Opportunistic Public Health Provision and Electoral Returns of Public Health Spending: Lessons from a Constitutional Reform in Brazil*

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Abstract

This paper combines health economics with political economy to describe the relationship between term limits and opportunistic political business cycles in public health care, and to document the electoral returns of public health spending at the local level. By leveraging the variation in health spending promoted by Brazil's 29th Constitutional Amendment of 2000 I am able to describe differential increases in spending, types of spending, and health inputs, between municipalities with mayors in first and second mandates. Moreover, I take advantage of this exogenous variation to estimate the electoral returns to health spending. The results suggest that term limits lead to opportunistic behavior and that voters reward increases in health spending. The estimates suggest that this effect is mediated by increases in primary care coverage and the supply of hospitals.

JEL Codes: I1, I3, O5, P16.
Keywords: Health spending; health care production; political business cycle; term limits; elections.

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1 Introduction

Since the seminal work of Nordhaus (1975), that proposed a theoretical model in which incumbent politicians would use economic policies opportunistically prior to elections to gain electoral advantage, a large stream of empirical work has been published testing his theory, the so called "Political Business Cycle". In general, this literature not only produced mixed evidence, but also generally overlooks how election eligibility and term limits affect opportunistic behavior.

The aim of this chapter is to empirically study the Political Business Cycle (PBC) in local governments within the Brazilian public health sector. We leverage the exogenous variation in local public health spending promoted by the EC/29 to answer several questions related to the PBC. Do mayors eligible to reelection behave opportunistically when they are induced to increase health spending? How do resource allocation and the supply of health inputs differ between municipalities with mayors that are eligible and not eligible for reelection? More specifically, do eligible mayors favor "visible expenditures" over other expenditures? If yes, do these expenditures actually translate into "visible public goods"? Finally, do public health spending and the supply public health goods affect reelection probabilities?

Political economists have long incorporated opportunistic behavior into political business cycle models. These theoretical studies have mainly focused on central governments monetary policy (Kramer, 1971; Nordhaus, 1975; Tufte, 1975; Lindbeck, 1976; Fair, 1978) and fiscal policy (Frey and Schneider, 1978a,b; Tufte, 1978; Rogoff and Sibert, 1988; Rogoff, 1990). However, empirical evidence supporting PBC has been more limited, specially when it comes to opportunistic behavior in local governments and in developing economies. Gonzalez (2002) finds evidence of opportunistic fiscal policy of the Mexican central government in election years. In opposition, Alesina et al. (1997) results indicate no opportunistic behavior for a sample of OECD countries. More recent cross-country studies have focused on examining countries at different levels of democratic maturity. Brender and Drazen (2005) found evidence of the influence of the electoral cycle on fiscal policy, but the effect comes only from young democracies. Similarly, Shi and Svensson (2006) present evidence of increases in deficit in election years, with effects being much larger in developing countries. They argue that this effect is explained by more inexperienced voters that are more susceptible to fiscal policy manipulations. Akhmedov and Zhuravskaya (2004) investigate a panel of monthly data for Russian jurisdictions and find evidence of a short lived PBC with increase in public expenditure before elections and decrease right after. Moreover, the findings suggest that the size of the cycle decreases with democracy, transparency, voter awareness, and media freedom.

Another stream of literature analyses not only the dynamics of expenditures around the elections, but also the composition of spending. In a cross-country study, Vergne (2009) finds evidence

of spending shifting towards visible current spending, such as subsidies and wages, and away from investments. The only study looking at local governments that finds similar evidence is Sakurai and Menezes-Filho (2011). In contrast, Kneebone and McKenzie (2001) finds evidence of increases in visible expenditure, in particular, investments in heavy infrastructures and road construction for Canadian provinces. Veiga and Veiga (2007) find that, in election years in Portugal, local governments reduce tax income and increase expenditure, specially investment expenditure. Drazen and Eslava (2010)'s model suggests that incumbents may try to influence voters by changing the composition of spending but not necessarily increasing total spending. Their empirical analysis for Colombian local governments suggests that the composition of expenditure in election years shifts towards road construction and heavy infrastructure.

One aspect of the political business cycle that has been overlooked by this literature is term limits. If the motivation politicians have to behave opportunistically comes from the possibility of gaining electoral advantage, then eligibility to run for reelection is central in the analysis of political cycles. Cross-country evidence that looks at the effects of term-limits on incumbent behavior is scant and inconclusive. For instance, Johnson and Crain (2004) document effects on spending, whereas Dalle Nogare and Ricciuti (2011) find no evidence of term limits affecting spending, while the micro evidence at the local level is considerably scarce, especially for young democracies. Besley and Case (1995), and more recently Alt et al. (2011), find that US governors who are eligible to reelection spend less and tax less than term limited governors. Similarly, legislators in the US facing term limits bring less funding to their districts (Aidt and Shvets, 2012) and are often less productive (Fouirnaies and Hall, 2022). Moreover, List and Sturm (2006) show that politicians seeking for reelection manipulate policies to attract voters. To our knowledge, the only study that evaluates the impacts of term limits in spending at the local level for young democracies is Klein and Sakurai (2015). In their analysis for Brazilian mayors, while they find no evidence of changes in total spending, they show that first term mayors shift the composition of spending towards investment expenditure in election periods. Term limits in Brazil are also associated with reductions in corruption behavior among mayors (Ferraz and Finan, 2011), reduction in the flows of resources to municipal employees public retirement systems (Schettini and Terra, 2020), and the inclusion by local governments of non-targeted and ineligible beneficiaries into federal socioeconomic programs (Frey et al., 2021).

In this paper we take a different approach to understand some of the impacts of term limits. We leverage a unique exogenous variation in health spending induced by a constitution amendment in Brazil to evaluate if reelection eligible mayors allocate resources differently within the public health sector. Moreover, we also assess if term limits are associated with differential provision of public health inputs. After a decade of public health underfinancing, in September of 2000, the Brazilian

Congress enacted the 29th Constitutional Amendment (EC/29). It established the minimum share of resources that the federal, state and municipal governments need to spend on the provision of public health services. This institutional reform was responsible for increasing public health spending and for raising the direct participation of states and municipalities in the financing of health care (Piola et al., 2013). Szklo et al. (2023) provides meaningful evidence of the causal impact of the EC/29 on public health spending, access to health care, and infant mortality.

We do not find any systematic evidence in support of the view that municipalities eligible versus non-eligible mayors differ in terms of resource allocation, but our estimates suggests that term limits were associated with greater investment spending being translated into greater supply of municipal hospitals in municipalities with eligible mayors. We also take advantage of EC/29 to estimate reduced-form probit regressions of the probability of reelection for the sample of municipalities with first term mayors. The hypothesis that additional public spending increases the probability of reelection in local governments has been verified in several papers. Akhmedov and Zhuravskaya (2004) shows that pre-electoral higher total spending does not increase the incumbent's probability of reelection, but higher social, health care, educational and cultural spending does increase probabilities. In contrast, Aidt et al. (2011) find that increases in total spending in election years leads to larger margins of victory in local governments in Portugal. The results for Brazil presented in Sakurai and Menezes-Filho (2008) suggest higher spending, not only before elections, but during the whole term, leads to higher probabilities of reelection. Spáč (2021) evaluates the effects of intergovernmental transfers to municipalities and finds that increases in resource availability near the end of mayoral terms provide electoral benefits only for small municipalities. Also evaluating intergovernmental transfers, Litschig and Morrison (2013)'s results suggest that transfers to municipalities in Brazil are associated with improvements in incumbent parties reelection probabilities. An exception in this literature is Brender (2003), who find that Israeli voters reward fiscal responsibility during the length of the term and that fiscal deterioration before elections does not influence probabilities of reelection.

Our results corroborate the hypothesis tha additional public spending increases the probability of incumbent's reelection. We find that a 20% increase in public health spending is associated with a 10 p.p. increase in the probability of reelection. We contribute novel evidence to the literature by documenting possible mechanisms that mediate this effect. We find large increases in the number of municipal hospitals, and small increases in primary care coverage at the expensive and intensive margins.

The remainder of the article is organized as follows. Section 2 outlines the institutional background and the 29th Constitutional Amendment. In Section 3 we detail our data. In Section 4 we describe our empirical strategy. Our results are presented in Section 5. Finally, Section 6 concludes the

paper.

2 Institutional Background

Brazil's political system is organized in a federalist structure that encompasses three independent government levels. The federal government, 26 states and the federal district, and 5570 municipalities. Every four years, in October, elections are held to elect mayors. At first, as defined in the Brazilian Constitution of 1988, chief executives stood in office for one term of four years of duration. However, in 1997, the Reelection Constitutional Amendment was enacted and the election for mayors of the year 2000 was the first in which incumbents were allowed to run for a second term in office. In this article, we focus our analysis on the period ranging from 2000 - 2004, the first period after Brazil's democratization for which we have mayors in the first and second mandate.

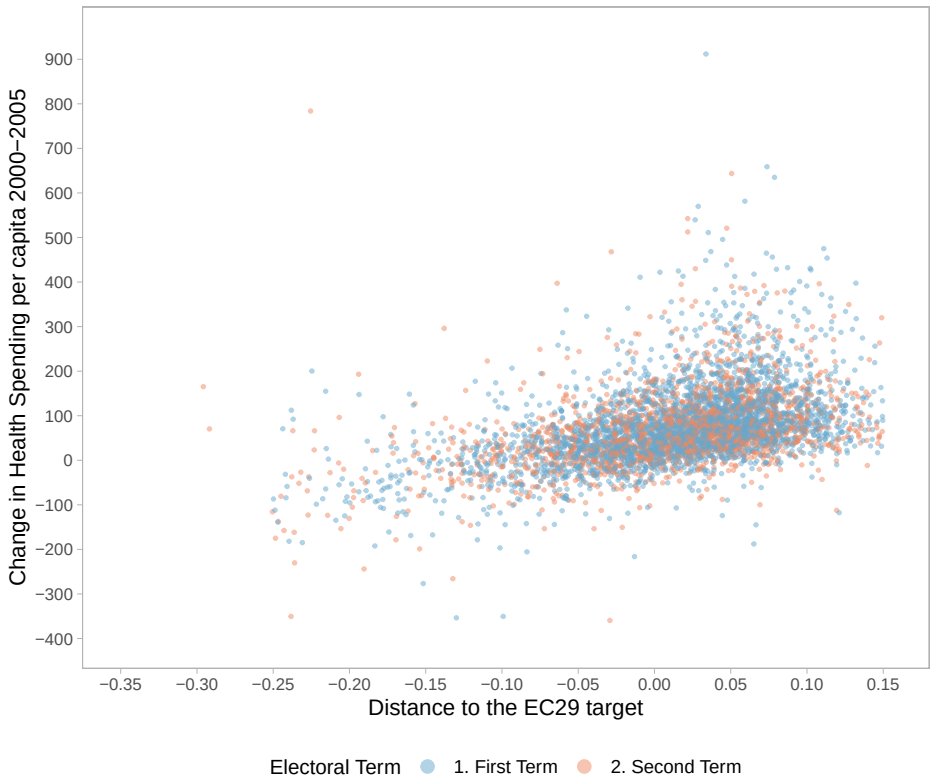
In Brazil's federalist arrangement, municipalities play a major role in the provision of public services and in the implementation public policies. The fiscal structure is characterized by high centralization of the tax income and decentralization of expenditure, that occurs via federal transfers to municipalities. Still, municipalities have a substantial level of autonomy in the allocation of resources. Within the public health sector, before the year of 2000, expenditure was concentrated mainly at the federal level. In the year of 2000 the 29th Constitutional Amendment was enacted with the goal of increasing public health expenditure and increasing the participation of states and municipalities in the provision of public health services. It established the minimum share of resources that the federal, state and municipal governments need to spend on the provision of public health services. According to Art. 7th of EC/29, from 2000 to 2004, the federal government should spend in the year of 2000 the amount spent in 1999 increased in 5% and from 2001 to 2004 correct this value by the GDP growth; the state governments should spend 12% of its tax income net of transfers to municipal governments; and municipalities should spend 15% of its tax income and constitutional transfers (own resource spending). The states and municipalities spending less than the amount established when the EC/29 was enacted would have to gradually increase its expenditure, decreasing the distance to the target by at least one fifth a year and spending at least 7% of its tax income.[1]

Szklo et al. (2023) shows that in 2000, our baseline year, most of the municipalities spent less than 15%, by 2005 the great majority of municipalities were complying with the target stipulated by the EC/29, and there was also a significant increase in the average health spending per capita in

[1]The EC/29 established the shares of resources that governments needed to spend only until 2004. A Complementary Law would have to be approved to regulate the EC/29 from 2005 on. In the a absence of a Complementary Law the share of resources defined by the Art. 7th would apply. The Complementary Law was only approved in 2012, but it made no changes to the Art. 7th.

this period. Furthermore, own resources, which were already the main source of public health spending for municipalities, gained even more importance after the EC/29. The authors also note that municipalities' baseline level of own resource spending in health presents ample variation and is somewhat predictive of the change in total health spending per capita, which will be crucial to our empirical strategy. The same pattern holds for both sub-samples analyzed here: municipalities with mayors in the first term and municipalities with mayors in the second term. Figure 1 plots, for the municipalities in both samples, the distance in percentage points to the EC/29 target versus the change in total health spending per capita between 2000 and 2005.

Figure 1: Changes in Health Spending per capita (2000-2005)



Notes: Distance to the EC/29 target comes from SIOPS data. Changes in Health Spending per capita calculated using Health and Sanitation spending per capita from Finbra (see Seciton 3 for more details). Correlation of 0.45.

3 Data

3.1 Electoral Data

We collect data from Superior Electoral Tribunal (*Tribunal Superior Eleitoral* - TSE) on elections results for 1996, 2000, 2004, and 2008. Our analysis covers the period of 1998 to 2000, but we are specially interested in the period ranging between 2000-2004. By verifying if the elected mayors in

1996 were also elected in 2000 we are able to classify municipalities into two different samples: first term mayors and second term mayors. Table A.1 presents summary statistics at the baseline year for the two samples separately, for all the variables used in this analysis: variables related to the EC/29, fiscal data, health inputs, infant mortality rates, birth outcomes, and control variables. We also present two-sample t-tests for all variables. By merging our first term sample with the TSE data on the elections results for 2004, we are able to check whether the mayors running for reelection were reelected. Likewise, by merging our sample with the election results of 2008, we are able to asses reelection probabilities in the mayoral election of that year.

3.2 EC/29 and Fiscal Data

To evaluate municipalities' fiscal reactions to the EC/29, we combine public spending data from the Brazilian Finance System (FINBRA)[2], which covers the period of 1998 to 2010, with data from the Brazilian National System of Public Health Budget (Datasus/SIOPS) available from 2000 onward[3].

Figure 2 displays the spatial variation in the share of own resources spent in health for both samples separately. Municipalities below the EC/29 are represented with colors in the red scale, while municipalities above the target are represented with the blue scale. The map shows significant differences in the share of own resources spent in health within the same state for both samples, providing the identifying variation of this study as we include state fixed-effects in our main specification.

3.3 Health Inputs

We combine data from several sources to build our health inputs data base. First we collect data on primary care coverage - extensive and intensive margin[4] - from Brazilian National System of Information on Primary Care (Datasus/SIAB). Data on health human resources and hospital infrastructure comes from the 1999, 2002, 2005 and 2009 Medical-Sanitary Assistance Survey (AMS), a census of the health sector run by Brazilian Institute of Geography and Statistics (IBGE).

Next, we use data from The Brazilian National System of Information on Ambulatory Care (Datasus/SIA) to create variables on ambulatory production, primary care ambulatory production, and ambulatory production by procedures complexity. We also use this data to indirectly create variables that measure the supply of health ambulatory facilities, as well as the supply of ambulatory facilities with health professionals related to primary care services.

[2]All spending data is presented in 2010 R$. We used the General Price Index (IGP) to correct values

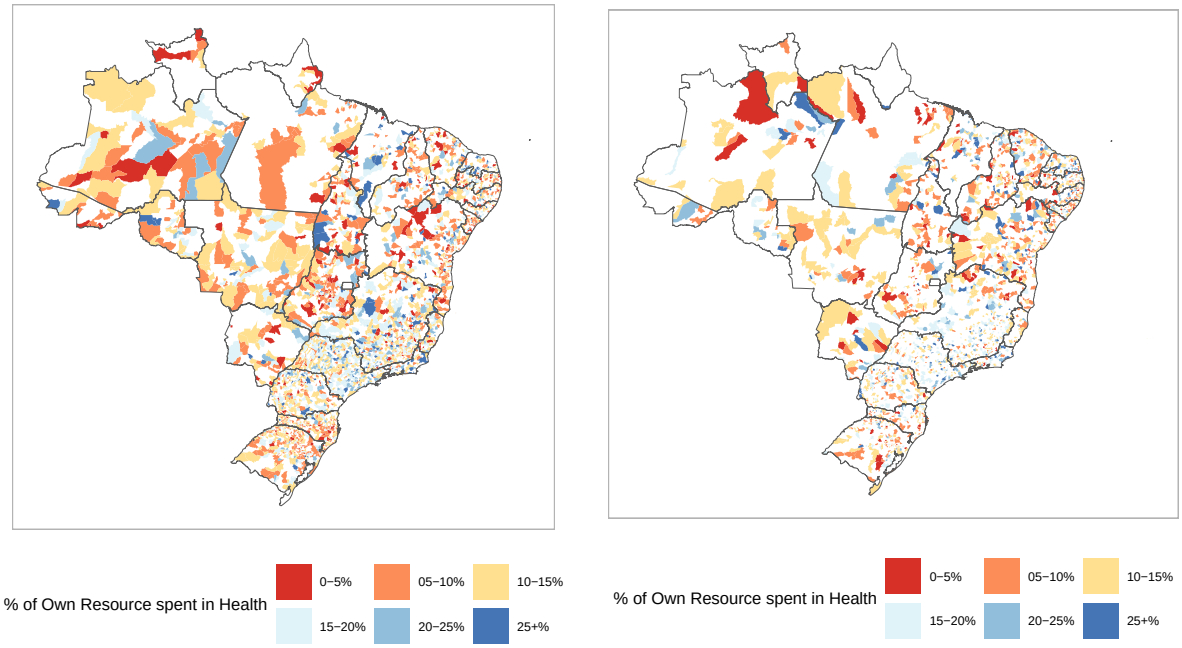
[3]Refer to section **??** of the last chapter for more detailed description of our health data set

[4]The extensive margin relates to the share of the population covered by the primary care system. The intensive margin relates to intensity of care within primary care, e.g. number of family visits by primary care agents.

Figure 2: EC/29 Compliance Geographic Variation

(a) First Electoral Term Municipalities

(b) Second Electoral Term Municipalities



Notes: Data is plotted at the municipality level. Borders at the state level. Colors in the red scale represent municipalities below the EC/29 target. Colors in the blue scale represent municipalities above the EC/29 target.

To measure access to health services, we used data from the from Brazilian National System of Birth Records (Datasus/SINASC). Using this data we calculated the share of no prenatal visits, 1-6 prenatal visits and more than 7 prenatal visits.

Lastly, we collect data on maternal and infant hospitalization from the National System of Information on Hospitalizations (Datasus/SIH). We use the classification from Alfradique et al. (2009) to split infant hospitalizations into causes that are amenable and not amenable to primary care services.

3.4 Infant Mortality and Birth Outcomes

We use microdata from the Brazilian National System of Mortality Records (Datasus/SIM) and from SINASC to construct infant mortality rates – total, by the timing of death, and for the main causes of death. The SINASC also provides detailed information on Apgar 1 and 5, birth weight, and premature births. We use yearly data on population by age and sex from Datasus to calculate mortality and fertility rates.

3.5 Controls

Our control variables can be classified into three different categories: baseline socioeconomic controls, time varying socioeconomic controls, and time varying fiscal controls.

4 Empirical Approach

4.1 The Effects of EC/29

We estimate the effects of the EC/29 using a difference-in-difference (DiD) design with a continuous treatment, exploiting within-municipality variation separately for our two sub-samples of municipalities. The design follows closely the one used in the last chapter. Intuitively, we compare the evolution of outcomes in municipalities far from the EC/29 15% target with municipalities that were already complying with the target. The underlying assumption is that changes in outcomes for the later group provide a good counterfactual for changes that would have been observed in the former group had they been complying with the target.

The identification relies on the cross-municipality variation in the share of own resource spent in the provision of healthcare and on the exogeneity of the EC/29 approval. Instead of estimating the classical DiD with pre and post treatment periods, we choose to work with dummies for each pre and post period, omitting our baseline year. These flexible estimates allow us to document the dynamic effects of the EC/29 on spending (and other outcomes) for each sample and compare them, and also verify for the presence of pre-trends. Our approach corresponds to the following equation:

$$\begin{aligned} Y_{mts} = & \sum_{i=1}^{I} \beta_{pre,i}\, Dist_{m,pre} \times EC29_{t+i} + \sum_{j=0}^{J} \beta_j\, Dist_{m,pre} \times EC29_{t-j} \\ & + \delta_{st} + \delta_m + \theta\, Z_{m,pre} \times \delta_t + \gamma\, X_{mts} + \epsilon_{mts} \end{aligned} \tag{1}$$

where Y_{mts} is an outcome of interest in municipality m, state s, year t; $EC29_{t+i}$ are year specific indicators for whether EC/29 would be enacted i years into the future; in like manner, $EC29_{t-j}$ are specific year indicators for whether EC/29 was enacted in year $t-j$. The former captures pre-trends in the outcome variable, the latter allows us to evaluate the dynamics through the years following the EC/29. The parameters δ_{st} and δ_j represent state-year fixed effects and municipality fixed effects. Additionally we include an interaction between socioeconomic baseline controls and time, $\theta Z_{m,pre} * \delta_t$, and time varying socioeconomic and fiscal controls, X_{mts}. Finally, ϵ_{mts} is the error component. Standard errors are clustered at the municipality level and the parameter of interest is β. All remaining details described in the last chapter apply to our approach here.

4.2 Reelection Probability

To document the effects of public health spending on the probability of reelection, we estimate reduced-form probit regressions with the following equation:

$$Elect_{ms} = \beta\, DistEC29_{m,pre} + \theta\, Z_{m,pre} + X_{mts} + \epsilon_{ms} \tag{2}$$

Where $Elect_{ms}$ is a dummy indicating if the mayor of municipality m was reelected in the 2004 election, $DistEC29_{m,pre}$ is the municipality m distance to the EC/29 target in the baseline year, $Z_{m,pre}$ are baseline socioeconomic controls from the census, X_{ms} are socioeconomic controls and fiscal controls for the year of 2004. Finally, ϵ_{ms} is the error component. The parameter of interest is β.

5 Empirical Findings

5.1 Opportunistic Behavioral

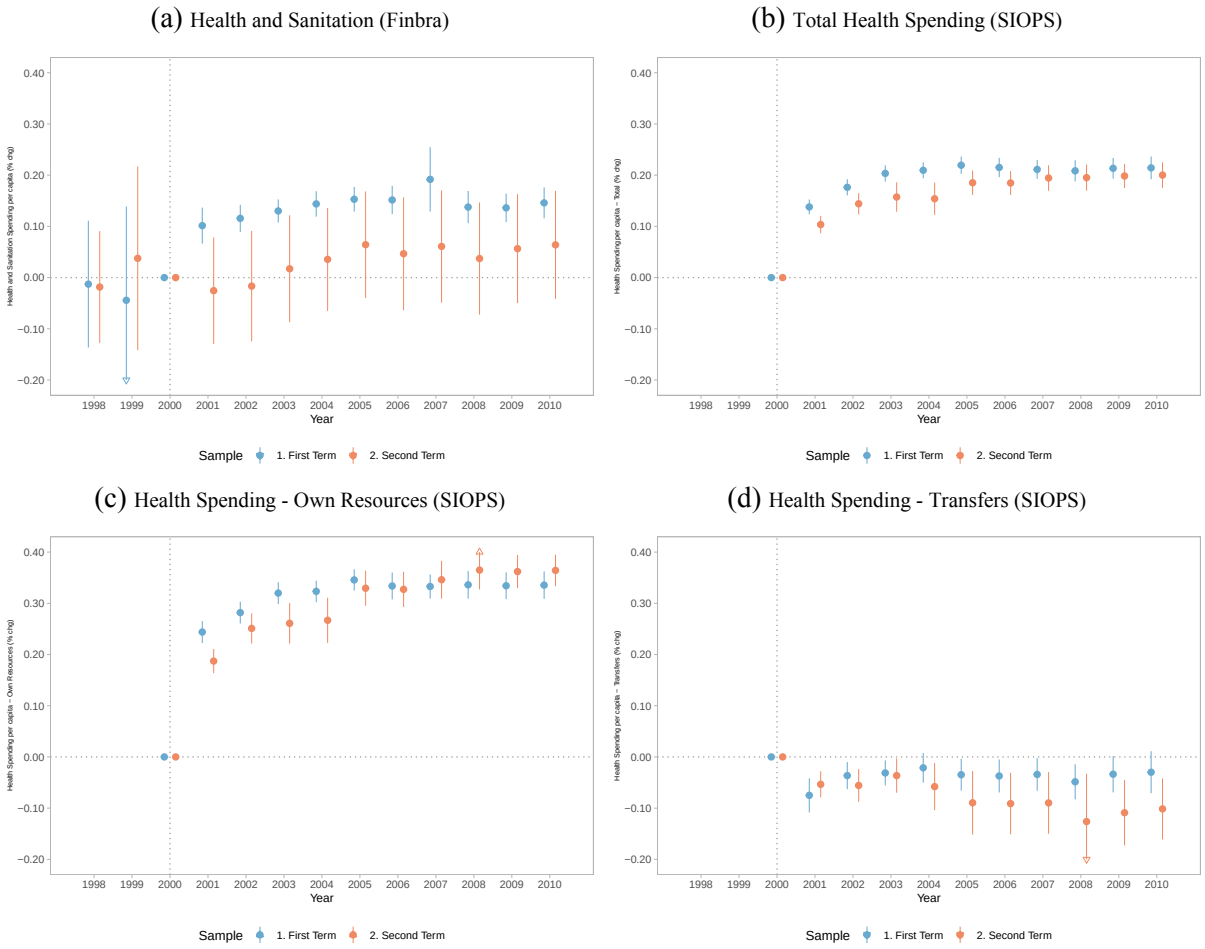
The goal of this section is to estimate the impacts of the EC/29 on public health spending for two different samples of municipalities, the ones with first term mayors and the ones with second term mayors, and assess if the possibility of running for reelection leads to opportunistic allocation of resources. We also describe for these samples how public health spending translates into supply of health infrastructure, human resources and services. All outcomes were analyzed as rates, but for the ease of interpretation and comparison between samples, we converted point estimates estimated with equation 1 to the percent change relative to baseline means for a municipality with a distance of 10% to the EC/29 target of the share of own resource spent in health. This distance is equivalent to the distance to the target of the municipalities in bottom quartile of the distribution of the share of own resource spent in health, which is the group of municipalities that presented the most pronounced increase in health spending after the EC/29 was enacted.

5.1.1 Municipalities' Fiscal Response to the EC/29

Figure 3 plots the results for total health spending and health spending by source. The results for Finbra Health and Sanitation spending presented in Figure 3a indicate greater increase in spending by the municipalities with mayors in the first term, almost no increase for the second term sample, and most importantly, no pre-trends for both samples. It is important to highlight notwithstanding, that the use of this data source serves the purpose of mainly verifying for the present of pre-trends.

The results for SIOPS total health spending in Figure 3b present a different pattern. Both samples

Figure 3: Effects on Public Health Spending per capita

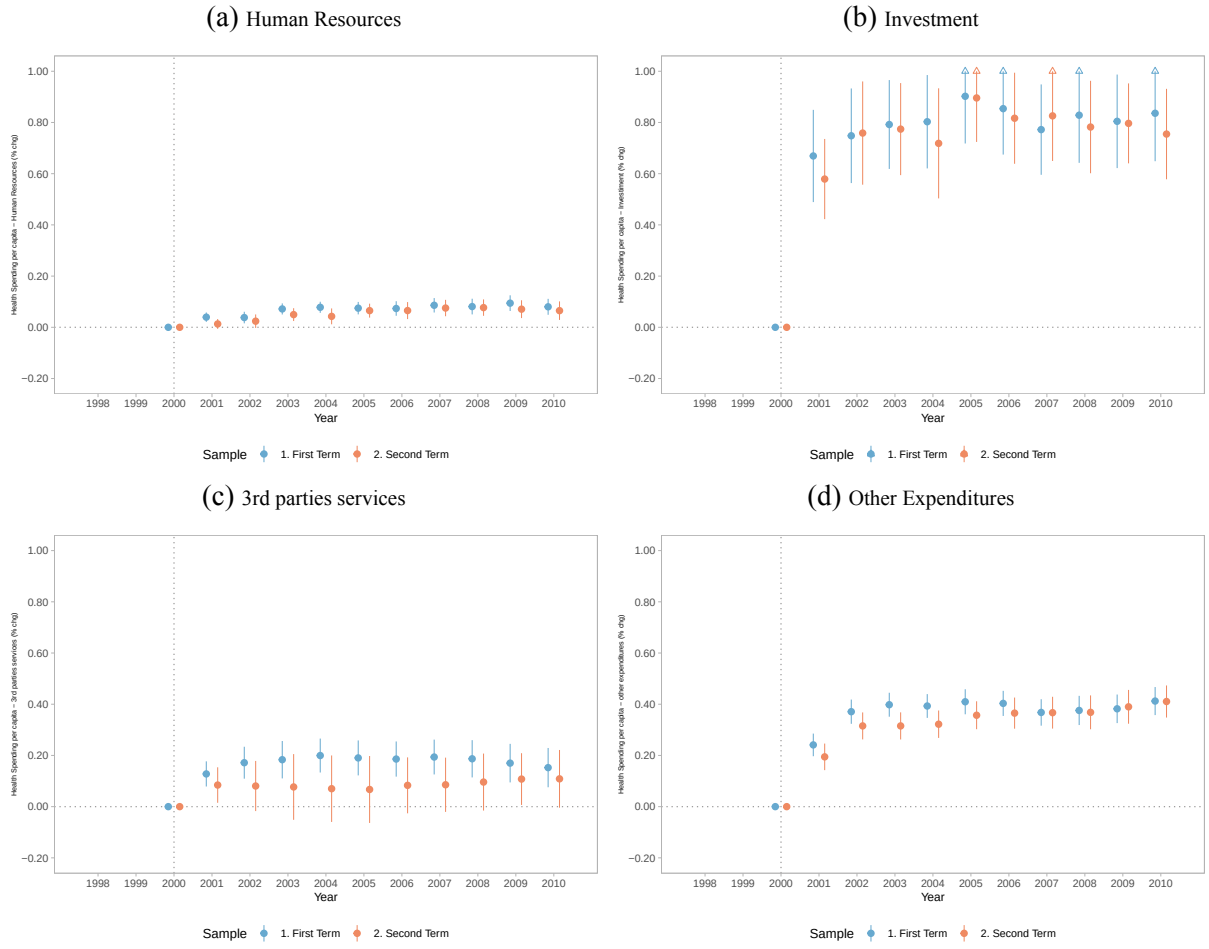


Notes: The number of observations is 63758 for Figure 3a and 55810 for the remaining. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

present increases in health spending, with first-term sample estimates indicating marginally greater point estimates in the first year of analysis, converging to a similar level after 2004, when mayoral elections were held. Figures 3c and 3c indicate that the effects might come from increases in own resource spending. However, the overlap of confidence intervals suggests that there is statistically no difference between samples for these three outcomes. We would not expect differential spending across samples as the EC/29 affected both samples the same way, and municipalities needed to comply with the amendment. Yet, municipalities could be increasing spending by the same level but with a difference composition of spending. The evidence on political business cycles suggests that incumbents tend to allocate more resources towards investment and ”visible” expenditure. Importantly, within the Brazilian public health sector, municipalities have a high level of discretion over the allocation of own resources, in opposition to intergovernmental transfers, that are mostly

transferred for the implementation of specific health programs designed at the central government. . Our results on Figure 4 suggest no statistically relevant differential allocation of resources between samples..

Figure 4: Effects on Public Health Spending per capita - By Type



Notes: The number of observations is 55810. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

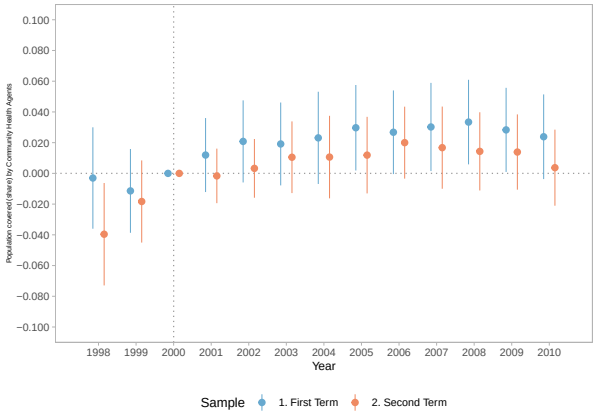
5.1.2 Effects on Health Inputs

We now analyze the impacts of EC/29 on primary care coverage, human resources, hospital infrastructure, primary care related infrastructure, ambulatory production, and access to health services.

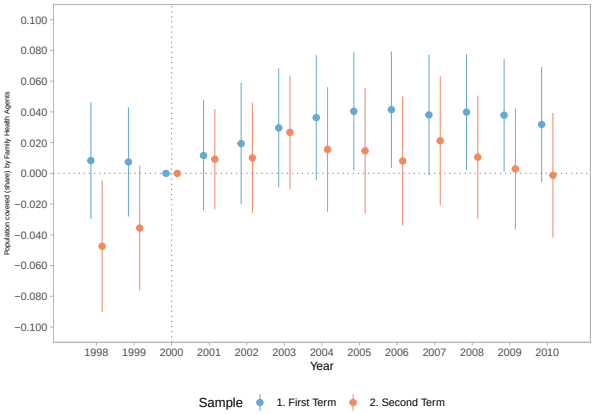
First we compare the effects for primary care coverage at the extensive and intensive margin. The results are presented in Figures 5 and 6. We do not find any clear difference between samples. Still, for most of the outcomes, the point estimates for the first term sample are slightly greater, specially in the period before the mayoral election of 2004.

Figure 5: Effects on Primary Care Coverage - Extensive Margin

(a) Population Covered by Community Health Agents



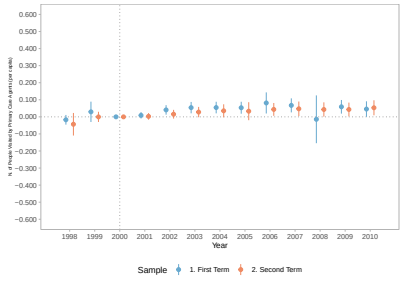
(b) Population Covered by Family Health Agents



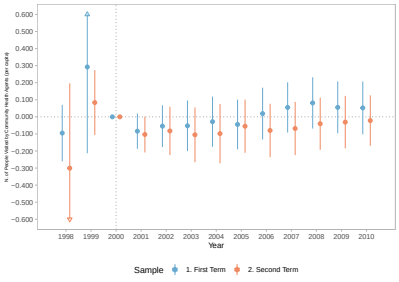
Notes: The number of observations is 64482. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

Figure 6: Effects on Primary Care Coverage - Intensive Margin

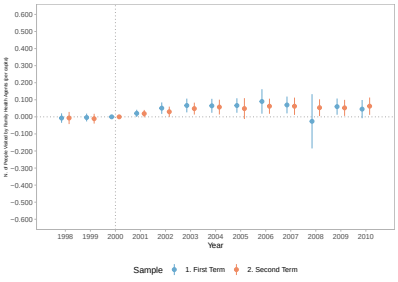
(a) N. of People Visited



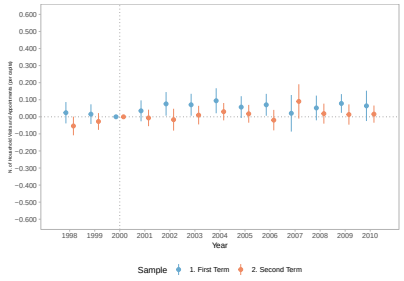
(b) People Visited by CH Agents



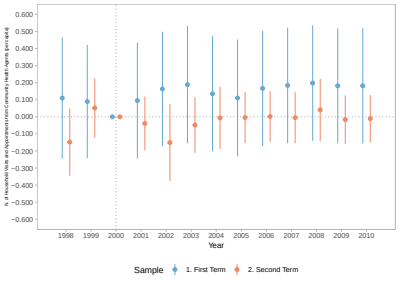
(c) People Visited by FH Agents



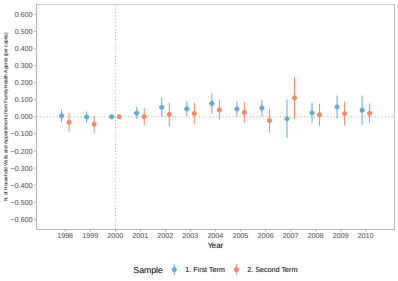
(d) N. of Household Visits and Appointments



(e) N. of Household Visits and Appointments by CH Agents



(f) N. of Household Visits and Appointments by FH Agents

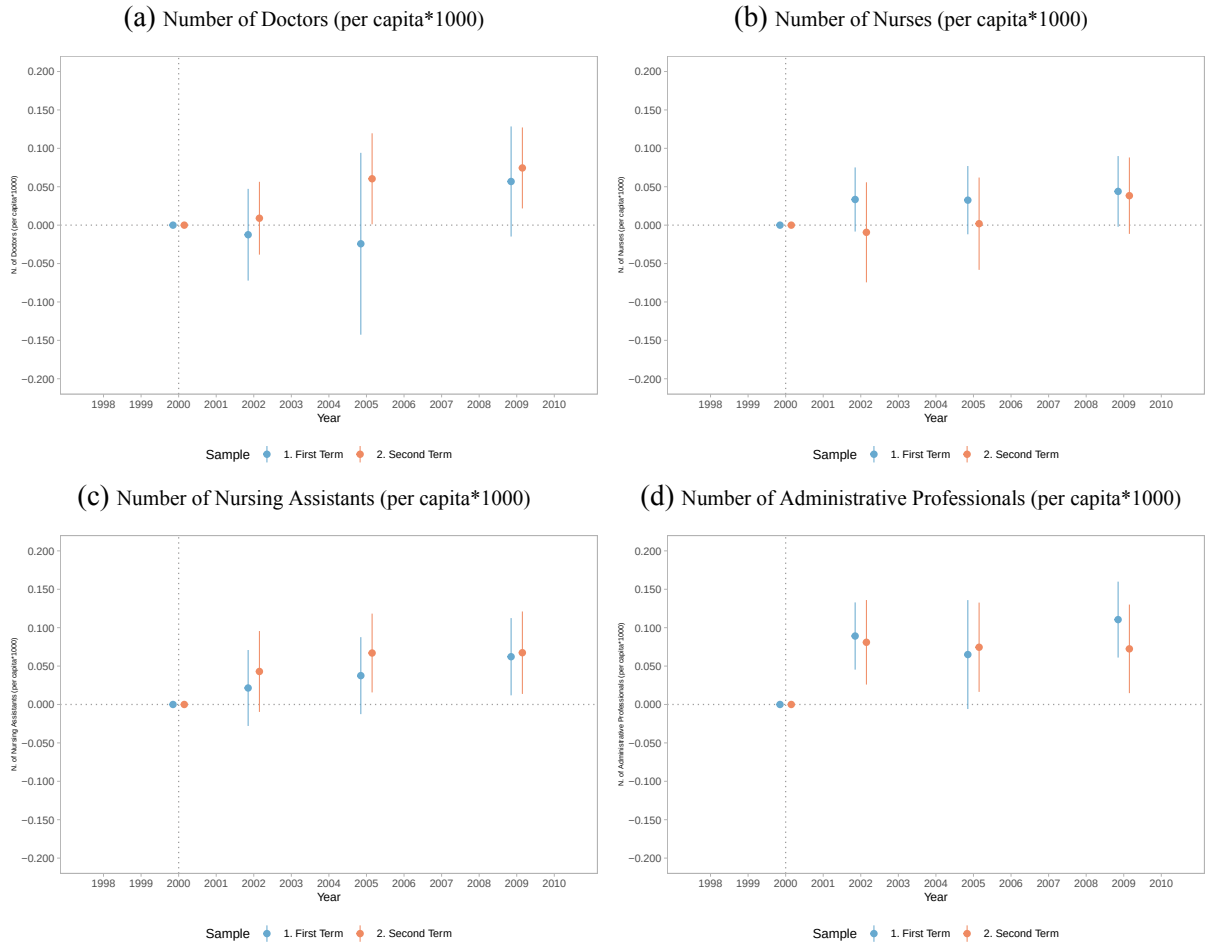


Notes: The number of observations is 64482. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

Next, we document the differential effects for the supply of human resources and health infrastructure. Figure 7 shows very similar point estimates for the number of doctors, nurses, nursing assistants and administrative professionals. Figure **??** presents the estimates for the number of hospitals. While the variation in the supply of municipal hospitals (Figure 8a) seems to be considerably higher for

the first term sample, with almost twice the effect for the second term sample, the variation in the supply of infrastructure related to primary care (Figure 9) is very similar between the two samples.

Figure 7: Effects on Health Human Resources

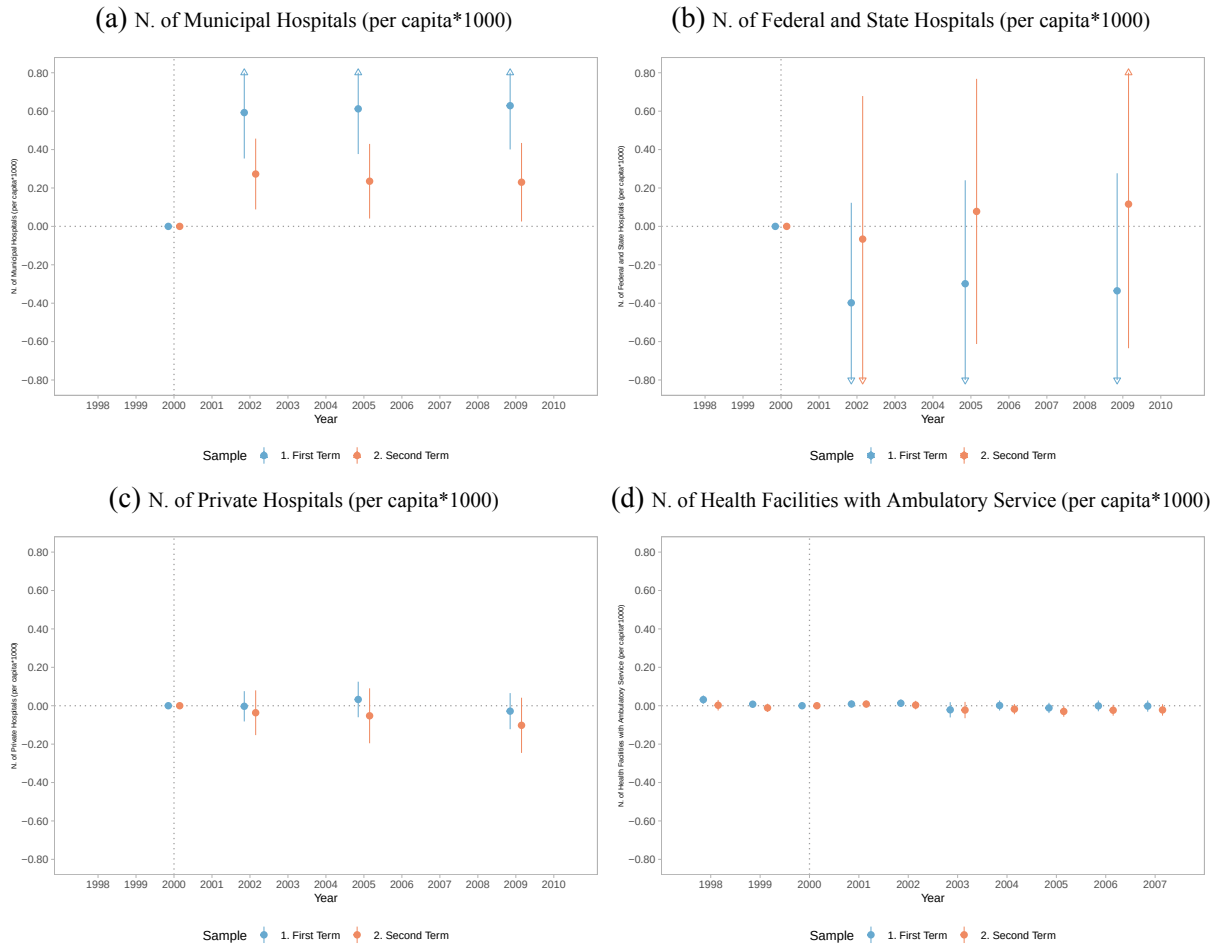


Notes: The number of observations is 19364. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

Figure 10 presents the effects on ambulatorial production. The municipalities with mayors in the first term appear to have an only marginally greater variation in ambulatory procedures of low and mid-complexity.

In Figure 11 we present our estimates for the access to health services, measured by prenatal visits. The decrease in prenatal visits ignored (Figure 11a) seems to be stronger for the first term sample in the years before 2004 election, in special for the years of 2002 and 2003. Likewise, the increase in 1 to 6 prenatal visits (Figure 11c) appears to be stronger for the same years. Possibly, this effect is mainly a result of differential improvement in registration for the first term sample and does not indicate differential improvements in access to health care.

Figure 8: Effects on Health Infrastructure



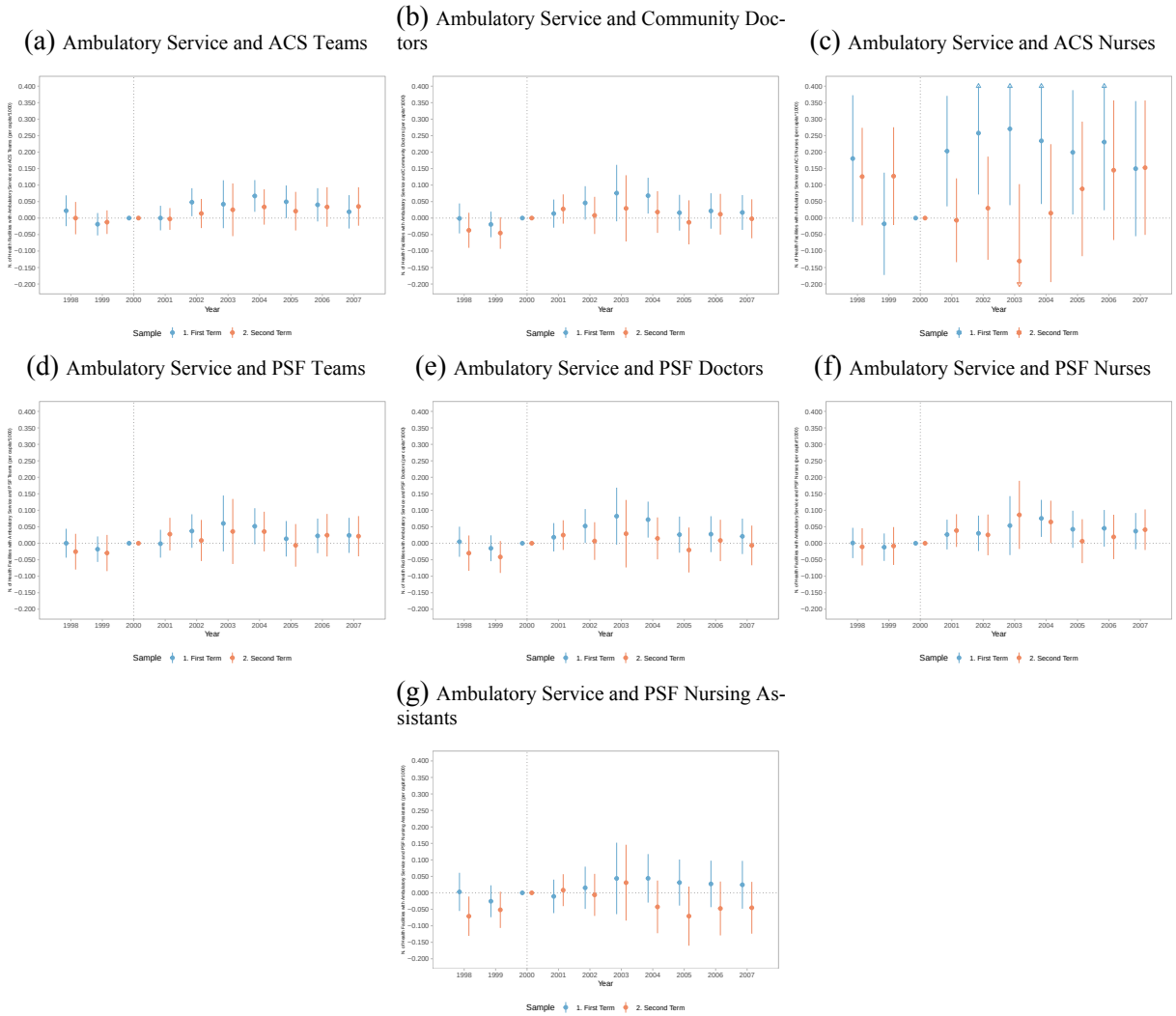
Notes: The number of observations is 19364 for Figure 8a, 8b, 8c and 48916 for the remaining. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

Finally, 12 presents the estimates for maternal hospitalization and infant hospitalization rates. The estimates suggests a marginally higher effect on maternal hospitalization 12a in 2003 and 2004 for municipalities with first term mayors. While the effects on Infant hospitalization rates 12b is very similar for both samples in the first years, in the long run our estimates suggests some effects of reduction taking place for the sample with municipalities with second term mayors.

5.2 Effects on Infant Mortality

Next, we present in Figure 13 the estimates for the main Infant Mortality Rates (IMR). The results suggests roughly no effect for municipalities with second term mayor and some effects for municipalities with first term mayors, specially in IMR amenable to primary care (13b), which could be related with marginally greater primary care coverage for this sample. Moreover, these effects start

Figure 9: Effects on Primary Care Related Infrastructure and Human Resources: N. of Health Facilities with:



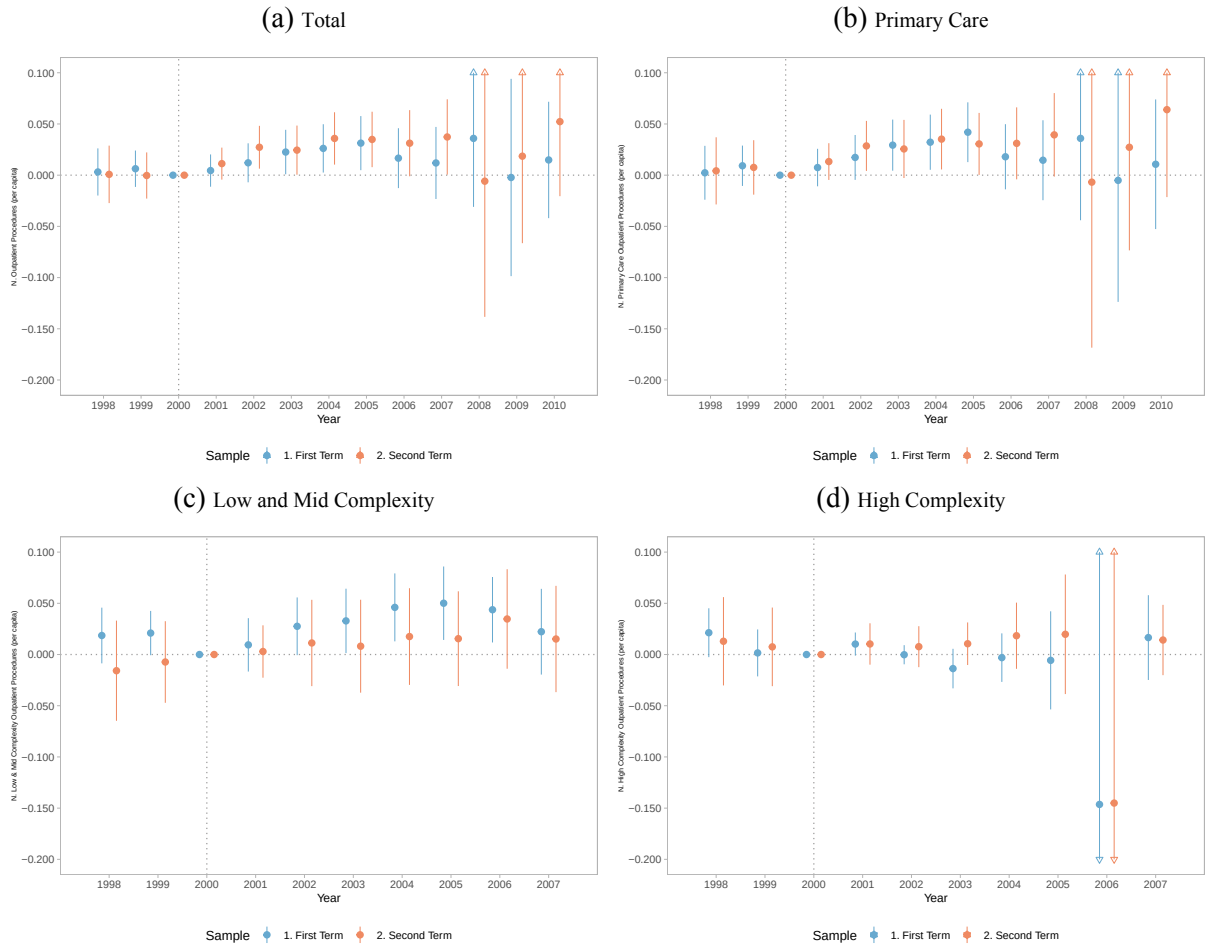
Notes: The number of observations is 48916. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

to take place from 2004 onward.

5.3 Electoral Returns to Health Spending

To evaluate the impact of public health spending on the probability of reelection, we estimate probit regressions for the sub-sample of municipalities with mayors in the first mandate. Figures 3 and 4 provided evidence of the causal effects of the distance to the EC/29 target on public health spending for the first term sample (estimates presented in blue). Therefore, by estimating reduced-form probits of the probability of reelection on the distance to target, we are indirectly assessing the

Figure 10: Effects on Ambulatory Production

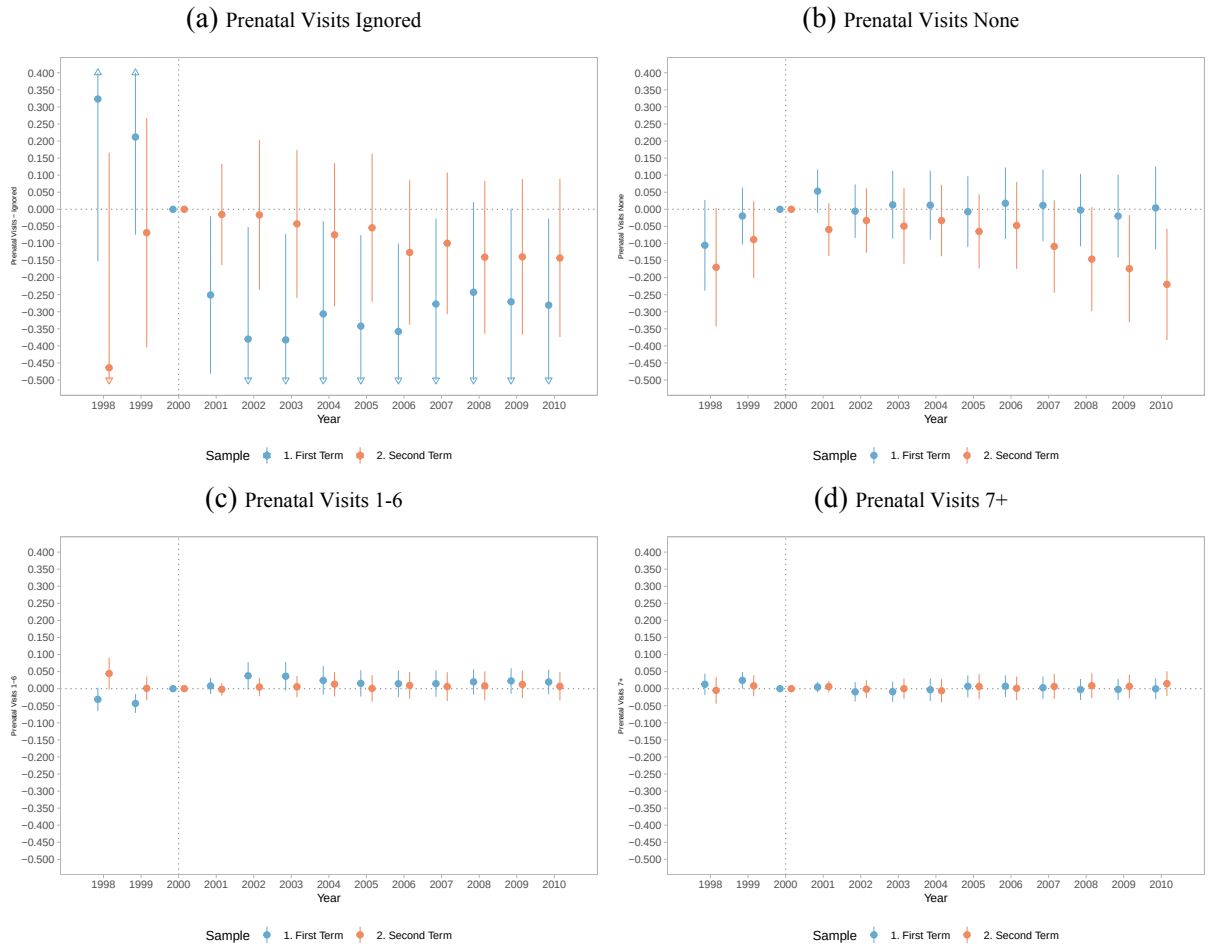


Notes: The number of observations is 64482 for 10a and 10b, 48916 for the remaining. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

effects of public health spending on reelection probabilities. We are also able to discuss the possible mechanisms through which spending increases the probability of reelection by analyzing for the first term sample the estimates on the effects on health inputs.

We present the results of the effects on reelection probability estimated with equation 2 in Table 1. In column 1 we present our baseline estimates. Column 2 adds to the baseline specification a set of baseline controls from the census of 2000. Column 3 adds socioeconomic controls for the year of 2004, and column 4 adds fiscal controls, also for 2004. Our results are robust to the different specifications and suggest a positive and significant impact on reelection probabilities. We interpret these estimates for our representative municipality with a distance of 10% to the EC/29 target of the share of own resource spent in health. The estimates suggest that a 20% (see Figure 3b) increase in public health spending is associated with a 10% increase in the probability of reelection.

Figure 11: Effects on Access to Health Services



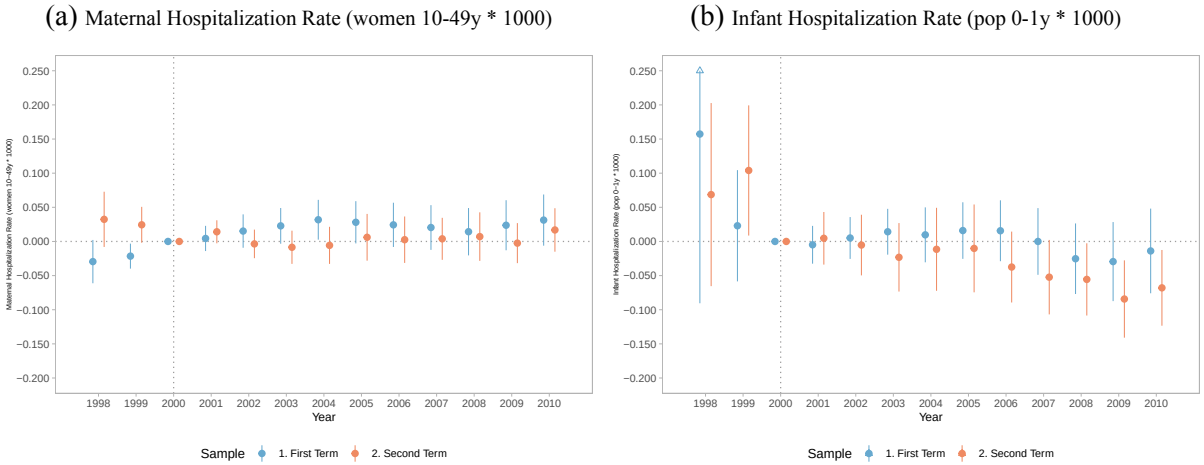
Notes: The number of observations is 64481. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

The increase in public health spending comes mainly from increases in investment and other expenditures (Figures 4b and 4d), that includes mainly expenses related to the maintenance of the public health administrative structure. Though the variation for spending in human resources (Figure 4b) is considerably lower, it represents quite a lot in per capita terms, as baseline human resource spending was already considerably high.[5]

The evidence on health inputs suggests that increases in human resource spending have been translated into greater primary care coverage at the extensive margin (Figure 5) and marginally higher coverage at the intensive margin (Figures 6a, 6c, 6d, 6f), a marginally higher number of facilities with primary care personnel (Figure 9), and into an increase in the number of nurses (Figure 7b). Moreover, increases in investment spending has been translated into greater supply

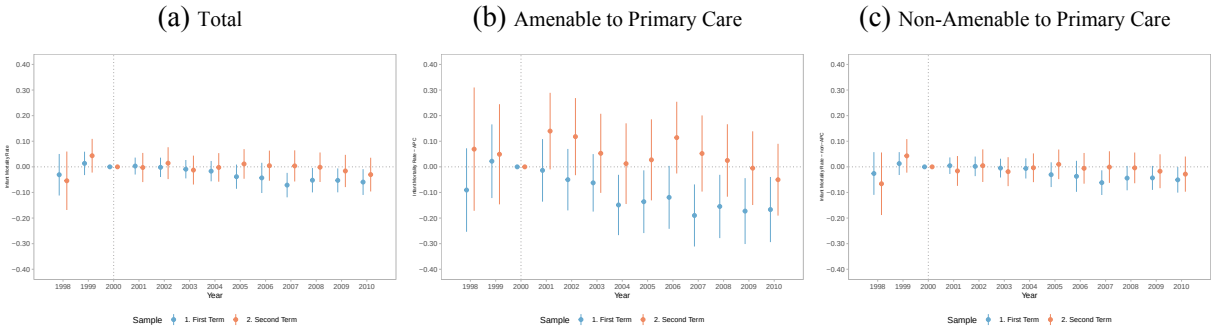
[5] see Table **??** for baseline statistics.

Figure 12: Effects on Hospitalization Rates



Notes: The number of observations is 64482. DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

Figure 13: Effects on Infant Mortality Rates



Notes: The number of observations is 64482.DiD Estimates from Equation 1. Independent variable is the distance to the EC/29 target in p.p. Colors indicate samples. Dots represent the estimates of our preferred specification. Lines represent 95% confidence intervals. Arrows, when present, indicate confidence intervals out of the plot bounds. Standard errors are clustered in the municipality level.

of municipal hospitals (Figure 8a), and a marginal increase in ambulatory production (Figure 11). Finally, our results also suggest some marginal decrease in IMR, specially for IMR amenable to primary care (Figure 13b).

5.3.1 Placebo Test

The evidence presented so far suggests that after the EC/29 was enacted, municipalities increased their health spending and the provision of health inputs. Furthermore, these effects took place almost entirely in the years following the EC/29, stabilizing after 2004. While we observe the electoral return of this spending in the mayoral election of 2004, we would not expect these shocks to affect reelection probabilities in the election of 2008. We formally assess this hypothesis by running the same regression model estimated with equation 2 for a sample of municipalities with mayors that

Table 1: Effects on Reelection Probability

	Dummy of Reelected in 2004			
	(1)	(2)	(3)	(4)
Distance to the EC/29	1.082***	0.947***	1.022***	1.178***
	(0.353)	(0.361)	(0.363)	(0.372)
Baseline Controls		X	X	X
2004 Socioeconomic Controls			X	X
2004 Fiscal Controls				X
N. of Observations	3014	3014	3014	2933

Notes: Probit estimates from Equation 2. Independent variable is the distance to the EC/29 target in p.p.. Covariates omitted. Standard errors in brackets. * p < 0.10, * * p < 0.05, * * * p < 0.011

were eligible to reelection in 2008. The results of this placebo test are presented in 2. The point estimates are very small and statistically insignificant, suggesting there is not any effect of variation in spending and health inputs in the probability of being reelected in 2008.

6 Discussion and Final Remarks

The results comparing samples of municipalities with mayors eligible and not eligible for reelection, though descriptive, indicate no opportunistic allocation of resources within the public health sector for first term mayors. This result contrasts with the results found by Drazen and Eslava (2010) and Sakurai and Menezes-Filho (2011). However, we are able to show differential shifts in the supply of public goods and services. Our results indicate marginally greater supply of hospitals for first term municipalities. At first glance, we would not expect differential supply of hospitals with no difference in investment expenditure. A plausible hypothesis is that, within health investments, first term mayors allocate resources towards more ”visible” infrastructure, corroborating the evidence presented in the PBC literature that looks at the composition of spending. This result highlights the importance of analyzing not only expenditure, as most of the papers on the topic do, but also how they translate into public goods and services, specially to validate the hypothesis of the influence of more visible expenditures.

Table 2: Effects on Reelection Probability - Placebo Test

	Dummy of Reelected in 2008			
	(1)	(2)	(3)	(4)
Distance to the EC/29	-0.32	-0.154	-0.155	-0.133
	(0.355)	(0.359)	(0.359)	(0.367)
Baseline Controls		X	X	X
2004 Socioeconomic Controls			X	X
2004 Fiscal Controls				X
N. of Observations	2932	2932	2932	2894

Notes: Probit estimates from Equation 2. Independent variable is the distance to the EC/29 target in p.p.. Covariates omitted. Standard errors in brackets. * p < 0.10, * * p < 0.05, * * * p < 0.011

Overall, our results suggest that a 20% increase in public health spending is associated with a increase of 10 p.p. in the probability of reelection, corroborating the available evidence on this relationship (Akhmedov and Zhuravskaya, 2004; Sakurai and Menezes-Filho, 2008; Aidt et al., 2011; Litschig and Morrison, 2013; Spáč, 2021). We add to this literature by documenting the types of expenditure that lead to increases in total spending and how they translate into the provision of public health goods and services. We have shown that the increase in public health spending comes mainly from increases in investment and administrative expenditures, and highlighted the relevance of human resources spending increase in per capita terms. Then we documented that these increases translated into greater primary care coverage at the extensive margin, marginally higher coverage at the intensive margin, a marginally higher number of facilities with primary care personnel, an increase in the number of nurses and administrative professionals, a marginal increase in ambulatory production, a greater supply of municipal hospitals, and some reduction in infant mortality rates amenable to primary care in the election year.

Considering that voters first contact with the public health system may happen through primary care programs and services, it is plausible to suggest that voters might be rewarding an increase in coverage and in the intensity of care. Finally, hospitals are a very ”visible” health infrastructure and the relevant increase in its supply supports the hypothesis of voters rewarding even more ”visible” expenditures and related public goods. These results also relate to the stream of studies on the

electoral impact of specific government policies (Manacorda et al., 2011; Zucco, 2011; De La O, 2013; Voigtländer and Voth, 2014; Firpo et al., 2017; Blattman et al., 2018, among others). The evidence for healthcare policies is more scarce and mixed. Fried and Venkataramani (2017) documents electoral returns to access to clean water in Mexico. Croke (2017) shows that the distribution of bed nets in malaria endemic areas in Tanzania results in higher approval of political leaders. Baicker and Finkelstein (2019) documents significant effects of access to Medicaid on vote turnout. In contrast, Imai et al. (2020) find no effect of access to government subsidized insurance on incumbents support. While analyzing the impact of a set of services highly related to public health, such as sanitation and access to clean water, De Kadt and Lieberman (2020)'s results suggest that government support actually decreased in South Africa. More recently, Braga (2020) showed that municipal investments in community base interventions, specifically the Family Health Program (*Programa Saúde da Família*), positively affect incumbents vote share. Similarly, Camargo (2021) finds that the share of population covered by the Family Health Program is associated with the incumbent vote share, with effects increasing with population proximity to primary care health facilities.

Our results add to the literature on electoral returns to public spending and government policies, specially within health care, by providing robust reduced-form estimates of the impacts of EC/29 on reelection probability for incumbents mayors and describing the possible types of spending and health inputs that mediate this relationship. Our results suggest that voters reward improvements in primary health care coverage, at the extensive and intensive margin, and especially increases in the supply of hospitals.

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Appendix

A Descriptive Statistics

Table A.1: Descriptive Statistics (at the baseline year)

	First Term Mayor		Second Term Mayor					
	Obs.	Mean (Std. Dev.)	Obs.	Mean (Std. Dev.)	% difference	t-Statistic	p-Value	Source of Data
EC 29 Variables								
Share of Municipality's Own Resource Spent in Public Health	3038	0.137 (0.066)	2023	0.14 (0.07)	-2.2%	-4.901	0.000	Datasus/SIOPS
Distance to the EC29 Target	3038	0.013 (0.066)	2023	0.01 (0.07)	23.1%	4.901	0.000	Datasus/SIOPS
Public Revenue								
Total Revenue per capita	3097	1181.337 (673.373)	2029	1307.295 (3583.092)	-10.7%	0.082	0.934	Finbra
Public Spending								
Total Spending per capita	3105	1239.151 (691.401)	2033	1373.992 (3767.371)	-10.9%	-0.37	0.711	Finbra
Spending by Category - per capita								
Health and Sanitation	3090	208.806 (132.374)	2031	232.893 (412.968)	-11.5%	-1.16	0.246	Finbra
Transport	3105	92.199 (110.642)	2033	91.999 (174)	0.2%	3.336	0.001	Finbra
Education and Culture	3105	404.073 (222.639)	2033	448.654 (994.926)	-11.0%	-2.81	0.005	Finbra
Housing and Urban	3105	107.734 (99.824)	2033	131.201 (469.562)	-21.8%	-3.239	0.001	Finbra
Social Assistance	3105	80.538 (74.195)	2033	91.399 (399.094)	-13.5%	1.459	0.145	Finbra
Other Categories	3105	454.543 (304.494)	2033	509.276 (1900.905)	-12.0%	0.453	0.651	Finbra

Table A1: Descriptive Statistics (at the baseline year) – *Cont.*

	First Term Mayor		Second Term Mayor					
	Obs.	Mean (Std. Dev.)	Obs.	Mean (Std. Dev.)	% difference	t-Statistic	p-Value	Source of Data
Public Health Spending								
Total Health Spending per capita	3038	191.351 (108.203)	2024	196.088 (114.571)	-2.5%	-1.723	0.085	Datasus/SIOPS
Health Spending by Source - per capita								
Own Resources spending per capita	3038	121.094 (94.732)	2024	119.632 (101.339)	1.2%	2.062	0.039	Datasus/SIOPS
Transfers Spending per capita	3038	70.257 (49.759)	2024	76.455 (50.107)	-8.8%	-9.168	0.000	Datasus/SIOPS
Health Spending by Type - per capita								
Human Resources Spending per capita	3038	74.742 (63.572)	2024	67.897 (59.838)	9.2%	4.046	0.000	Datasus/SIOPS
Investiments Spending per capita	3038	13.164 (26.334)	2024	16.615 (27.759)	-26.2%	-4.104	0.000	Datasus/SIOPS
3rd parties services Spending per capita	3038	32.785 (43.097)	2024	34.311 (44.175)	-4.7%	-1.78	0.075	Datasus/SIOPS
Other Spendings per capita	3038	70.66 (50.284)	2024	77.264 (56.183)	-9.3%	-5.088	0.000	Datasus/SIOPS

Table A1: Descriptive Statistics (at the baseline year) – *Cont.*

	First Term Mayor		Second Term Mayor					
	Obs.	Mean (Std. Dev.)	Obs.	Mean (Std. Dev.)	% difference	t-Statistic	p-Value	Source of Data
Primary Care Coverage								
Extensive Margin								
Population covered (share) by Community Health Agents	3226	0.591 (0.419)	2087	0.69 (0.388)	-16.8%	-14.006	0.000	Datasus/SIAB
Population covered (share) by Family Health Agents	3226	0.274 (0.369)	2087	0.376 (0.398)	-37.2%	-7.347	0.000	Datasus/SIAB
Intensive Margin								
N. of People Visited by Primary Care Agents (per capita)	3226	0.257 (0.28)	2087	0.297 (0.295)	-15.6%	2.624	0.009	Datasus/SIAB
N. of People Visited by Community Health Agents (per capita)	3226	0.118 (0.182)	2087	0.121 (0.176)	-2.5%	-1.059	0.29	Datasus/SIAB
N. of People Visited by Family Health Agents (per capita)	3226	0.138 (0.241)	2087	0.176 (0.27)	-27.5%	3.072	0.002	Datasus/SIAB
N. of Household Visits & Appointments (per capita)	3226	1.715 (2.856)	2087	2.087 (2.023)	-21.7%	-8.339	0.000	Datasus/SIAB
N. of Household Visits & Appointments by Community Health Agents (per capita)	3226	1.015 (2.568)	2087	1.096 (1.339)	-8.0%	-6.922	0.000	Datasus/SIAB
N. of Household Visits & Appointments by Family Health Agents (per capita)	3226	0.696 (1.373)	2087	0.989 (1.705)	-42.1%	-5.13	0.000	Datasus/SIAB
Health Human Resources								
N. of Doctors (per capita*1000)	3226	1.597 (2.776)	2087	1.479 (1.725)	7.4%	3.088	0.002	IBGE/AMS
N. of Nurses (per capita*1000)	3226	1.195 (1.954)	2087	1.125 (1.039)	5.9%	1.964	0.05	IBGE/AMS
N. of Nursing Assistants (per capita*1000)	3226	1.176 (1.389)	2087	1.381 (1.544)	-17.4%	-5.133	0.000	IBGE/AMS
N. of Administrative Professionals (per capita*1000)	3226	1.157 (1.349)	2087	1.159 (1.105)	-0.2%	-0.74	0.459	IBGE/AMS
Health Infrastructure								
N. of Municipal Hospitals (per capita*1000)	3226	0.056 (0.135)	2087	0.065 (0.143)	-16.1%	-3.613	0.000	IBGE/AMS
N. of Federal and State Hospitals (per capita*1000)	3226	0.015 (0.082)	2087	0.016 (0.084)	-6.7%	0.223	0.824	IBGE/AMS
N. of Private Hospitals (per capita*1000)	3226	0.034 (0.063)	2087	0.023 (0.051)	32.4%	12.248	0.000	IBGE/AMS
N. of Health Facilities (per capita*1000) with Ambulatory Service	3216	0.523 (0.366)	2083	0.514 (0.34)	1.7%	1.392	0.164	Datasus/SIA

Table A1: Descriptive Statistics (at the baseline year) – *Cont.*

	First Term Mayor		Second Term Mayor					
	Obs.	Mean (Std. Dev.)	Obs.	Mean (Std. Dev.)	% difference	t-Statistic	p-Value	Source of Data
Primary Care Related Infrastructure and Human Resources								
Number of Health Facilities (per capita * 1000) with								
Ambulatory Service and ACS Teams	3216	0.127	2083	0.162	-27.6%	-10.398	0.000	Datasus/SIA
		(0.186)		(0.215)				
Ambulatory Service and Community Doctors	3216	0.072	2083	0.099	-37.5%	-6.298	0.000	Datasus/SIA
		(0.141)		(0.17)				
Ambulatory Service and ACS Nurses	3216	0.063	2083	0.083	-31.7%	-7.501	0.000	Datasus/SIA
		(0.139)		(0.175)				
Ambulatory Service and PSF Teams	3216	0.073	2083	0.101	-38.4%	-6.562	0.000	Datasus/SIA
		(0.143)		(0.179)				
Ambulatory Service and PSF Doctors	3216	0.068	2083	0.094	-38.2%	-6.123	0.000	Datasus/SIA
		(0.136)		(0.166)				
Ambulatory Service and PSF Nurses	3216	0.066	2083	0.091	-37.9%	-6.99	0.000	Datasus/SIA
		(0.133)		(0.169)				
Ambulatory Service and PSF Nursing Assistants	3216	0.047	2083	0.057	-21.3%	-4.416	0.000	Datasus/SIA
		(0.114)		(0.135)				
Ambulatorial Production								
N. Outpatient Procedures (per capita)	3226	8.676	2087	9.08	-4.7%	3.138	0.002	Datasus/SIA
		(4.523)		(4.582)				
N. Primary Care Outpatient Procedures (per capita)	3226	7.245	2087	7.714	-6.5%	1.552	0.121	Datasus/SIA
		(3.947)		(3.985)				
N. Low & Mid Complexity Outpatient Procedures (per capita)	3216	9.205	2083	9.955	-8.1%	-1.382	0.167	Datasus/SIA
		(5.295)		(6.535)				
N. High Complexity Outpatient Procedures (per capita)	3216	0.005	2083	0.005	0.0%	0.535	0.593	Datasus/SIA
		(0.06)		(0.04)				
Access to Health Services								
Prenatal Ignored	3203	0.044	2065	0.043	2.3%	1.162	0.245	Datasus/SINASC
		(0.093)		(0.093)				
Prenatal Visits None	3187	0.049	2057	0.054	-10.2%	-6.833	0.000	Datasus/SINASC
		(0.075)		(0.075)				
Prenatal Visits 1-6	3226	0.516	2087	0.543	-5.2%	-16.954	0.000	Datasus/SINASC
		(0.213)		(0.22)				
Prenatal Visits 7+	3226	0.392	2087	0.362	7.7%	16.556	0.000	Datasus/SINASC
		(0.232)		(0.237)				
Hospitalization								
Infant Hospitalization Rate (pop 0-1y * 1000)	3226	283.109	2087	274.702	3.0%	4.542	0.000	Datasus/SIH
		(350.733)		(306.277)				
Infant Hospitalization Rate - APC (pop 0-1y * 1000)	3226	208.012	2087	204.156	1.9%	3.327	0.001	Datasus/SIH
		(259.302)		(228.653)				
Infant Hospitalization Rate - non-APC (pop 0-1y * 1000)	3226	75.097	2087	70.546	6.1%	7.48	0.000	Datasus/SIH
		(114.15)		(121.02)				
Maternal Hospitalization Rate (women 10-49y * 1000)	3226	50.746	2087	51.604	-1.7%	-9.09	0.000	Datasus/SIH
		(43.24)		(21.66)				

Table A1: Descriptive Statistics (at the baseline year) – *Cont.*

	First Term Mayor		Second Term Mayor					
	Obs.	Mean (Std. Dev.)	Obs.	Mean (Std. Dev.)	% difference	t-Statistic	p-Value	Source of Data
Infant Mortality Rate								
Total	3226	22.493 (20.455)	2087	24.339 (33.372)	-8.2%	-0.776	0.438	Datasus/SIM
APC	3226	1.941 (4.673)	2087	2.394 (9.911)	-23.3%	-5.021	0.000	Datasus/SIM
non-APC	3226	20.552 (19.174)	2087	21.945 (26.494)	-6.8%	0.314	0.754	Datasus/SIM
Fetal	3226	0.003 (0.074)	2087	0.003 (0.087)	0.0%	-0.21	0.834	Datasus/SIM
Within 24h	3226	5.505 (8.313)	2087	5.776 (12.676)	-4.9%	1.298	0.194	Datasus/SIM
1 to 27 days	3226	13.65 (14.591)	2087	14.14 (17.661)	-3.6%	0.395	0.693	Datasus/SIM
27 days to 1 year	3226	8.843 (12.826)	2087	10.199 (20.898)	-15.3%	-1.813	0.07	Datasus/SIM
Infectious	3226	1.877 (5.159)	2087	2.218 (9.38)	-18.2%	-1.935	0.053	Datasus/SIM
Respiratory	3226	1.46 (4.084)	2087	1.616 (5.044)	-10.7%	0.106	0.916	Datasus/SIM
Perinatal	3226	10.825 (13.175)	2087	11.566 (20.287)	-6.8%	0.337	0.736	Datasus/SIM
Congenital	3226	2.334 (5.446)	2087	1.91 (4.363)	18.2%	3.066	0.002	Datasus/SIM
External	3226	0.411 (2.163)	2087	0.32 (1.548)	22.1%	3.378	0.001	Datasus/SIM
Nutritional	3226	0.577 (2.485)	2087	0.659 (4.198)	-14.2%	-1.641	0.101	Datasus/SIM
Other	3226	0.923 (3.752)	2087	0.811 (3.427)	12.1%	0.281	0.779	Datasus/SIM
Ill-Defined	3226	4.086 (9.925)	2087	5.238 (11.803)	-28.2%	-3.797	0.000	Datasus/SIM

Table A1: Descriptive Statistics (at the baseline year) – *Cont.*

	First Term Mayor		Second Term Mayor					
	Obs.	Mean (Std. Dev.)	Obs.	Mean (Std. Dev.)	% difference	t-Statistic	p-Value	Source of Data
Fertility								
Rates of Birth per Woman (10-49y)	3226	0.055 (0.016)	2087	0.056 (0.017)	-1.8%	-11.392	0.000	Datasus/SINASC
Birth Oucomes								
Apgar 1	3184	8.239 (0.76)	2055	8.169 (0.932)	0.8%	8.199	0.000	Datasus/SINASC
Apgar 5	2980	8.728 (0.681)	1923	8.629 (0.972)	1.1%	10.452	0.000	Datasus/SINASC
Low Birth Weight (<2.5k)	3226	0.066 (0.032)	2087	0.065 (0.034)	1.5%	7.108	0.000	Datasus/SINASC
Premature Birth	3226	0.093 (0.104)	2087	0.091 (0.106)	2.2%	4.693	0.000	Datasus/SINASC
Sex Ratio at Birth	3225	1.077 (0.247)	2086	1.067 (0.225)	0.9%	-1.061	0.289	Datasus/SINASC

Table A1: Descriptive Statistics (at the baseline year) – *Cont.*

	First Term Mayor		Second Term Mayor					
	Obs.	Mean (Std. Dev.)	Obs.	Mean (Std. Dev.)	% difference	t-Statistic	p-Value	Source of Data
Controls								
Population (1,000)	3226	28.837 (210.892)	2087	31.317 (117.21)	-8.6%	-2.249	0.024	IBGE/Census
GDP per capita (2010 R$)	3226	9.899 (11.79)	2087	9.261 (10.648)	6.4%	6.13	0.000	IBGE/Census
'Bolsa Familia' transfers per capita (2010 R$)	3226	0 (0)	2087	0 (0)	0.0%	-14.601	0.000	IBGE/Census
Life Expectancy	3226	68.892 (3.777)	2087	67.867 (4.053)	1.5%	33.354	0.000	IBGE/Census
Expected Years of Study	3226	8.54 (1.741)	2087	8.153 (1.798)	4.5%	27.979	0.000	IBGE/Census
Iliteracy Rate (above 18y old)	3226	21.924 (12.827)	2087	25.635 (14.167)	-16.9%	-34.882	0.000	IBGE/Census
Income per capita	3226	356.87 (184.506)	2087	318.545 (200.351)	10.7%	25.324	0.000	IBGE/Census
Share of Population Below Poverty Line	3226	0.382 (0.219)	2087	0.441 (0.232)	-15.4%	-33.294	0.000	IBGE/Census
Gini Coefficient	3226	0.545 (0.067)	2087	0.548 (0.069)	-0.6%	-5.785	0.000	IBGE/Census
Access to Sewage Network	3226	0.273 (0.311)	2087	0.232 (0.29)	15.0%	17.788	0.000	IBGE/Census
Access to Garbage Collection Service	3226	0.556 (0.261)	2087	0.522 (0.273)	6.1%	16.24	0.000	IBGE/Census
Access to Water Network	3226	0.601 (0.234)	2087	0.571 (0.243)	5.0%	16.068	0.000	IBGE/Census
Access to Electricity	3226	0.885 (0.152)	2087	0.858 (0.171)	3.1%	20.58	0.000	IBGE/Census
Urbanization Rate	3226	0.619 (0.221)	2087	0.583 (0.234)	5.8%	20.242	0.000	IBGE/Census
Average Neighbors Spending Health Spending per capita (2010 R$)	3223	212.893 (132.302)	2087	199.278 (116.223)	6.4%	12.736	0.000	Finbra
Municipality's Spending in Human Resources (% of Total Revenue)	3105	0.425 (0.109)	2033	0.401 (0.106)	5.6%	9.389	0.000	Finbra

Notes: Authors' own tabulation. Statistics for IBGE/AMS data refer to the year 1999 and statistics for all remaining variables refer to the baseline year o 2000. Data sources indicated in the table.