

Economics

Political turnover and public health provision in Brazilian municipalities

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1 INTRODUCTION

In Brazil, public health service follows a decentralized organization. Although the federal government still accounts for most of the sector's financing, there is an increasing participation by the other federal entities. Data from the Ministry of Health for 2017 indicate that 11 of the 27 states surpass the Union in public health accounts. In fact, today, states and municipalities finance about 55% of Health Unic System (Sistema Único de Saúde, SUS). Thus, governors and, mainly, mayors — all elected by the population — are important agents in the administration of resources destined for public health. In joint actions with health managers, they must ensure that national and state policies are met and, above all, that the needs of their constituency's actions and services are addressed.

Lee, Moretti and Butler (2004) point out that competition for votes causes politicians to adopt the middle ground, worrying about the interest of the electorate but moderating and avoiding extreme policies. Within this theme, the incumbent's advantage becomes a relevant object of study¹. This advantage, according to Groseclose (2001), can explain the competition among the candidates, electoral cycles and the candidates' positions. Starting from Erikson (1971), much of the empirical literature highlights the intrinsic advantage of incumbent parties and candidates, derived from the possession of political office during election campaigns.

This relationship between political turnover and public service provision is an interesting object of study. As highlighted by McCabe et al. (2008), the change of title in the head of the municipal executive power can have significant implications, since each political agent has different preferences, skills and experiences. According to the authors, turnover can affect the implementation and provision of public services, in addition to hindering long-term commitments and obligations, among other factors.

Brazilian municipalities are autonomous and decentralized, responsible for public provision of services considered basic, such as education, health, transport and sanitation (including the management of public companies operating in these areas). This scenario favors the study of the relationship between political turnover and public service provision in the country's municipalities.

¹ For example: Erikson (1971), Alford and Hibbing (1981), Cox and Katz (1996), Ansolabehere, Snyder and Stewart (2000), Groseclose (2001), Butler (2009) and Freier (2015).

More specifically, we will focus on the issue of public health. The quality of services offered by the municipalities directly affects the welfare of the population. And it is the responsibility of the mayors and their respective managers to decide what the priorities will be and how the public health budget will be applied during their management.

Thus, we question how political turnover affects public health provision in Brazilian municipalities. The purpose of this essay is to test the relationship between political turnover and health indicators in Brazilian municipalities. To do so, we will use regression discontinuity (sharp case) applied to close elections. Our sample comprises a pool of data on municipal elections that took place in 2008 and 2012 and health indicators verified for the periods after the elections. Our result variables pertain to the periods of one year (2009 and 2013) and three years (2011 and 2015) after the elections, which will be analyzed separately.

The strategy used makes it possible to compare municipalities that underwent party changes in the leadership of the municipal executive branch against those in which a party remained in power, whether by re-election of the mayor or the election of a successor to the incumbent. It is logical to argue that political parties act differently, since they represent different constituencies. Thus, if the electorate considers that the incumbent party does not do a good job, it will vote for an opponent that represents better prospects for the municipality. Thus, according to Alesina (1988), given the responsibility assumed with the electorate, in addition to winning the elections, the parties can care about the quality of the policies resulting from an election. Furthermore, in a scenario where the election was defined by a small margin of difference, it is intuitive to think that the electorate will be even more attentive to the performance of the elected candidate

The most recent literature on this subject has made use of experimental or quasi-experimental techniques to deal with possible methodological problems. The work of Ansolabehere, Snyder and Stewart (2000), for example, studies U.S. elections and finds evidence that in an electoral dispute, competing candidates tend to take positions that are more extreme than those of incumbents. Lee's work (2008), first within this theme to make regression discontinuity, points to evidence that the incumbent political party has approximately a 40% greater chance of maintaining a seat in the U.S. House of Representatives compared with challengers.

Still within the political economy, the concept of close elections is another issue that has been extensively addressed in the recent period. The initial approach with Lee's work (2008) and the author's basic idea is that districts where Republicans and Democrats have

won close victories are very similar to one another, except that one of the two won the previous election. In other words, given that the final result of the election is defined by an exogenous and random component, the intuition presented by the author is that in close elections, candidates who lose or win the contest can be compared on average.

Since then, studies have addressed the issue of close elections on various topics². Vogl (2014), for example, examines race in U.S. elections, using a sample of mayoral election data from 1965 to 2010. The results point to evidence that in close elections in cities in the south of the country, victories by black candidates are more likely than losses. In addition, black candidates are more likely to be re-elected. The work of Brollo and Troiano (2016) analyzes close municipal elections that took place in 2000 and 2004 in Brazil. Among other results, the authors find evidence that in power, women are less prone to corruption than men and that women are less likely to be re-elected.

Finally, it is interesting to highlight the work of Akhtari, Moreira and Trucco (2017). The authors study how political turnover in Brazilian municipalities affects public provision of education. For that, they use regression discontinuity applied in close elections. The results indicate that municipalities with new parties in power score lower on school tests, suggesting that political turnover affects the quality of public services offered by this sector.

. First, our results indicate that in the period immediately after the elections, political turnover benefits health indicators related to administrative issues (number of SUS workers, visits made by the Family Health Program (Programa Saúde da Família, PSF) coverage of primary care and cervical exams performed). In other words, such indicators are better in municipalities where the incumbent party lost the election and another party took power. We tested the persistence of these effects, and in this case, only the variable referring to the number of SUS workers remained significant, indicating that the effect of the new management on it is not lost during the mandate of the new incumbent party. To test the robustness of our evidence, three other estimates derived from our main model were made and our evidence corroborated. However, three years after the elections, the coverage of primary care was significant, indicating that the improvement in this variable may not be transient. Finally, the study of possible channels of transmission of these beneficial effects showed us that on average, municipalities that underwent Political turnover had more qualified municipal SUS managers (appointed by mayors). In addition, in those

² For example: Cellini, Ferreira and Rothstein (2010), Trounstein (2011), Brollo and Nannicini (2012), Albouy (2013), Vogl (2014), Eggers et al. (2015), Brollo and Troiano (2016), Akhtari, Moreira and Trucco (2017).

municipalities where there was a change of party in power, more basic health units (primary attention) were created during the new administration.

This essay is structured as follows, in addition to the Introduction: The second section presents a brief contextualization about the municipal political situation and public health management in the country. In the third section, the materials and methods used in our empirical exercise are presented; the fourth section presents the results found; and the fifth and last section presents the final considerations that we can make from our efforts.

2 BRAZILIAN CONTEXTS

2.1 Municipal political scenery

Brazil is a federative democratic republic, characterized by having a multiparty system. Its territory is divided into 26 states and a federal district. The 5,570 municipalities, belonging to the states, form the local layer of public administration in the country. This local layer is the closest to the citizens, being made up of mayors and councilors. The mayors, heads of the municipal executive branch, are elected every four years in a direct democratic manner. In these elections, the councilors of each administration are also elected, forming the legislative body of the municipality.

In municipalities with a population below 200,000 inhabitants, mayors are elected according to the majority rule (absolute majority of votes), while municipalities with a population above this threshold follow the rule of plurality of votes, and victory may occur in the second round of an election if no candidate achieves victory in the first round. Mayors are elected to four-year terms, and since 1998, their terms may extend for four more years through re-election³.

2.2 Municipal public health provision and management

Created from the 1988 Constitution, the SUS is based on three basic principles: universality, integrality and equity. It was conceived following a hierarchical and

³ It is important to note that a mayor's term of office can last up to eight years (in the case of re-election), but there are no limitations on how long a party can remain in power (in the case of electing several mayors in a row).

decentralized organization, in which the primary health care is destined to the municipalities and the most complex procedures are responsibilities of the states and the federal government. The 1988 Constitution therefore established organizational guidelines for the SUS, which have implications for decisions and implementations of public health policies. Among these guidelines, one aspect is extremely important for the functioning of the public health system: the definition of the role and attributions of SUS managers.

As the Ministry of Health points out (2019), it is up to the three spheres of government to jointly define mechanisms for the evaluation and control of health services, as well as to manage and apply budgetary and financial resources, to develop short and medium-term policies and to promote their articulation, among other functions.

In this sense, Machado, Lima and Baptista (2011) emphasize that in the three spheres of government, decisions about health policies involve a large number of services and people. At the municipal level, health secretariats (or equivalent bodies) are administered by SUS managers — a term used to refer to the minister and state and municipal health secretaries. In other words, the SUS manager is the health authority in each sphere of government. The position has a very important political meaning, since each manager is appointed by the head of the executive branch.

In addition, according to Machado, Lima and Baptista (2011), the main duties of the SUS manager can be divided into four categories: formulation of public policies; financing; regulation, coordination, control and evaluation; and direct execution of services. At the municipal level, it is important to note that it is up to the SUS manager to identify the problems and define the municipality's priorities and carry out the planning of necessary actions for public health. It is also the responsibility of the municipal SUS manager to ensure the application of resources and make investments, and to articulate with other municipalities, guarantee the direct provision of assistance services, manage the basic health units and, consequently, evaluate the results of adopted municipal policies.

3 MATERIALS AND METHODS

3.1 Election data

In this work we used data from municipal elections that took place in 2004⁴, 2008 and 2012, obtained through the Superior Electoral Court (Tribunal Superior Eleitoral, TSE). With these, it was possible to calculate the incumbent's voting margin for the years 2008 and 2012, defined for each year as the share of votes received by the incumbent party minus the share of votes received by its strongest opponent. Like Lee (2008), we consider only the cases in which the incumbent was the most voted or second, since candidates outside these positions generally obtain a small portion of the votes.

From this, it was possible to build our running variable of the regression discontinuity model — the incumbent's narrow margin of votes. Here, we consider an election with a narrow margin one in which the incumbent almost lost or almost won the election with a margin of less than 5% or, in absolute terms, 10%. The idea is that in competitive elections, the result of winner or loser is random, as the candidates are similar.

3.2 Municipal health indicators

The data referring to municipal health indicators were obtained through the SUS Department of Informatics (DATASUS), for the years after the 2008 and 2012 municipal elections. More specifically, we used data from the indicators for the years 2009 and 2011 and for 2013 and 2015 (one and three years after the election of 2008 and 2012). Table 1 below shows the indicators that will be tested in this work, as well as their respective definitions:

Table 1 - Definition of the health indicators used.

Health indicator	Definition
Cytopathological examinations of the cervix	Number of cervical cytopathological exams performed on women aged 25 to 64 years, by place of residence and year of care.
Immunization coverage rate	Number of doses applied on children under one year old, divided by the target population and multiplied by one hundred, by place of residence and year of application.
Child mortality rate	Number of deaths of residents under one year of age regarding to the total number of live births to resident mothers, in the year considered.
SUS workers	Workers who attend SUS, in the public sphere, with protected bonds, in a specific municipality, in the year considered. Ratio per thousand inhabitants.

⁴ The 2004 data was used to identify incumbents who attempted re-election in 2008.

Visits made by Family Health Program	Home visits made by community health agents, referring to the Family Health Program, in a specific location, in each municipality. Ratio per thousand inhabitants.
Primary Health Care Coverage Rate	Population coverage rate of family health teams and Primary Care teams used for the monitoring access to Primary Care services, in a specific municipality, in the year considered.

Source: DATASUS.

3.3 Municipal characteristics

Finally, the data used to form our covariate vector were obtained through the National Treasury Secretariat. We decided to use only budgetary variables — tax revenue per capita and expenditure per capita on health — since these are directly linked to the execution and provision of public services. Furthermore, as Ferraz and Finan (2011) point out, the use of such variables controls possible differences among the municipalities' budgets.

3.4 The regression discontinuity design

The work of Thistlethwaite and Campbell (1960) introduced the idea of the method that we now know as regression discontinuous design (RDD). As Imbens and Lemieux (2008) point out, the basic idea behind the RDD is that whether an individual is treated or not is determined totally, or partly, by the value of a covariate, which is on both sides of a fixed limit. The covariate may be associated with potential results, but this association is supposed to be mild. Thus, any discontinuity of the result due to the covariate is interpreted as evidence of a causal effect of the treatment.

Lee (2008) points out that for an RDD in the sharp case, it is necessary to assume two hypotheses. The first hypothesis concerns continuity: The conditional regression functions of the results of treatment and control in X_i must be continuous. Formally:

$$E[Y_i(0) | X_i = x] \text{ and } E[Y_i(1) | X_i = x] \text{ are continuous at } x.$$

where $Y_i(0)$ and $Y_i(1)$ are the potential results and X is the so-called running variable, a covariate that indicates whether the individual will receive treatment or not.

Imbens and Lemieux (2008) point out that this condition assumes that the conditional distribution function is smooth in the covariate and can be called the conditional distribution function. Let F_y be the conditional distribution function of $Y_{(t)}$, given X , where T indicates the treatment. The general version of the hypothesis therefore becomes

$F_{y(0)|X}(Y|X)$ and $F_{y(1)|X}(Y|X)$ are continuous at x for all y .

The continuity hypothesis makes it clear, according to Lee (2008), that the credibility of impact estimates via RDD depends on whether the average result of individuals just below the cutoff point identifies the true counterfactual for those individuals who are just above the discontinuity. In other words, it is the continuity hypothesis that guarantees that we are identifying the causal effect of a treatment.

The second important hypothesis to be assumed is that of local ignorability. If around the point $X_i=c$ the condition of being treated or has not been defined at random, we have local ignorability. Formally:

$$Y_i(0), Y_i(1) \perp T_i | X_i = c.$$

According to Imbens and Lemieux (2008), this assumption is trivial because, depending on the covariables, there is no change in treatment. In other words, an individual cannot manipulate a covariate in order to be treated or not.

Under the two hypotheses presented above, the only explanation for the discontinuity in Y_i in c is that an individual has received treatment, so that we can interpret the jump of T_i at point c as the causal effect of the treatment. Thus, according to Hahn, Todd and Klaauw (2001) and Angrist and Pischke (2009), we have $T^+=1$ and $T^-=0$, and the average local treatment effect can be expressed by:

$$LATE_{(c)} = Y^+ - Y^-.$$

That is, the causal effect of the treatment is given by the difference in results between individuals who are located above the cutoff point and below this point.

3.5 Empirical strategy

We want to examine whether the fact that a municipality has experienced party turnover has any effect on the health indicators of these municipalities. Following on the work of Akhtari, Moreira and Trucco (2017), we will make a comparison between municipalities in which the incumbent party almost lost the election — and, therefore, remained in power — and municipalities in which the incumbent party was almost re-elected — and, in this way, there was party rotation in the municipal leadership. For that, we will make use of a sharp RDD.

To work with the concept of “almost lost” or “almost re-elected,” we will use a variable referring to the incumbent’s narrow margin of votes. The incumbent’s voting margin refers to the portion of votes that the incumbent party received in a given election, considering the total useful votes received in its respective municipality. By restricting this margin to a limit of $[-5\%; 5\%]$ we have what we call a narrow margin⁵.

Furthermore, it is important to highlight that as Lee’s (2008) study, we will work only with municipalities where the incumbent party finished first or second in the election, since the share of votes received by a third or other places tends not to be significant.

Following on Imbens and Lemieux (2008), Brollo and Troiano (2016) and Akhtari, Moreira and Trucco (2017), we will work with a linear regression specification, which is restricted to municipalities that are in the range of vote margins specified.

Thus, our specification can be expressed as follows:

$$Y_{m,t+1} = \alpha - \beta * IncumbentMargin_{m,t} - \gamma * IncumbentMargin_{m,t} < 0 - \rho * IncumbentMargin_{m,t} * IncumbentMargin_{m,t} < 0 + \epsilon_{m,t}$$

where $Y_{m,t+1}$ are the outcome variables (health indicators) of municipality m , measured one year after the elections (we are working with a pool of data from the 2008 and 2012 elections (period t), so that the period $t+1$ corresponds to the data pool for the years 2009 and 2013). The result variable $Y_{m,t+1}$, in this case, represents the local average effects (LATE) at the cutoff point $c=0$. Our running variable is the incumbent’s margin of votes whereas our treatment variable is the incumbent’s margin of votes less than 0, which indicates that the incumbent lost his attempt at re-election and, therefore, the municipality underwent Political turnover. In addition, standard errors are grouped at the municipal level. In order to verify whether possible effects of political turnover on municipal indicators are transient or permanent, we will estimate the same model above but consider the three-year period after the elections. In this case, our result variables will be given by $Y_{m,t+3}$ (corresponding to the data pool for the years 2011 and 2015).

The intuition of our empirical strategy is that municipalities in which the incumbent party lost the election by a narrow margin of votes form a good counterfactual for municipalities in which the incumbent party remained in power (won the election with an advantage of at most 5%). Therefore, according to Lee (2008) and Brollo and Troiano

⁵ The work of Lee (2008), Butler (2009), Trounstein (2011) and Brollo and Nannicini (2012) study tight elections and their effects on the economy. To this end, the authors have also used this narrow margin of votes with which we will work.

(2016), the assumption stems from the fact that in close races, the result is defined by random factors, so that the incumbent's probabilities of being re-elected or losing the election are the same.

Thus, through our empirical efforts, it will be possible to discover whether Political turnover (which occurs when the incumbent party loses the election and another party takes over the municipal leadership) has an effect on municipal health indicators and whether this effect is beneficial or deteriorates public health management in the municipalities.

4 RESULTS

4.1 Descriptive analysis of the data

In the years 2008 to 2012, Brazil had 5,565 municipalities in its territory. Of these, we excluded the municipalities in which there was a possibility of a second round of elections (that is, with a population of 200,000 or more) or went through supplementary elections, the municipalities went through supplementary elections, or both. Thereafter, for each year, we restricted our sample to the municipalities in which the incumbent party was trying to remain in power and finished first or second in its respective election.

As a result, our sample was reduced to 2,820 municipalities for 2008 and 2,675 for 2012, totaling 5,495 municipalities in the total of our sample. The left part of Figure 1 below presents the histogram of the incumbent's vote margin constructed from the steps mentioned above:

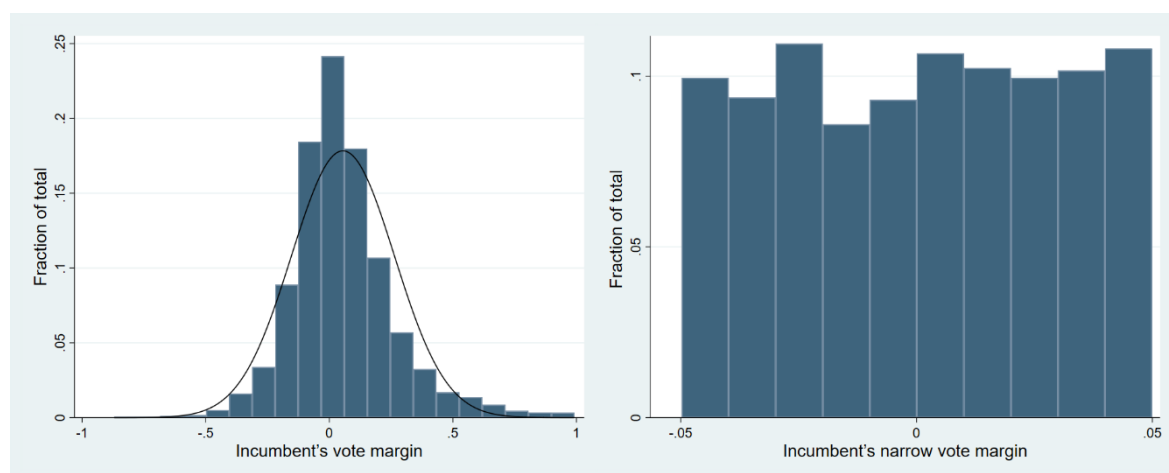


Figure 1 – Incumbent's vote margin and incumbent's narrow vote margin - Histogram - 2008 and 2012.
Source: TSE, data worked by the research.

Municipalities that are left to zero in the histogram are those in which the incumbent party lost the election (in 2008 or 2012) and there was Political turnover. The right side of the histogram represents the municipalities in which the incumbent party remained in power. Figure 1 shows that the distribution of the incumbent's voting margin seems normally distributed close to zero, indicating symmetry between the two sides of the distribution.

When we consider only the incumbent's narrow vote margin, in which the party won or lost with a margin of no more than 5%, our sample is reduced to 686 municipalities in 2008 and 711 municipalities in 2012, totaling 1,397 municipalities. The right part of Figure 1 shows the histogram of this sample section.

Continuing, Table 2 presents descriptive statistics of the two groups of municipalities with which we deal:

Table 2 - Descriptive statistics for municipalities - 2010 - Averages.

	Political turnover	No political turnover
Incumbent's vote margin	-0.0252	0.0251
Electorate (number)	13,239	12,323
Per capita income	R\$ 510.36	R\$ 509.89
Urban population	64%	62%
Illiteracy rate - 18 years and over	17%	16%
Activity rate - 18 years or older	64%	64%
Dependency ratio	0.50	0.51
Aging rate	8.74	8.79
Gini Index	0.49	0.49
N	672	725

Source: IPEADATA.

Table 2 shows that within our sample, the municipalities that suffered Political turnover and those that kept the parties in power were quite similar to each other.

Finally, we performed the test by Cattaneo, Jansson and Ma (2018) for our discontinuity, in order to check if there is manipulation in our running variable. The results are shown in Table 3 below:

Table 3 - Test of manipulation around discontinuity - Incumbent's narrow vote margin - 2008 and 2012.

Running variable: narrow_margin		
Method	T	P> T
Conventional	0.7565	0.4493
Robust	0.5374	0.5910

Source: Data worked by the research.

The results show that there is no evidence of manipulation in our variable, since the values found for the t-statistic lead us not to reject the null hypothesis of non-manipulation. Figure 4, in the Appendix, shows this result graphically⁶. From that result, we proceed to our main objective.

4.2 Political turnover and health outcomes

Next, we present graphically the results of the regression discontinuity estimations carried out in order to verify how political turnover affects the provision of public health in the municipalities. Therefore, we estimated Equation 1 using the incumbent's narrow vote margin as the model's running variable. The graphs that compose the figures presented below were generated using the uniform selection method of bins. The results can also be seen in Tables 9 and 10, both in the Appendix⁷.

In each figure presented from this point on, the right side (incumbent's narrow vote margin < 0) refers to the municipalities in which the incumbent was almost re-elected — and there was political turnover — while the left side represents the municipalities in which the party almost lost but remained in power.

First, Figure 2 presents the results for SUS workers, visits from the PSF and coverage of primary care for the period immediately after the elections ($t+1$) and, in a measure of the persistence of the effects, for the period of three years after the elections ($t+3$). When we analyzed one year after the elections (left column), the three variables were found to be significant and minor in municipalities where the incumbent party almost lost and, thus, there was no Political turnover. In other words, the change of party in municipal power has a positive effect on such variables. Thus, when compared with municipalities where the incumbent remained in power, municipalities with a new ruling party had more SUS workers, more PSF visits are made and the coverage of primary care is greater one year after the elections.

⁶ In the Appendix, we also present the statistics of the covariates used in our study.

⁷ We carry out the same estimates for the periods of two and four years after the elections, in addition to the average of the mayors' terms. Such results can be seen in Tables 11, 12 and 13, in the Appendix.

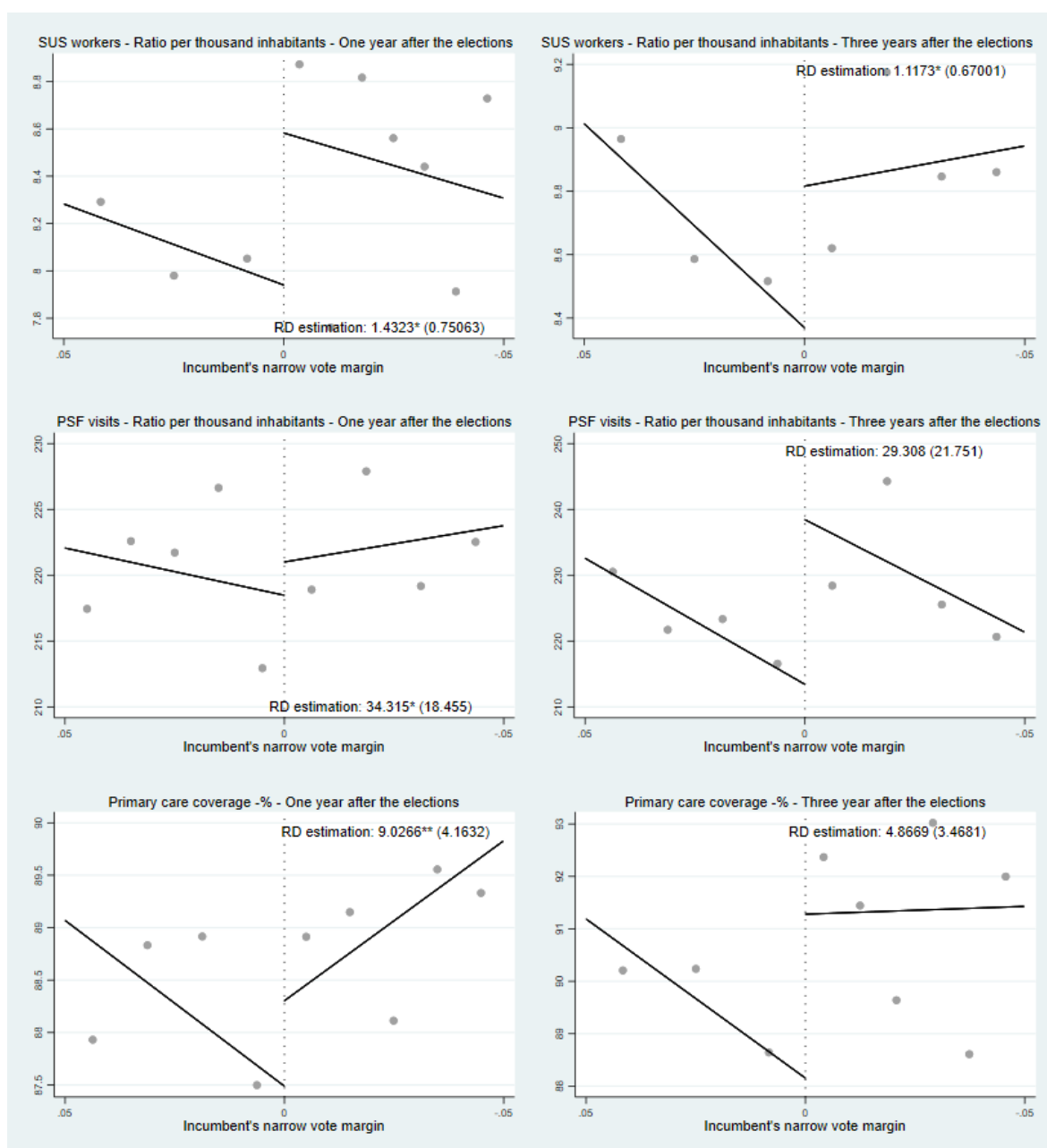


Figure 2 - Political turnover (2008 and 2012) and municipal health indicators: One (2009 and 2013) and three years after the elections (2011 and 2015) - Part 1.

Source: DATASUS and TSE, data worked by the research.

However, when we analyze three years after the elections (right column), the significant result is not maintained for two of the three variables, so that only the number of SUS workers per thousand inhabitants remains significant⁸. Three years after the elections, the results for the visits made by the PSF and the coverage of primary care indicate that there is no significant difference between municipalities that underwent political turnover and

⁸ Although the result appears graphically significant, the results of the estimates were not statistically significant.

those that did not. We have indications, therefore, that the improvement in some indicators is transient, since the result was verified only in the year in which the political change took place.

Proceeding, Figure 3 below shows the results for the ratio of cervical exams performed, immunization coverage and infant mortality rate. For one year after the elections, only the variable referring to cervical exams performed is significant, indicating, once again, that in municipalities where there was no political turnover, this indicator was lower. For rates of immunization coverage and infant mortality, the results are not significant. For three years after the elections, none of these variables shows statistical significance.

Through these results presented, it is possible to perceive a different behavior for the tested response variables. The indicators shown in Figure 2 reflect administrative variables, related to the configuration and functioning of SUS activities. In these indicators, the role of the SUS municipal manager is a protagonist.

As noted earlier, we obtained significant results for the number of SUS workers, the visits made by the PSF and the coverage of primary care, indicating that one year after the elections, municipalities where there was a political turnover present such higher indicators.

We have also said that the position of SUS manager is appointed by the head of the municipal power. Thus, the change of party in power is related to the change of the municipal health manager. Our results indicate that the change in the municipal chief of power seems to benefit the health administration, but that these benefits do not seem to last after the year of the change. That is, the adoption of new strategies and the realization of new actions in the health sector — given the entry of a new party in the municipal power — is effective, but only in the current period when political change is taking place.

The indicators presented in Figure 3 reflect health variables that can be considered structural. Although the performance of cervical exams⁹ and the rate of immunization coverage directly depend on the management and SUS workers, they also depend on the interest of the service users. The infant mortality rate, in turn, depends on factors such as assistance to pregnant women, instruction and education policies, and adequate sanitation conditions. The results for immunization coverage and the infant mortality rate are not significant in the analyzed periods — one and three years after the elections. The lack of

⁹ It is worth noting, once again, that the result for this variable was significant. A possible explanation is that the number of exams performed depends - in addition to the users' interest - on the approval by the SUS managers, which can change with the change in management.

effect of political change on such indicators reflects the difficulty in reaching structural public health factors in the short term.

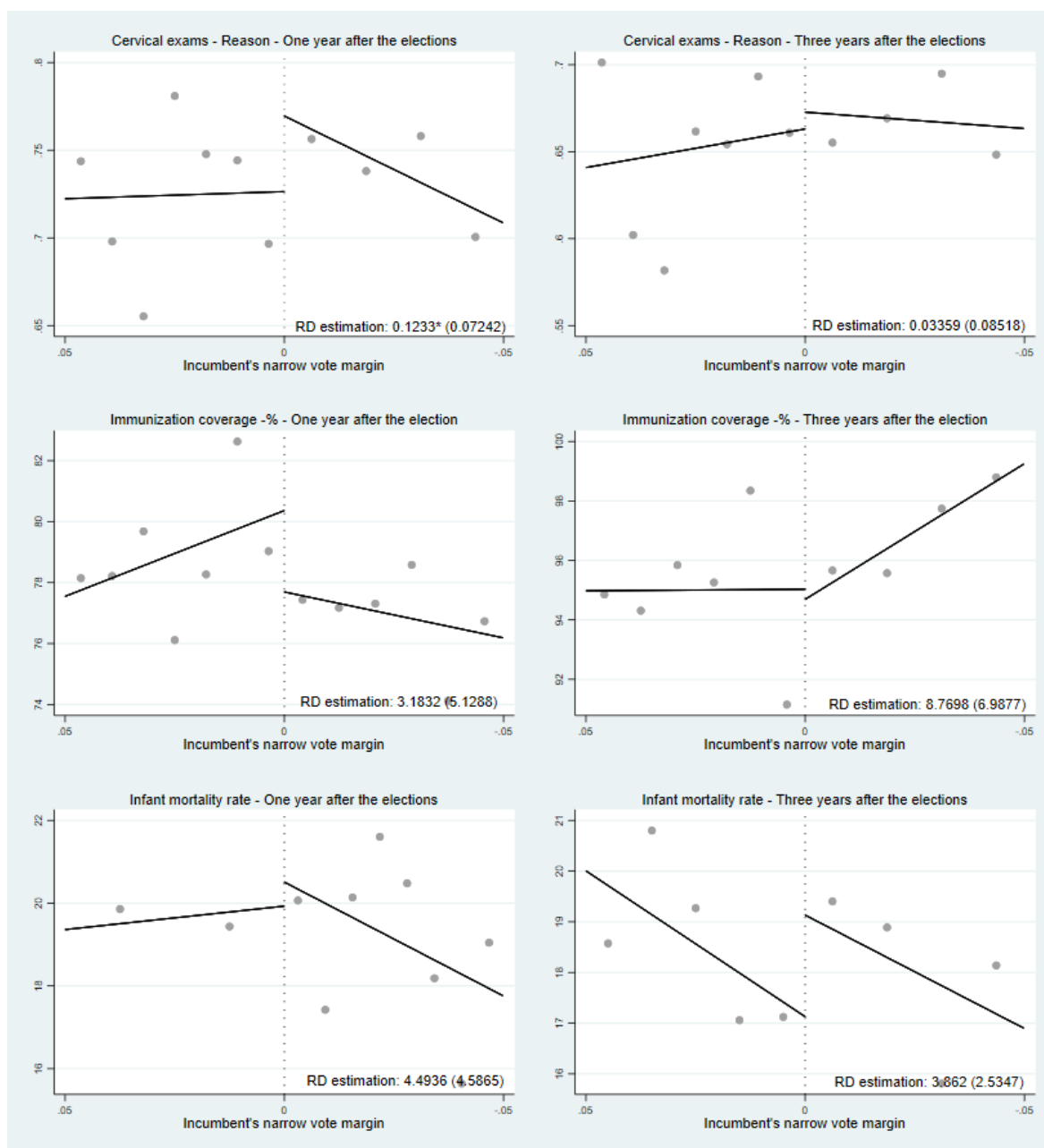


Figure 3 - Political turnover (2008 and 2012) and municipal health indicators: One (2009 and 2013) and three years after the elections (2011 and 2015) - Part 2.

Source: DATASUS and TSE, data worked by the research.

Our positive results found for the administrative variables can be related to the practice known as the report of the 100 days¹⁰. It is common that on the hundredth day of

¹⁰ For more information, see: <https://politica.estadao.com.br/blogs/blog-do-mlg/os-100-primeiros-dias-de-gestao-dos-prefeitos>; <https://exame.abril.com.br/brasil/o-que-bons-prefeitos-fazem-em-100-dias-de-governo/>.

government, mayors publish reports on the strategies to be followed in their mandates, dictating the pace of the government in the next four years, in addition to publishing the first balance sheets on their management. Therefore, the first year of management is a milestone for mayors, as it is an opportunity for them to demonstrate their management skills to the population. The improvement seen in the administrative variables can be explained by the need to adopt practices that, simultaneously, improve the government's management indicators. This creates an illusion of greater administrative competence for the electorate. Furthermore, the idea of transient competence shocks is also explained by the more competitive political environment (close elections) that amplifies political pressure on the government.

4.3 Robustness and sensitivity

To test the validity of our evidence, we estimated the same Equation 1 using two other estimation methods, in addition to the conventional one shown previously. Presented by Calonico, Cattaneo and Titiunik (2014), these two other methods are characterized by correcting the bias and robustness of the estimator. In addition, we also estimated our Equation 1 by including the covariates shown in Table 8 and changing the polynomial specification of the model. Table 4 shows the results for the outcome variables one year after the elections, and Table 5 shows the results for three years after.

For one year after the elections (Table 4), the new results obtained for the number of SUS workers, the visits made by the PSF and the coverage of primary care remain consistent with the idea that municipal political turnover favors health indicators related to its administration, since, in general, the three variables still prove significant.

When we analyze three years after the elections (Table 5 below), the results for the coverage of primary care are significant to the specification changes, indicating that the improvement in this variable may not be transient; that is, the improvement seemed maintained throughout the term of new managers. We also detect a change in the infant mortality rate, which in some specifications proves significant. However, for this variable, the result is not consistent, since it changes as we change the polynomial specification or include covariates in the model. Thus, we do not have precise conclusions on the impact of political turnover on the infant mortality rate.

The robustness analysis confirms our results found for the health variables that are most directly associated with the control of municipal management. These results show that political turnover has short term (transitory) impacts on public health administrative variables, so that these benefit from the change of party in the municipal leadership. Thus, it is interesting to try to understand the mechanisms used by the new municipal management that can favor or imply the results found.

Table 4 - Political turnover (2008 and 2012) and health indicators one year after the elections (2009 and 2011) - Robustness.

Result variables one year after the elections - 2009 and 2013									
	SUS workers				PSF visits		Primary Care Coverage		
Incumbent's Margin of Votes< 0	0.62381	1.786 *			28.387	72.778 **	7.984 *	12.875 **	
Conventional	(0.75715)	(0.92611)			(18.424)	(28.838)	(4.33835)	(5.4206)	
Incumbent's Margin of Votes< 0	1.6657 **	0.78953	1.9219 **	40.856 **	35.179 *	82.267 ***	10.662 ***	9.5805 **	14.256 ***
Bias Correction	(0.75063)	(0.75715)	(0.92611)	(18.455)	(18.424)	(28.838)	(4.11632)	(4.33835)	(5.4206)
Incumbent's Margin of Votes< 0	1.6657 *	0.78953	1.9219 *	40.856 *	35.179 *	82.267 ***	10.662 **	9.5805 *	14.256 **
Robust	(0.881)	(0.90952)	(1.0501)	(21.394)	(21.273)	(31.85)	(4.77425)	(5.0674)	(6.0155)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.013	0.012	0.019	0.013	0.013	0.013	0.014	0.014	0.017
Order bias (b)	0.021	0.019	0.027	0.024	0.022	0.022	0.027	0.024	0.025
N	1,397	1,276	1,397	1,260	1,150	1,260	1,397	1,276	1,397
Covariates	No	Yes	No	No	Yes	No	No	Yes	No
	Cervical exams				Immunization Coverage		Child mortality rate		
Incumbent's Margin of Votes< 0	0.08998	0.14534			1.2964	6.5611	2.6306	5.3407	
Conventional	(0.07058)	(0.10836)			(4.7638)	(5.9714)	(4.3259)	(5.154)	
Incumbent's Margin of Votes<0	0.13825 **	0.09694	0.14177	5.2066	2.977	8.3259	5.6675	3.4106	6.6348
Bias Correction	(0.07242)	(0.07058)	(0.10836)	(5.188)	(4.7638)	(5.9714)	(4.5865)	(4.3259)	(5.154)
Incumbent's Margin of Votes< 0	0.13825	0.09694	0.14177	5.2066	2.977	8.3259	5.6675	3.4106	6.6348
Robust	(0.08695)	(0.08531)	(0.12631)	(5.9006)	(5.5596)	(6.6862)	(5.5453)	(5.2287)	(5.8385)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.018	0.019	0.020	0.010	0.013	0.016	0.012	0.012	0.021
Order bias (b)	0.029	0.030	0.027	0.019	0.022	0.024	0.019	0.020	0.029
N	1,397	1,276	1,397	1,397	1,276	1,397	1,017	928	1,017
Covariates	No	Yes	No	No	Yes	No	No	Yes	No

Source: Data worked by the research.

Note: * = p <0.1; ** = p <0.05; *** = p <0.01. The columns refer to the estimates made by the method of Regression Discontinuity and the values in parentheses refer to the standard errors. The sample is restricted to the incumbent's narrow margin of votes ([−5%; + 5%]).

Table 5 Political turnover (2008 and 2012) and health indicators three years after the elections (2009 and 2011) Robustness.

Result variables three years after the elections 2011 and 2015									
	SUS workers			PSF visits			Primary Care Coverage		
<i>Incumbent's Margin of Votes</i> < 0	0.23966	1.2839		15.695	33.757		4.3845	13.15 **	
<i>Conventional</i>	(0.67383)	(0.83116)		(20.602)	(26.734)		(3.775)	(5.6339)	
<i>Incumbent's Margin of Votes</i> < 0	1.3432 **	0.3093	1.4075 *	32.3	16.528	36.843	5.7866 *	5.2419	15.122 ***
<i>Bias Correction</i>	(0.67001)	(0.67383)	(0.83116)	(21.751)	(20.602)	(26.734)	(3.4681)	(3.775)	(5.6339)
<i>Incumbent's Margin of Votes</i> < 0	1.3432 *	0.3093	1.4075	32.3	16.528	36.843	5.7866	5.2419	15.122 **
<i>Robust</i>	(0.77673)	(0.81153)	(0.93593)	(26.193)	(24.663)	(30.288)	(4.075)	(4.471)	(6.1959)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.014	0.014	0.020	0.015	0.016	0.022	0.019	0.019	0.015
Order bias (b)	0.024	0.022	0.028	0.024	0.025	0.031	0.032	0.031	0.024
N	1,382	1,264	1,382	990	896	990	1397	1,276	1,397
Covariates	No	Yes	No	No	Yes	No	No	Yes	No
	Cervical exams			Immunization Coverage			Child mortality rate		
<i>Incumbent's Margin of Votes</i> < 0	0.01794	0.04231		7.6436	9.4794		2.187	6.0238 *	
<i>Conventional</i>	(0.08494)	(0.11071)		(6.5031)	(8.5778)		(2.6064)	(3.5061)	
<i>Incumbent's Margin of Votes</i> < 0	0.0443	0.01814	0.05393	10.387	9.221	9.5025	4.2274 *	2.0186	6.5285 **
<i>Bias Correction</i>	(0.08518)	(0.08494)	(0.11071)	(6.9877)	(6.5031)	(8.5778)	(2.5347)	(2.6064)	(3.5061)
<i>Incumbent's Margin of Votes</i> < 0	0.0443	0.01814	0.05393	10.387	9.221	9.5025	4.2274	2.0186	6.5285 *
<i>Robust</i>	(0.10454)	(0.10469)	(0.13134)	(8.357)	(7.7194)	(9.9712)	(3.0177)	(3.0835)	(3.9087)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.016	0.017	0.022	0.015	0.018	0.022	0.021	0.019	0.017
Order bias (b)	0.024	0.026	0.030	0.026	0.031	0.029	0.031	0.027	0.025
N	1,397	1,276	1,397	1,397	1,276	1,397	995	903	995
Covariates	No	Yes	No	No	Yes	No	No	Yes	No

Source: Data worked by the research.

Note: * = p < 0.1; ** = p < 0.05; *** = p < 0.01. The columns refer to the estimates made by the method of Regression Discontinuity and the values in parentheses refer to the standard errors. The sample is restricted to the incumbent's narrow margin of votes ([−5%; + 5%]).

4.4 Mechanisms

Since we find that political turnover has improved some administrative health indicators, we wonder how it happens. At first, we analyzed variables regarding the characteristics of municipal health management. Table 6 below shows the average incidences and the tests on the equality of means performed on selected variables, considering the municipality that underwent political turnover as treated:

Table 6 Characteristics of the Municipal Health Management Body and characteristics about the manager One year after the elections (2009 and 2013) Average variations and tests on the equality of means (*Pvalue*)

	Political turnover	No political turnover	Tests on the equality of means (<i>Pvalue</i>)
Exclusive Secretariat	0.83	0.83	0.945
SUS municipal manager with higher education or more	0.70	0.65	0.0350
SUS municipal manager with health university degree	0.44	0.36	0.0149
Meetings held by the Municipal Health Council	12	11	0.3778
N	972	725	

Source: Data from DATASUS and IBGE, worked on by the research.

Note: The Pvalue column refers to the tests on the equality of means performed, comparing the treated group (which underwent political turnover) and control (the incumbent party remained in power). The sample is restricted to the incumbent's narrow margin of votes ([−5%; + 5%]).

We obtained significant results for the tests of difference of means performed for the two variables referring to the education of the municipal manager of SUS. Thus, the results presented above indicate that in municipalities that underwent political turnover, the average education level of SUS managers was higher. One year after the elections, 70% of the municipalities with political change had SUS managers with higher education, whereas in municipalities where the party remained in power, this incidence is lower, around 65%. In addition, in municipalities with political turnover, there was a higher incidence of healthtrained managers¹¹. Thus, we can infer that political turnover is beneficial in the sense that as new mayors take office, the health managers they appoint are better qualified compared with those in which the municipal executive power has not undergone changes in leadership. This better qualification may reflect more effective strategies in order to improve or make administrative issues more efficient, which may explain the significant results previously presented in Figure 2.

¹¹ We consider medical, nurses, dentists, nutritionists and social workers as graduated in the health area.

We also sought to investigate whether there is a difference between some variables in the municipal health care network. In this case, we calculated the variation¹² average one year after the election of such variables, in order to verify whether there is a difference in the generation of new units of the same between municipalities that have undergone political turnover and those that have not. The results can be seen in Table 7 below:

Table 7 Variables of the municipal health care network Electoral years and one year after the elections (20082009 and 20122013) Average variations and tests on the equality of means (*Pvalue*)

	Political turnover	No political turnover	Tests on the equality of means (<i>Pvalue</i>)
Community agents	0.79	0.34	0.1296
PSF nurses	0.5	0.37	0.3765
PSF doctors	0.55	0.52	0.8176
Basic Health Units	0.16	0.06	0.0764
Health Surveillance Units	0.13	0.09	0.2633
Psychosocial Care Center	0.17	0.12	0.2638
N	672	725	

Source: Data from DATASUS and IBGE, worked on by the research.

Note: The *Pvalue* column refers to the tests on the equality of means performed, comparing the treated group (which underwent political turnover) and control (the incumbent party remained in power). The sample is restricted to the incumbent's narrow margin of votes ($[-5\%; +5\%]$).

We obtained a significant result of the test of difference of means for the variable referring to the variation of basic health units. In this case, we can intuit that municipalities that underwent political turnover created more basic health units compared with municipalities in which there was no political change. In fact, the data in Table 7 tell us that for every six municipalities in which the incumbent party lost the elections and there was political turnover, one center of basic health unit was created. As for the sample in which there was no political turnover, one center of basic health unit was created for each 17 municipalities in our sample. This result is consistent with the positive effect found in the previous section, where we verified that municipalities that go through rotation have better rates of coverage of primary care. We can infer, therefore, that this result is explained by the higher occurrence of creation of new basic health units in municipalities that underwent changes in municipal leadership.

However, although we do not have significant results from the means tests for the other variables in Table 7, we think it is important to highlight how different they are

¹² In this case, $\Delta_x = \text{Average} (\Delta_{x,i,t} - \Delta_{x,i,t-1})$, where t is the period one year after the elections and $t-1$ is the period referring to the electoral years.

between the treated and control groups. For the variation of jobs of community agents, for example, we found that one new agent was hired from each municipality that underwent political turnover. For municipalities where the party remained in power, however, one new community agent was hired for every three municipalities. Table 14, in the Appendix, shows the maximum and minimum values of the care network variables found for both groups. For the group that underwent political turnover, the maximum creation of jobs for community agents in a single municipality was 68, whereas for the sample of municipalities in which the parties remained in power, this maximum number was 32. Thus, for such indicators, even if we did not obtain significant results in the averages tests, it is possible to perceive that the scenario in question in municipalities that undergo political turnover is better.

5 FINAL CONSIDERATIONS

This study set out to examine how political turnover affects municipal health indicators. Using a pool of data from close municipal elections that occurred in the country, our results showed that in the period immediately after the elections, political turnover benefits health indicators related to administrative issues, such as the number of SUS workers, the visits made by the PSF and the coverage of primary care. In addition, one year after the elections, the variable referring to the number of cervical exams performed also proved to benefit from political turnover. These results indicate that these variables were better in municipalities where the incumbent party lost the election and another party took power.

We sought to investigate the persistence of these effects. To this end, we tested the effect of political turnover on the same health indicators three years after the elections. In this case, only the variable referring to the number of SUS workers remained significant, indicating that the effect of the new management on it is not lost during the mandate of the new incumbent party.

For the strength of our evidence, we tested three other estimates derived from our main model. For the years following the elections, our previous results for the three administrative variables were corroborated. However, three years after the elections, the coverage of primary care was significant, indicating that the improvement in this variable may not be transient.

Finally, the study of possible channels of transmission of these beneficial effects showed us that on average, municipalities that underwent political turnover had more qualified municipal SUS managers (appointed by mayors). This better qualification may reflect better strategies and more effective public policies, which is reflected in health indicators related to administrative issues. In addition, in these municipalities where there was a change of party in power, more basic health units were created during the new administration, which helps us to understand the positive result found for the coverage of primary care.

The study of political mandate and close elections has recently gained prominence. Thus, we hope that this article will contribute to the literature that seeks to understand how political turnover affects the local economy. In our case, political turnover seems to benefit the municipal public health supply. A possible step forward would be to identify how this improvement in health indicators directly benefits the population.

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APPENDIX

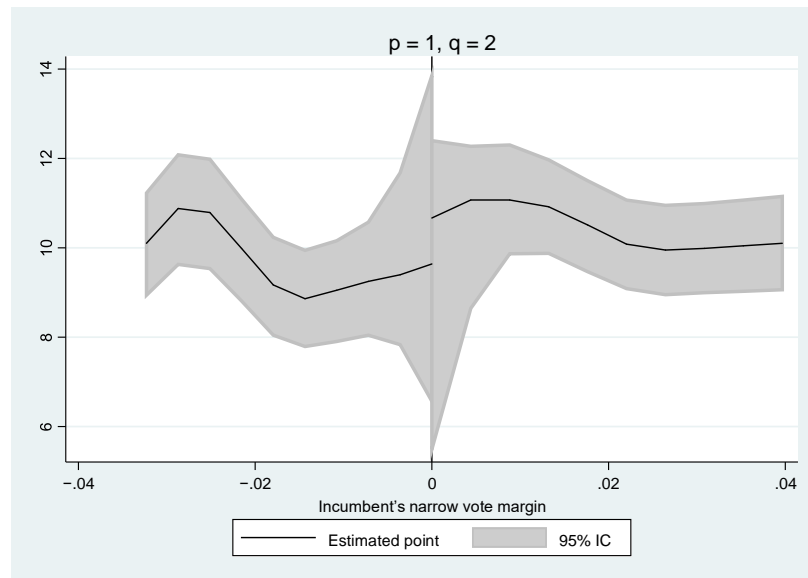


Figure 4 Test of Manipulation around the discontinuity Incumbent's narrow vote margin 2008 and 2012.

Source: Data worked by the research.

Table 8: Descriptive statistics for covariates.

Budgetary characteristics		Averages	
	Political turnover	No political turnover	Tests on the equality of means (<i>Pvalue</i>)
Per capita tax revenue	R\$ 124.94	R\$ 118.49	0.4139
Per capita health expenditure	R\$ 457.28	R\$ 450.86	0.1482
N	672	725	

Source: FINBRA data, worked on by the research.

Note: The *Pvalue* column refers to the tests on the equality of means performed, comparing the treated group (which underwent political turnover) and control (the incumbent party remained in power). The sample is restricted to the incumbent's narrow margin of votes ($[-5\%; +5\%]$).

Table 9 Political turnover (2008 and 2012) and health indicators one year after the elections (2009 and 2013) Linear discontinuity model.

Result variables one year after the elections 2009 and 2013			
	SUS workers	PSF visits	Primary Care Coverage
<i>Incumbent's Margin of Votes < 0</i>	1.4323*	34.315*	9.0266**
<i>Conventional</i>	(0.75063)	(18.455)	(4.11632)
BW Polynomial location (h)	0.013	0.013	0.014
Order bias (b)	0.021	0.024	0.027
N	1,397	1,260	1,397
	Cervical exams	Immunization Coverage	Child mortality rate
<i>Incumbent's Margin of Votes < 0</i>	0.1233*	3.1832	4.4936
<i>Conventional</i>	(0.07242)	(5.188)	(4.5865)
BW Polynomial location (h)	0.018	0.010	0.012
Order bias (b)	0.029	0.019	0.019
N	1,397	1,397	1,097

Source: Data worked by the research.

Note: * = p < 0.1; ** = p < 0.05; *** = p < 0.01. The columns refer to the estimates made by the method of Regression Discontinuity, using polynomial order p (1), and the values in parentheses refer to standard errors. The sample is restricted to the incumbent's narrow margin of votes ([−5%; + 5%]).

Table 10 Political turnover (2008 and 2012) and health indicators three years after the elections (2011 and 2015) Linear discontinuity model.

Result variables three years after the elections 2009 and 2013			
	SUS workers	PSF visits	Primary Care Coverage
<i>Incumbent's Margin of Votes < 0</i>	1.1173*	29.308	4.8669
<i>Conventional</i>	(0.67001)	(21.751)	(3.4681)
BW Polynomial location (h)	0.014	0.015	0.019
Order bias (b)	0.024	0.024	0.032
N	1,382	990	1,397
	Cervical exams	Immunization Coverage	Child mortality rate
<i>Incumbent's Margin of Votes < 0</i>	0.03359	8.7698	3.862
<i>Conventional</i>	(0.08518)	(6.9877)	(2.5347)
BW Polynomial location (h)	0.016	0.015	0.021
Order bias (b)	0.024	0.026	0.031
N	1,397	1,397	995

Source: Data worked by the research.

Note: * = p < 0.1; ** = p < 0.05; *** = p < 0.01. The columns refer to the estimates made by the method of Regression Discontinuity, using polynomial order p (1), and the values in parentheses refer to standard errors. The sample is restricted to the incumbent's narrow margin of votes ([−5%; + 5%]).

Table 11 Political turnover (2008 and 2012) and health indicators two years after the elections (2010 and 2014)

Result variables two years after the elections 2010 and 2014									
	SUS workers			PSF visits			Primary Care Coverage		
<i>Incumbent's Margin of Votes < 0</i>	1.3794*	0.5316	1.483*	38.243*	29.854	69.332**	10.262**	8.6379**	12.709**
<i>Conventional</i>	(0.0754)	(0.7462)	(0.8448)	(21.285)	(21.06)	(30.405)	(4.2048)	(4.2186)	(5.2854)
<i>Incumbent's Margin of Votes < 0</i>	1.5887 **	0.6717	1.6837 **	44.69 **	35.508 *	78.935 ***	11.644 **	9.9551 **	13.744 ***
<i>Bias Correction</i>	(0.0754)	(0.7462)	(0.8448)	(21.285)	(21.06)	(30.405)	(4.2048)	(4.2186)	(5.2854)
<i>Incumbent's Margin of Votes < 0</i>	1.5887 *	0.6717	1.6837 *	44.69 *	35.508	78.935 **	11.644 **	9.9551 **	13.744 **
<i>Robust</i>	(0.8765)	(0.8954)	(0.9414)	(25.085)	(24.836)	(34.197)	(4.9065)	(4.99739)	(5.9978)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.013	0.012	0.022	0.017	0.015	0.016	0.013	0.014	0.020
Order bias (b)	0.022	0.020	0.032	0.025	0.024	0.024	0.024	0.024	0.027
N	1,397	1,276	1,397	1,069	1,069	1,174	1,397	1,276	1,397
Covariates	No	Yes	No	No	Yes	No	No	Yes	No
	Cervical exams			Immunization Coverage			Child mortality rate		
<i>Incumbent's Margin of Votes < 0</i>	0.1147	0.0679	0.1161	3.7053	4.5355	5.7082	2.8416	0.02099	4.5521
<i>Conventional</i>	(0.076)	(0.0801)	(0.1151)	(4.291)	(4.5397)	(7.1241)	(3.3307)	(2.9818)	(4.5097)
<i>Incumbent's Margin of Votes < 0</i>	0.1269 *	0.0696	0.1035	3.8105	5.02	7.1614	3.8027	0.1348	5.249
<i>Bias Correction</i>	(0.076)	(0.0801)	(0.1151)	(4.291)	(4.5397)	(7.1241)	(3.3307)	(2.9818)	(4.5097)
<i>Incumbent's Margin of Votes < 0</i>	0.1269	0.0696	0.1035	3.8105	5.02	7.1614	3.8027	0.1348	5.249
<i>Robust</i>	(0.0923)	(0.0982)	(0.1346)	(5.1494)	(5.462)	(8.104)	(3.994)	(3.646)	(5.2461)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.016	0.016	0.018	0.020	0.019	0.017	0.018	0.020	0.022
Order bias (b)	0.025	0.025	0.024	0.031	0.030	0.024	0.028	0.030	0.030
N	1,397	1,276	1,397	1,397	1,276	1,397	1,014	919	1,014
Covariates	No	Yes	No	No	Yes	No	No	Yes	No

Source: Data worked by the research.

Note: * = $p < 0.1$; ** = $p < 0.05$; *** = $p < 0.01$. The columns refer to the estimates made by the method of Regression Discontinuity. using polynomial order p (1). and the values in parentheses refer to standard errors. The sample is restricted to the incumbent's narrow margin of votes ($[-5\%; +5\%]$).

Table 12 Political turnover (2008 and 2012) and health indicators four years after the elections (2012 and 2016)

Result variables four years after the elections 2012 and 2016									
	SUS workers			PSF visits			Primary Care Coverage		
<i>Incumbent's Margin of Votes < 0</i>	1.6723 *	0.7042	1.9396 *	51.625	28.62	72.081 *	17.575 **	13.805	18.534 *
<i>Conventional</i>	(0.9102)	(0.7767)	(1.0102)	(32.13)	(28.443)	(38.518)	(8.8)	(8.6255)	(9.7262)
<i>Incumbent's Margin of Votes < 0</i>	1.8078	0.8258	2.1752 **	64.579 **	39.105	83.963 **	20.174 **	16.236 *	20.533 **
<i>Bias Correction</i>	(0.9102)	(0.7767)	(1.0102)	(32.13)	(28.443)	(38.518)	(8.8)	(8.6255)	(9.7262)
<i>Incumbent's Margin of Votes < 0</i>	1.8078	0.8258	2.1752 *	64.579 *	39.105	83.963 **	20.174 *	16.236	20.533 *
<i>Robust</i>	(1.1001)	(0.9278)	(1.11364)	(36.835)	(32.755)	(42.835)	(10.43)	(10.131)	(11.152)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.013	0.014	0.023	0.011	0.013	0.016	0.014	0.015	0.025
Order bias (b)	0.020	0.023	0.033	0.020	0.020	0.024	0.023	0.024	0.032
N	686	625	686	608	551	608	686	625	686
Covariates	No	Yes	No	No	Yes	No	No	Yes	No
Cervical exams			Immunization Coverage			Child mortality rate			
<i>Incumbent's Margin of Votes < 0</i>	0.0578	0.1558	0.0793	4.253	4.282	4.9305	5.1992	0.3325	6.3206
<i>Conventional</i>	(0.1566)	(0.1621)	(0.2078)	(7.6621)	(7.874)	(9.4095)	(4.852)	(4.2119)	(7.0088)
<i>Incumbent's Margin of Votes < 0</i>	0.0678	0.1955	0.0707	5.0465	5.4772	5.2602	6.5572	0.4793	6.666
<i>Bias Correction</i>	(0.1566)	(0.1621)	(0.2078)	(7.6621)	(7.874)	(9.4095)	(4.852)	(4.2119)	(7.0088)
<i>Incumbent's Margin of Votes < 0</i>	0.0678	0.1955	0.0707	5.0465	5.4772	5.2602	6.5572	0.4793	6.666
<i>Robust</i>	(0.1916)	(0.1923)	(0.2491)	(9.4676)	(9.7913)	(10.911)	(6.0799)	(5.2167)	(8.3538)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.016	0.016	0.023	0.020	0.023	0.028	0.014	0.017	0.019
Order bias (b)	0.025	0.027	0.029	0.028	0.032	0.034	0.022	0.025	0.027
N	686	625	686	686	625	686	504	458	504
Covariates	No	Yes	No	No	Yes	No	No	Yes	No

Source: Data worked by the research.

Note: * = $p < 0.1$; ** = $p < 0.05$; *** = $p < 0.01$. The columns refer to the estimates made by the method of Regression Discontinuity, using polynomial order p (1), and the values in parentheses refer to standard errors. The sample is restricted to the incumbent's narrow margin of votes ($[-5\%; +5\%]$).

Table 13 Political turnover (2008 and 2012) and health indicators during mandates Averages (2009 to 2012 and 2013 to 2016)

Result variables after the elections Averages 2009 to 2012 and 2013 to 2016									
	SUS workers			PSF visits			Primary Care Coverage		
<i>Incumbent's Margin of Votes < 0</i>	1.6836 *	0.7542	1.9148 *	10.906	6.8262	68.434	16.46 *	11.568	16.418 *
<i>Conventional</i>	(0.9469)	(0.8175)	(1.0267)	(22.795)	(22.358)	(41.691)	(8.6694)	(8.139)	(8.9601)
<i>Incumbent's Margin of Votes < 0</i>	1.8486 *	0.8264	2.1657 **	11.84	7.9495	81.712 **	19.344 **	13.938 *	18.558 **
<i>Bias Correction</i>	(0.9469)	(0.8175)	(1.0267)	(22.795)	(22.358)	(41.691)	(8.6694)	(8.139)	(8.9601)
<i>Incumbent's Margin of Votes < 0</i>	1.8486	0.8264	2.1657 *	11.84	7.9495	81.712 *	19.344 *	13.938	18.558 *
<i>Robust</i>	(1.143)	(0.9824)	(1.11552)	27.535	(26.468)	(46.738)	(10.092)	(9.5709)	(10.31)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.012	0.013	0.023	0.020	0.017	0.014	0.012	0.013	0.023
Order bias (b)	0.019	0.020	0.032	0.032	0.026	0.022	0.020	0.021	0.031
N	686	625	686	525	479	525	686	625	686
Covariates	No	Yes	No	No	Yes	No	No	Yes	No
	Cervical exams			Immunization Coverage			Child mortality rate		
<i>Incumbent's Margin of Votes < 0</i>	0.0133	0.0639	0.0010	3.0547	3.0078	4.031	1.0892	1.9929	0.0788
<i>Conventional</i>	(0.1232)	(0.1395)	(0.1573)	(5.9699)	(6.2421)	(7.4407)	(1.9504)	(2.11552)	(3.22675)
<i>Incumbent's Margin of Votes < 0</i>	0.0033	0.0961	0.0254	4.16	4.3735	4.6357	1.3187	2.7062	0.4185
<i>Bias Correction</i>	(0.1232)	(0.1395)	(0.1573)	(5.9699)	(6.2421)	(7.4407)	(1.9504)	(2.11552)	(3.22675)
<i>Incumbent's Margin of Votes < 0</i>	0.0033	0.0961	0.0254	4.16	4.3735	4.6357	1.3187	2.7062	0.4185
<i>Robust</i>	(0.1512)	(0.1655)	(0.1852)	(7.3608)	(7.7268)	(8.7403)	(2.33311)	(2.5157)	(3.9167)
Order (p)	1	1	2	1	1	2	1	1	2
Polynomial Local BW (h)	0.018	0.016	0.027	0.021	0.023	0.029	0.020	0.019	0.016
Order bias (b)	0.028	0.026	0.035	0.029	0.032	0.034	0.031	0.031	0.026
N	686	625	686	686	625	686	323	289	323
Covariates	No	Yes	No	No	Yes	No	No	Yes	No

Source: Data worked by the research.

Note: * = $p < 0.1$; ** = $p < 0.05$; *** = $p < 0.01$. The columns refer to the estimates made by the method of Regression Discontinuity, using polynomial order p (1), and the values in parentheses refer to standard errors. The sample is restricted to the incumbent's narrow margin of votes ($[-5\%; +5\%]$).

Table 14 Variables of the municipal health care network Variations Electoral years and one year after the elections (20082009 and 20122013). Maximum and minimum values

	Political turnover		No political turnover	
	Minimum value	Maximum value	Maximum value	Minimum value
Community agents	36	68	43	32
PSF nurses	17	24	5	34
PSF doctors	9	16	5	15
Basic Health Units	8	10	11	10
Health Surveillance Units	0	2	0	1
Psychosocial Care Center	0	2	1	1
N	672		725	

Source: Data worked by the research.

Note: The sample is restricted to the incumbent's narrow voting margin ([−5%; + 5%]).