Political Alignment and Public Health Conditions: an empirical approach based on a regression discontinuity design[1]

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Abstract

The aim of this paper is to evaluate the effects of political alignment on public health conditions in Brazil. We adopt a regression discontinuity design, both in its parametric and non-parametric versions. Our source of exogeneous discontinuity is based on the results of the municipal executive elections in the years 2004 and 2008, in which the winner and runner-up belonged to opposing coalitions. This study is a step forward in the related literature since the existing empirical work has only explored the effect on public spending. Public health condition is measured by health indicators taken from DATASUS, including infant mortality due to diarrhea, general infant and maternal mortality rate. The variables related to the elections were taken from the Brazilian Superior Electoral Court (Tribunal Superior Eleitoral, TSE). The main findings point that : i) the discontinuity observed in the federal transfers and heath indicators varies across political cycles; ii) the effects of political alignment are more sensitive to the first two years after the elections; iii) the absence of discontinuities in health care indicators may mean that decision-makers are sensitive to these indicators, avoiding opportunistic choices.

Resumo

O objetivo deste trabalho é avaliar os efeitos do alinhamento político nas condições de saúde pública no Brasil. Adotamos um desenho de regressão de descontínua, tanto em suas versões paramétricas como não paramétricas. Nossa fonte de descontinuidade exagerada baseia-se nos resultados das eleições executivas municipais nos anos 2004 e 2008, nas quais o vencedor e o vice-campeão pertenciam a coalizões opostas. Este estudo é um passo em frente na literatura relacionada, uma vez que trabalhos anteriores exploram apenas o efeito sobre os gastos públicos. O estado de saúde pública é medido por indicadores de saúde tomados de DATASUS, incluindo a mortalidade infantil devido à diarréia, taxa geral de mortalidade infantil e materna. As variáveis relacionadas às eleições foram retiradas do Tribunal superior eleitoral brasileiro (Tribunal Superior Eleitoral, TSE). As principais conclusões apontam que: i) a descontinuidade observada nas transferências federais e indicadores de saúde varia em todos os ciclos políticos; Ii) os efeitos do alinhamento político são mais sensíveis aos dois primeiros anos após as eleições; Iii) a ausência de descontinuidades nos indicadores de cuidados de saúde pode significar que os decisores são sensíveis a esses indicadores, evitando escolhas oportunistas.

JEL Classification: H10; I15; I18
Palavras chave: ciclos políticos, saúde pública, eleições municipais, Brasil, RDD
Key Words: political cycles; health care; municipal executive elections; Brazil, RDD
Area: Economia do Setor Público

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1 Introduction

History has demonstrated a close relationship between politics and economy and how political goals affect the behavior of economic variables. According to the theory of Political Cycles, in order to achieve or remain in power, the political agents must show that they can lead in a way that each voter can be provided with their essential needs. One way of doing this is through decision-making at the macroeconomic level on the conduct of the fiscal and monetary policy and its impact on the voter's daily life.

In this regard, over the past few years, several studies have been devoted to understanding this interrelation between political and economic systems. In the international literature, the works of Downs (1957), Nordhaus (1975) and Hibbs (1977) demonstrate the existence of cycles caused by political reasons. Downs (1957), for instance, relates how the political actors' (parties and candidates) private interests motivate their choices. According to the author, the economic problem of the political parties is vote maximization. Thus, policy-making is focused on the achievement of this objective, that is, the victory in the elections.

On the other hand, Nordhaus (1975) showed that a pattern of political decisions can be found when elections happen regularly. His work analyzes the Phillips Curve in nine countries during the election period in order to check for any control or manipulation of the behavior of two variables: unemployment and inflation. The result indicated that there is a reduction in unemployment before the election period with a rise in the inflation rates.

These two works have contributed to the emergence of the theory of opportunistic political behavior, in which the political agent solely seeks to remain in power. Regardless of ideological bias, the goal is to maximize votes.

The partisan model (Hibbs, 1977), on the other hand, shows a causal relationship between political decisions motivated by ideological interests and economic cycles. Thus, political parties committed to different interests behave differently, seeking to favor those groups with whom they have the greatest ideological affinit. In this sense, besides a victory in the elections, governments would be interested in meeting the demands of the social class that provides greater political support to them and that somehow is related to the ideologies of the ruling party.

Rogoff and Sibert (1988), based on Nordhaus (1975), proposed the theory of political budget cycles, in which the focus is on fiscal policies. According to this theory, in election years, governments increase public spending and transfers, allocate budget funds to short-term and high visibility projects, besides waiving tax revenues.

In Brazil, the research on the existence of political-economic cycles has advanced in recent years due to the democratization processes, the organization of the party system and data reliability. The studies have been conducted in the three administrative levels (Federal, State and Municipal) and, in most of them there is empirical evidence suggesting the existence of cycles. The main issues addressed refer to the opportunistic and partisan effects on spending and private investments (Sakurai and Gremaud, 2007; Ferreira and Bulgarin, 2007; Nakaguma and Bender, 2010; Novaes and Mattos, 2010; Mendes and Chein,2015). However, most of these studies use panel estimators that, although having the appropriate treatment to capture the unobservable specific effects of the units treated, do not guarantee the exogenous effect of the policy cycle on the variables under consideration. Therefore, any empirical correlation between the political cycle and the variable of interest can be completely driven by local socioeconomic conditions that affect both the election results and the phenomenon being focused.

Considering the importance of health care policies in developing countries, especially in Brazil, the aim of this article is to investigate the relationship between political alignment and public health conditions. Therefore, we check whether the expenditure on health care is affected or not by the political alliances that are formed during the period of elections and whether health indicators are also affected by these cycles. Given the difficulty of describing the level of health care, it was decided

to use variables related to infant mortality. This indicator is commonly used as a proxy to indicate the level of health care and socioeconomic development of populations.

Our empirical strategy is very similar to the one adopted by Brollo and Nannicini (2012) and Leão, Mello and Ferraz (2012). We use a regression discontinuity approach that exploits the outcomes of local and general elections held during the period 2004-2012 as a source of within-municipality variation in political alignment.

The use of regression discontinuity (RD) aims to advance in the identification of the relationship between the political alignment and health care, since a comparison between municipalities ruled by mayors aligned with the president and those with mayors who are not is likely to generate unbiased estimates due to the problem of endogeneity. The goal is to find an exogenous variation that affects political alignment, considering only the close races.

The remainer of this paper is organized as follows: Section 2 provides a brief background on health care funding in Brazil. The next section presents a descriptive data analysis to support the treatment applied to the variables selected. Section 4 deals with the methodological description the models employed, followed by the estimated results. Finally, in Section 5, the main conclusions are drawn.

2 Health Care Financing in Brazil

The Brazilian Unified Health System (Sistema Único de Saúde, SUS) is the official federal health care institution in the country. The SUS is one of the largest public health systems in the world and the only one that provides a comprehensive care to the population and is completely free.

The theoretical basis of the system is the fiscal federalism and decentralization. Federalism refers to the provision of public goods in a decentralized manner to sub-national governments in order to allow that levels of public spending are adapted to meet the needs of a heterogeneous population. Decentralization refers to a transfer of certain administrative and fiscal functions and powers from a central authority to various local authorities (OATES, 1972).

The SUS is managed by representatives of each level of government designated to develop executive functions regarding health. In the national level, it is the Minister of Health; in the state level, the Secretary of State for Health; and, in the local level, the Municipal Health Secretary. SUS managers are responsible for the coordination, articulation, negotiation, planning, monitoring, control, evaluation and audit of the health system under their management.

The legislation that established the SUS also laid the foundations of the federal funds transfer model for sub-national governments as regards the funding for decentralized health actions and services. In the national level, funding for health actions and services occurs through the intergovernmental application and/or transfers of the public funds collected. In the states, the funding system comes from their resources as well as from transfers from the federal level. In the municipalities, in addition to their resources, funding depends on federal and state transfers. Municipalities are responsible for the formulation of the municipal health care policy, planning, complementary regulation, direct control and provision of direct and health care services or through referrals to other towns.

The legislation governing the SUS establishes that fund transfers (fund to fund) occur regularly and automatically from the National Health Fund (Fundo Nacional de Saúde) to the State Health Funds (Fundos Estaduais de Saúde) and Municipal Funds (Fundos Municipais de Saúde, FMS). These transfers must comply with various criteria, such as the demographic and epidemiological profile of the population, the characteristics of the health services network, performance in the previous period of time, the budget of municipal and state funds for health care, investment forecast, and compensation paid to other spheres of government regarding health care.

The several mechanisms and criteria regarding fund transfers to SUS determine different capabilities for the redistribution of resources among states and municipalities. Each transfer mechanism is

linked, to a greater or lesser extent, to the installed and production capacity of public and private services accredited to the existing SUS in a given jurisdiction. According to Lima (2007), this structure helps to accentuate socioeconomic inequalities in a context of scarce resources for health care and has shaped the positioning of federal actors as well as cooperation and conflict relationships, stimulating the creation of new criteria and mechanisms of redistribution of federal funds since the late 1990s. Due to that, the authors believe that the health care policy is developing its own mechanisms, and they interact in a specific context, with structural and institutional variables that are difficult to be changed by the actors who work in the health care sector.

3 Descriptive Analysis of the Data

The database includes information from 5,569 municipalities, and the findings refer to 2004-2012. This article does not deal with compared minimum areas so as not to lose information related to election variables and their resulting impact on the scope of this article. In the regressions, the municipalities created after 2005 have been excluded, as well as the municipalities that have originated them, with a final total of 5,548 municipalities being included in the study.

3.1 Brazilian political scene

The initial analysis aims to describe the political scenario in the reference period. The variables concerning the elections that are being assessed are: candidates and winners in municipal and national elections, their parties and the number of votes obtained. From this information, it is possible to build other variables describing the election process. The base variable of political control in the study is a dummy one used to indicate the alignment between the party of the mayor and that of the president. The value of 1 is assigned to this variable if the parties are the same, and 0 if otherwise. This strategy was adopted based on the empirical model by Leão, Mello and Ferraz (2012) and Videira and Mattos (2011).

Brazil is a democratic republic with three levels of government, namely: central, regional and local. The central government is formed by the President and the National Congress, comprising the House of Representatives and the Federal Senate. The regional government has representation in each of the 26 states and the Federal District, which are under the leadership of the Governor and of the Legislative Assembly. In the local level, the public representatives of the people are the Mayor - the largest local authority - and the City Council.

The country has adopted a multi-party system in which the various parties can take leadership throughout the territory and in the three levels of government. Governance is ensured only when the most representative member of the executive branch has the administrative support of the majority of the members in the chambers of the legislative branch. Therefore, there are often coalitions between parties in order to ensure the approval of projects and bills as well as the control over the bureaucratic apparatus available to the executive branch.

It is worth highlighting that there is a difference in the Brazilian electoral calendar regarding the dispute of positions in the central, regional and local governments, generating an overlapping of electoral cycles between levels. As a consequence, each elected member of government in the executive branch serves the equivalent to two mayoral mandates and vice versa. Two election cycles are analyzed in this article. The first cycle refers to the 2004 municipal elections from 2005 to 2008, while the second one is related to the outcome of the electoral process of 2008, which elected the mayors who served between 2009 and 2012. During that time, there was no party change in the central government, although there were three democratic electoral processes for the presidential post (the 2002, 2006 and 2010 elections), with the Workers' Party (Partido dos Trabalhadores, PT) being the ruling party.

In the period before the 2004 electoral process, 3.28%, or 182 municipalities, were governed by mayors who belonged to the same party as the president elected in 2002. After the closing of the electoral process, 7.25% (402 municipalities) were administered by mayors aligned with the central government. In the 2008 election cycle, 9.73% of the municipalities (540) were managed by mayors aligned with the central government. The 2010 central elections brought little change to the political landscape, with a drop of 0.03 percentage points in the total of aligned municipalities.

It is useful to evaluate the level of competitiveness of the electoral process between candidates who were aligned and those not aligned with the central government. Out of the total of municipalities analyzed, it turns out that in 1902 municipalities, i.e. 34.28% of the sample, the difference of votes between aligned and non-aligned candidates in the 2004 elections was 10%. In 968 municipalities, or 17.45% of the sample, the difference of votes between those candidates is 5%. For the 2008 election cycle, considering the difference of votes of up to 10%, 29.16% of the sample is represented, i.e., 1618 municipalities. In 892 municipalities, or 16.08%, the difference in votes between the aligned and non-aligned candidates was up to 5%.

3.2 Health care spending

Financial and budgetary data on health care are captured by the variables Discretionary Transfers of Federal SUS allocated to the Municipality, Transfers of Federal SUS-allocated Funds to the Municipality (fund to fund transfers, i.e. from the National Health Care Fund to the Municipal Health Care Fund) and Discretionary Transfers of Capital Resources of SUS allocated to the Municipality. These transferences are handled separately by relevance account to subject, by the celebration of agreements, transfers of contracts and mainly Fund to Fund transfers.

In addition, we include variables related to general transfers from the federal government to municipalities: Discretionary Transfers of the Current Resources, Transfers of Capital Resources and Discretionary Transfers of Capital Resources of the Federal Government allocated to the Municipality. We focus on these types of federal transfers because their allocation mechanism depends on the support of federal government. All data have been taken from a database called FINBRA - Finances of Brazil - which is under the responsibility of the National Treasury (Secretaria do Tesouro Nacional, STN).

Table 1 shows the descriptive statistics of variables for the period that includes the 2004 and 2008 cycles. The values are in BRL and have been deflated using the IGP-DI index (Base year: 2012).

Table 1: Descriptive statistics of variables related to federal transfers in the 2004 and 2008 cycles

Year	2005					2008				
Variable	Obs	Mean	Std.Dev.	Min	Max	Obs	Mean	Std.Dev.	Min	Max
Federal Discretionary Transfers	5245	342268.60	2044930.00	0.00	78400000.00	5482	456751.40	2892370,00	-20523.89	107000000.00
Federal Transfers of Capital Resources	5245	92101.96	1635111.00	-5949.71	113000000.00	5482	292093.00	2572939,00	-1.67	121000000.00
Discretionary Transfers of Capital Resources	5245	288313.00	1444761.00	0.00	40800000.00	5482	1000465.00	5034851,00	0.00	138000000.00
Federal Transfers of SUS	5245	3469110.00	23900000.00	0.00	1070000000.00	5482	4582781.00	30200000,00	0.00	1130000000.00
Discretionary Transfers of SUS	5245	102577.70	1214560.00	0.00	67800000.00	5482	71391.77	576804,40	0.00	17300000.00
Discretionary Transfers of Capital Resources of SUS	5245	47557.55	365194.90	0.00	12300000.00	5482	45028.82	417032,60	0.00	15300000.00
	2009					2012				
Federal Discretionary Transfers	5520	379228.50	2430905.00	-262517.60	131000000.00	5175	337023.30	1365486,00	-20021.66	38900000.00
Federal Transfers of Capital Resources	5520	220259.80	3276887.00	-29472.41	215000000.00	5175	400114.90	1956707,00	-38250.00	60500000.00
Discretionary Transfers of Capital Resources	5520	831330.80	4566178.00	-922990.40	121000000.00	5175	1398601.00	4516237,00	0.00	137000000.00
Federal Transfers of SUS	5520	5239903.00	35000000.00	0.00	1350000000.00	5175	6200977.00	38100000,00	0.00	1240000000.00
Discretionary Transfers of Resources of SUS	5520	89678.51	1686124.00	0.00	116000000.00	5175	30227.31	300741,90	0.00	14000000.00
Discretionary Transfers of Capital Resources of SUS	5520	53738.36	586944.80	0.00	31400000.00	5175	119943.80	1313387,00	0.00	62000000.00

2005-2008					
Variable	Obs	Mean	Std.Dev.	Min	Max
Federal Discretionary Transfers	21785	416984.00	2689038.00	-20523.89	136000000.00
Federal Transfers of Capital Resources	21785	172831.90	1642614.00	-5949.71	121000000.00
Discretionary Transfers of Capital Resources	21785	634408.40	3548348.00	-251918.40	172000000.00
Federal Transfers of SUS	21785	4001774.00	27800000.00	0.00	1260000000.00
Discretionary Transfers of Resources of SUS	21785	99894.36	1110036.00	-8123.22	70500000.00
Discretionary Transfers of Capital Resources of SUS	21785	51495.04	407304.40	-320245.30	21900000.00
			2009-2012		
Federal Discretionary Transfers	21573	346659.10	1785710.00	-262517.60	131000000.00
Federal Transfers of Capital Resources	21573	279302.20	2295241.00	-38250.00	215000000.00
Discretionary Transfers of Capital Resources	21573	1027107.00	4337800.00	-922990.40	246000000.00
Federal Transfers of SUS	21574	5586553.00	35500000.00	0.00	1350000000.00
Discretionary Transfers of Resources of SUS	21573	54488.52	954165.00	-27.21	116000000.00
Discretionary Transfers of Capital Resources of SUS	21573	74865.86	886561.10	0.00	62000000.00

Source: Prepared by the authors

Concerning the health care indicators, given the difficulty of describing the level of health care, we decided to use variables related to infant mortality. This indicator is commonly used as a proxy

to indicate the level of health care and socioeconomic development of populations. There are several books discussing the validity of its use (Leal and Szwarcwald, 1996; Reidpath and Allotey, 2003; and Akachi and Canning, 2009). Among the limitations to its use as a health indicator, these stand out: (a) it reflects an incomplete history of the disease; (b) diseases that weaken, but do not lead to death are not represented; and (c) deaths are events that express only the maximum severity.

The health care indicators of the municipalities were taken from the database in their absolute form and transformed into rates per inhabitant. For the years 2004-2005, the reference population used was the one accounted for in the 2000 census; for the following years, the information from the 2010 census was used. Chart 1 provides a brief description of the health care variables selected. In addition of these variables, we also consider the variables related to number of physicians and hospital beds and the immunization coverage. Our goal is to verify that the opportunistic actions due to political alignment also affect the provision of health services.

Chart 1: Description of the health care variables

Dependent variables	Description	Source
Mortality rate of one-year-olds due to diarrhea per 1,000 live births.	All children aged up to 11 months and 29 days who died of diarrhea per 1,000 live births. This total is obtained by the sum of deaths due to diarrhea of children under 28 days of age and of those from 28 days to 11 months and 29 days of age.	DataSUS
Infant mortality rate under one year of age per 1,000 live births.	Number of deaths under one year of age, according to the deceased's place of residence, per 1,000 live births.	DataSUS
Maternal mortality rate per 1,000 live births.	Number of women of childbearing age (10-49 years old), according to the place of residence of the deceased, divided by total births, multiplied by 1,000. Information about whether the death occurred during pregnancy, childbirth, miscarriage or postpartum.	DataSUS
Physicians per 1,000 inhabitants.	Number of physicians per 1,000 inhabitants	DAB/MS
Hospital beds per 1000 inhabitants.	Number of hospital beds per 1,000 inhabitants	DAB/MS
Immunization Coverage	Immunization Coverage	DAB/MS

Source: Prepared by the authors.

Table 2 shows the descriptive statistics of the health-dependent variables related to the 2004 and 2008 cycles, and the total average of the period.

Infant mortality rate due to diarrhea in children under one year of age decreased by 27% between the 2004 and 2008 cycles. The overall average for the period was 1.47 deaths per 1,000 live births. The statistics on the average rate of overall infant mortality in children under one year of age decreased by 16.11% between the 2004 and 2008 cycles, reaching 16 deaths per 1,000 live births.

Maternal mortality rate remained stable during the period being studied. During that time, 0.6 deaths of mothers during labor per thousand live births were recorded.

The Physicians varied between 8 and 10 doctors per thousand inhabitants between 2004 and 2008 cycles, in both cycles, the number of Physicians were increased when we compare the initial and final period of political cycles.

Hospital beds rate and immunization coverage remained stable during the period being studied.

Table 2: Descriptive statistics of health variables in the election cycles of 2004, 2008 and the period from 2004 to 2012.

Year			2005					2008					2005-2008		
Variable	Obs	Mean	Std.Dev.	Min	Max	Obs	Mean	Std.Dev.	Min	Max	Obs	Mean	Std.Dev.	Min	Max
Mortality rate due to diarrhea	5561	1,61	5,25	0	125	5564	1,16	5,65	0	260,39	22253	1,47	8,01	0	760,56
Overall Infant Mortality Rate	5561	17,50	14,35	0	153,85	5564	15,78	14,68	0	200,00	22253	16,83	15,01	0	428,57
Maternal Mortality Rate	5561	0,61	2,55	0	62,5	5564	0,64	2,68	0	76,92	22253	0,59	2,53	0	76,92
Physicians	5563	8,61	4,17	0	46,02	5563	9,28	3,77	0,13	42,78	22252	8,97	4,00	0	86,55
Hospital beds	5563	2,61	2,95	0	77,11	5563	2,43	2,53	0	63,57	22252	2,53	2,75	0	77,11
Immunization Coverage	5564	78,54	10,89	3,61	172,61	5564	75,26	10,69	35,04	176,88	22256	77,93	11,06	3,61	280,19
			2009					**2012**					**2009-2012**		
Mortality rate due to diarrhea	5565	1,40	9,29	0	509,80	5565	54,49	3987,80	0	297485,9	22260	15,12	1995,03	0	297485,90
Overall Infant Mortality Rate	5565	15,31	14,24	0	200	5565	14,00	13,30	0	200	22260	14,46	13,83	0	333,33
Maternal Mortality Rate	5565	0,68	2,61	0	66,67	5565	0,57	2,43	0	66,67	22260	0,61	2,63	0	125,00
Physicians	5565	9,83	4,03	0,48	46,67	5565	11,55	5,72	0,39	180,45	22260	10,73	4,68	0,39	180,45
Hospital beds	5565	2,41	2,48	0	62,08	5565	2,35	2,30	0	56,20	22260	2,39	2,42	0	62,08
Immunization Coverage	5565	84,56	10,99	0	213,66	5565	79,52	20,74	20,1	668,17	22260	83,26	17,33	0	668,17

Source: Prepared by the authors

Table 3 shows the results of the mean test for the variables 'Transfers' and 'Health care', comparing the results in municipalities aligned to the president with those that are not. All the result of the

significance test of federal transfers was significant at 1%. This implies that municipalities where the mayors are from the same party as the president receive more resources than those municipalities that are not aligned. As mentioned earlier, empirical studies have shown the impact of political alliances on expenditures variables. (ARAUJO, FILHO, 2010; NOVAES AND MATTOS, 2010; NAKAGUMA AND BENDER, 2010; SAKURAI, 2009)

Regarding health variables, the tests of differences between means are not significant. Contrary to expectations, aligned municipalities have, on average, a higher rate of infant deaths. The difference reaches on Physicians indicates that mayors aligned have more 0.5 doctors per 1,000 inhabitants. In addition, the municipalities administered by the same political party as that of the president have a higher rate of hospital beds. Table 3 contains the complete results.

Table 3 – Test of differences between means for the variables 'Transfers' and 'Health Care' regarding the alignment between mayors and the president

Variables	Obs	Alignment of President		Difference		p-value
		No	Yes			
Mortality rate due to diarrhea	49,844	8.150	1.251	-6.899		0.289
		(6.500)	(0.113)			
Overall Infant Mortality Rate	49,844	16.02	15.67	-0.347		0.115
		(0.0686)	(0.209)			
Maternal Mortality Rate	49,844	0.607	0.579	-0.0287		0.440
		(0.0121)	(0.0351)			
Physicians	49,839	9.667	10.26	0.590	***	0
		(0.0206)	(0.0712)			
Hospital beds	49,839	2.472	2.603	0.131	**	0.00109
		(0.0124)	(0.0380)			
Immunization Coverage	49,839	80.35	80.65	0.299		0.183
		(0.0675)	(0.214)			
Federal Discretionary Transfers	48,459	357,247	711,113	353,866	***	0
		(10,654)	(46,846)			
Federal Transfers of Capital Resources	48,459	192,764	508,724	315,959	***	0
		(8,450)	(53,114)			
Discretionary Transfers of Capital Resources	48,459	687,311	1,813,000,000	1 1,126,000,000	***	0
		(15,446)	(117,975)			
Federal Transfers of SUS	48,460	4,168,000,000	9,887,000,000	5,719,000,000	***	0
		(141,358)	(740,918)			
Discretionary Transfers of SUS	48,459	74,753	138,988	64,236	***	0.00077
		(4,716)	(18,522)			
Discretionary Transfers of Capital Resources of SUS	48,459	49,731	198,969	149,238	***	0
		(1,837)	(30,804)			

Source: Prepared by the authors with data from Finbra and DataSUS.
Note[1]: Standard errors in brackets
Note[2]: *** 1% significance level; ** 5% significance level; * 10% significance level.

4 Empirical Strategy

The regression discontinuity design is a quasi-experimental empirical strategy widely used in economics and other social sciences (IMBENS and LEMIEUX, 2008; LEE and LEMIEUX, 2010). Thus, the empirical strategy adopted in this article aims to advance the identification of the relationship between political alignment and health care. The traditional methods (estimated in a panel) when comparing municipalities ruled by mayors aligned with the president and those whose mayors are not aligned are likely to generate biased estimates due to the problem of endogeneity, since the local health care policies offered can be correlated with specific characteristics, such as transfers of funds related to the installed capacity of the municipalities, and this could also influence the political cycle.

The variable $S_{it}(1)$ is defined as the level of potential health care of the municipality i if the mayor is aligned with the president, and $S_{it}(0)$ as the level of potential health care of the same municipality i if the mayor is not aligned with the president, in a specific period t. The aim is to estimate the difference in the potential outcome of a close race between aligned and non-aligned mayors, i.e. $E[S_{it}(1) - S_{it}(0)X_i = \overline{x}]$, where X_i is the variable that determines whether the municipality i will receive the treatment $(X_i \geq \overline{x})$ or not $(X_i < \overline{x})$. The problem of the causal inference established is that it is not possible to find the two results at the same time. In other words, it is impossible to measure the level of health care for the same municipality if it is managed by a mayor who is aligned with the president or by one who is not.

The understanding of the identification strategy is that in cities where the mayoral candidates aligned with the president who won the elections by a narrow margin of votes against a non-aligned candidate can be a good counterfactual for those municipalities where the opposite occurred (a mayoral candidate who is not aligned defeated an aligned candidate by a narrow margin of votes).

In this sense, the identification is based on the assumption that random factors in closely fought elections are crucial to deciding who the winner is. Therefore, the probability of winning is the same for candidates, the one aligned and the one not aligned with the president.

The variable $Alipres_{it}$ defines the status of the treatment: $Alipres_{it} = 1$ if the mayor belongs to the same party of the president, i.e., is aligned with him, and $Alipres_{it} = 0$, if otherwise. The result observed is $S_{it} = Alipres_{it} * S_{it}(1) + (1 - Alipres_{it}) * S_{it}(0)$. The estimator of interest is the Average Treatment Effect (ATE), $E[S_{it}(1) - S_{it}(0)]$, defined for the population of interest.

In this case, the population of interest includes only the municipalities where the dispute for the position of mayor involved candidates of opposing coalitions, i.e., the municipalities in which either the winners or the runner-ups in municipal elections belong to the same party as the central government. The treatment group consists of the municipalities where the allied mayor was elected to compete with candidates who are not allied with the president. The assignment of the treatment can be formalized as:

$$Margin_{it} = 1[MV_{it} \geq 0] \tag{1}$$

wherein MV_{it} is the margin of victory of the candidate aligned with the president in the municipality i during the period t and 1 [.] is an indicator function. This function is specified as the difference between the percentage of valid votes of the aligned candidate and the percentage of valid votes of the unaligned candidate, which means that this value will be positive if the aligned candidate wins the election. Therefore, this measure is greater than zero if the mayor is aligned and less than zero if otherwise. In the limit, when $MV_{it} = 0$, the alignment $Alipres_{it}$ changes abruptly from zero to one. MV_{it} can be seen as a random variable, in accordance with the observed and unobserved variables, and as random events that can occur on the election day. The standard regression discontinuity approach assumes that the potential results should be continuous functions of the margin of victory (MV) at its limit (Angrist and Pischke, 2009). This article tests this hypothesis:

The ATE in the election period is:

$$\gamma = E[S_{it}(1) - S_{it}(0)|MV_{it} = 0] = \lim_{MV_{it} \downarrow 0} Y_{it} - \lim_{MV_{it} \uparrow 0} Y_{it} \tag{2}$$

γ is defined as the local effect since it captures the impact of the alignment between a mayor and the president on health care only in cities where MV_{it} was close to zero.

In order to estimate the ATE, the authors have chosen a local linear approach (Angrist and Pischke, 2009) which restricts the sample to municipalities where $MV_{it} \in [-h, +h]$ and the estimation model is:

$$S_{it} = \rho_0 + \rho_1 MV_{it} + \delta_0 Alipres_{it} + \delta_1 Alipres_{it} * MV_{it} + \upsilon_t + \varepsilon_{it} \tag{3}$$

in which standard errors are grouped by municipal level and $\widehat{\delta_0}$ identifies the ATE in the limit of $MV_{it} = 0$. According to Angrist and Pischke (2009), since the result of interest of the discontinuous regression is on a small neighborhood to the left and to the right of MV_{it}, the estimate of the mean effect of the treatment is not dependent on the correct specification of the function. The discontinuity regressions tested in this article were linear, quadratic and cubic in shape.

However, the methodological difficulty is to determine a value of h that characterizes the close race and that ensures precision and no bias in the estimates. Thus, the estimation of the regression discontinuity design may occur through the parametric and the nonparametric methods. In Brazil, Leão, Mello and Ferraz (2010) use the parametric method to estimate the effect of the alignment between mayors and the president on federal bank lending. According to Lee and Lemieux (2010), the non-parametric specification should be used when there is a reason to believe that the true model is non-linear. The poor specification of the functional form generates bias on the treatment effect. Since Hahn, Todd and van der Klaauw (2001), the regression discontinuity (RD) estimation can

generally be interpreted as an RD-related estimation problem.

The conventional non-parametric estimators based on the kernel method depend on the choice of bandwidth. Calonico, Cattaneo and Titiunik (2014) argue that even the estimators of the existing bandwidth selectors (Imbens and Kalyanaram, 2012; Fan and Gijbels, 1996), based on the balancing of the squared bias and on the variance of the regression discontinuity estimator tend determine wider bandwidths to ensure the validity of the distribution. Thus, these bandwidth selectors lead to considerable bias in the approximations of the distribution of the estimator. As a result, the confidence intervals estimated by the RD treatment effect may be biased, having empirical coverage well below its nominal target. In other words, the conventional confidence intervals can substantially over-reject the null hypothesis for the absence of the treatment-effect.

The alternative proposed by Calonico, Cattaneo and Titiunik (2014) is to build more robust confidence intervals, starting with the treatment-effect estimators of the regression discontinuity for bias correction. Intuitively, these estimators are not a good fit for small samples because the estimated bias (b_n) introduces an additional variability in $\widehat{\tau}^{bc}_{p,q}(h_n, b_n) = \widehat{\tau}_p(h_n) - h_n^{p+1}\widehat{B}_{n,p,q}$. This variability is not accounted for when forming confidence intervals. This proposal incorporates an asymptotic approach for which is determined by observing that $\widehat{\tau}^{bc}_{p,q}(h_n, b_n)$ which is determined by observing that:

$$\sqrt{nh_n}\{\widehat{\tau}^{bc}_{p,q}(h_n - b_n) - \tau\} = \sqrt{nh_n}(\widehat{\tau}^{bc}_{p,q}(h_n) - \tau - h_n^{p=1}\{\widehat{B}_{n,p,q} - B_{n,p}\} \tag{4}$$

In which:

$$\sqrt{nh_n}(\widehat{\tau}^{bc}_{p,q}(h_n) - \tau - h_n^{p=1}\{\widehat{B}_{n,p,q}\} \xrightarrow[d]{} N(O, V_p) \tag{5}$$

$$\sqrt{nh_n}h_n^{p+1}\{\widehat{B}_{n,p,q} - B_{n,p}\} \xrightarrow[d]{} N\{O, V_{p+1,q}(\rho)\} \tag{6}$$

determines appropriate regularity conditions to ensure that:

$$\frac{h_n}{b_n} \to \rho \in (0, \infty) \tag{7}$$

$V_{p,q}(\rho)$ can be interpreted as the contribution of bias correction to the variability of the bias correction estimator. Under weaker constraints, the authors demonstrate that

$$\sqrt{nh_n}\{\widehat{\tau}^{bc}_{p,q}(h_n - b_n) - \tau\} \to N\{0, V^{b,c}_{p,q}(\rho)\} \tag{8}$$

Where $V^{b,c}_{p,q}(\rho)$ is the asymptotic variance estimator of the corrected bias, which is different from the usual formula,V_p. The variance formula is built to account for the variability of both estimators of treatment effect in the RD: the original one, $\widehat{\tau}_p(h)$ and the one with bias correction, $\widehat{B}_{n,p,q}$.

Overall, the robust confidence interval for the correction of bias proposed by Calonico, Cattaneo and Titunik (2014) can be defined as:

$$CI^{rbc}_{SRD}(h_n, b_n) = (\widehat{\tau}_{SRD}(h_n - h_n^{p+1}B_{n,p.q} \pm \Phi^{-1}_{1-\frac{\alpha}{2}}\sqrt{V_{SRD}(h_n) + C^{bc}_{SRD}(h_n, b_n)} \tag{9}$$

5 Results

The results are presented by political cycle. The section 5.1 refers to the results of the political cycle 2004 and section 5.2 refers to the results of the estimations for the political cycle 2008. The analysis of political cycles was carried out in two stages in order to capture the design of the Brazilian electoral calendar. Initially, we analyze the first two years of each cycle, the run-up to federal elections. We then test the same variables for the final year of each cycle, the run-up to local elections in that elect the mayors of each municipality.

According to our identification strategy, we first check for opportunistic actions on the transfer of central government funds to the municipalities aligned. After that, we check if the alignment affect's the provision of health care services, as part of the discretionary resources not linked to SUS can be used to promote actions within the system. Finally, in order to fulfill the objectives proposed by this paper, we analyze the effects of alignment on health indicators, represented by mortality rates.

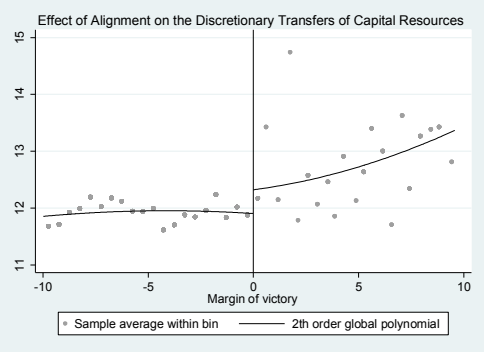
5.1 Political Cycle of 2004

5.1.1 Federal Transfers and Transferences of SUS funds

Regarding the election period after the 2004 cycle, it was found that there was discontinuity for the parametric approach in discretionary Transfers of Capital Resources. The effect of alignment on this variable expressed in logarithmic form is about 333.33%. The figure 1 illustrates this point. In the linear specification of the polynomial, municipalities where the mayors are aligned with the president receive on average 15.71% more than those who lost close races in the relation of variable ldt1. For ldt4, the effect of political alignment is about 13.28%. In the non-parametric approaches, these effects cannot be identified.

For nonparametric approach the effect of alignment between the president and mayors on discretionary Transfers of Federal Government variable have negative signal for conventional and robust model. This result is counterintuitive and deserves a deeper analysis in the future.

Figure 1: Effect of the political alignment between mayor and president on the logarithm Discretionary Transfers of Capital Resources in the 2004 cycle (2005-2006).



Source: Prepared by de authors

Notes: The horizontal axis measures the margin of votes for aligned mayors. The solid line is the predictive value of the logarithm Discretionary Transfers of Capital Resources estimated on the degree 2 polynomial. The zero point is the threshold for victory (greater than zero) and the defeat of the aligned municipalities (less than zero).

In the final period of the cycle, when there is the preparation for the upcoming municipal elections, no significant coefficient was found. The complete results are shown in Table 4 and Table 5.

Table 4: Estimates of the political alignment effects on Federal Transfers (in log) in the Political Cycle of 2004 (2005-2006).

Parametric Approach									
	Linear			Quadratic			Cubic		
Variable	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital
Effect of alignment	-0.060	-0.145	**1.466*** **	1.630		2.855	-1.066		**11.102*** **
Robust Standard Error	(0.298)	(0.417)	**(0.339)**	-1.516		-2.589	-1.420		**-3.616**
Observations	414	87	274	124	29	98	124	29	98
R-squared	0.267	0.436	0.328	0.494	0.670	0.493	0.513	0.671	0.537
Non Parametric Approach									
Conventional	**-1.702****	-2.893	0.452	**-1.544***	**-3.827***	0.206	**-1.767****	-2.065	0.084
	(0.851)	-1.873	(0.668)	**(0.798)**	**-2.042**	(0.779)	**(0.876)**	-3.432	(0.927)
Robust	**-2.010****	-3.772*	0.342	**-1.808****	-3.933	0.094	**-1.791***	-0.950	0.030
	(0.969)	-2.090	(0.726)	**(0.889)**	-2.447	(0.833)	**(0.983)**	-4.389	-1.008
Observations	52	88	101	166	105	167	261	106	190
Conventional Std. Error	0.851	1.873	0.668	0.798	2.042	0.779	0.876	3.432	0.927
Conventional p-value	0.0455	0.122	0.498	0.0530	0.0609	0.792	0.0437	0.547	0.927
Robust p-value	0.0381	0.0711	0.638	0.0421	0.108	0.910	0.0685	0.829	0.976
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	1.126	3.878	2.338	2.799	4.318	3.586	4.228	4.433	4.125
BW Bias (b)	2.555	5.702	4.824	4.670	6.406	5.870	5.510	5.633	5.302

Source: Prepared by the authors.

Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the *dummy* of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 5: Estimates of the political alignment effects on Federal Transfers of SUS (in log) in the Political Cycle of 2004 (2005-2006).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variable	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS
Effect of alignment	**0.146***	0.471	**2.328*****	0.030			0.204		
Robust Standard Error	**(0.086)**	(0.678)	**(0.550)**	(0.668)			(0.644)		
Observations	866	60	22	286	19	7	286	19	7
R-squared	0.805	0.572	0.928	0.776	0.819	1.000	0.782	0.819	1.000
	Non Parametric Approach								
Conventional	0.210	1.478	1.302	0.379	1.566	1.416	0.418	1.890	1.652
	(0.497)	-1.034	-1.149	(0.596)	-1.218	-1.334	(0.596)	-1.296	-1.539
Robust	0.223	1.654	1.340	0.423	1.599	1.569	0.436	1.666	2.022
	(0.560)	-1.204	-1.353	(0.626)	-1.356	-1.522	(0.601)	-1.599	-1.670
Observations	342	68	39	379	87	66	397	125	89
Conventional Std. Error	0.497	1.034	1.149	0.596	1.218	1.334	0.596	1.296	1.539
Conventional p-value	0.673	0.153	0.257	0.525	0.198	0.288	0.484	0.145	0.283
Robust p-value	0.691	0.169	0.322	0.499	0.238	0.303	0.468	0.298	0.226
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	3.259	3.582	2.868	3.642	4.993	4.613	3.785	6.915	5.847
BW Bias (b)	4.963	6.174	4.751	5.000	7.448	6.145	5.100	8.593	7.996

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the *dummy* of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 5 shows the results of the final period of cycle 2004. In the parametric approach, the discretionary Transfers of Capital Resources remains significant in three specifications of the polynomial. Aligned municipalities receive on average 112.5 % more capital resources from the federal level through agreements. This result is significant at 1 % . In the nonparametric approach, only this variable was significant. The effect of alignment is achieved of 266 % more.

Transfers of direct agreements for SUS also showed sensitivity to alignment variable. Showing that on the eve of municipal elections, the aligned municipalities receive around 149 % more resources than the non-aligned, according to the linear specification. Transfers to SUS are significant to 5 %. Aligned mayors received about 41 % more resources to their municipalities at the end of the policy cycle in 2004.Full results are available in Table 6 and Table 7.

Table 6: Estimates of the political alignment effects on Federal Transfers (in log) in the Political Cycle of 2004 (2007-2008)

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variables	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital
Alignment Effect	0.201	-0.325	**0.754*****	-0.890		**1.781*****	-1.719		**1.702***
Robust standard errors	(0.418)	(0.718)	**(0.276)**	(0.848)		**(0.611)**	-1.373		**(0.893)**
Observations	286	101	260	79	19	64	79	19	64
R-squared	0.400	0.568	0.432	0.690	0.929	0.503	0.698	0.947	0.583
	Non Parametric Approach								
Conventional	1.236	0.942	**1.323****	1.314	4.241	0.955	0.565	5.821	0.572
	-1.015	-2.951	**(0.596)**	-1.189	-3.975	(0.776)	-1.642	-4.532	(0.968)
Robust	1.328	1.790	**1.378****	1.329	6.393	0.767	0.235	7.632	0.566
	-1.198	-3.323	**(0.657)**	-1.342	-4.746	(0.838)	-1.821	-5.274	-1.034
Observations	149	64	179	218	66	163	220	102	168
Conventional Std. Error	1.015	2.951	0.596	1.189	3.975	0.776	1.642	4.532	0.968
Conventional p-value	0.224	0.749	0.0263	0.269	0.286	0.219	0.731	0.199	0.555
Robust p-value	0.268	0.590	0.0360	0.322	0.178	0.360	0.897	0.148	0.584
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	3.209	2.729	3.671	5.064	2.945	3.201	5.076	4.700	3.306
BW Bias (b)	4.849	4.338	5.773	6.591	4.943	4.992	6.644	6.291	4.706

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the *dummy* of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 7: Estimates of the political alignment effects on Federal Transfers of SUS (in log) in the Political Cycle of 2004 (2005-2006).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variables	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS
Alignment Effect	0.016	**2.776****		**0.352****			**0.359****		
Robust standard errors	(0.057)	**-1.134**		**(0.158)**			**(0.163)**		
Observations	711	41	17	183	15	6	183	15	6
R-squared	0.914	0.570	0.861	0.910	0.993	0.999	0.910	0.993	0.999
	Non Parametric Approach								
Conventional	0.794	0.838	1.484	0.847	1.374	2.123	0.806	1.820	2.213
	(0.674)	-1.050	-1.609	(0.804)	-1.167	-2.039	(0.867)	-1.625	-2.295
Robust	0.770	1.122	1.700	0.809	1.660	2.376	0.807	1.830	2.283
	(0.780)	-1.150	-1.836	(0.869)	-1.255	-2.301	(0.900)	-1.790	-2.491
Observations	256	33	41	305	45	43	353	50	58
Conventional Std. Error	0.674	1.050	1.609	0.804	1.167	2.039	0.867	1.625	2.295
Conventional p-value	0.239	0.425	0.356	0.292	0.239	0.298	0.353	0.263	0.335
Robust p-value	0.323	0.329	0.355	0.352	0.186	0.302	0.370	0.307	0.359
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	2.956	3.061	3.050	3.662	4.562	3.383	4.362	5.153	4.953
BW Bias (b)	3.977	5.721	4.765	4.546	7.272	4.597	5.286	7.564	6.298

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the *dummy* of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

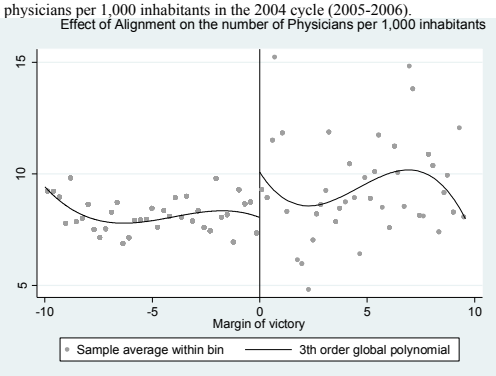
5.1.2 Health Care Services Provision

Once found evidence of opportunistic actions on the transfer of federal funds to municipalities that belong to the same party as the president, intends to verify if the political alignment affects the provision of services to the population. As health services offer proxy variables were used, number of physicians and hospital beds per 1,000 inhabitants and Immunization Coverage.

In relation to the initial period of the cycle 2004, it appears that only the variable Immunization Coverage presents significant result in the 10% significance level. The Immunization Coverage between aligned municipalities is on average 1.11% higher, in parametric approach with linear specification. In nonparametric approach the sensitivity of the data improves.

The variable Physicians indicates that on average the aligned municipalities have 2-3 more doctors per thousand inhabitants than the non-aligned to the central government. This result was identified in three specifications of the polynomial by the conventional method. The Figure 2 illustrates these differences. In the estimation method for robust confidence intervals, the linear specification of the polynomial does not detect differences between aligned and unaligned.

Figure 2: Effect of the political alignment between mayor and president on the number of the physicians per 1,000 inhabitants in the 2004 cycle (2005-2006).



Source: Prepared by de authors
Notes: The horizontal axis measures the margin of votes for aligned mayors. The solid line is the predictive value of number of the physicians per 1,000 inhabitants estimated on the degree 3 polynomial. The zero point is the threshold for victory (greater than zero) and the defeat of the aligned municipalities (less than zero).

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Although for the nonparametric approach, the Immunization Coverage has indicated there effect between the political alignment and the provision of this service, the signal effect is negative. This result suggests that there is some disadvantage in offering this service to the population located in aligned municipalities.

The variable Hospital beds is significant by nonparametric approach by the two methods in the estimation of confidence intervals, on the quadratic and cubic specification of the polynomial. The results indicate that the aligned municipalities have on average 3 to 4 hospital beds more than the municipalities not aligned to the central government, with 5% significance level.

At the end of the 2004 election cycle, it appears that the effect of political alignment for the hospital beds per 1,000 inhabitants was significant for the parametric approach to quadratic and cubic specifications of the polynomial. However, the signal effect is negative and the value of the effect is around 0.5%. The same happens with the doctor per thousand inhabitants. In the nonparametric approach, the sign of the effect of political alignment on the Immunization Coverage is ambiguous; positive is presented only for the cubic and negative specification for other specifications.

The effect of alignment between mayors and president for Hospital beds at the end of the cycle in 2004 is expected, indicating that aligned municipalities have on average 4 hospital beds more per thousand that the non-aligned. All results can be found in the tables 8 and 9.

Table 8: Estimates of the effect of political alignment on health care service provision in the 2004 political cycle (2005-2006).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variable	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage
Effect of alignment	-0.037	0.016	**1.117***	-0.270	0.055	-0.646	-0.478	0.068	0.512
Robust Standard Error	(0.131)	(0.038)	**(0.662)**	(0.331)	(0.043)	(1.498)	(0.324)	(0.052)	(1.679)
Observations	1,086	1,086	1,086	357	357	357	357	357	357
R-squared	0.900	0.991	0.646	0.911	0.985	0.703	0.911	0.985	0.706
	Non Parametric Approach								
Conventional	**1.927***	-0.705	**-4.933****	**3.466****	**3.551****	**-5.380***	**3.701****	**3.881****	-5.303
	(1.131)	(0.977)	**(2.434)**	**(1.607)**	**(1.796)**	**(3.221)**	**(1.758)**	**(1.774)**	(3.770)
Robust	2.049	-0.667	**-5.063***	**3.758****	**4.089****	-5.799	**4.062****	**4.450****	-5.591
	(1.275)	(1.069)	**(2.757)**	**(1.758)**	**(2.003)**	(3.571)	**(1.877)**	**(1.951)**	(4.153)
Observations	384	446	281	346	240	334	544	396	446
Conventional Std. Error	1.131	0.977	2.434	1.607	1.796	3.221	1.758	1.774	3.770
Conventional p-value	0.0884	0.471	0.0427	0.0310	0.0481	0.0948	0.0353	0.0286	0.160
Robust p-value	0.108	0.533	0.0663	0.0325	0.0413	0.104	0.0304	0.0225	0.178
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	3.486	3.993	2.549	3.151	2.172	3.051	4.835	3.574	3.998
BW Bias (b)	6.167	5.716	4.459	5.048	3.717	4.617	6.701	5.332	5.446

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 9: Estimates of the effect of political alignment on health care service provision in the 2004 political cycle (2007-2008).

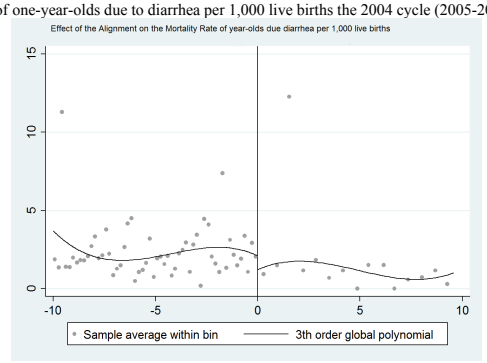
	Parametric Approach								
	Linear			Quadratic			Cubic		
Variable	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage
Effect of alignment	**-0.850****	0.189	-0.255	-0.520	**-0.558****	-3.545	-1.370	**-0.579***	-4.493
Robust Standard Error	**(0.386)**	(0.145)	(0.939)	(0.825)	**(0.215)**	(2.695)	(1.082)	**(0.296)**	(3.488)
Observations	808	808	808	211	211	211	211	211	211
R-squared	0.575	0.933	0.458	0.494	0.891	0.477	0.509	0.895	0.482
	Non Parametric Approach								
Conventional	-0.116	-0.820	-4.799	0.099	**4.456****	**-5.904***	0.368	**4.049***	**-7.498****
	(1.272)	(1.207)	(2.964)	(1.551)	**(2.169)**	**(3.370)**	(1.941)	**(2.165)**	**(3.615)**
Robust	0.039	-0.608	**-6.204***	0.113	**5.098****	**-6.385***	0.251	**4.545***	**-7.934****
	(1.440)	(1.335)	**(3.296)**	(1.759)	**(2.433)**	**(3.785)**	(2.137)	**(2.562)**	**(3.925)**
Observations	211	340	146	290	201	234	318	314	328
Conventional Std. Error	1.272	1.207	2.964	1.551	2.169	3.370	1.941	2.165	3.615
Conventional p-value	0.927	0.497	0.105	0.949	0.0399	0.0798	0.850	0.0614	0.0381
Robust p-value	0.978	0.649	0.0598	0.949	0.0362	0.0916	0.907	0.0760	0.0432
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	2.328	4.103	1.554	3.240	2.238	2.556	3.733	3.637	3.901
BW Bias (b)	4.068	6.039	2.971	4.674	3.842	3.865	5.033	4.937	5.402

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

5.1.3 Health Indicators

The results for the heath indicators were not significant to the estimates that consider the parametric approach in the initial period of the 2004 cycle. However, for non-parametric approach variables Mortality rate due to diarrhea and Overall Infant Mortality Rate showed effect on the alignment between mayors and president. Municipalities aligned with the president have the Mortality rate due to diarrhea on average 2 to 3 lower than those who are not aligned. This result is illustrated for figure 3.

Figure 3: Effect of the political alignment between mayor and president on Mortality Rate of one-year-olds due to diarrhea per 1,000 live births the 2004 cycle (2005-2006).



Source: Prepared by de authors
Notes: The horizontal axis measures the margin of votes for aligned mayors. The solid line is the predictive value Mortality Rate of one-year-olds due diarrhea per 1,000 inhabitants estimated on the degree 3 polynomial. The zero point is the threshold for victory (greater than zero) and the defeat of the aligned municipalities (less than zero).

In relation to Overall Infant Mortality Rate, the effect of the political alignment between the local and central governments is greater. Aligned municipalities have on average 8 to 10 deaths less per thousand live births. These results are valid with significance level of 5%. The advantage of

the nonparametric approach is to decrease the probability of over-reject the null hypothesis. For the variable Maternal Mortality Rate , the results were not significant at any of approaches.

Regarding the final period of the 2004 cycle (prior to municipal elections) it was found that there were no significant results for health indicators in any of the approaches. The only significant result refers to the variable Mortality rate due to diarrhea, the parametric approach to linear specification. According to this result, municipalities where the mayors are aligned to the president have an average infant death from diarrhea in thousand live births. While this result has been found is a weak evidence that there are health effect on this indicator. The complete results are shown in Tables 10 and 11.

Table 10: Estimates of the effect of political alignment on the heath indicators in the 2004 political cycle (2005-2006).

	Parametric Approach								
	Linear			**Quadratic**			**Cubic**		
Variable	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate
Effect of alignment	0.026	2.378	-0.331	-0.461	-3.325	0.103	-0.640	-5.223	0.005
Robust Standard Error	(0.737)	(1.637)	(0.295)	(0.712)	(4.258)	(0.522)	(0.879)	(5.046)	(0.528)
Observations	1,086	1,086	1,086	357	357	357	357	357	357
R-squared	0.072	0.086	0.072	0.202	0.160	0.093	0.203	0.162	0.094
	Non Parametric Approach								
Conventional	**-2.031****	**-8.495****	1.835	**-2.758****	**-10.539****	3.302	**-3.040****	**-11.322****	3.717
	(0.980)	**(3.872)**	(2.731)	**(1.386)**	**(4.801)**	(3.855)	**(1.494)**	**(5.172)**	(4.174)
Robust	**-2.224****	**-9.012****	2.449	**-2.947***	**-11.222****	3.904	**-3.006***	**-11.688****	4.180
	(1.076)	**(4.251)**	(3.233)	**(1.553)**	**(5.209)**	(4.266)	**(1.624)**	**(5.513)**	(4.522)
Observations	311	281	319	301	324	382	482	470	562
Conventional Std. Error	0.980	3.872	2.731	1.386	4.801	3.855	1.494	5.172	4.174
Conventional p-value	0.0381	0.0282	0.502	0.0465	0.0281	0.392	0.0418	0.0286	0.373
Robust p-value	0.0388	0.0340	0.449	0.0578	0.0312	0.360	0.0642	0.0340	0.355
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	2.927	2.625	2.976	2.813	3.002	3.451	4.311	4.227	4.991
BW Bias (b)	5.403	4.939	4.698	4.475	4.689	4.400	6.091	5.926	5.999

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 11: Estimates of the effect of political alignment on heath indicators in the 2004 political cycle (2007-2008).

	Parametric Approach								
	Linear			**Quadratic**			**Cubic**		
Variable	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate
Effect of alignment	**-1.255****	-1.933	0.078	-3.511	-3.035	-0.624	-3.401	2.185	-0.730
Robust Standard Error	**(0.542)**	(1.688)	(0.233)	(2.441)	(4.175)	(0.435)	(2.828)	(5.142)	(0.526)
Observations	808	808	808	211	211	211	211	211	211
R-squared	0.125	0.067	0.016	0.174	0.170	0.121	0.175	0.181	0.122
	Non Parametric Approach								
Conventional	0.175	0.195	-0.415	-0.139	-0.809	-0.540	-1.337	-1.901	-0.525
	(0.724)	(4.579)	(0.333)	(0.752)	(5.649)	(0.600)	(0.959)	(6.956)	(0.730)
Robust	0.196	-0.949	-0.455	-0.222	-1.274	-0.532	-1.478	-2.023	-0.546
	(0.868)	(5.188)	(0.420)	(0.801)	(6.336)	(0.703)	(1.092)	(7.677)	(0.858)
Observations	274	234	262	318	324	298	306	370	392
Conventional Std. Error	0.724	4.579	0.333	0.752	5.649	0.600	0.959	6.956	0.730
Conventional p-value	0.809	0.966	0.213	0.854	0.886	0.368	0.163	0.785	0.472
Robust p-value	0.821	0.855	0.278	0.782	0.841	0.449	0.176	0.792	0.524
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	3.052	2.647	2.908	3.688	3.798	3.313	3.507	4.506	4.886
BW Bias (b)	5.648	4.580	4.787	5.829	5.551	5.256	5.573	5.810	6.476

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

5.2 Political Cycle of 2008

5.2.1 Federal Transfers and Transference of SUS funds

The results for the initial period of the 2008 cycle were not significant. The only effect was found for variable Discretionary Transfers of Capital Resources in nonparametric approach. According to this result , the municipalities where mayors are aligned to the central government received 275% more capital resources through agreements.

At the end of the period to variable Discretionary Transfers of Federal Government was significant, at level 10% , for the parametric approach only in the linear specification. Still, the effect was negative for the aligned, against the theoretical assumptions. In the nonparametric approach, the effect on the variable Transfers of Capital Resources is ambiguous. The effect is positive for the quadratic

specification, about 520 % more , with a significance of 10 %, and negative for the cubic polynomial specification , around 349 % less. All results can be found in tables 12 to 15.

Table 12: Estimates of the effect of political alignment on federal transfers (in log) in the 2008 political cycle (2009-2010).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variables	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital
Effect of alignment	-0.306	0.112	0.260	-0.484	1.226	0.883	0.104	-2.586	0.819
Robust Standard Error	(0.428)	(0.440)	(0.242)	-1.055	-3.496	(0.813)	-1.199	-4.667	-1.126
Observations	325	112	419	114	26	129	114	26	129
R-squared	0.194	0.549	0.218	0.310	0.865	0.286	0.342	0.874	0.289
	Non Parametric Approach								
Conventional	1.236	0.942	**1.323****	1.314	4.241	0.955	0.565	5.821	0.572
	-1.015	-2.951	**(0.596)**	-1.189	-3.975	(0.776)	-1.642	-4.532	(0.968)
Robust	1.328	1.790	**1.378****	1.329	6.393	0.767	0.235	7.632	0.566
	-1.198	-3.323	(0.657)	-1.342	-4.746	(0.838)	-1.821	-5.274	-1.034
Observations	149	64	179	218	66	163	220	102	168
Conventional Std. Error	1.015	2.951	0.596	1.189	3.975	0.776	1.642	4.532	0.968
Conventional p-value	0.224	0.749	0.0263	0.269	0.286	0.219	0.731	0.199	0.555
Robust p-value	0.268	0.590	0.0360	0.322	0.178	0.360	0.897	0.148	0.584
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	3.209	2.729	3.671	5.064	2.945	3.201	5.076	4.700	3.306
BW Bias (b)	4.849	4.338	5.773	6.591	4.943	4.992	6.644	6.291	4.706

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 13: Estimates of the political alignment effects on Federal Transfers of SUS (in log) in the Political Cycle of 2004 (2005-2006).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variables	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS
Effect of alignment	-0.003	0.739	0.965	0.041			0.139		
Robust Standard Error	(0.028)	(0.861)	(0.835)	(0.086)			(0.102)		
Observations	786	47	35	263	19	3	263	19	3
R-squared	0.959	0.500	0.445	0.953	0.949	1.000	0.954	0.949	1.000
	Non Parametric Approach								
Conventional	0.794	0.838	1.484	0.847	1.374	2.123	0.806	1.820	2.213
	(0.674)	-1.050	-1.609	(0.804)	-1.167	-2.039	(0.867)	-1.625	-2.295
Robust	0.770	1.122	1.700	0.809	1.660	2.376	0.807	1.830	2.283
	(0.780)	-1.150	-1.836	(0.869)	-1.255	-2.301	(0.900)	-1.790	-2.491
Observations	256	33	41	305	45	43	353	50	58
Conventional Std. Error	0.674	1.050	1.609	0.804	1.167	2.039	0.867	1.625	2.295
Conventional p-value	0.239	0.425	0.356	0.292	0.239	0.298	0.353	0.263	0.335
Robust p-value	0.323	0.329	0.355	0.352	0.186	0.302	0.370	0.307	0.359
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	2.956	3.061	3.050	3.662	4.562	3.383	4.362	5.153	4.953
BW Bias (b)	3.977	5.721	4.765	4.546	7.272	4.597	5.286	7.564	6.298

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 14: Estimates of the effect of political alignment on the federal transfers in the 2008 political cycle (2011-2012).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variables	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital	Federal Discretionary Transfers	Transfers of Capital	Discretionary Transfers of Capital
Effect of alignment	**-0.725***	0.311	0.235	-0.300	-0.350	0.075	-0.503	0.035	-0.069
Robust Standard Error	**(0.374)**	(0.472)	(0.205)	(0.788)	(0.821)	(0.326)	-1.257	(0.974)	(0.376)
Observations	245	98	424	104	55	173	104	55	173
R-squared	0.326	0.222	0.205	0.483	0.415	0.258	0.485	0.425	0.261
	Non Parametric Approach								
Conventional	0.832	1.379	0.042	1.043	**1.825***	-1.108	0.998	1.739	**-1.500***
	(0.668)	(0.977)	(0.513)	-1.213	**-1.076**	(0.731)	-1.572	-1.086	**(0.867)**
Robust	0.926	1.689	0.096	1.066	**2.044***	**-1.312***	0.891	1.876	**-1.635***
	(0.829)	-1.088	(0.599)	-1.489	**-1.192**	**(0.773)**	-1.898	-1.207	**(0.926)**
Observations	137	38	236	131	73	192	156	144	220
Conventional Std. Error	0.668	0.977	0.513	1.213	1.076	0.731	1.572	1.086	0.867
Conventional p-value	0.213	0.158	0.934	0.390	0.0899	0.130	0.526	0.109	0.0836
Robust p-value	0.264	0.121	0.872	0.474	0.0865	0.0897	0.639	0.120	0.0775
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	3.660	1.810	3.630	3.447	2.988	2.865	4.243	4.957	3.280
BW Bias (b)	5.878	3.370	5.322	4.492	4.485	4.597	5.014	6.554	4.477

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 15: Estimates of the political alignment effects on Federal Transfers of SUS (in log) in the Political Cycle of 2004 (2005-2006).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variables	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS	Federal Transfers of SUS	Discretionary Transfers of SUS	Discretionary Transfers of Capital Resources of SUS
Effect of alignment	-0.051	0.284	0.509	-0.101			-0.084		
Robust Standard Error	(0.050)	-2.544	(0.812)	(0.087)			(0.105)		
Observations	693	26	44	298	13	11	298	13	11
R-squared	0.913	0.771	0.877	0.900	0.942	0.901	0.900	0.942	0.901
Non Parametric Approach									
Conventional	-0.064	0.706	-0.867	-0.230	1.179	-1.138	-0.322	1.287	-1.165
	(0.287)	-1.187	(0.798)	(0.410)	-1.712	(0.866)	(0.461)	-2.095	-1.004
Robust	-0.090	1.059	-1.015	-0.329	1.323	-1.187	-0.368	1.156	-1.217
	(0.335)	-1.392	(0.920)	(0.474)	-2.085	(0.962)	(0.534)	-2.541	-1.103
Observations	226	19	43	246	24	87	363	37	106
Conventional Std. Error	0.287	1.187	0.798	0.410	1.712	0.866	0.461	2.095	1.004
Conventional p-value	0.823	0.552	0.277	0.574	0.491	0.189	0.484	0.539	0.246
Robust p-value	0.787	0.447	0.270	0.488	0.526	0.217	0.490	0.649	0.270
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	2.854	2.489	2.227	3.101	3.542	4.197	4.544	4.558	5.331
BW Bias (b)	4.650	4.991	4.060	4.455	5.270	6.086	5.769	6.002	7.068

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

5.2.2 Heath Care Service Provision

The variables of heath care showed no significant result for the parametric approach in the 2008 cycle, in both periods . Only the variable Hospital beds proved relevant to the end of the cycle . The effect of alignment indicates that municipalities aligned with the president have on average 0.7 hospital beds more than not aligned with significance of 10 %.

In the nonparametric approach , the results for the variable Physicians have become more sensitive to alignment both at the beginning and end of the cycle . However, the effect of the signal is negative, contrary to the theoretical assumption . The variable Hospital beds also had the sign of negative in both periods . The Immunization Coverage also had a negative sign for the purpose of alignment with the central government , but only for the second period. Results are showed in table 16 and table 17.

Table 16: Estimates of the effect of political alignment on health care in the 2008 political cycle (2009-2010).

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variable	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage
Alignment Effect	0.349	0.064	0.589	0.489	-0.055	0.219	0.571	-0.111	0.249
Robust Standard error	(0.224)	(0.141)	(1.166)	(0.476)	(0.175)	(3.129)	(0.620)	(0.208)	(3.958)
Observations	853	853	853	290	290	290	290	290	290
R-squared	0.843	0.942	0.245	0.846	0.929	0.320	0.846	0.929	0.321
Non Parametric Approach									
Conventional	**-2.576****	-0.928	1.511	**-4.320*****	-1.154	-0.208	**-4.321*****	**-3.295*****	-1.073
	(1.151)	(0.994)	(3.819)	**(1.140)**	(1.035)	(4.350)	**(1.180)**	**(1.097)**	(4.692)
Robust	**-2.685****	-0.922	0.649	**-4.572*****	-1.242	-0.953	**-4.463*****	**-3.330*****	-1.514
	(1.312)	(1.093)	(4.491)	**(1.221)**	(1.051)	(4.854)	**(1.244)**	**(1.181)**	(5.078)
Observations	452	358	174	258	450	326	430	308	492
Conventional Std. Error	1.151	0.994	3.819	1.140	1.035	4.350	1.180	1.097	4.692
Conventional p-value	0.0252	0.350	0.692	0.000151	0.265	0.962	0.000252	0.00267	0.819
Robust p-value	0.0406	0.399	0.885	0.000181	0.237	0.844	0.000333	0.00480	0.766
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	4.773	3.903	1.941	2.749	4.717	3.499	4.527	3.222	5.326
BW Bias (b)	6.945	5.282	3.459	4.469	6.823	5.305	6.477	4.803	7.022

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 17: Estimates of the effect of political alignment on health care in the 2008 political cycle (2011-2012)

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variables	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage	Physicians	Hospital beds	Immunization Coverage
Alignment Effect	-0.192	0.121	-0.017	-0.551	**0.780***	5.491	-0.051	0.599	2.528
Robust Standard error	(0.437)	(0.219)	(2.926)	(0.846)	**(0.428)**	(5.839)	(1.005)	(0.524)	(7.185)
Observations	760	760	760	329	329	329	329	329	329
R-squared	0.706	0.789	0.132	0.731	0.772	0.149	0.733	0.773	0.163
Non Parametric Approach									
Conventional	-1.575	-0.426	**-19.220*****	**-3.529****	**-2.472*****	**-24.003*****	**-4.380*****	**-3.518*****	**-26.753*****
	(1.488)	(0.952)	**(6.228)**	**(1.418)**	**(0.892)**	**(7.208)**	**(1.593)**	**(1.151)**	**(7.790)**
Robust	-1.632	-0.378	**-22.287*****	**-3.861****	**-2.811*****	**-25.893*****	**-4.698*****	**-3.597*****	**-27.859*****
	(1.668)	(1.103)	**(6.800)**	**(1.538)**	**(0.931)**	**(7.839)**	**(1.729)**	**(1.247)**	**(8.385)**
Observations	372	416	136	238	230	212	319	260	319
Conventional Std. Error	1.488	0.952	6.228	1.418	0.892	7.208	1.593	1.151	7.790
Conventional p-value	0.290	0.655	0.00203	0.0128	0.00560	0.000869	0.00596	0.00225	0.000594
Robust p-value	0.328	0.732	0.00105	0.0121	0.00253	0.000957	0.00659	0.00393	0.000892
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	4.464	5.228	1.655	2.858	2.830	2.659	3.880	3.133	3.898
BW Bias (b)	5.880	6.864	3.885	4.515	5.006	4.186	5.646	4.591	5.392

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

5.2.3 Health Care Indicators

Table 18 and 19 show the results of political alignment on health indicators. At the end of the cycle 2008, there is a decrease in the Maternal Mortality Rate to municipalities aligned in the non parametric estimates. On the other side, the effect of alignment on the variable Overall Infant Mortality Rate was positive in the initial period of this cycle. The average effect is 11 to 12 deaths per 1,000 live births. In the final period there was no statistical significance for this variable.

For all variables, except the Maternal Mortality rate, there was no significant effect of alignment on health indicators in the parametric approach.

Table 18: Estimates of the effect of political alignment on health indicators in the 2008 political cycle (2009-2010)

	Parametric Approach								
	Linear			Quadratic			Cubic		
Variable	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate
Alignment Effect	-0.257	-2.351	-0.150	0.321	-10.938	0.008	-0.446	-8.935	-0.166
Robust Standard error	(0.308)	(1.978)	(0.198)	(0.442)	(6.761)	(0.318)	(1.138)	(8.461)	(0.515)
Observations	853	853	853	290	290	290	290	290	290
R-squared	0.034	0.086	0.036	0.124	0.145	0.047	0.129	0.153	0.048
	Non Parametric Approach								
Conventional	1.185	**11.870****	-0.139	1.336	**12.838****	-0.055	1.174	**14.958****	-0.081
	(1.899)	**(5.371)**	(0.149)	(2.424)	**(6.255)**	(0.261)	(2.776)	**(7.284)**	(0.144)
Robust	1.362	**12.886****	-0.138	1.238	**13.655***	-0.032	1.132	**15.546***	-0.066
	(2.352)	**(6.343)**	(0.194)	(2.744)	**(7.106)**	(0.301)	(2.910)	**(7.993)**	(0.165)
Observations	380	214	162	492	358	282	588	478	312
Conventional Std. Error	1.899	5.371	0.149	2.424	6.255	0.261	2.776	7.284	0.144
Conventional p-value	0.533	0.0271	0.353	0.582	0.0401	0.832	0.672	0.0400	0.571
Robust p-value	0.562	0.0422	0.479	0.652	0.0547	0.917	0.697	0.0518	0.690
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	4.092	2.330	1.751	5.349	3.868	2.946	6.224	5.043	3.326
BW Bias (b)	5.534	4.081	4.034	6.390	5.387	4.793	7.893	6.303	5.320

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

Table 19: Estimates of the effect of political alignment on health indicators in the 2008 political cycle (2011-2012)

	Parametric Approach								
Variable	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate	Mortality rate due to diarrhea	Overall Infant Mortality Rate	Maternal Mortality Rate
Alignment Effect	0.167	-0.766	**-0.589****	-0.142	-2.152	-0.590	-0.290	-1.198	-0.549
Robust Standard error	(0.282)	(1.626)	**(0.270)**	(0.437)	(3.314)	(0.613)	(0.540)	(4.455)	(0.923)
Observations	760	760	760	329	329	329	329	329	329
R-squared	0.079	0.070	0.025	0.081	0.093	0.026	0.091	0.094	0.026
	Non Parametric Approach								
Conventional	-0.813	-4.728	**-1.271****	-1.254	-5.843	**-1.267***	-0.860	-7.941	**-1.232***
	(0.687)	(5.149)	**(0.645)**	(0.840)	(5.526)	**(0.733)**	(0.996)	(6.267)	**(0.714)**
Robust	-0.853	-6.592	**-1.429***	-1.406	-7.415	**-1.374***	-0.722	-8.946	-1.176
	(0.859)	(5.979)	**(0.762)**	(0.954)	(6.280)	**(0.803)**	(1.082)	(7.073)	(0.719)
Observations	156	156	186	319	305	313	350	416	327
Conventional Std. Error	0.687	5.149	0.645	0.840	5.526	0.733	0.996	6.267	0.714
Conventional p-value	0.237	0.358	0.0488	0.136	0.290	0.0838	0.388	0.205	0.0844
Robust p-value	0.321	0.270	0.0608	0.140	0.238	0.0870	0.505	0.206	0.102
Order Loc. Poly. (p)	1	1	1	2	2	2	3	3	3
Order Bias (q)	2	2	2	3	3	3	4	4	4
BW Loc. Poly. (h)	1.975	1.959	2.278	3.894	3.658	3.798	4.205	5.145	4.026
BW Bias (b)	3.131	3.366	3.805	5.785	5.161	4.697	6.216	6.367	5.448

Source: Prepared by the authors.
Notes: The regressions of the parametric form include the polynomial of the margin of votes and its interaction with the dummy of the alignment with the president. The regression also controls, for state-specific purposes, the year and the value of the dependent variable in the initial year of the cycle. The standard errors in brackets are grouped in clusters of municipalities. Level of significance: ***< 1%, ** <5%, * <10%. The regression discontinuity of the conventional non-parametric kind does not allow for bias correction.

6 Final Considerations

The aim of this article was to analyze how the political alignments influence health care in Brazilian municipalities. The theory of political cycles studies, within a democratic political system, how the political choices of governments affect economic variables. This influence can occur through the practice of opportunistic actions, in which the decisions of the elected members of government seeks only to maintaining their power or in which political actions are taken solely to meet the aspirations of specific groups (seeing this through the ideological-partisan point of view).

This article contributes to the literature on political cycles by adopting a differentiated identification strategy through the use of the regression discontinuity design for the analysis of the effect of political alignment on health care in Brazilian municipalities. This estimator, which accommodates

the presence of unobserved variable and fixed factors in time, shows that the mayors who are politically aligned with the president and who participated in closely fought elections tend to receive more on federal transfers in the two first two years after the elections.

We found that the main variable that allows opportunistic actions of politicians is the discretionary transfer of capital resources between the central and municipal government. The funds received exclusively for the SUS have little sensitivity to political alliances, since they are determined by specific legislation. Thus, according to our analysis, the resources for health in Brazil are not subject to strong electoral manipulation. However, there is still a channel through which it is possible to opportunistic allocation of resources.

The estimates found increased health service provision at the beginning of the election cycle of 2004, more than in 2008. Regarding health indicators there was low sensitivity of such data to the political alignment. This can be attributed to the fact that these variables are long-term policy dependent and are correlated with people's health habits. Many of the estimates found effects with the sign opposite to that indicated by the literature, it is believed that this fact may be correlated with the extent of policy effects.

The strategy of dividing the electoral cycles in periods allow us to identify different behaviors according to the electoral calendar. The effects of alignment to the central government are more sensitive in the run-up to presidential election, i.e., the first two years of each cycle. This is strong evidence that the political actions aimed at maintaining power.

The comparison between the estimates of the political cycles of 2004 and 2008 show that the data for 2004 are more sensitive to alignment than 2008. Among the possible hypotheses, it is considered that a possible effect of the financial crisis in 2008 can have contributed to a slight adjustment of public accounts. The political cycle 2008 includes the period of development of new four-year planning (PPA 2008-2011-Plano Prurianual). In addition, this period is no longer possible to re-election, ending his second term. Even with the party's maintenance of Workers (PT) in the central government in the years 2011 and 2012, the Brazilian electorate is characterized by personalism.

Among the limitations of the article, these stand out: i) the difficulty of condensing the complexity of the concept of health care into a number of relevant variables. Even if that were possible, there would still be the problem of data reliability, since the information system is powered by its local health care managers, and many of these municipalities are linked to a management **?**pact**?** with the states where the release of funds is linked to the achievement of goals; ii) the effect of time and the behavior of individuals regarding health. Some variables are sensitive to short-term policies, whereas others need investment maturation to be changed. The rulers do not control habits, beliefs, values, and behaviors of individuals regarding their health status.

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