



Responsible Editor: Rodrigo de Souza Gonçalves
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Evaluation Process: Double Blind Review pelo SEER/OJS

Political electoral cycles: Are municipal elections influenced on the budget execution of Minas Gerais municipalities?

ABSTRACT

Objective: This article intends to assess whether political cycles generate impacts on the allocation of public resources in education, health, and infrastructure investments (works and installations) in municipalities in the State of Minas Gerais.

Method: In this context, the sample consisted of 500 municipalities from 2007 to 2016, excluding cities that did not present all the data in the period studied. The Seemingly Unrelated Regression (SUR) panel model proposed by Zellner and Theil (1962) was used to elaborate a system of equations responsible for identifying the existence of electoral cycles in the expenses above, totaling three equations.

Originality/relevance: Because of the locus of the study, it is admitted that the results can contribute to the understanding of the municipal budget dynamics, considering the influence of other variables, such as the binary, that refer to mesoregions and their characteristics.

Results: Corroborating the literature on political-budgetary cycles, the results of this research point to the existence of influence of the electoral process in the application of public resources, with increased spending in electoral years and retraction in post-electoral years in municipalities, a fact that is well evidenced in expenses with works and installations, the most visible to the population.

Theoretical/methodological contributions: In this way, the article contributes to a better understanding of the determinants of the use of public resources in municipalities in Minas Gerais.

Keywords: Public budget; Budgetary-electoral cycles; Tax policy; Municipal Elections.

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Received: April 16, 2021
Revised: June 24, 2021
Accepted: August 03, 2021
Published: August 31, 2021



How to Cite (APA)

Santos, P. H. P., Wakim, V. R., & Fernandes, C. I. P. (2021). Political electoral cycles: Are municipal elections influenced on the budget execution of Minas Gerais municipalities?. *Journal of Accounting, Management and Governance*, 24 (2), 239-255. http://dx.doi.org/10.51341/1984-3925_2021v24n2a6

1 INTRODUCTION

Over time, Brazilian legislation has sought to develop mechanisms that offer the Public Administration a character of irreproachability, based for example, on the establishment of constitutional principles, namely, legality, impersonality, morality, publicity and efficiency (Constitution of the Federative Republic of Brazil, 1988). Furthermore, with regard to the public budget, a set of laws was created to ensure due respect and value to public money such as Law 4320/1964, known as the Public Finance Law, Law 8666/1993, known as the Bidding Law, the Fiscal Responsibility Law (Complementary Law 101/2001), in addition to the Annual Budget Law, the Budget Guidelines Law, and the Pluriannual Plan.

In this sense, the Public Administration and the control of public finances, based on a bureaucratic model, are guided by a series of rules that act to minimize actions that may harm the correct use of public resources and harm the community and the common good.

In this context, several authors have researched the existence of electoral cycles and their influence on public spending. This situation arises from "the use by policy makers, of economic policy instruments not with the purpose of obtaining the socially optimal policy, but with the opportunistic intention of re-electing themselves or pursuing some ideological objective" (Orair, Gouvêa, & Leal, 2014, p. 10).

The literature has long demonstrated determinant elements regarding the political cycle in local governments during election periods, and its influence on economic fluctuations. According to Brender and Drazen (2005), the presence of these elements becomes more noticeable in underdeveloped countries with a recent democratic regime, given that they are more prone to manipulation of fiscal policies with an electoral bias during the election period.

Downs (1957) teaches that political agents exercise their social functions driven by particular motivations. Consequently, international surveys point to manipulation in the composition of public spending during an election period.

It is noteworthy that studies carried out with several countries (Katsimi & Sarantides, 2012; Vergne, 2009) prove the change in public spending towards current expenditures to the detriment of capital. Regarding the researches that evaluated municipalities (Drazen & Eslava, 2010; Veiga & Veiga, 2007), it was evident that the opportunistic behavior is based on investments, as they are final expenses capable of signaling competence and increasing the chances of re-election of officers.

In the Brazilian context, Sakurai and Gremaud (2007) evaluated the fiscal behavior of 572 municipalities in the State of São Paulo between 1989 and 2001, and found evidence of positive impulses in terms of municipal expenditure in the 1992 and 2001 election years. Furthermore, Vasconcellos de Oliveira and Azevedo de Carvalho (2009), when analyzing 40 municipalities in the state of Rio de Janeiro, highlight positive impulses in electoral periods in terms of transport and legislative functions.

Furthermore, Vasconcelos, Ferreira Júnior and Nogueira Júnior (2013), when studying the behavior of fiscal budget execution, concluded that the federal fiscal policy presents a cyclical behavior, since public revenues and expenses are conditioned to the frequency of presidential elections.

Thus, the proposed research analyzes whether there is influence of municipal political cycles on the budget execution of municipalities in Minas Gerais with regard to spending on education, health, and works and installations in the period 2007-2016. Such expenses are of a greater amount, as they are the most significant in the municipal budget (education and health) and most visible to citizens (works and installations). Furthermore, the investigation

analyzes the effect of Minas Gerais regionalities on budget execution, from the use of binaries that refer to Minas Gerais mesoregions.

2 THEORETICAL FRAMEWORK AND LEGAL FOUNDATION

2.1 Theory of political-economic cycles

In relation to political cycles, the literature assesses how the government's ideology and desire for re-election influences the government's budget dynamics. The first researches related to the theory of political cycles were developed by Kalecki (1943) and Akerman (1947) when they analyzed how the behavior of economic policy makers and how their choices generate fluctuations in economic indicators in the short term (Gobbi, 2011).

At a later time, the theory under discussion was systematized by Downs (1957), acquiring strands through various researches carried out between the 1970s and 1980s. Downs (1957) established the basis of the theory of political cycles as three aspects (persuasion, ideologies and irrationality). For the author, parties seek to maximize votes in elections to remain in power, an understanding also defended by Nordhaus (1975) who promoted the study of the political cycle with his opportunist model, in which he argues that policymakers act to ensure increased support during the election period.

Furthermore, Tufte (1978) also discusses the relationship between the inflation-unemployment trade-off and the political cycle, highlighting the use of fiscal policy for electoral purposes. The author argues that expansionary fiscal policies increase real income in a short period of time, such as the increase in government transfers and the advance in raising taxes. When adopted in a period prior to elections, the referent mechanism tends to influence the result of these, above all, due to the ease and speed in which they can be implemented.

Indeed in general, the empirical evidence raised by the literature emphasizes that political cycles are relevant elements to be observed in public budgets, both nationally and locally, and the literature on political-budgetary cycles is conclusive in ensuring that the greater the resources employed in pre-election periods, the greater the possibility of re-election of the political agent.

2.2 Brazilian tax laws and policy

The public budget and its execution are presented as important tools for separating the public and the private. The setting of expenditure and tax levels have become major influencers on economic activity, leading countries to pass laws that enable the conduct of fiscal policy, and above all, the control of public accounts both during the term of office and during electoral periods.

Regarding the Brazilian budget system, Rezende (2009) prescribes that there is a three-cycle process, contemplating short and medium-term planning based on the Pluriannual Plan (*Plano Plurianual* - PPA), the Budget Guidelines Law (*Lei de Diretrizes Orçamentárias* - LDO) and the Annual Budget Law (*Lei Orçamentária Anual* - LOA), so that they ensure greater transparency in relation to public resources.

In relation to the PPA, the Federal Constitution specifies in its art.165, paragraph 1, that the law that institutes the multiannual plan will establish, in a regionalized manner, the guidelines, objectives, and goals of the federal public administration for capital expenditures and others and for those relating to programs of continued duration (Constitution of the Federative Republic of Brazil, 1988).

The Budget Guidelines Law (LDO) is defined in art.165, paragraph 2 of the Federal Constitution by establishing that "the law on budget guidelines will comprise the goals and

priorities of the federal public administration, including capital expenditures for the subsequent financial year, will guide the preparation of the annual budget law, will provide for changes in the tax legislation, and will establish the application policy of the official financial development agencies” (Constitution of the Federative Republic of Brazil, 1988).

Regarding the Annual Budget Law (LOA), art.165, paragraph 5 of the Federal Constitution provides that the LOA will comprise the fiscal budget referring to the Federal Government, its funds, bodies, and entities of direct and indirect administration, including foundations established and maintained by the Public Power; the investment budget of companies in which the Federal Government directly and indirectly holds the majority of the share capital with voting rights; the social security budget, covering all entities and bodies linked to it, of direct or indirect administration, as well as the funds and foundations instituted and maintained by the Public Power (Constitution of the Federative Republic of Brazil, 1988).

Therefore, budget laws provide for the forecast of revenues to be collected in the following year, as well as their respective destinations. Thus, they are designed to prevent the diversion of public money, as well as to prevent unplanned and unforeseen actions from being carried out (Silva, Carvalho, & Medeiros, 2009).

Improvements in public management, in their financial, economic, social and management aspects, depend on the correct and persistent management of financial resources. Therefore, in addition to the transparency and social control bias, the public budget is considered a planning tool that provides subsidies for government action (Abreu & Câmara, 2015).

It should be noted that budget laws are mechanisms by which the State institutes its action plan in accordance with the available financial resources, through continuous planning carried out by the executive branch and short and medium-term strategies to be followed (Silva *et al.*, 2009). However, well-prepared planning is not synonymous with good results, so that in order to achieve the established goals, it is essential to comply with pre-defined goals according to reality (Kanayama, 2009).

In this context, considering that the Public Administration is subject to compliance with the laws, the Complementary Law 101 of 2000, known as the Fiscal Responsibility Law (*Lei de Responsabilidade Fiscal* - LRF), makes public agents responsible for their conduct regarding the use of public resources, in order to ensure the public interest (Kanayama, 2009). Thus, it is important to highlight that this law came into force, aiming above all to regulate art.163 of the Federal Constitution, which provides for Taxation and Budget (Title VI).

The LRF in its art. 1, paragraph 1 establishes that responsibility in fiscal management presupposes planned and transparent action, in which risks are prevented and deviations capable of affecting the balance of public accounts are corrected, through the fulfillment of goals, results between income and expenses with personnel, of the social security and others, consolidated debts and securities, credit operations, including anticipation of revenue, granting of guarantee and registration of amounts owed (Complementary Law n. 101, 2000).

Reston (2000) argues that the LRF triggered a substantial change in the way in which the financial management of the three levels of government is performed, in a way that innovates Public Accounting and the execution of the Public Budget, since it establishes spending limits for both the expenses of the year and the degree of indebtedness.

However, although there are budgetary norms and guidelines to be complied with by federated entities, there are still gaps that allow for the benefits and electoral manipulation, even though the political-budgetary cycles are currently conditioned, above all, to the LRF and Law 4,320 of 1964, which establishes norms rules of financial law for the elaboration and control of the budgets of the federative entities.

3 METHODOLOGY

The database for this study was built from the analysis of the availability of information from 853 municipalities in Minas Gerais. Those municipalities that did not have all the information regarding the variables used in the model were excluded, leaving therefore 500 municipalities with complete information that totaled 5000 observations over the period 2007 to 2016. Expenditure on education, health, and works and installations were used because they have a strong popular appeal, as pointed out by Sakurai (2009) and Nunes (2017).

In principle, the period of analysis of this article would be from 2007 to 2017, as this period would cover one year before the 2008 municipal elections and one year after the 2016 elections. However, the information regarding the GDP (Gross Domestic Product) of Minas Gerais municipalities for the year 2017 is not available, and it is necessary to exclude this year from the database. In the preparation of the database, the monetary values were updated from the General Price Index – Internal Availability (*Índice Geral de Preços – Disponibilidade Interna - IGP-DI*) of the Getúlio Vargas Foundation (*Fundação Getúlio Vargas - FGV*) based on July 2019. It should be noted that this index is commonly used in studies concerning political cycles, according to Fialho (1997), Salvato, Antunes, Araujo Jr and Shikida (2007), and Sakurai (2009).

In order to capture the effect of the electoral cycle on each of the aforementioned headings, a system with three equations was created based on the SUR (Seemingly unrelated regression) model developed by Zellner and Theil (1962), noting that procedures were performed for correction of endogeneity between variables. Vasconcelos *et al.* (2013), in an article on budget execution and the electoral cycle, list three important features provided by the SUR model: a) a system of equations involving different data from different individuals in a given period can be used; b) each equation corresponds to an individual not requiring the equations to have the same data sets, and; c) there is the hypothesis that the error term of at least one equation is correlated with the error terms of the other equations. Confirming this, although the parameters lose efficiency, the estimates remain consistent and not biased. The equations and description of the variables will be presented below.

3.1 Model equations

The econometric model is composed of three equations that combined quantitative and qualitative variables (dummies). The model basically uses the same variables in equations (1) to (3), differing only the dependent variables and their lagged versions.

$$\left\{ \begin{array}{l} \log Educ_{it} = \beta_1 + \beta_2 \log Educ_{it-1} + \beta_3 \log Educ_{it-2} + \beta_4 \log Rec_{it} + \beta_5 Ano_i + \beta_6 Regioes + \beta_7 \log PIB_{it} + \beta_8 Eleit + \beta_9 PósEleit + \varepsilon_{it} \quad (1) \\ \log Saude_{it} = \alpha_1 + \alpha_2 \log Saude_{it-1} + \alpha_3 \log Saude_{it-2} + \alpha_4 \log Rec_{it} + \alpha_5 Ano_i + \alpha_6 Regioes + \alpha_7 \log PIB_{it} + \alpha_8 Eleit + \alpha_9 PósEleit + \varepsilon_{it} \quad (2) \\ \log ObInst_{it} = \gamma_1 + \gamma_2 \log ObInst_{it-1} + \gamma_3 \log ObInst_{it-2} + \gamma_4 \log Rec_{it} + \gamma_5 Ano_i + \gamma_6 Regioes + \gamma_7 \log PIB_{it} + \gamma_8 Eleit + \gamma_9 PósEleit + \varepsilon_{it} \quad (3) \end{array} \right.$$

where: *t* refers to the period from 2007 to 2017; *i* refers to the municipalities of Minas Gerais belonging to the database; logEduc are the expenses implemented in education; LogSaude concerns the expenses implemented in health; logObInst comprises the expenses implemented in works and installations; Ano (Year) covers the period analyzed; Regioes (Regions) refers to the dummies that represent the mesoregions of the state of Minas Gerais; logPIB integrates

the Gross Domestic Product of Minas Gerais municipalities; LogRec refers to municipal budget revenues; Eleit refers to election years and; PósEleit refers to years after election years.

Quantitative variables are in per capita values, considering the estimated population of each municipality. In addition, these variables are logarithmized, since in this way the model found a better fit. The GDP and Revenue variables were included in the model, having as reference the study by Sakurai (2009). In turn, the inclusion of lagged interest variables and electoral dummies had as reference the work of Araújo (2010).

The values of the variables concerning municipal budgets were obtained through the National Treasury Secretariat (*Secretaria do Tesouro Nacional - STN*). The GDP values of the municipalities and their estimated populations each year were collected at the João Pinheiro Foundation. The division into mesoregions was used from the methodology of the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística - IBGE*) which highlights 12 mesoregions of Minas Gerais, and in this study the metropolitan region of Belo Horizonte was removed from the database to serve as a reference in the analysis of results. The mesoregions are: North (nor), Jequitinhonha (jeq), Vale do Mucuri (muc), Triângulo Mineiro/Alto Paranaíba (tra), Central (cen), Vale do Rio Doce (rdo), West (oes), South/Southwest (sso), Campo das Vertentes (cve), and Zona da Mata (zma).

The Eleit and PósEleit dummies are the variables of interest in the article. Eleit assumes a value of 1 in municipal election years and zero in other years. The variable PósEleit assumes a value of 1 in the years immediately following the years of municipal elections and zero in the remaining years. These variables will be analyzed with reference to the PréEleit dummy, which was assigned a value of 1 in the years immediately preceding the municipal elections and zero in other years.

4 RESULTS

4.1 Presentation of the results

In this section the main results of the study will be highlighted. Initially, Table 1 presents the descriptive statistics of the variables that made up the model, identified in 5000 observations. The values of the variables are in per capita proportion, not logarithmized, and corrected by the IGP-DI, based on July 2019.

Table 1
Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum
ObInst	177.62	208.57	0.04	5405.30
Saude	839.03	523.02	29.71	6325.05
Educ	940.13	3720.97	1.14	232909.80
PIB	19.45	18.81	4.57	236.82
Rec	3408.32	1550.48	55.54	30232.81

The description of the three variables referring to municipal expenditure reveals the regional disparities, which are so characteristic of the State of Minas Gerais. The values shown in the ObInst variable show a high difference in capital expenditure on works and installations, showing regional differences in such expenditure, given that the highest value was found in the municipality of Jeceaba (5,288 inhabitants) in 2012 in the Metropolitan mesoregion, and the lowest value was identified in the municipality of Pocrane in the mesoregion of Vale do Rio Doce. It should be noted that in 2018, Jeceaba represented the 14th largest GDP per capita in the country and the 3rd largest in the state of Minas Gerais (Brazilian Institute of Geography and Statistics [IBGE], 2020).

Regarding the variable Saude, the maximum value is found in 2007 in the municipality of Serra da Saudade in the Central mesoregion, and the minimum in the municipality of Espera Feliz in the Zona da Mata mesoregion. The mesoregions that have an average health expenditure below the state average are Vale do Rio Doce, Vale do Jequitinhonha, Vale do Mucuri, South/Southwest, and North.

Regarding the Educ variable, the minimum and maximum values are observed, respectively, in the Zona da Mata (Juiz de Fora, in 2012) and Metropolitana (Belo Vale, in 2012) mesoregions, emphasizing that the latter is involved with mining, i.e., it receives mining royalties. Such information contributes to the interpretation of discrepancies found in studies dealing with educational indices in the state of Minas Gerais, as shown by the results of the research by Costa, Ervilha, Viana and Gomes (2019). However, only the information regarding per capita expenditure on education does not allow inferring the quality of education, since the municipality identified as the maximum value in this heading did not show high efficiency in the use of educational resources (Rodrigues, 2015).

These results can be explained by the coefficients observed in the logPIB and logRec headings. Most mesoregions that have expenditure on works and installations, health, and education below the state average have produced wealth (GDP) and per capita budget availability (revenues) also below the average for the state of Minas Gerais. The differences in economic development in relation to the mesoregions of Minas Gerais are also evident in these results, as generally economically developed municipalities present themselves in these mesoregions with higher revenues and GDP.

The figures presented denote not only disparities related to municipal public budgets, but historical, geographic, socioeconomic, and many other aspects so well addressed by Costa, Ferreira, Braga and Abrantes (2012), which often affect the economic development of each municipality, and consequently, in its capacity to offer adequate public services to its population.

To find the effect of electoral cycles, a system of equations (SUR) developed by Zellner and Theil (1962) was estimated. It is noteworthy that in order to correct possible heteroscedasticity problems, the robust errors (vce robust) were applied in the estimation. Another point to be noted about the model is that most of the variables used refer to dummies, which removes problems with multicollinearity and autocorrelation. The results can be seen in Table 2.

4.2 Discussion of results

It is important to highlight initially that the public expenditures studied here have a strong temporal influence, in the sense that the expenditures of previous years condition the budget execution in the coming years, as verified in the lag of the variables of interest. All results of these variables were significant at the 1 % level of significance and with a positive sign, a fact that corroborates the literature, since legal determinations lead to temporal persistence in budget execution (Covre & De Mattos, 2016).

With regard to the Year variable, it is noted that there is a downward trend in spending, whether with education, health, or works and installations. This trend can be explained by the economic crisis that began in financial institutions in the United States in 2007, which impacted Brazilian municipal public finances, as evidenced by Santos (2018). In addition, according to Rossi and Mello (2017), the 2014 economic recession greatly influenced the budgets of federal entities, causing a strong reduction in public expenditure, especially investments. Another possible explanation is the attempt by municipalities to adapt the execution of their budgets to the legal requirements of the Fiscal Responsibility Law and

Constitutional Amendment No. 95/2016, which established a federal spending limit that indirectly can affect budget execution of the municipalities.

Table 2
Results from the estimations of equations 1, 2 and 3

Variable	Education	Health	Works and installations
logEduc (1 year lag)	0.1796 ^{***} (0.0225)	-	-
logEduc (2 year lag)	0.1490 ^{***} (0.0191)	-	-
logSaude (1 year lag)	-	0.5486 ^{***} (0.0713)	-
logSaude (2 year lag)	-	0.0244 ^{***} (0.0586)	-
logObInst (1 year lag)	-	-	0.2786 ^{***} (0.0176)
logObInst (2 year lag)	-	-	0.1323 ^{***} (0.0161)
Year	-0.1467 ^{***} (0.0060)	-0.0611 ^{***} (0.0054)	-0.1100 ^{***} (0.0076)
Nor	0.0457 ^{NS} (0.0314)	0.0280 ^{***} (0.0115)	-0.0217 ^{NS} (0.0643)
Jeq	0.0248 ^{NS} (0.0311)	0.0178 ^{NS} (0.0105)	-0.0640 ^{NS} (0.0699)
Muc	0.0835 ^{NS} (0.0407)	0.0118 ^{NS} (0.0158)	-0.2122 ^{**} (0.1159)
Tra	-0.0277 ^{NS} (0.0359)	0.0117 ^{NS} (0.0122)	-0.1929 ^{***} (0.0577)
Cen	0.0370 ^{NS} (0.0373)	0.0171 ^{NS} (0.0112)	-0.1705 ^{**} (0.0718)
Rdo	-0.0162 ^{NS} (0.0328)	0.0050 ^{NS} (0.0105)	0.0460 ^{NS} (0.0629)
Oes	-0.0220 ^{NS} (0.0312)	0.0058 ^{NS} (0.0099)	-0.1312 ^{**} (0.0645)
Sso	0.0202 ^{NS} (0.0272)	0.0141 ^{**} (0.0082)	-0.1530 ^{***} (0.0479)
Cve	-0.0618 ^{NS} (0.0396)	0.0290 ^{**} (0.0109)	-0.1939 ^{***} (0.0838)
Zma	-0.0098 ^{NS} (0.0318)	0.0195 ^{**} (0.0111)	-0.1359 ^{***} (0.0543)
logPIB	-0.1003 ^{***} (0.0209)	-0.0181 ^{***} (0.0057)	0.0551 [*] (0.0291)
logRec	0.6049 ^{***} (0.0300)	0.1764 ^{***} (0.0206)	0.0641 ^{***} (0.0482)
Eleit	0.0788 ^{***} (0.0296)	0.0746 ^{***} (0.0082)	0.2170 ^{***} (0.0319)
PosEleit	-0.0012 ^{NS} (0.0096)	-0.0055 ^{NS} (0.0054)	-0.9604 ^{***} (0.0408)
Constant	294.9875 ^{***} (12.1653)	122.7437 ^{***} (10.8977)	219.0101 ^{***} (15.3605)

Where: *** significant at 1 %; ** significant at 5 %; * significant at 10 %; NS, not significant; Standard deviation within parentheses.

Regarding the binaries that capture the effect of Minas Gerais regionalities on the expenditures studied (regional dummies), it is observed that there is a clear contrast in the log

of per capita expenditures on education in the State, since six mesoregions presented positive coefficients, leading to the understanding that such per capita expenditures in these mesoregions are statistically higher than in the metropolitan mesoregion. In contrast, five mesoregions had a negative sign in their coefficients, which allows us to infer that in these localities per capita spending on education is statistically lower than in the reference mesoregion.

In contrast, it should be noted that the average per capita spending on education in the period studied is higher in the metropolitan mesoregion than in the other mesoregions, since the former is made up of economically more robust municipalities. This panorama is very explicit in the results of the binaries referring to the log of per capita expenses with works and installations, which show the investment capacity of metropolitan municipalities. The negative signs of all the coefficients of the mesoregions point to this reality, demonstrating that they are statistically smaller than the reference mesoregion. The average per capita expenditures on works and installations in the period observed also confirm this scenario, in which municipalities in the metropolitan mesoregion spend more than all other mesoregions.

Regarding the results of the mesoregions in reference to the log of per capita expenditures on health, although some results are not significant, it is noteworthy that all coefficients have a positive sign, leading to the understanding that such expenditures are statistically higher than in the mesoregion metropolitan area. However, it is important to note that the average per capita of this expenditure in the metropolitan mesoregion is higher than in all other mesoregions, which explains the economic robustness of the metropolitan municipalities.

Regarding expenses with the education function, in the regional analysis based on the results of the Regions variable, it is possible to identify that the municipalities of all the analyzed mesoregions have economic, geographic, cultural, historical, etc. characteristics, statistically similar to the characteristics of the mesoregion metropolitan area of reference. This perspective originates in the non-significant results presented in all regional dummies.

That said, it is clear that in the present study spending on education is not as disparate as the investment capacity of each municipality would suggest, even though it is in mesoregions known to have low economic development, such as Vale do Jequitinhonha, Vale do Mucuri, and the North of Minas. This finding partly corroborates the research carried out by Caetano, Ávila and De Tavares (2017), in which no direct relationship was found between the degree of financial autonomy and investments in education in the municipalities of Minas Gerais. In this way, it is possible for small municipalities and even those with low financial autonomy to invest more than municipalities that are more financially autonomous.

This aspect becomes important, considering that education can be used as a tool to combat inter-regional socioeconomic disparities in the State of Minas Gerais by training and preparing people for the labor market and for actions aimed at identifying and solving the problems caused by social inequality. Regarding this, Pereira, Nakabashi and Sachside (2011) attest that the increase in the levels of education drives economic growth, based on the increase in productivity and technological innovation.

Regarding health expenses, even in the regional analysis, it is identified that part of the Minas Gerais mesoregions, namely, Jequitinhonha, Mucuri, Triângulo Mineiro/Alto Paranaíba, Central, Vale do Rio Doce, and Oeste, presented non-significant statistical results. This scenario makes it possible to state that regional characteristics, in these cases, are not preponderant to differentiate the way in which public spending takes place under the aforementioned heading. This certain similarity between mesoregions can be based on the constitutional obligation of municipalities to invest at least 15 % of their tax revenue in health services.

However, it is noteworthy that there are regional disparities when it comes to the territory of Minas Gerais, given that the other four mesoregions presented significant statistical results. This disparity was also noticed by Fonseca and Ferreira (2009) when they investigated the level of efficiency of public spending on health in the microregions of Minas Gerais.

With regard to expenditure on works and installations, it appears that most mesoregions, except for Norte, Jequitinhonha, and Vale do Rio Doce, have significant econometric results. In this sense, it is admissible to infer that there are characteristics (historical, cultural, political/partisan alignment, budget, etc.) in these mesoregions that differentiate them in terms of expenditure procedures on works and installations. This denotes statistical differences in the use of public resources in works and installations that can be explained by the fact that such resources are less rigid in their use and endowed with discretion on the part of the public agent (Orair *et al.*, 2014).

Spending on works and installations can also differ between mesoregions due to the needs of each location and the economic development policy adopted by the municipal government, since investments in infrastructure usually figure as a condition for the resumption or continuation of the sustained economic growth (Rigolon & Piccinini, 1997).

Given the logPIB variable, which represents the log of the Gross Domestic Product per capita of each municipality, it was found to be significant at the 1 % level of significance in the education and health equations. Thus, it is interpreted that a 10 % increase in GDP would represent a decrease of approximately 1 % in spending on education and 0.1 % in spending on health. The negative sign in this variable was not the expected, given the literature in the area, such as the studies by Neto and Rossi (2016) and Puchale, Pereira and Veloso (2018). A possible explanation for this finding is that the increase in municipal GDP may have non-immediate results in the economy and budget of the municipality, as indicated by Lautenschlage (2017), since such headings are more restrictive in relation to the heading of Works and Installations.

In turn, the statistical result of the logPIB variable in relation to the Works and Installations heading had the expected sign, and the 10 % increase in GDP would result in a 0.5 % increase in expenditures in that heading, with a 10 % level of significance. There is therefore, a return to society in the form of works when the municipality perceives growth in its economy.

Apparently there is a two-tailed relationship between the Works and Installations and GDP per capita variables, when this represents the level of economic development of the municipalities. For Silva and Santolin (2012), as previously identified, the increase in municipal investments generates economic growth. The opposite is also identified in the proposed research, indicating that the increase in expenditure on works and investments favors the economic growth of municipalities in the long term, as explained by Wakim, Magalhães, Gomes and Silva (2015), emerging as an alternative to municipalities with low rates of economic development in the state of Minas Gerais.

When checking the results in relation to the Revenue variable, it is identified that it was significant in both equations, all at the 1 % level of significance and with a sign as expected, i.e., positive. Thus, analyzing the education heading, the results show that the 10 % increase in municipal per capita revenue causes a 6 % increase in the per capita expenditure on education. In turn, the 10 % increase in per capita income generates an increase of 1.7 % and 0.6 % in the headings of health and works and installations, respectively. Such results are close to those found by Nunes (2017) when analyzing the influence of political cycles on public spending in municipalities in Rio Grande do Sul and Silva, Faroni and Barbiéri (2016) in an investigation on political-budgetary cycles in Northern Brazil.

Such results can be explained by the origin of municipal revenues, which for the most part, are linked to some legal obligation of the states and/or federal government, which direct financial resources to meet specific demands, especially with regard to the functions of health and education. In municipalities, this obligation to apply resources in legally pre-defined demands reduces the possibility of using the public machine in favor of public agents endowed with political-electoral opportunism. As a result of this, there is a greater possibility that the population will be met with basic needs such as the provision of basic sanitation services, urban mobility works, infrastructure for educational and health services, among others.

Regarding the dummies of electoral cycles, with the pre-electoral period as a reference, Table 2 shows that there are significant differences for the electoral period, as the three headings were statistically significant at the level of 1 %. Therefore, it is possible to say that there is an increase in these expenses (Health, Education and Works and Investments) from the pre-election year to the electoral.

However, comparing the post-election period with the pre-election period, it was found that for the headings of Education and Health, there was no statistical significance for the coefficients. It can be inferred that there is no difference in the level of expenses for these periods (before and after the electoral cycle). The heading Works and Installations, in turn, presented statistical significance at the level of 1 %. With this, it is possible to deduce that considering the negative sign of the variable coefficient, there is a decrease in this expense compared to the pre-electoral period.

In relation to works and installations, the result confirms the study carried out by Gonçalves, Funchal and Bezerra Filho (2017) when they analyzed the influence of political cycles on public investments in infrastructure. These results indicate that the delay in serving the population is often related to the political perspectives of the public agent of the executive branch to the detriment of the municipality's demands in the areas studied here. This situation favors the explanation of the delay in the socioeconomic development of many municipalities that, guided by the opportunism of the public agent, choose to apply financial resources at the end of their political term in order to influence the opinion and votes of voters in their favor. In contrast, it cannot be ruled out that processes in the public sector are often time-consuming and can also justify delays in the implementation of policies.

It is also worth noting, especially with regard to expenses with works and installations, that the results found in this study are in line with the literature of electoral political cycles (Dias, Nossa, & Monte-Mor, 2018; Lautenschlage, 2018; Videira & Mattos, 2011). Even though expenditure on education has increased more than expenditure on works and installations, it is clear that the increase with the second heading is a trend among the municipalities studied, taking into account its low standard deviation (Table 1).

The significant increase in the works and installations heading in election years compared to health and education expenditures in the same period highlights that the electoral calendar is a determinant of municipal expenditures in relation to the surveyed headings. Thus, the phenomenon of political-electoral cycles contributes to the variation in the quantity of resources implemented by the municipalities, without setting aside other decisive factors, such as the lack of planning or its non-compliance, the scarcity of resources, or the political opportunism of administrators in an attempt to demonstrate their achievements from results visibly more noticeable to the population.

The PostEleit dummy therefore, obtained non-significant results for spending on education and health, showing that there were no electoral influences in relation to these variables. With regard to the works and installations heading, its statistical result reached a significance level of 1 %, characterized by an adjustment of accounts from a decrease in this

expense in post-electoral years. These results corroborate those found by Gionedis and Guimarães (2016).

The econometric results of the electoral dummies emphasize the existence of a strong relationship between public spending in municipalities in Minas Gerais and political-electoral cycles in order to increase public spending in the election year, in this case on education, health, and works and installations, and in the year immediately afterwards, adjust the accounts, offsetting the increase made in the election year. As noted in the theoretical framework, the explanation for this fact may be the attempt to influence the population's perception of the municipal government in order to be re-elected or elect a candidate supported by the current government. These results show evidence of political opportunism found in other studies (Nakaguma & Bender, 2010; Queiroz & Silva, 2011; Salvato, Antunes, Araujo Jr., & Shikida, 2008) in the municipalities studied.

5 FINAL CONSIDERATIONS

Using panel data from the SUR (Seemingly Unrelated Regression) model, this article aimed to test the existence of political-budgetary cycles in municipalities in Minas Gerais in the period 2007-2016. For this purpose a system of three equations was built, each representing municipal public expenditure on education, health, and works and installations.

The economic literature addresses the issue related to political cycles in public administration in order to observe whether electoral periods have an influence on public spending. From the studies, it was possible to build theories such as the opportunist model of Nordhaus (1975).

It is important to highlight that the heading of expenditure on works and installations, which theoretically has more discretion in its use, had econometric results more in line with reality, pointing out statistical differences between the mesoregions of Minas Gerais. In contrast, the headings of expenditures on education and health obtained statistical results that showed some inelasticity in the use of such resources. This fact can be justified by the legal requirements in the financial resources of the aforementioned functions.

Regarding the electoral period and its variables established in the model, it is observed that for expenditure on health, education, and works and installations, there is an increase in expenditure when compared to expenditure in the pre-election years. In the post-electoral years, there is a contraction in spending on works and installations, suggesting a recomposition considering the increase in spending in election years. These findings corroborate the theory of Nordhaus (1975) and evidence the existence of political cycles in the municipalities of Minas Gerais. Even though the results of this research do not make it possible to affirm the existence of political opportunism in the use of public resources, it is important to highlight that political cycles contribute significantly to public spending, without addressing the reality of social inequalities found between the regions of Minas Gerais being dealt with satisfactorily, since regional disparities were still identified in this research.

It is possible to affirm that the proposed study reached the established objective and it is suggested to test in future investigations the influence of political ideology in the application of public resources and the alignment of municipal governments with state and federal governments.

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Ciclos políticos eleitorais: há influência das eleições municipais sobre a execução orçamentária dos municípios mineiros?

RESUMO

Objetivo: Este artigo pretende avaliar se os ciclos políticos geram impactos na alocação de recursos públicos em educação, saúde e investimentos de infraestrutura (obras e instalações) nos municípios do Estado de Minas Gerais.

Método: Nesse contexto, a amostra foi composta por 500 municípios no período de 2007 a 2016, sendo excluídos os municípios que não apresentaram todos os dados no período estudado. Foi utilizado o modelo *Seemingly Unrelated Regression (SUR)* em painel proposto por Zellner e Theil (1962), elaborando-se um sistema de equações responsável por identificar a existência de ciclos eleitorais nas despesas supracitadas, totalizando três equações.

Originalidade/Relevância: Tendo em vista o locus do estudo, admite-se que os resultados podem colaborar no entendimento da dinâmica orçamentária municipal, considerando a influência de outras variáveis, como as binárias que se referem às mesorregiões e suas características.

Resultados: Corroborando a literatura atinente aos ciclos políticos-orçamentários, os resultados desta pesquisa apontam para a existência de influência do ciclo eleitoral na aplicação de recursos públicos com aumento de gastos em anos eleitorais e retração em anos pós-eleitorais nos municípios, fato bastante evidenciado nas despesas com obras e instalações, as mais visíveis para a população.

Contribuições teóricas/metodológicas: Desta forma, o artigo favorece uma melhor compreensão dos determinantes da utilização dos recursos públicos nos municípios mineiros.

Palavras-chave: Orçamento Público; Ciclos orçamentário-eleitorais; Política Fiscal; Eleições Municipais.

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Recebido: Abril 16, 2021

Revisado: Junho 24, 2021

Aceito: Agosto 03, 2021

Publicado: Agosto 31, 2021

