the existence of electoral cycles. According to Nakaguma and Bender (2005), public policies exert a considerable influence on elections. Within this context, public opinion can play a decisive role in the relationship between the economic and political sectors, and this can have repercussions in terms of voters' choices during elections, influencing the way in which politicians seek to fulfill their promises. In this way, voters can base their political choices on their evaluation of the government's performance (Coelho, 2004).

Among the studies that discuss the effects of public spending on the chances of being re-elected, Rogoff's study (1990) stands out, and suggests that leaders tend to prioritize spending that will be more visible to voters. Shi and Svensson (2006) on the other hand, conclude that governments generally promote an overall increase in public spending to signal their competence to the electorate, even though this may lead to budgetary deficits and may be associated with short-term voter memory.

Along these lines, this area's literature has also presented some evidence that increasing public investment is the main means for the government to increase its popularity during election periods, due to its direct and immediate impact on the voter's well-being. For example, Schuknecht (2000) cites the effect of increasing investment spending on employment indicators, as well as certain capital spending in and of itself such as highway construction, which is relatively easy to initiate or accelerate during pre-election periods.

In Brazil it has become commonly accepted that the federal administration tends to spend more and begin more projects in the periods leading up to elections with the objective of presenting an image of managers with recent accomplishments (Kroehn, 2017).

When exploring the context of the state of Espírito Santo in particular, we may observe that during the second half of city government terms in 2001-2004, 2005-2008 and 2009-2012, municipalities spent more than R$ 5 billion in investment (using current values). In parallel to this, ever since the re-election of heads of the executive branch has been permitted by the Brazilian constitution, 82 mayors in the state of Espírito Santo have been re-elected. This constitutes a re-election rate of 43%, considering the municipal elections of 2000, 2004, 2008 and 2012.

The view that an increase in capital spending and fiscal expansion are effectively tools for obtaining votes has been questioned (Drazen and Eslava, 2005). Peltzman (1992) finds evidence that American voters have punished local leaders who have promoted general increases in public spending on the eve of elections, while Brender and Drazen (2005) conclude, in a study of various developed nations, that budget deficits during the last three years of mandates reduce the chances that governments will be re-elected.

Within this context, using the municipal elections of 2004, 2008 and 2012, this study seeks to answer the following research question:

Has public investment during pre-election periods influenced the reelection of mayors in the state of Espírito Santo?

According to Arvate, Mendes and Rocha (2010), studies of political cycles based on municipal administrations have the advantage of few differences between themselves in terms of their constitutional, legal and electoral structure, and tend to produce results that are better adjusted.

Along the same lines, Klein (2012) states that a large portion of the revenues of Brazilian municipalities depends on transfers from the federal government, while most of the public spending is decentralized on the local level, making mayors key pieces to understanding the management of municipal public finances, especially in terms of public spending.

So-called “fiscal manipulations” to help private interests are largely used in new democracies due to the inexperience of voters or a lack of information (Brender and Drazen, 2005), combined with hard to understand budgetary information provided by candidates (Miranda et al., 2008).

In addition, it’s important to point out that the manipulation of fiscal policy tends to be more accentuated in subnational entities, due to the more restricted access that they have to other government policy instruments, such as monetary policy and exchange rates (Kneebone and Mackenzie, 2001).

Based on the formulated question, the objective of this study is to investigate the influence exercised by public investment during pre-election periods on the re-election of mayors in the state of Espírito Santo during the elections of 2004, 2008 and 2012.

One of the main contributions of this study is its innovative modeling which includes not only the re-election of mayors but also whether parties or their coalitions have retained power, in addition to the electoral revenues variable. This has made it possible to estimate the impact of the economic power of candidates on their chances for re-election, as well as parties and party coalitions remaining in power, which contributes to the robustness of the applied econometric model.

Through logistic regression analysis, the results suggest that voters in this state, in general, reward mayors who promote relative increments in public investment during pre-election periods. These findings are consistent with the most recent literature about political cycles, voter behavior and democratic accountability, though there is no empirical proof that the voters are conservative from a fiscal point of view. This study also reveals that having greater electoral financial resources and greater political capital are factors that, to a greater or lesser extent, contribute to the success of mayors, parties and coalitions in getting re-elected.

2. REVIEW OF THE LITERATURE

2.1 ELECTORAL CYCLES

The relationship between economic and political cycles has been studied in academia at least since Kalecki (1943), who suggested that government economic policy designed to encourage full employment faces political obstacles when it occurs in given phases of the economic cycle.

However, the view that those responsible for economic policy only make their decisions based on maximizing social well-being was put in check in a definitive manner by the work of Downs (1957), for whom parties seek instead to maximize their votes and permanence in power. Along these lines, a series of works began to appear about political cycles in economic literature, based on the idea that policymakers use instruments of political economy in order to get re-elected or to attain ideological goals.

Assuming the opportunistic behavior on the part of governments, Nordhaus (1975) published a seminal study whose model displays the trade-off between inflation and unemployment through the Phillips curve. According to the opportunistic model created by this author, leaders tend to adopt expansionist policies in pre-election periods in order to foster economic growth and lower unemployment to gain popularity and increase their chances of re-election; after the elections, they adopt contractionary policies to reduce inflation rates (political myopia).

Years later, the partisan model of cycles gained relevance based on the behavior of leaders being ideological rather than opportunistic. According to the partisan model, created by Hibbs (1977), the leader is not mainly focused on re-election, but rather on meeting partisan-ideological ideas, seeking to implement partisan policies supported by their main bases of electoral support.

At the end of the 1970s and the beginning of the 1980s, a new focus emerged in the theory of political cycles. Based on the appearance of the rational expectations hypothesis, the classical and partisan perspectives based on the conception of adaptive expectations began to be refuted, and it came to be assumed that rational behavior on the part of voters would imply the anticipation of governmental decisions and actions, in such a way that the deliberate use of economic policy measures can be foreseen by the public, making it impossible to have political cycles of longer duration (Fialho, 1997).

The incorporation of rationality in the opportunistic models has brought a new focus to the study of political cycles, based on two important concepts: if, on one hand, the "rational opportunists" recognize the existence of an asymmetry of information between voters and the government, on the other, it should be recognized that government competence and its signalization may be taken into account as fundamental variables (Arvate and Biderman, 2005).

The literature of political cycles is related to the present study to the extent that it seeks to analyze the impact of economic variables on political results, under the assumption that elections stimulate politicians to demonstrate their competence.

2.2 VOTING BEHAVIOR AND DEMOCRATIC ACCOUNTABILITY

Among the various currents of thought in terms of voting behavior, the sociological, psychological and rational choice approaches stand out. Sociological theory seeks to explain voting based on social interactions and groups, linking the formation of political opinions with an individual's social and economic origins. The bases of the sociological approach appeared with the works *The people's choice* (Lazarsfeld, Berelson and Gaudet, 1944) and *Voting* (Berelson, Lazarsfeld and Mcphee, 1954), and their studies, in general, evaluated the relationships between socio-economic, demographic and occupational variables in voting behavior, going beyond the analysis of factors related to electoral campaigns and media content.

The psychological approach was created in the 1950s by the Michigan School whose most eminent work *The American voter* (1960) explores an analytical approach of political behavior based on an individual's motivations, perceptions and attitudes in relation to the political world. Relating individuals to their psychological motivations as explanatory voting factors, academics of this current argue that most voters are not interested in politics and have little knowledge of it. The rational choice school, inaugurated by Downs (1957), is based on the assumption that the voters are rational and seek to maximize the utility of their votes, reducing their costs and increasing their benefits. Assuming the instrumental nature of an individual's vote, the rational choice school sheds light on the capacity of the individual to vote for the leaders who are most closely aligned with their objectives and preferences, which approximates the democratic accountability perspective of governments controlled by and responsive to the population's wishes (Cavalcante, 2015).

According to rational voter behavior, Maravall (1999) states that under democratic and responsive governments, citizens can judge the performance of their rulers retrospectively through elections, punishing or rewarding them in the voting booths. However, he points out that politicians tend to anticipate this judgment in their political initiatives and are attentive to voter preferences.

Moreover, he applies the agency theory to give context to the role of democratic accountability, especially when leaders seek to influence public opinion, and not just respond to it.

Along these lines, Nakaguma and Bender (2010:4) propose an explanation for electoral cycles that explores the phenomenon of moral risk due to the relationship between political agents and voters:

> The theoretical literature of political economy proposes two alternative explanations for the phenomenon of electoral cycles. On one hand, political cycle models emphasize the idea that electoral manipulation serves to signal the "administrative competence" of governmental leaders, given that only really adept politicians are capable of producing these cycles. On the other hand, electoral control models emphasize the possibility that electoral cycles can be induced, at least in part, by the absence of adequate political monitoring on the part of the voters, who in this case are incapable of identifying and punishing opportunistic fiscal manipulations.

Thus, this work assumes, based on the rational choice theory of voting behavior, that voters seek to maximize the utility of their votes, selecting leaders who give priority to their preferences, and that elections, as instruments of control, serve to limit opportunistic manipulation of the policies developed by leaders.

2.3 IMPACTS OF PUBLIC INVESTMENT AND FISCAL POLICY ON ELECTION RESULTS

The literature has emphasized that public opinion exercises a decisive role in the relationship between the economic and political sectors, which affects voter choices during elections and influences the way in which politicians seek to fulfill their objectives. Voters base their political choices on the evaluations they make of government performance, in which the economic analysis is the determinant factor (Coelho, 2004).

Various authors have found indications that public investment has a positive impact on economic growth and productivity. Among these studies, Aschauer (1989), who studied the American private sector from 1949 to 1985, stands out and he finds evidence that public investment, in general, has a positive impact on economic growth and productivity. Easterly and Rebelo (1993) studied 100 countries between 1970 and 1988 and conclude that public investment in transport and communication have a significant positive relationship with long-term growth rates.

Schuknecht (1996) has already verified the occurrence of opportunistic cycles in terms of fiscal deficits using data from 35 developing countries from 1970 to 1992. He found that increases in fiscal deficits in pre-election periods were generated through the expansion of public spending rather than taxation. Later Schuknecht (2000) analyzed 24 developing countries from 1973 to 1992 and concluded that public investment is also subject to electoral cycles.

Akhmedov and Zhurasvskaya (2004), in investigating budgetary behavior in local Russian jurisdictions during electoral periods, found indications of increases in spending and public deficits during electoral periods, added to the theory in the sense that local voters, even though they permitted increases in public spending, tend to punish leaders who generate these budget deficits.

In Brazil up until the end of the 1990s, tendencies in favor of fiscal manipulation in order to get re-elected were not discussed in academic articles, because this was permitted under Brazilian legislation only beginning in 1998. Since then various empirical studies of this trend have been produced in this country.

Political cycles in municipalities in Minas Gerais were analyzed by Araújo Junior, Cançado and Shikida (2005), based on the 2000 elections, and they found that voters tend to punish leaders who realize excessive expenditures in maintaining the "public machine" and re-elect mayors who raise more resources through an increase in revenues.

Sakurai and Menezes-Filho (2008), in a study of more than 2,000 Brazilian municipalities, examined the way in which municipal spending affects the probability of a mayor's re-election, based on municipal elections from 1988 to 2003. The results suggest that increases in capital spending (investment) has a positive influence on the re-election of Brazilian mayors, while in terms of socio-demographic variables, they found a positive relationship between the size of the population and re-election.

Arvate, Avelino and Lucinda (2008), in a study of Brazilian municipal elections in 2000, investigated whether voters are conservative from a fiscal point of view. They found indications that Brazilian voters have a preference for higher levels of public spending, especially among those in the sample with less education.

Klein and Sakurai (2015), in a study covering more than 3,000 Brazilian municipalities between 2001 and 2008, found relevant evidence that local leaders seek to maximize their chances of re-election by executing more visible spending during election periods, even though they attempt to avoid compromising budgetary and fiscal equilibrium.

Finally, Cavalcante (2015), in examining the effects of fiscal performance in Brazilian cities in terms of the probability of the re-election of mayors in 2008, found that results that re-affirm the impact of budgetary and financial variables on the chances of these leaders being re-elected.

Based on these studies and examining the municipalities of the state of Espírito Santo from 2001 to 2012, this work will test the following hypothesis:

H1: Increases in public investment realized in the second half of administrations compared to the first half imply a greater chance of success for the mayor up for re-election.

3. RESEARCH METHODOLOGY

To achieve the objective of this work, we examined 78 municipalities in the state of Espírito Santo. The data ranges from 2001 to 2012, including the municipal elections of 2004, 2008 and 2012.

Accounting information was collected from the consolidated Brazilian Finance (Finbra) database of municipalities, available on the website of the National Treasury Secretariat (STN), while the demographic and political-electoral data was extracted, respectively, from the Brazilian Institute of Geography and Statistics (IBGE) and the Supreme Electoral Court (TSE) website, including:

Accounting Information:

— Funds committed to investment;
— Committed budgetary spending;
— Budget revenues raised; and
— Budgetary balance.

Demographic Information:

— Population; and
— Municipal Human Development Index (IDH-M).

Election Information:

— Election results;
— Political parties of the nation's president, the state governor and the mayors;
— Campaign contributions; and
— Votes obtained in previous elections.

In terms of the data available for all of the variables under analysis, municipal observations that did not supply data for all of the models' explanatory variables were discarded. Thus, the tests which used the dependent variable of the mayor's re-election totaled 102 complete observations out of a total of 109 observations. For the tests of the re-election of the ruling party and its coalition, the totals were 137 and 138 complete observations respectively out of a total of 234 observations for each dependent variable.

In addition, the observations for the years in which there were no mayoral re-election disputes were not considered for the tests that used the dependent mayor re-election variable. In the same way, the years in which there were no mayoral party re-election disputes were not considered for the tests that used the dependent party re-election variable. Observations related to years in which there were no mayoral re-election disputes involving a ruling coalition were not considered for tests that used the dependent coalition re-election variable.

In this study, information related to mayor, party, and coalition re-election information was used to create dependent variables.

The dependent variable *Mayor Re-Election* (MAYREE) is a binary (dummy) variable which assumes a value equal to 0 (zero) for the municipalities whose mayors disputed re-election and were not re-elected, and a value equal to 1 (one) when they were.

The dependent variable *Political Party Re-Election* (PARTREE) is a binary (dummy) variable which assumes a value equal to 0 (zero) for the municipalities in which the mayoral parties seeking re-election were not re-elected, and a value equal to 1 (one) when they were.

The dependent variable *Political Party Coalition Re-Election* (COALREE) is a binary (dummy) variable which assumes a value equal to 0 (zero) for the municipalities in which the mayoral party coalitions seeking re-election were not re-elected, and a value equal to 1 (one) when they were.

For this study, the dependent variables *Political Party Re-Election* (PARTREE) and *Political Coalition Re-Election* (COALREE) also assumed a value equal to 1 (one) for the municipalities in which mayors disputing re-election were re-elected, independently of whether the political party or political coalition was re-elected.

Box 1 displays the dependent variables which were tested statistically:

BOX 1 DEPENDENT VARIABLES — MAYOR, PARTY AND COALITION RE-ELECTION

Dependent Variable	Dummy	Description
Mayor Re-Election	0	The mayor was not re-elected
	1	The mayor was re-elected
Party Re-Election	0	Neither the mayor nor the party was re-elected
	1	Either the mayor or the party was re-elected
Coalition Re-Election	0	Neither the mayor, the party nor the coalition was re-elected
	1	Either the mayor, the party or the coalition was re-elected

Source: Elaborated by the authors.

The selected explanatory variables are presented in box 2 along with their descriptions and their expected relationship with the re-election of the mayor, the party or the coalition.

BOX 2 EXPLANATORY VARIABLES — MAYOR, PARTY AND COALITION RE-ELECTION

Explanatory Variable	Description	Expected Relationship	Theoretical Support
President's Party	Information as to whether the mayor, the party or the coalition disputing re-election is the same as that of the country's president.	Positive	Klein (2010)
Governor's Party	Information as to whether the mayor, the party or the coalition disputing re-election is the same as that of the state's governor.	Positive	
Population	Population of the municipality.	Positive	

Continue

Explanatory Variable	Description	Expected Relationship	Theoretical Support
MHDI	Municipal Human Development Index	Negative	Vicente and Nascimento (2012)
Public investments (variation)	Difference between the municipal budgetary spending on investment during the pre-election and post-election periods.	Positive	Schuknecht (2000) and Drazen and Eslava (2005)
Budgetary balance (variation)	Difference between the municipal budgetary balances during the pre-election and post-election periods.	Positive	Peltzman (1992)
Campaign contributions	Quotient of the campaign contributions raised for the mayor, party or coalition in the re-election dispute over the corresponding figures for the greatest vote getting opponent.	Positive	Cervi (2010)
Political capital	Quotient of the votes received by the mayor, the party or coalition during the previous election over the corresponding figures for the greatest vote getting opponent.	Positive	Klein (2010)

Source: Elaborated by the authors.

The fiscal variables are in the format of a quotient to avoid the utilization of buying power correction indices as well as distortions due to the differences in the "size" of the municipalities, following the example of Vicente and Nascimento (2012).

To demonstrate the impact of *public investment* on the probability of re-election for mayors, parties or coalitions, we have adopted the use of a proxy variable (CHANGE_INV) related to the difference in municipal budgetary spending on investment between the pre-election and post-election periods. It is expected that this indicator will have a positive relationship with the probability of mayor, party or coalition re-election in line with the findings of Schuknecht (2000), Drazen and Eslava (2005) and Sakurai and Menezes-Filho (2008), by corresponding to expenses whose effects are more visible to voters.

We have adopted a proxy variable for *budgetary balance* in this study, namely (CHANGE_RESOURCE) which is related to the differences between the municipality's budgetary balances during the pre-election and post-election periods. For the objectives of this study, the budgetary balance corresponds to the quotient of the total campaign contributions over the municipality's total spending.

In this study, it is assumed that voters are conservative from a fiscal point of view and tend to punish political leaders who run up budget deficits (Klein, 2012), in the hope of corroborating the results of Klein and Sakurai (2015) and Cavalcante (2015), in the sense of an increase in the difference between budgetary balances between the pre-election and post-election periods and a positive impact on the chances of the mayor, party or coalition's re-election as a result.

According to Klein (2010) and Cavalcante (2015), previous studies have revealed that belonging to the same party as the nation's president or the governor of the state can increase the chances of a mayor's re-election, especially due to the probable political distribution of income from the federal and state governments to municipalities governed by the same party or coalition.

Thus, to capture the *political alignment* of the mayor, party or coalition up for re-election with that of the *nation's president*, we have adopted a binary variable (PRESPART) as a proxy which assumes a value of 1 (one) when the mayor is a member of the same party as the president and a value of 0 (zero) when the mayor is not.

In the same manner, to capture the *political alignment with the state governor*, we have also adopted a binary variable (GOVPART) which assumes a value of 1 (one) if the mayor is a member of the same party as the president and a value of 0 (zero) when the mayor is not.

To estimate a municipality's *degree of accountability*, we have used a proxy of the city's number of inhabitants in a logarithmic format to control for its effect in the model (POP variable). A portion of the political science literature suggests that the degree of accountability is inversely proportional to the size of electorate (Klein, 2010), with smaller cities tending to reduce the "distance" between the voters and their political representatives, which suggests an increase in terms of voter sensitivity to policymaker performance (Porto and Porto, 2000).

The expected results for this variable also corroborate the evidence found by Sakurai (2008), which in a study of more than 2,000 Brazilian municipalities between 1988 and 2000, suggests a positive relationship between population size and the probability of being re-elected.

To analyze *the degree of human development* in relation to longevity, education and income, we have adopted the Municipal Human Development Index (MHDI) as a proxy. The closer it is to 1, the greater the human development, which may be linked to greater conscientiousness on the part of the electorate as a consequence of a greater flow of information (Araújo Junior, Cançado and Shikida, 2005).

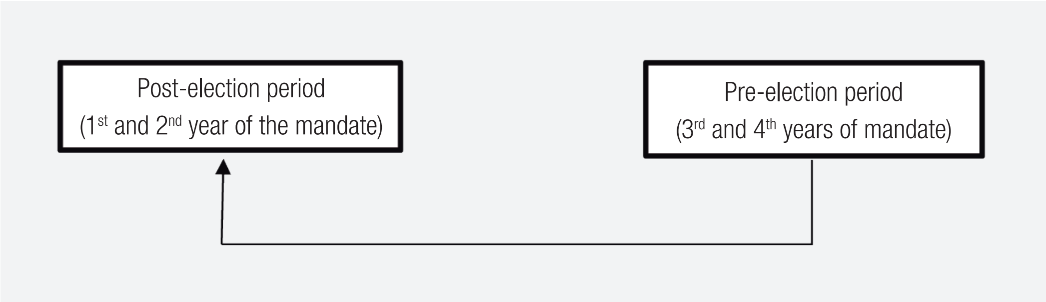
To estimate the impact of *economic power* on the chances of the mayor, party or coalition being re-elected, we use a proxy, namely the quotient of the total campaign contributions received by the mayor, party or coalition in the re-election dispute, over the same figures for the opponent who was elected mayor, or whose party or coalition was elected, or the opponent who finished second in the contest, depending on the situation. Of the total campaign contributions received by the mayoral candidate, party or coalition, we see what percentage this represented compared to the opponent's corresponding figures to capture the influence of campaign contributions on the chances of mayors, parties or coalitions being re-elected.

To estimate the local *political power* of the mayor, party or coalition (Klein, 2010), we have opted to use a proxy for the political capital ("electoral college") of the mayoral candidate, party or coalition, based on the percentage of votes received in the previous municipal election as compared to the main political adversary (margin of victory). Thus, we seek to measure the effects of a preview of a candidate's supposed base of support (Cavalcante, 2015), as a proxy for voter loyalty, independent of the mayor's performance, which constitutes a "margin of fat" for the beginning of the campaign (Peltzman, 1990).

To predict the impact of the explanatory variables considered in this study of the probability of re-election, we employ the methodology of logistic regression, because this is the most appropriate treatment of data when the dependent variable is categorical (Gujarati, 2011).

The accounting variables were analyzed at two different times: post-election, associated with the first two years of the mandate, and pre-election, associated with the last two years of the mandate, as in Klein (2010), as can be seen in figure 1.

FIGURE 1 PERIODS OF ANALYSIS



Source: Elaborated by the authors.

The inclusion of the penultimate year of the mandate in the pre-election period is justified by the idea that the expansion of spending in supposedly opportunistic behavior on the part of the mayor, party or coalition begins before the last year of the mandate, mainly due to the legal restrictions related to budgetary spending.

In addition, a difference test was performed between the variations in budgetary spending on public investment made in the pre-election and post-election periods in order to verify whether the average variation in investment made by re-elected mayors is different that the average variation in investment by mayors who were not re-elected.

The logistic regression models used were the following:

$$\textit{Reelection of the mayor}_i = \beta_0 + \beta_1 X_{1i} + \Sigma\ \textit{Controls}_i + \varepsilon_{1i} \quad (1)$$
$$\textit{Reelection of the party}_i = \beta_0 + \beta_1 X_{1i} + \Sigma\ \textit{Controls}_i + \varepsilon_{2i} \quad (2)$$
$$\textit{Reelection of the coalition}_i = \beta_0 + \beta_1 X_{1i} + \Sigma\ \textit{Controls}_i + \varepsilon_{3i} \quad (3)$$

In which:

X_1 = Variation of Investment

Controls: president's party, governor's party, population; MHDI; budgetary balance (variation); campaign contributions; political capital.

ε = error term

4. STUDY RESULTS

This section will present a descriptive analysis of the variables proposed in this study, as well as the results obtained through the logistic regressions.

In the municipal elections of 2004, 2008 and 2012, 62 mayors were re-elected, 77 mayors and parties were re-elected, and 205 mayors, parties and coalitions were re-elected. Table 1 presents the descriptive data of the municipalities of the state of Espírito Santo relative to the years from 2001 to 2012 proposed for this study's objectives.

TABLE 1 DESCRIPTIVE STATISTICS

Variable	Average	Standard-Deviation
Re-election of mayor	0.57	0.50
Re-election of party	0.35	0.48
Re-election of coalition	0.47	0.50
Alignment with president	0.73	0.26
Alignment with governor	0.24	0.43
Population	44,146.39	81,716.39
MHDI	0.62	0.07
Δ Investment	0.01	0.05
Δ Budgetary balance	0.02	0.11
Campaign contributions	0.62	0.20
Political capital	53.59	12.22

Source: Study data. Elaborated by the authors.

A difference between means test was performed to verify if the mean variation of investment made by re-elected mayors is different from the variation of investment made by mayors who disputed re-election but were not re-elected. In the difference between means test, the variations in budgetary spending through investment were analyzed in the pre-election and post-election periods, considering the municipal elections of 2004, 2008 and 2012. The results are presented in table 2.

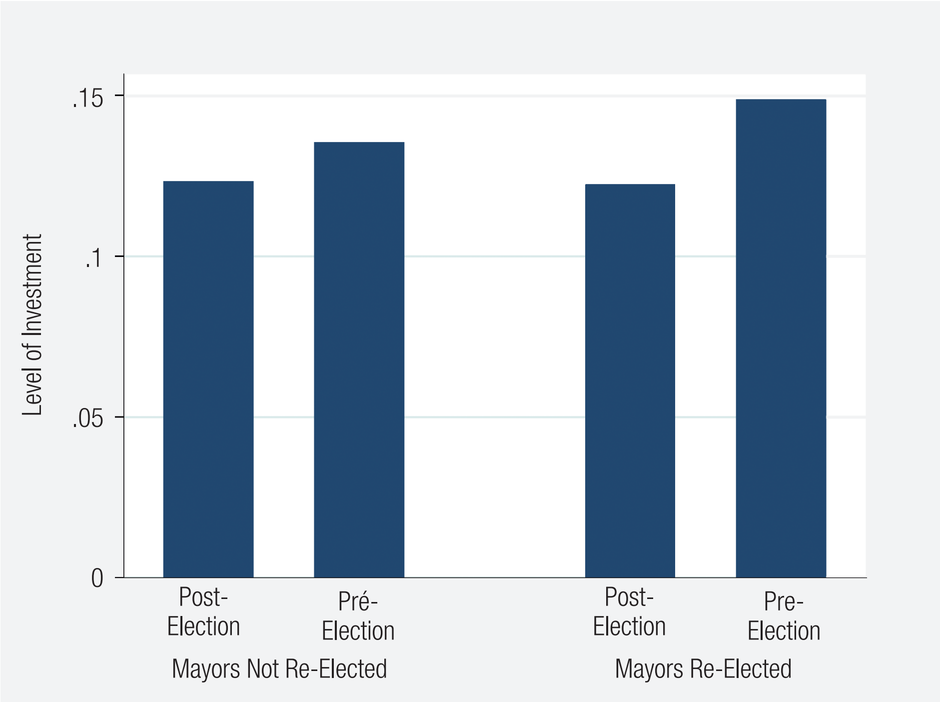
TABLE 2 DIFFERENCE BETWEEN MEANS TEST FOR INVESTMENT

Group	Obs.	Means	Standard Error	Standard Deviation
Not re-elected	45	-0.0016443	0.0066324	0.0444912
Re-elected	58	0.0153004	0.0054829	0.0417562
Diff = mean (0) – mean (1)				
H_0: diff = 0				
H_a: diff < 0	Pr(T < t) = 0.0249			
H_a: diff != 0	Pr(|T| > |t|) = 0.0498			
H_a: diff > 0	Pr(T > t) = 0.9751			

Source: Study data. Elaborated by the authors.
In which,
Mean (0) = The difference between means of public investment made in the pre-election and post -election periods by mayors who were eligible for re-election but were not re-elected.
Mean (1) = The difference between means of public investment made in the pre-election and pos-t-election periods by mayors who were re-elected.

We may observe in graph 1 that the level of investment made by mayors who were re-elected as opposed to those who were not during the post-election period was reasonably equivalent.

GRAPH 1 LEVEL OF INVESTMENT BY MAYORAL GROUP — PRE-ELECTION AND POST-ELECTION



Source: Study data. Elaborated by the authors.

In table 3, we present the results of the regression for the Mayor's Re-Election (MAYREE), Mayor or Party Re-Election (PARTREE) and Mayor, Party or Coalition Re-Election (COALREE).

Based on the results of table 3, using the Mayor's Re-Election (MAYREE), Mayor or Party Re-Election (PARTREE) and Mayor, Party or Coalition Re-Election (COALREE) as dependent variables, the explanatory variables that proved to be significant with expected signs were: the difference between investment in the pre-election and post-election periods (CHANGE_INV), campaign contributions (QCCMAY, QCCPAR and QCCCOAL), political capital (PERCVCOAL) and the Municipal Human Development Index (MHDI).

The significant results at a level of 1% with the expected sign for the variable CHANGE_INV demonstrate that an increase in public investment during the pre-election period compared with the post-election period increased the chances of mayors, parties and coalitions being re-elected, corroborating the studies of Schuknecht (2000), Drazen and Eslava (2005) and Sakurai and Menezes-Filho (2008). *At this point, H1 cannot be rejected.*

TABLE 3 RESULTS — RE-ELECTION OF MAYORS, PARTIES AND COALITIONS

	Statistic	Expected Sign	Coefficient	Standard Error	p-value
RE-ELECTION OF MAYOR	Alignment with President	+	0.13	0.53	0.800
	Alignment with Governor	+	0.52	0.35	0.138
	Population	-	4.58e-07	1.90e-06	0.809
	MHDI	-	-4.77	2.29	0.037**
	Δ Investment	+	9.32	3.63	0.010***
	Δ Budgetary Balance	+	-2.31	2.10	0.273
	Campaign Contributions	+	1.81	0.74	0.014**
	Political Capital	+	0.02	0.01	0.142
RE-ELECTION OF PARTY	Alignment with President	+	0.14	0.42	0.749
	Alignment with Governor	+	0.47	0.30	0.116
	Population	-	-2.26e-07	1.38e-06	0.870
	MHDI	-	-3.63	1.84	0.049**
	Δ Investment	+	6.83	2.86	0.017**
	Δ Budgetary Balance	+	-1.49	1.95	0.445
	Campaign Contributions	+	2.00	0.60	0.001***
	Political Capital	+	0.02	0.01	0.063*
RE-ELECTION OF COALITION	Alignment with President	+	-0.23	0.42	0.588
	Alignment with Governor	+	0.35	0.30	0.233
	Population	-	1.47e-08	1.36e-06	0.991
	MHDI	-	-4.48	1.84	0.015**
	Δ Investment	+	6.53	2.86	0.023**
	Δ Budgetary Balance	+	-2.45	1.93	0.204
	Campaign Contributions	+	1.85	0.59	0.002***
	Political Capital	+	0.02	0.01	0.034**

Source: Study data. Elaborated by the authors.
***, **, * Statistically significant at levels of 1%, 5% and 10% respectively.

In line with the statistical results generated by the logistic regressions displayed in table 3, the difference between means tests in table 2 demonstrated, with a 95% level of confidence, that the mean variation of public investment made by re-elected mayors is significantly greater than the mean variation of public investment made by mayors who ran for re-election but were not re-elected, which suggests a desire on the part of local leaders to signal competence through increasing public investment, corroborating the findings of Klein and Sakurai (2015).

Thus, in line with Rogoff (1990), we have verified that, to signal their competence, local leaders tend to realize more "visible" investments in pre-election periods, such as investments in streets, schools, hospitals, etc., taking advantage of the asymmetry of information between leaders and voters.

At the same time, considering that investments on the municipal level (normally referring to the construction of schools and hospitals, basic sanitation, paving streets, etc.) are relatively discretionary forms of spending, these expenses reflect the quality of municipal fiscal management (Cavalcante, 2015), and the results signal that the voter tends to reward mayors who promote relative increases in public investment.

However, we did not find significant results for the CHANGE_RESOURCE variable, which measures the variation between the budgetary balances during the pre-election and post-election periods, which thus indicates a conservative point of view of fiscal results was not proved empirically, as has been found in the more modern literature dealing with this subject.

Statistically significant results were obtained for the campaign contribution variables (QCCMAY, QCCPAR and QCCCOAL), which suggests that an increase in campaign contributions as compared to other candidates increases the chances that mayors, parties or coalitions are re-elected, which corroborates the findings of Cervi (2010) indicating the influence of economic power in voter decisions.

It is important to remember that, political campaign contributions by companies were prohibited beginning in 2016, with all contributions having to originate from the party itself or donations by individuals (including the candidate). If on one hand this can make electoral disputes more equal, on the other it can make the situation more onerous for the treasury, appropriating financial resources that could be invested in other areas, such as health and education (Moreira, 2016).

The political capital variable (PERCVCOAL), even though it did not present significant results in relation to the dependent Mayor Re-Election variable (MAYREE), was shown to have a positive significant relationship with the dependent variables Mayor or Party Re-Election (PARTREE) and Mayor, Party or Coalition Re-Election (COALREE), corroborating Cavalcante's study (2015) and signals that the greater the "political capital" of the mayor's party or coalition up for re-election, the greater the chances that they will be re-elected.

The significant results with the expected sign for the MHDI variable suggest that the lower the Municipal Human Development Index is, the greater the chances are that the mayor, party or coalition will be re-elected, corroborating the research of Vicente and Nascimento (2012) and their theory about this subject.

5. CONCLUSION

The objective of the present work has been to analyze the impact of public investment by mayors in the state of Espírito Santo. It's main contribution is demonstrating the effects of public investment and its fiscal impact on voters in terms of the re-election of the local government, based on the main idea that voters reward or punish fiscal manipulations (Nakaguma and Bender, 2010), collaborating to elevate the understanding of voters in relation to the capital spending of public managers (Vicente and Nascimento, 2012).

The results obtained in this study corroborate the traditional literature that voters award mayors who promote relative increments in public investment during pre-election periods (Schuknecht, 2000; Drazen and Eslava, 2005; Sakurai and Menezes-Filho, 2008), even though there has been no empirical confirmation that voters in the state of Espírito Santo are conservative from a fiscal point of view. The evidence is even more relevant considering that a significant positive relationship has been found between capital spending and the re-election of parties and coalitions.

More specifically this study has also obtained evidence that campaign contributions raised by mayors affect their chances of re-election or the re-election of their party or coalition, which corroborates the findings of Cervi (2010) and indicates that money makes a difference in terms of electoral disputes.

In addition, this study's results point to the fact that voters in municipalities with lower human development tend to re-elect more mayors on average, confirming the results of Araújo Junior, Cançado and Shikida (2005).

In this way, the results obtained in this work confirm the influence of public investment on the re-election chances of mayors in Espírito Santo, and also bring greater quality to the analysis of the behavior of fiscal variables related to these entities in election years, providing voters with a greater understanding of the actions of public managers which could be used to inform the implementation of fiscal restrictions during election periods.

A limitation of this study's results is the fact that the proxy used in relation to public investment is based on the commitment of budgetary funds which does not correspond temporally to that envisioned by Brazilian accounting norms for the public sector. The commitment of funds is the first stage of executing the budget and assures the supplier or service provider that there are sufficient budgetary funds to pay the contract that is to be fulfilled.

In terms of future research, we propose that studies investigate evidence of the influence of electoral cycles on the budgetary functions of municipalities in the state of Espírito Santo, and their relationship to the re-election of mayors. We also suggest studies that will explore the relationship between the party ideology of mayors and their re-election.

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Bruno Pires Dias
Masters in Accounting Sciences and General Accountant of the State of Espírito Santo.
E-mail: bpdiascapixaba@gmail.com.

Valcemiro Nossa
PhD in Controllership and Accounting and Professor at Fucape Business School. E-mail: valcemiro@fucape.br.

Danilo Soares Mont-Mor
PhD in Accounting Sciences and Administration and Professor at Fucape Business School.
E-mail: danilo@fucape.br.