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**Incumbency advantage: the bureaucracy  
appointment mechanism**

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## **Incumbency advantage: the bureaucracy appointment mechanism**

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Universidade Federal do Rio de Janeiro (UFRJ)

Instituto de Economia (IE)

Programa de Pós-Graduação em Economia (PPGE)

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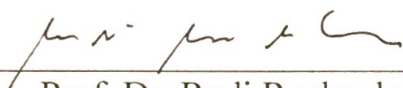
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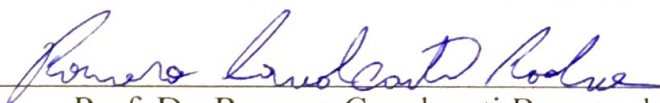
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*Este trabalho é dedicado aos meus pais.*

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*"The beautiful thing about learning is nobody can take it away from you."*

B. B. King

# Resumo

Este trabalho apresenta novas evidências sobre uma fonte de vantagem de incumbência direta, a nomeação discricionária de servidores públicos, mais especificamente, a nomeação de diretores de escolas municipais por prefeitos no Brasil. No Brasil, escolas públicas geralmente são usadas como locais de votação e a maioria dos diretores de escolas municipais são nomeados pelos prefeitos. Eu testo se esses diretores podem influenciar o resultado eleitoral nessas localidades em benefício do prefeito principal. A realocação exógena de seções eleitorais, feita independentemente por juízes eleitorais, é usada para identificar se as mudanças de e para as escolas municipais cujo diretor foi indicado para o cargo afetam os resultados eleitorais do prefeito incumbente. Para isso, eu uso uma base de dados únicos gerada a partir da combinação de dados administrativos de escolas e dados eleitorais. Os resultados sugerem que os prefeitos incumbente recebem um aumento médio de 2,7 pontos percentuais na votação quando as seções eleitorais são realocadas de outros locais de votação para escolas municipais com diretores indicados; e quando as seções eleitorais são realocadas de escolas municipais com diretores designados para outros locais de votação, os titulares têm uma diminuição média de 1,5 pontos percentuais de votos. Essas diferenças não são devido a alterações nas características ou na participação dos eleitores. Os resultados também sugerem que a localização de seções eleitorais em escolas importa para os resultados eleitorais, revelando o papel dos diretores nas eleições e sua influência nas seções eleitorais localizadas em escolas.

**Palavras-chaves:** Vantagem de incumbência; Seleção de burocratas; Escolas públicas.



# Abstract

This paper presents new evidence on a source of direct incumbency advantage, the discretionary appointment of public servants, more specifically, the appointment of municipal school principals by local mayors in Brazil. In Brazil, public schools are generally used as polling places and the majority of municipal school principals are appointed by mayors. I test whether those principals can influence the electoral outcomes in those localities for the benefit of the incumbent mayor. The exogenous reallocation of polling stations, independently made by electoral judges, is used to identify whether shifts from and towards municipal schools with appointed principal affect incumbent electoral outcomes. I make use of a unique dataset that matches administrative data of schools and electoral data. The results suggest that incumbents receive an average increase of 2.7 percentage points in vote share when polling stations are reallocated from other polling places to municipal schools with appointed principals; and when polling stations are reallocated from municipal schools with appointed principals to other polling places, incumbents have an average decrease of 1.4 percentage points in vote share. Those differences are not due changes in voters' characteristics or turnout. These findings also give evidence that the location of polling stations in schools matters, unveiling principals' role in elections and their influence over polling stations located in schools.

**Key-words:** Incumbency Advantage; Bureaucracy selection; Public Schools.

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# Introduction

Incumbency advantage is a well documented feature of political races. Incumbent candidates have asymmetrical advantages compared to challengers due to holding office, which can be exploited in their political strategy for re-election. Many papers have been dedicated to understand this political phenomenon (Stonecash (2008)). However, they differentiate from each other by what the main mechanisms behind the incumbency effect are. Some papers focus on the overall effects (Gelman e King (1990); Lee (2008)), others in disentangling different channels of incumbency advantage (Cox e Katz (1996), Levitt e Wolfram (1997)), and others in distinguishing differences in political careers (Ansola-behere e Snyder (2004)). This paper follows the branch of the literature that highlights the significant role of state bureaucracy as a potential driver of the incumbency advantage (Fiorina (1977); Fiorina (1989); Folke, Hirano e Snyder (2011)). Yet more, I focus on its implications to the electoral process itself, indicating that incumbency status has much more practical implications to the electoral system than already shown.

In theory, the discretionary selection of public servants by political appointment can represent a source of incumbency advantage. Politicians make use of personnel appointments for private and political interests, biasing the allocation in favor of socially or politically connected subordinates (Folke, Hirano e Snyder (2011); Colonnelli, Prem e Teso (2017); Xu (2017)). In response, those appointees have direct incentives for politically supporting the incumbent by exploiting administration resources (Oliveros (2016); Zarazaga (2014)). This paper tests whether the appointment of municipal school principals by mayors in Brazil constitutes a source of incumbency advantage.

In the Brazilian context, local governments are the main providers of primary education and expend a great part of their budget on education provision. They have a considerable discretion over the public education system and the appointment of public school personnel, with about 60% of municipal school principals being politically appointed. The electoral logistics make use of schools as the main locations to house polling stations, being about 80% of them located in school buildings. Similarly, schools are well used as polling places in other countries. Even more, Berger, Meredith e Wheeler (2008) find evidence that the location of polling stations in schools influence voters' behavior in

the USA and Larreguy, Olea e Querubin (2017) that Mexican political parties connected with teachers' unions have better electoral outcomes in polling stations located in schools, because of the role of teachers as political brokers. In this work, I propose that the location of polling stations in schools facilitates the role of appointed school principals as political brokers to electorally support incumbent mayors. Principals would be able to easily enforce their influence over the voting behavior of the school community, engage in electoral frauds (Brunazo e Cortiz (2006)), and better monitor the role of school teachers as political brokers (Larreguy (2012); Chambers-Ju e Eaton (2014); Sanches et al. (2016)).

Therefore, in order to empirically assess the role of appointed principals in elections, this work exploits the reallocation of polling stations. Polling stations are reallocated by electoral judges, following objective criteria determined by higher institutions. It is designed to be independent of political interests, then exogenous to the political outcomes. The polling stations' reallocation enable us to identify whether shifts towards/from municipal schools whose principals were appointed by the incumbents explain differences in incumbent's voting outcomes between the electoral cycle at the polling stations there located.

The results suggest that the appointment of school principals represents a relevant incumbency advantage mechanism. The reallocation of polling stations from any other polling place to municipal schools whose principals were appointed by incumbents increases incumbents' vote share, on average, in 2.7 percentage points. On the other hand, the reallocation of polling stations from municipal schools with appointed principal to other polling places decreases incumbents' vote share, on average, in 1.4 percentage points.

Principals appointment can, therefore, affect the Brazilian electoral process, as local elections in Brazil are very competitive. Winning candidates usually have little margin of victory over their opponents. For the 2008, 2012 and 2016 local elections, the winning mayor had an average margin of victory of only 0.54 percentage points over their strongest opponent in 2.7% of Brazilian municipalities, 447 on the aggregate, for the combined elections. Given that approximately 20% of polling stations in a municipality are located in municipal schools with appointed principals, if we generalize our findings asserting that incumbents have an average 2.7 percentage points increase in vote share for polling stations there located, this source of incumbency advantage could have been decisive for elections in a great number of Brazilian municipalities.

The remainder of this paper is organized as follows. Chapter 2 provides a conceptual discussion. Chapter 3 introduces the context of political and educational systems in Brazil. Chapter 4 describes the data. Chapter 5 presents the empirical and identification strategies. Chapter 6 discusses the results. Chapter 7 presents robustness tests. Chapter 8 concludes.

# 1 Related Literature

This paper is linked to the literature of incumbency advantage. In the past decades, a lot of attention was payed in disentangling mechanisms behind incumbents' electoral gains for holding office. The first works, developed in the 1970's and 1980's, found great correlation between political incumbency, re-election and electoral outcomes in the US.<sup>1</sup> However, [Gelman e King \(1990\)](#) demonstrated that most part of those estimates suffered from various sources of bias, proposing an unbiased method for estimating incumbency advantage. Still, there was no consensus over the main causes of the observed incumbency effect. [Cox e Katz \(1996\)](#) and [Levitt e Wolfram \(1997\)](#) gathered the past decades of evidence to propose a decomposition of the incumbency advantage into direct and indirect effects. The direct incumbency effect is the result of resources and opportunities that incumbency confers. Staff and office allowances may be used to provide electorally valuable services to constituents. Incumbent candidates may promote themselves with mails, news and press releases, that increase their visibility. Committee positions may be used to raise campaign funds. The empirical evidence is mostly indirectly observed by the size and budget of the candidate's office ([Fiorina \(1989\)](#); [Gelman e King \(1990\)](#); [King \(1991\)](#)). On the other side, the indirect effects are due to deterring high-quality challengers from running for office, because of the relative higher opportunity costs generated by the resources available only to incumbents.

The focus of this analysis is in the specific mechanism of bureaucracy appointment, part of the direct incumbency effect. Prior literature highlights the significant role of state bureaucracy as a component of incumbency advantage. [Fiorina \(1977\)](#) and [Fiorina \(1989\)](#) show that the observed growth of the incumbency advantage in the U.S. postwar congressional elections is directly related to the growth of the bureaucracy in the U.S. districts. [Folke, Hirano e Snyder \(2011\)](#) gives evidence of how political patronage in the administration's bureaucracy assignment helped U.S. parties in office retain political power.

Politicians would make use of personnel appointments for private and political interests, biasing the allocation in favor of socially or politically connected subordinates,

<sup>1</sup> For a review of the literature, see [Stoncash \(2008\)](#). Highlight to the pioneer work of [Erikson \(1971\)](#)



paying them back in return to their political support. Colonnelli, Prem e Teso (2017) show that political parties appoint party donors to public servant positions when elected in Brazilian municipalities. Zarazaga (2014) presents the role of brokers in Argentinian elections and their later appointment for public servant positions when the supported party is elected. The appointees would have personal incentives for politically supporting the incumbent and do so by exploiting the administrative resources. Oliveros (2016) shows that patronage employees in Argentina are more involved than non-patronage employees in dispensing favors to voters, complying with the expected services in return for their jobs. Following the evidence observed in this literature, this work proposes that local mayors, in Brazil, appoint public municipal school principals for electoral reasons, constituting a source of incumbency advantage.

In Brazil, most part of municipal school principals are politically appointed (about 60%). Borges (2007), Myers (2008), and Paro (1996) observe that appointed principals are committed with the local government and engage in its electoral support. Brollo, Kaufmann e Ferrara (2017), for instance, provides evidence that mayors exploit their relations with school principals to electorally benefit from the *Bolsa Família* anti-poverty social program. These evidences suggest that school principals are political brokers, acting for the electoral benefit of the incumbent mayor. Political brokers represent a direct link between the administration and voters. They are responsible for influencing voting behavior, for instance, through clientelistic and vote-buying strategies (Stokes et al. (2013)). Gingerich (2014), for instance, gives evidence that brokers allegiance was associated with an increase in 4 to 6 percentage points of governor's vote share in the Brazilian state of Minas Gerais. Brokers may exploit the Brazilian historical context of vote coercion (Leal (1949)), clientelistic electoral networks (Avelino (1994)) and electoral fraud (Telarolli (1982)), in their electoral strategy.

Another relevant aspect of the Brazilian context is that most polling stations are housed in school buildings, about 80% of them. Recent literature presents evidence that the location of polling stations in schools matter for electoral purposes. Larreguy, Olea e Querubin (2017) find that Mexican political parties supported by teachers' unions have better electoral outcomes in polling stations located in schools. Berger, Meredith e Wheeler (2008) show that people who were assigned to vote in schools were more likely to support a school funding initiative. Furthermore, Larreguy, Olea e Querubin (2017) concludes that

teachers can maintain brokers activities, such as clientelistic networks, vote buying and voters coercion, more effectively in school buildings. In this work, I exploit the fact that school principals are generally prior school teachers, and have unique control over the school area. We can expect that principals can facilitate brokers' electoral practices by exercising their control over the polling place.

Moreover, principals can also monitor the role of school teachers as brokers. The monitoring of brokers is found in the literature to be important for their actual political engagement. [Stokes et al. \(2013\)](#) shows that brokers are not perfect agents of parties and their performance determines the effectiveness of clientelistic practices. [Larreguy \(2012\)](#) and [Larreguy, Marshall e Querubín \(2016\)](#) give evidence on how monitoring political brokers is important to guarantee political parties more votes and increase voters' turnout in Mexican communal lands. In Brazil, [Sanches et al. \(2016\)](#) and [Brasil \(2008\)](#) give evidence that public school teachers are used as political brokers, and we can find similar evidence for Mexico in [Larreguy, Olea e Querubin \(2017\)](#), and for Colombia in [Chambers-Ju e Eaton \(2014\)](#). In this context, we might also expect that the placement of polling stations in schools under principals' authority can improve the monitoring of school teachers as political brokers. For this reason, changes in polling station locations should also represent a variation in the incumbency advantage, here observed through principals' role in elections at school locations.

## 2 Context

### 2.1 BRAZILIAN ELECTORAL INSTITUTIONS

Brazilian electoral institutions are designated following the territory administrative division from the Brazilian 1988 Federal Constitution. Each level of jurisdiction is responsible for the organization, regulation and law enforcement of the electoral process under the guide-lines of the Electoral Code, law 4.737 of 1965. The electoral justice is also distinguished from other judiciary subdivisions by its specialization characteristic. It has the judiciary attribution of law enforcement as well as the legislative and executive assignments regarding the electoral process. To guarantee the highest level of independence from outsiders, all judges at any level of the electoral justice have a fixed two-year term, being replaced by another individual of same qualification as required by law (Moraes (2007)).

The Brazilian Superior Electoral Court (TSE) is the highest level of electoral administration, responsible for the electoral system at the national level. The Regional Electoral Courts (TRE) are responsible for the electoral system at the state level. The electoral courts are responsible for the electoral system at the voting zone <sup>1</sup> level, the lowest level of administration. They are ruled by a electoral judge appointed by the respective TRE.

During the electoral period, up to sixty days before elections, other two relevant institutions are created: the electoral boards (*juntas eleitorais*) and the reception desks (*mesas receptoras*). The electoral boards are responsible for the electoral accountability at the voting zone level. They are composed by the respective electoral judge and two to four civil citizens, all appointed by the TRE. The reception desks are responsible for the organization of the actual moment voters come to the polling stations and do vote through the electronic ballots. They are composed by six registered voters at the polling station, assigned and appointed by the responsible electoral judge.<sup>2</sup> The electoral code

<sup>1</sup> Voting zones are subdivisions of each federation unit, generally corresponding to one municipality or about 200 polling stations, organized by the respective TRE based on the number of registered voters for organizational reasons.

<sup>2</sup> With positions: one president of the desk, one first and one second *mesários*, two secretaries and one

also determines that they should preferably be voters with college degree, teachers or public servants of the justice power. The average number of polling stations for the 2008, 2012 and 2016 elections is 426,747, what requires a total of 2.5 million of voters to work as reception desks' organizers. The fact is that on average only 3% of registered voters have college degree<sup>3</sup> (about 4 million of voters), and justice servants are nation-wide only 162,394 workers<sup>4</sup> (about 0.1% of the registered voters). Public school teachers are about 2.2 millions of workers, and 85% of them have post-secondary education.<sup>5</sup> This suggests that based on the law recruitment criteria most reception desks organizers in Brazil are school teachers.

## 2.2 ELECTORAL LOGISTICS

Electoral judges distribute voters, within a voting zone, across polling stations. Polling stations must have no more than 400 voters in state capitals, 300 voters in other towns, and no less than 50 registered voters. In rural areas, they must be exclusively housed in public spaces with the necessary infrastructure for receiving the electronic ballots, organizers and voters. The same is applied to urban areas, with the exception that private places can also serve as polling places, but with the requirement that the owner does not have any personal or familiar relation to any political candidate or party, and does it entirely for free. Overall, about 80% of polling stations are housed in school buildings.

According to the electoral law, electoral judges must publish a list with the location of polling stations sixty days before election day. They are responsible for checking the availability and infrastructure of those places to properly house polling stations and the electronic ballots in that election. These inspections are generally made by members of the electoral justice, being reported to the electoral judge. Any change in locations must be properly justified and registered with the respective TRE. If any irregularity is suspected, any citizen or political agent can question and appeal to the TRE, or to the TSE, to overlook the allocation process. These clear and independent criteria utilized in

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surrogate.

<sup>3</sup> as data from TSE

<sup>4</sup> as data from the 2013 Judiciary Census

<sup>5</sup> Data from IBGE PNAD. Average number of workers and characteristics for the years of 2006, 2011 and 2013.

the reallocation of polling stations are the key exogenous variation exploited by this work as a quasi-natural experiment.

## 2.3 BRAZILIAN MUNICIPALITIES

Municipalities are the local administrative division of autonomous jurisdiction in the Brazilian Federation institutional design. There are 5568 municipalities in Brazil (as of 2016) each belonging to one of the 26 federal units, and the federal district (*Brasília*). The government three-power division at municipal level is represented by the executive, in the figure of the mayor; the legislative, municipal chambers; and the judiciary, local or regional divisions. Mayors are elected in a four-year term and can be re-elected for just one more term in a row, standing at least one term absent to run for office in that municipality again.

Municipalities are responsible for a great number of key public services such as education, health, transportation, and sanitation. They have their revenues relying majorly on state and federal transfers. Municipal governments also employ a great part of local workforce, specially in small towns. Political control over public budget and public service positions constitutes a great source of political power, specially for incumbent mayors.

Although the majority of public workers are civil servants contracted by passing an exam (*concurso público*), there is still the possibility of individual hiring by limited term contracts and appointments. Specially for the so called "trust positions" (*cargo de confiança*), as guaranteed by the article 37 of the Brazilian 1988 Federal Constitution. The selection of school principals is such a case, and they are actually appointed by politicians in most Brazilian municipalities.

## 2.4 BRAZILIAN EDUCATIONAL SYSTEM

The Brazilian Educational System is composed by a set of public and private schools, being the majority of students enrolled in public schools.<sup>6</sup> Public schools are of federal, state, or municipal level administration. Since the 1996 National Education Law

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<sup>6</sup> 82.8% are enrolled in public schools as the Basic Education Census of 2013

9394 (*Lei de Diretrizes e Bases da Educação Nacional*, also known as *LDB*), there has been a major effort in organizing public schools' systems. Municipalities are responsible for the basic education (early childhood and first stage elementary education), states for the middle schools (second stage elementary education and high schools), and the federal government for the higher education.

The constitutional guarantee of universal public education gives the educational system a deeply spread network withing the Brazilian territory. That is one of the reasons why schools are widely used as polling places. On the matter of funding, public schools' resources come to a great extent from a federal non-discretionary fund called *FUNDEF*. It pays a fixed rate per enrolled student and it is the most important resource in guaranteeing school daily expenditures. In addition, schools can also receive funds from the state or municipal revenues. However, these are generally based on the discretion and following the interests of politicians.

The municipal administration, in the figure of the secretary of education, is responsible for the operation management of municipal schools, food and maintenance goods provision, students transportation, and the selection and training of school personnel, including principals.

## 2.5 SELECTION OF PRINCIPALS

There is no higher institutional law concerning the selection of municipal school principals. This decision is made by local laws, legislated in the municipal chambers, and following the Brazilian Federal Constitution broaden principles of governmental civil servants contracts. Overall, 60% of municipal school principals are politically appointed by the local administration, as opposed to being selected through a competitive process or being elected by the school community, as data from Prova Brasil. They are mainly experienced school teachers with higher education. The selection criteria of municipal school principals, however, can vary among municipalities, and even within schools of a municipality. As a matter of fact, 65% of municipalities have all their municipal school principals appointed by the local government. Other 16% have no municipal school with appointed principal, relying on community elections or competitive exams for the principal selection. About 19% present a multiple method of principals selection, i.e. schools principals

in that municipality were selected through different methods. This can be explained by how flexible the local institutional framework is. For instance, in the city of *Petrópolis* the municipal law 7,121/2013 determines that municipal school principals should be elected by the school community, but in an advisory character. The law also guarantees that the city mayor is the highest authority in this matter and has all the discretionary power to appoint anyone of his trust to the position. This is, in fact, guaranteed by the Brazilian Constitution article 37 and disregards the proposed school election. As in this example, there is the institutional possibility of more than one type of principals' selection method within a municipality.

There are some reasons, however, why politicians may appoint a school principal. First, politicians can hold private information and appoint someone thought to be of great qualification and accountability (Knott e Miller (2006)). Second, politicians may want to exploit a connection with the local community through principals, as they hold a prominent position in those localities. A great number of welfare benefits are obtained by the population through schools, e.g. meals and transportation, particularly in poor and remote locations. For instance, Brollo, Kaufmann e Ferrara (2017) provides evidence that mayors exploit their relations with school principals to politically benefit from the Brazilian Federal government anti-poverty social program *Bolsa Família*.<sup>7</sup> Finally, the principal position may be used to award political supporters, in exchange for electoral support (Colonnelli, Prem e Teso (2017)).

## 2.6 PRINCIPAL AS BROKERS AND POLLING STATIONS LOCATED IN SCHOOLS

The role of school principals as brokers is directly linked to their selection method. Borges (2007), Myers (2008), and Paro (1996) observe that appointed principals are strictly committed with local governments. The patronage schemes in the appointment of principals have historically guaranteed electoral benefits to politicians. Borges (2007) states that because principals have direct and constant contact with a large numbers of parents and students, this makes them potential community leaders and vote-gatherers

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<sup>7</sup> *Bolsa Família* is a cash-pay program based on conditionalities to access the benefit. As a major conditionality is that school-aged children must attend at least 85% of school-days, school principals are found to justify students' absences in favor of mayor's local voters to keep receiving the cash-pay.

in election years. Principals can also exploit their bureaucratic obligations to benefit incumbents, as [Brollo, Kaufmann e Ferrara \(2017\)](#) provide evidence of the manipulation of students' attendance criteria, one of the *Bolsa Família* conditionality. Moreover, principals can also exploit the Brazilian historical context of vote coercion ([Leal \(1949\)](#)), clientelistic electoral networks ([Avelino \(1994\)](#)) and electoral fraud ([Telaroli \(1982\)](#)), in the electoral strategy for the incumbent re-election.

Still, there is one feature that might be particularly important for principals' role as brokers, the allocation of polling stations in schools. The overall allocation of polling stations in schools seems to affect electoral outcomes. [Berger, Meredith e Wheeler \(2008\)](#) observe that American voters who were assigned to vote in schools were more likely to support a school funding initiative. [Larreguy, Olea e Querubin \(2017\)](#) find that Mexican political parties supported by teachers' unions have better electoral outcomes in polling stations located in schools. Furthermore, his findings even suggest that teachers can maintain brokers activities, such as clientelistic networks, vote buying and voters coercion, more effectively in school buildings. Beyond the usual opportunities of political brokers, principals may be able to access another electoral strategies when polling stations are located in schools under their authority. It may facilitate the monitoring of brokers, specially their subordinated teachers. It can also facilitate electoral frauds by exploiting failures in the electronic ballots system and in the election logistics.

Electoral frauds must be analyzed and better understood. [Brunazo e Cortiz \(2006\)](#) describe a number of elections frauds in the Brazilian context of electronic ballots. We can highlight those related to the role of principals and the allocation of polling stations in schools. First, principals can facilitate and monitor frauds made by teachers as reception desks' organizers.<sup>8</sup> Organizers are allowed to cancel the voting process if a voter spends more than one minute in the ballot cabin. As teachers hold personal information of voters preferences, they can selectively cancel ballots. Second, they can also vote in the place of absent voters. It consists of registering an absent voter as present, meanwhile an organizer votes in her place. Anecdotal evidence is also found in [Souza \(2016\)](#) and [Madeiro \(2010\)](#). Another fraud, although more complex, is during the logistics and placement of electronic ballots in schools. Principals can facilitate the so-called ballots cloning. It consists of changing validated and registered electronic ballot for also validated but unregistered

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<sup>8</sup> In section 3.1, I argue that it is highly probable that most reception desks organizers are teachers in Brazil, based on the selection criteria determined by law.



ballots.<sup>9</sup> The unregistered ballot is placed in the ballot cabin and receive votes, meanwhile the actual registered ballot is hidden and charged with votes the fraudsters want. The registered ones are those used to compute the overall votes in an election. It is important to note that most part of electoral frauds are due lack of surveillance by the political party delegates and members of the electoral justice. [Brunazo e Cortiz \(2006\)](#) confirm that this is the exactly case for Brazil. Electoral controllers and supervisors are very inexperienced and unprepared.

The allocation of polling stations in schools and the associated role of principals as brokers are central to understand how the reallocation of polling stations allows to observe indirectly the incumbent effect of bureaucracy appointment.

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<sup>9</sup> Extra electronic ballots are built as spares and are kept unregistered waiting for eventualities to replace a registered one.

## 3 Data

I use electoral data from the *Tribunal Superior Eleitoral* (TSE) and school data from the *Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira* (INEP). From INEP, I get data on schools' names, characteristics and selection method of principals. From TSE, data on electoral outcomes, polling station locations and demographic characteristics of voters.

### 3.1 TIMELINE

This analysis focuses on the 2008, 2012 and 2016 municipal elections, at the polling station level. Data on polling stations' location began to be schematically registered by TSE only in 2008. I start with 5,568 municipalities for the 2012 and 2016 municipal elections, and 5,562 for the 2008 election. Due to irregularities in candidate registration, detection of fraud or judicial impediment, supplementary elections were taken in some municipalities. Because of that, I drop 148, 112 and 11 municipalities for the 2008, 2012 and 2016 elections, respectively.<sup>1</sup>

I use first round electoral outcomes<sup>2</sup> for municipalities where an individual mayor got first elected in 2008 (2012) and ran for reelection, as incumbent, in 2012 (2016). That is because the Brazilian Constitution allows only one reelection term for executive offices. This is the case for 1,740 and 2,460 municipalities in the 2008-2012 and 2012-2016 electoral cycles, respectively. Because the incumbent mayor lost the run for re-election in 2012, 503 municipalities are observed in both electoral cycles. Then, I observe 3697 different municipalities from all the 26 states of Brazil.

I need to follow the same polling station in both datasets within the electoral cycle in order to compare incumbents' electoral outcomes between the first and re-election races at the polling station level. Polling stations can be shut down or new ones created within

<sup>1</sup> In those cases, the timeline of events are significantly distinguished from the regular ones, in a way we may not be able to actually observe the incumbency effect, as it might be overshadowed by irregularities.

<sup>2</sup> First rounds are open competitive elections with all registered candidates. Second rounds are taken with the two most voted candidates in first round for municipalities with more than 200,000 registered voters. They take place only if the winning candidate doesn't win by simple majority in the first round.

a electoral cycle. In those cases, I do not observe candidates' outcomes, because I cannot compare the incumbent's vote share before and after incumbency status effects. For the municipalities in the sample, I observe 76,559 polling stations in the 2008-2012 cycle, out of a total of 115,590 in 2008, and 125,879 in 2012; and 119,514 polling stations in the 2012-2016 cycle, out of a total of 199,862 in 2012, and 213,144 in 2016. This sums 196,073 polling stations observations in both electoral cycles.

Data on the selection method of school principals is only available for public schools that take the Prova Brasil exam.<sup>3</sup> Therefore, the principal appointment effect can only be accessed for municipal schools with Prova Brasil data. This can represent a positive selection of schools, by including more schools from wealthier locations. Brokers would have less influence on the more sophisticated voters and, therefore, the sample may provide a lower bound for the principal effects. Hence, I drop 23,659 polling stations that are located in municipal schools without principals' data.<sup>4</sup> Overall, the sample consists of 172,414 polling stations, of 3692 distinguished municipalities in both electoral cycles.

As shown in the timeline of Figure 1, a mayor candidate runs for office and wins the municipal elections in October of year 2008/2012, taking office in January of the following year, 2009/2013. In the beginning of 2009/2013 the TRE assigns new electoral judges to electoral zones respecting the turnover principle. One year before the following elections, 2011/2015, school level data is collected by School Census in May and Prova Brasil in November. Sixty days before elections day, the new electoral judge publish a list of polling stations locations, emphasizing reallocation. Finally in October of 2012/2016 the incumbent runs for office again in municipal elections.

## 3.2 INCUMBENT ELECTORAL OUTCOMES

Incumbency advantage is generated while politicians hold office. In their first race, mayors would ultimately have no incumbency power. It would be observed just in their re-election race. Therefore, I estimate incumbency status effects by comparing the vote share of mayors at a given polling station in their first election race with their vote

<sup>3</sup> Prova Brasil is a nation-wide, standardized exam, administered to all 4th and 8th graders in public schools that have at least 20 students enrolled in that particular grade-level. Principals of participant schools answer a questionnaire reporting their selection method.

<sup>4</sup> Schools that take Prova Brasil are generally bigger and house more polling stations than the non-takers. See table 12

share in the re-election race. Following [Fowler e Hall \(2014\)](#) I focus on incumbency of individual candidates and not political parties. Brazilian parties are characterized for weak ideology and representation in local elections ([Mainwaring \(1999\)](#)), being individual mayoral candidates much more important regarding electoral outcomes. For the sample of mayors, they have an average decrease of 6.3 percentage points in vote share between the two elections at the polling station level.

### 3.3 SCHOOL PRINCIPALS AND POLLING STATIONS REALLOCATION

This paper estimates the incumbency effect mechanism of bureaucracy appointment by the political role of appointed principals. Principals can possibly influence electoral outcomes at polling stations located in schools, because of their unique control over the school area. However, for estimation purposes, the appointment of principals is endogenous to the local laws and the discretion of mayors. This makes the comparison between electoral outcomes of polling stations allocated in municipal schools with appointed principals and in other polling places also endogenous. Therefore, I exploit the logistics of elections as a quasi-natural experiment. Polling stations are exogenously reallocated by electoral judges within the electoral cycle, when locations are no longer suited for housing polling stations. I use the differences in electoral results for polling stations reallocated to municipal schools with appointed principals to indirectly observe the role of appointed principals during elections.

In order to do so, I match electoral data with school level data by matching the name of polling places localities with the name of schools. This is made by using a *fuzzy merge* strategy at the municipality level. It consists of a name recognition algorithm that matches school names with polling station location names.<sup>5</sup> What allows, for instance, to match the school with the name *EE FERNANDO MELO VIANA* with the polling stations located in *ESCOLA ESTADUAL FERNANDO MELO VIANA*.

This identification is implemented after some data cleaning, in which I keep only the core of the place's name for the match process, e.g. *EE FERNANDO MELO VIANA* is identified as *FERNANDO MELO VIANA*; the same for *ESCOLA ESTADUAL FER-*

<sup>5</sup> see [Raffo \(2015\)](#) for the algorithm explanation.

*NANDO MELO VIANA*. The name similarity algorithm will generate a matching score for the two places being compared. Exactly identification, as in the example above, gives a score of 1.00. In the generated dataset I find that approximately 72% of places score perfect identification, 1.00. For identifications with scores below 1.00, I run a random experiment within the sample to check the algorithm effectiveness. I find that only 0.84% of all polling places are possibly incorrectly assigned to a school with some resemblance in name. Scores are usually not perfect because of typos like the school with core name *ANTONIO SINIBALDI* appears in the polling place location as *ANTONIO SINNIBALDI*, and because of that missing "N" do not score 1.00 for exactly identification.

After that, INEP schools identification codes are used to observe whether polling stations were reallocated or not between the electoral cycles. It is, then, possible to determine if a polling station is located in a municipal school with appointed principal or in another place.

## 3.4 CONTROL VARIABLES

Possible confounders of polling stations reallocation are changes in the pool of voters, and so the average preference of voters in a polling station. I use variations between the two elections in the share of voters' characteristics, e.g. gender, schooling and marital status, at the polling station level to control for possible changes in preferences correlated with the polling station reallocation.

## 3.5 SUMMARY STATISTICS

Table 1 presents characteristics of polling stations and voters that constitute the sample, as well as electoral outcomes, in the re-election year (2012/2016). The 172,414 polling stations in the sample hold 57.2 million voters. There are 41,490 polling places in 3,692 municipalities. Most polling stations are located in school buildings, being 22% in municipal schools with appointed principal. 8% of polling stations are reallocated during the electoral cycle. This is the source of variation I use in the empirical strategy. The polling stations used in treatment group are the 2% reallocated to school with appointed principal. The average number of polling stations in each polling place is 4 and in each municipality 41. It is important to notice that 39% of polling stations come from the 2008-

2012 electoral cycle, and 61% from the 2012-2016 electoral cycle. Regarding the electoral outcomes, voters' turnout is on average 84%<sup>6</sup>, and incumbents' average vote share in the re-election race is 41%. Regarding voters' characteristics, they are almost half male, aged between 25 years and 69 years, and with uncompleted or completed primary education. The data we have on the characteristics of voters are obtained when they register to vote, which usually occurs when citizens are about eighteen years old, because this is the age at which voting becomes mandatory in Brazil. This explains why the mean share of secondary and post-secondary educated individuals are so low. Appendix ?? presents the same information adding data of polling stations located in municipal schools that do not take Prova Brasil exam. The sample is very similar in voters' and polling stations' characteristics, and electoral outcomes at the polling station level.

Prior differences in average voters' characteristics, as well as their consequent electoral decisions, between polling station location groups are important to determine whether the observed treatment effect is not due spurious correlation. Table 2 presents average voters' characteristics and electoral outcomes in the first election, 2008/2012, by breaking the sample in groups of polling stations located in school and non-school buildings (columns 1 and 2, respectively); and in the control and treatment groups (columns 3 and 4, respectively). Treated polling stations are those reallocated to municipal schools with appointed principals. Polling station in control group are those reallocated to other polling places or not reallocated at all. The last column presents the average differences between treatment and control groups. The statistical significance of the differences in treatment and control groups are observed from the treatment coefficient in an auxiliary regression, with the mean of a characteristic or electoral outcome as dependent variable. This OLS regression has municipality and electoral cycle fixed effects, weight for the number of voters registered in a polling station, and cluster at the polling place level. Voters' characteristics and electoral outcomes do not seem to greatly vary according to the groups of polling places. To causal inference reasons, we might expect no significant differences in polling stations in the control and treatment groups. We can see in the last column of Table 2 that this is the case. Voters in the treatment and control groups are similar in observable characteristics, which is a good assessment to differences in unobservables. Differences are of small magnitude and just significant for the completed post-secondary

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<sup>6</sup> Voting is obligatory in Brazil for citizens aged 18-70 years old.

education group. Incumbents have an average higher vote share in the re-election race in the treatment group, what is possibly a result of the treatment; and the difference of voters' turnout in the first election is slightly significant but of small magnitude. These differences do not seem to invalidate the empirical strategy.

Table 3 presents a matrix of polling stations reallocation between the first and re-election races. From a total of 172,414 polling stations, 158,932 of them do not change location between the first and the re-election races. 13,482 (7.8%) of them were reallocated. For the reallocated, 26% of them were reallocated to municipal schools with appointed principals, 11% to other municipal schools, 43% to schools of other administration, and 20% to other polling places not located in schools. Appendix ?? presents the polling stations reallocation matrix for each electoral cycle.

## 4 Empirical Strategy

I exploit the reallocation of polling stations as a quasi-natural experiment to identify the effect of appointed principals' influence on electoral outcomes of incumbent mayors. Electoral judges assignment and decisions are independently determined from the political cycles or interests, making the reallocation of polling stations also designed to be independent of the administration. The results also support the independence of the reallocation of polling stations. It is, however, not enough to guarantee the exogeneity of polling stations' reallocation. Because of that, I evaluate mayors' electoral outcomes between two elections by taking the difference of the vote share at the polling station level. This controls for individual political candidates' characteristics and voters' preferences, taking into account that the pool of voters in a polling station does not change in grate proportion between elections. I also control for municipality and electoral cycle fixed effects to eliminate municipalities and election races specifics fixed on time and possibly correlated with the estimated effect.

The treatment effect relies on the importance of the polling location on the electoral outcomes of polling stations there located. Treated polling stations receive the treatment of principals' role as political brokers in the re-election race as they are reallocated to the municipal schools with appointed principals. Principals would have influence over the electoral process on those localities and impact the electoral outcomes. Therefore, the treatment group consists of polling stations that were reallocated towards municipal schools whose principal was appointed by the incumbent mayor between the electoral cycle. The control group of polling stations are those not reallocated, reallocated to schools of other administration, or municipal schools whose principals were selected by another method than political appointment. Overall, other polling places than municipal schools with appointed principals are non-school, private schools, federal schools, state schools, and municipal schools with not appointed principals locations.

I estimate the average effect of polling station reallocation on electoral outcomes based on the linear regression equation:



$$\begin{aligned}
\Delta vote_{semt} = & \alpha + \beta Reallocated * MunicipalSchool * AppointedPrincipal_{semt} + \\
& \delta_1 Reallocated * MunicipalSchool_{semt} + \\
& \delta_2 Reallocated * AppointedPrincipal_{semt} + \\
& \delta_3 MunicipalSchool * AppointedPrincipal_{semt} + \\
& \delta_4 Reallocated_{semt} + \delta_5 Municipal_{semt} + \delta_6 AppointedPrincipal_{semt} + \\
& \Delta X'_{semt} \Gamma + \rho_m + \lambda_t + \epsilon_{semt}
\end{aligned}$$

where  $\Delta vote$  is the difference in incumbent's vote share between the first and re-election races, in a specific polling station  $s$ , in polling place  $e$ , municipality  $m$  and electoral cycle  $t$ . The parameter of interest is  $\beta$  that indicates the average impact on the dependent variable of a polling station reallocation (*Reallocated*) between the first and re-election races towards a municipal school (*Municipal School*) with appointed principal (*Appointed Principal*). I also control for the interaction terms *Reallocated\**Municipal School** that control for general factors associated with polling stations reallocated to municipal schools; *Municipal School\**Appointed Principal** for common factors associated with polling stations located in municipal schools with appointed principal; *Reallocated\**Appointed Principal** for those related to polling stations reallocated to schools with appointed principal; *Reallocated* that absorbs all the factors associated with the sole change in poll location such as distance, voters misinformation about their voting place; *Municipal School* for the factors associated with polling stations located in municipal schools; *Appointed Principal* for those located in schools with appointed principal.  $\Delta X'$  is a matrix of controls at the polling station level, that includes differences of registered number of voters and share of voters' characteristics between the first and re-election races. The voters' characteristics controls consist of the share of voters based on gender (if male or female), marital status (if single, married, unmarried, divorced, or widower), age (if they are 16 years old, 17, 18 to 20, 21 to 24, 25 to 34, 35 to 44, 45 to 59, 60 to 69, 70 to 79, or 80 plus), and education level (if they are illiterate, know how to read and write, have uncompleted primary education, completed primary education, uncompleted secondary education, completed secondary education, uncompleted post-secondary education, or completed post-secondary education).<sup>1</sup>  $\rho_m$  is a municipality fixed effect,  $\lambda_t$  is an electoral cycle fixed effect, and  $\epsilon_{semt}$  the

<sup>1</sup> The controls are represented by the terms:  $\Delta \%Man$ ,  $\Delta \%Woman$ ,  $\Delta \%Single$ ,  $\Delta \%Married$ ,  $\Delta \%Wi-$

clustered, robust, idiosyncratic error.

The sample consists of two cross-sections of polling stations level data in differences, between the first and re-election races an incumbent mayor candidate runs. The 2008-2012 and 2012-2016 electoral cycle data are stacked up for an OLS regression strategy exploiting the panel structure of polling stations electoral outcomes between the electoral cycle. I use clusters at the polling place level, because vote outcomes of polling stations located in a same polling place can be correlated. I also weight the regressions by the number of registered voters at a polling station in the re-election race, to properly compute the standard errors by placing larger weights in polls with more voters and, therefore, less noise.

The main assumption for casual inference is that conditional on municipality and electoral cycle fixed effects, changes in polling stations location is independent of any other factor that explains the difference in electoral outcomes observed between two elections. As polling stations location is determined by independent electoral judges and published sixty days before elections day, not in time to voters try to change their assigned polling location<sup>2</sup>, the impact of those changes on electoral outcomes should be uncorrelated with the idiosyncratic error.

Still, there are some concerns I should address for estimation purposes. Electoral judges could be captured by politicians and reallocate polling stations following political interests. This would represent that the reallocation of polling station is endogenous to the political system. I show that the reallocation of polling stations have a small and negative impact on incumbent electoral outcomes. This suggests that it is contrary to the expected if political interests motivated the reallocation of polling stations.

Another concern is that voters' political preferences could change over time differently in the control and treatment groups, not because of principal's political engagement. This could be correlated with the treatment effect and generate a bias in the estimated parameter of interest. I address this problem by controlling for differences in observable

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dower,  $\Delta$  %Divorced,  $\Delta$  %Unmarried,  $\Delta$  %Age 16,  $\Delta$  %Age 17,  $\Delta$  %Age 18-20,  $\Delta$  %Age 21-24,  $\Delta$  %Age 25-34,  $\Delta$  %Age 35-44,  $\Delta$  %Age 45-59,  $\Delta$  %Age 60-69,  $\Delta$  %Age 70-79,  $\Delta$  %Age 80+,  $\Delta$  %Illiterate,  $\Delta$  %Read and Write,  $\Delta$  %Uncompleted Primary Education,  $\Delta$  %Completed Primary Education,  $\Delta$  %Uncompleted Secondary Education,  $\Delta$  %Completed Secondary Education,  $\Delta$  %Uncompleted Post-secondary Education,  $\Delta$  %Completed Post-secondary Education,  $\Delta$  Number of registered voters

<sup>2</sup> Voters can only ask to change their polling location four months in advance of the election day as determined by the electoral law.

voters' characteristics over the electoral cycles, as well as by controlling for electoral cycle fixed effect. Differences in voters characteristics between control and treatment groups in Table 2 also suggest that there are no prior substantial differences in voters' characteristics that could bias the treatment effect estimation.

There is also the possibility that school and electoral administrative data present measurement error, which can also generate bias to the estimation. Most outstanding is principals' self-portrayed answers to the Prova Brasil questionnaire, used to observe the principals selection method. If appointed principals do not properly report their selection method, it would generate an attenuation bias to the treatment estimator. I cannot fully overcome this possible problem. However, the data is consistent over the years for each municipality context, and is constantly revised by the institutions.

## 5 Results

### 5.1 POLLING STATIONS REALLOCATION

Table 4 shows the OLS estimations of the polling station reallocation effects. I start testing whether the sole change of polling station location affects voting outcomes. Column 1 of Table 4 shows that the reallocation of polling stations has an average negative and significant impact on the difference of incumbent's vote share between the first and re-election races. The point estimate constitutes about 6% of the mean of the dependent variable.<sup>1</sup> This result supports the idea that electoral judges independently reallocate polling stations. If we suspected that any political capture of judges was at place, the average change of polling station location should lead to a better electoral outcome for the incumbent.

There is a concern that the difference observed between reallocated polling stations and not reallocated are due to differences in the average voters' characteristics composition. Voters are systematically assigned to the same polling station and this do not change unless requested with formal requirements. Therefore, the composition of voters within a polling station can only marginally change between elections. In column 2 of Table 4, I estimate the reallocation effect by controlling for the changes in voters' characteristics over the electoral cycle. The estimated coefficient for the polling station reallocation does not change and is still significant. Another concern is that the reallocation effect is not nosily computed due to differences in the number of voters in a polling station. In column 3 of Table 4, I weight the effect of polling station reallocation by the number of voters registered in the polling station. The estimated coefficient for reallocation is also significant and of similar magnitude. In any case, to overcome possible estimation concerns I control for differences in voters characteristics in time and weight on the number of registered voters at a polling station in the rest of the estimates.

In column 4 of Table 4, I estimate the effect of polling station reallocation by controlling for municipal school administration and political appointment of principals. The reallocation coefficient is still significant but with a sharp increase in magnitude, and

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<sup>1</sup> The average difference of incumbents' vote share is of -6.3 percentage points for the studied years.

municipal school location have a significant negative impact on electoral outcomes. In column 5 of Table 4, we observe that the reallocation of polling stations towards municipal schools have a significant effect on the incumbent's vote share. Further, in column 6 we observe that the positive effect of shifts towards municipal schools comes exactly from those with appointed principals. Shifts towards municipal schools with appointed principals increase incumbent's vote share on average in 2.34 percentage points, and the coefficient for shifts to overall municipal schools is no longer significant. This is the average incumbency effect through principals electoral engagement expected in our empirical context, consistent with municipal school principals as political brokers.

In Appendix ??, I estimate the same results presented in this section adding municipal schools without Prova Brasil data to the sample.<sup>2</sup> The reallocation effects are very similar in significance and magnitude. This is an assessment that the selection on schools possibly does not raise great concerns to the estimation.

## 5.2 HETEROGENEITY REGARDING POLLING PLACE IN THE FIRST AND RE-ELECTION RACES

In Table 4, I estimate the impact of polling stations reallocation without taking into consideration the location it was placed in the incumbent first election. Another effect I miss in that specification is the possible decrease in incumbent's vote share because polling stations located in municipal schools with appointed principals are relocated to another polling places. Table 5 shows results for the same specification but taking into consideration this heterogeneity regarding the location of polling stations in the first race. The baseline category is composed of polling stations located in polling places other than municipal schools with appointed principals. Those could have not been reallocated between the first and re-election races, or were reallocated to polling places of the same type. Reallocation of polling stations from other polling places to municipal schools with appointed principals increase the incumbent's vote share in 2.7 percentage points, on average. Meanwhile, changes from polling stations located in municipal schools with appointed principals to other polling places decreases incumbent's vote share in 1.4 percentage points, on average. These results suggest that the polling place is a significant

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<sup>2</sup> This sample selection is discussed on section ??.

determinant of electoral outcomes by evidencing the role of principals in supporting mayoral candidates, specially in the re-election race of incumbent candidates.

## 6 Robustness Tests

### 6.1 VOTERS' TURNOUT

A consequence of polling stations reallocation that could generate differences in incumbent vote share at a polling station is changes in voters turnout. Voters could get confused by location change and simply not vote, changing the average vote share of the candidate on those polling stations. For this reason, I test whether shifts in polling station location impact voters' turnout. Table 6 suggests that the reallocation of polling station do have some marginal effect on voters' turnout. However, the specific reallocation towards municipal schools with appointed principal have no significant impact on voters' turnout. These results suggest that the treatment effect on incumbent vote share is not due to a reshuffle in the pool of voters that come to vote in the re-election race.

### 6.2 MEAN-REVERTING PROCESS

Differences in electoral outcomes between the two elections at a polling station may also be the result of mean-reverting processes in the treatment and control groups. The stochastic generating process could be different for each group. In this case the results observed in Table 4 would be spurious. For this reason, Table 7 follows the main specification, but takes as dependent variable the incumbent vote share in the re-election run, and controls for the incumbent vote share in the first run. The mean-reverting process is captured by controlling the regression on the incumbent vote share in the re-election race by the incumbent vote share in first election. If the estimated coefficients in Table 4 are spurious they would have no statistical significance in this specification. The coefficient of the polling station reallocation to municipal school with appointed principal is still significant in Table 7 and of similar magnitude, 1.95 p.p., of those observed in table 4. That suggests that the estimated treatment effect is not spurious due to mean-reverting processes. In Appendix E, I test the robustness of results found in Table 5 for mean-reverting processes, as well.

### 6.3 VOTERS' CHARACTERISTICS

Table 2 suggests that the average characteristics of voters are not significantly different between the treatment and control groups in the incumbent first race. Those characteristics can, however, change over time, and differences within the electoral cycle could be correlated with the treatment effect. Table 8 and Table 9 check whether the reallocation of polling stations to municipal schools with appointed principals affect the differences in the average share of voters' characteristics over time at the polling station level. The difference in characteristics can represent an assessment to changes in the average voters' preference, confounder of the treatment effect impacting incumbent's vote share in the re-election race. The results suggests that the reallocation of polling stations is not correlated with changes in the share of average voters' characteristics. The reallocation of polling stations to municipal schools with appointed principal is only marginally significant for differences in the share of voters aged less than 24 years and with age between 45 and 69 years, being insignificant for all other characteristics. This suggests that the treatment is not correlated with differences in voters characteristics over time, with no issues regarding estimation bias. Moreover, it also suggest that the reallocation of polling stations do not cause changes in the pool of voters registered at them.

### 6.4 PLACEBO TEST WITH STATE ADMINISTERED SCHOOLS

I also run a placebo test using state administered schools. In this case, I need information on principals' selection method only for state administered schools, what makes the sample be composed of 180,684 polling stations. State administered school principals are selected by the state government and do not have, in principle, the same motivations to support incumbent mayors as municipal school principals do, what the literature also supports. For instance, [Akhtari, Moreira e Trucco \(2017\)](#) find that municipal government turnover does not impact the turnover of state school principals, differently from what is observed for municipal school principals. Table 10 column 1 shows that the overall reallocation effect is still observed. Column 2 and 3 show that the reallocation of polling stations to state schools and state schools with appointed principals are not significant. This means that we cannot observe any incumbency effect through state school principals.



## 7 Conclusion

In this work I provide evidence that incumbents exploit the appointment of municipal schools principals to obtain electoral gains. This consists a source of incumbency advantage, which I indirectly observe by the exogenous variation of polling stations reallocation. I found that incumbent majors increase their vote share in 2.7 percentage points in polling stations reallocated from other polling places to municipal schools whose principal was appointed by the incumbent. I also found that when polling station formerly located in municipal schools with appointed principal are reallocated to other polling places, incumbents lose on average 1.4 percentage points in vote share. These results are robust to changes in voters' characteristics and are not correlated with lower voters' turnout or any mean-reverse process. The same mechanism is not observed in reallocation towards other types of buildings, as state administered schools.

The results contribute to the literature that highlight the role of principals and teachers of schools as political brokers. Although, I cannot directly observe that principals manipulate the electoral process in schools, I provide indirect evidence that the location of polling stations in schools under their authority impacts incumbents' electoral outcomes. Principals may engage in brokers surveillance, clientelistic networks, vote coercion, vote buying, and any other electoral strategy based on the location of polling stations to electorally benefit the incumbent.

They also contribute to the incumbency advantage literature, by shedding light on a specific mechanism of incumbent advantage, the appointment of principals. They also contribute to the bureaucracy selection literature as disclose the political motivation behind bureaucrats selection and their use for electoral purposes. This mechanism might be decisive to local elections in Brazil, as they are very competitive. This suggests that local elections have being decided by disruptions of the electoral system, instead of through a democratic competition.

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## 8 Figures and tables

Figure 1: Timeline of Elections and Data

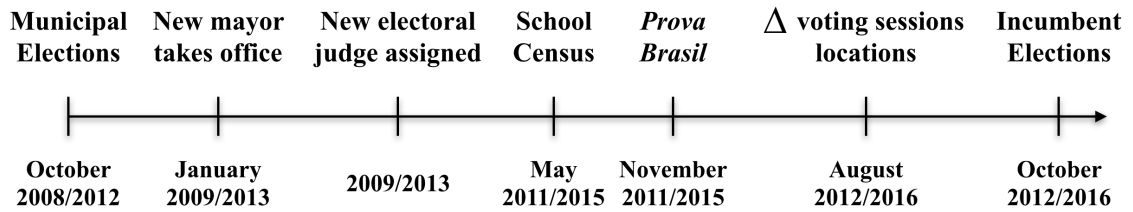


Tabela 1 – Summary Statistics

	Mean	Std. Dev.	Min	Max
Polling Station characteristics				
% Located in Schools	0.77	0.42	0.00	1.00
% Located in Municipal Schools	0.33	0.47	0.00	1.00
% Located in Mun. Schools with Appointed Principal	0.22	0.41	0.00	1.00
% Reallocated between the first and re-election races	0.08	0.27	0.00	1.00
% Reallocated to Mun. Schools with App. Principal	0.02	0.14	0.00	1.00
Average number of Polling Stations in a Polling Place	4	4	1	47
Average number of Polling Stations in a Municipality	41	50	1	631
% From the 2008-2012 electoral cycle	0.39	0.49	0.00	1.00
% From the 2012-2016 electoral cycle	0.61	0.49	0.00	1.00
Electoral outcomes at the polling station level				
Voters Turnout	0.84	0.06	0.06	1.00
Incumbent Vote Share	0.41	0.16	0.00	0.99
Voters characteristics at the polling station level				
% Males	0.49	0.05	0.00	0.97
% Voters with age $\leq 24$ years	0.16	0.12	0.00	0.94
% $25 \leq$ Voters with age $\leq 44$ years	0.43	0.15	0.00	1.00
% $45 \leq$ Voters with age $\leq 69$ years	0.33	0.13	0.00	0.92
% Voters with age $\geq 70$ years	0.08	0.06	0.00	1.00
% Illiterates	0.07	0.07	0.00	0.91
% Uncompleted Primary Education	0.48	0.15	0.00	1.00
% Completed Primary & Uncomp. Secondary Educ.	0.24	0.09	0.00	0.71
% Completed Sec. & Uncomp. Post-sec. Educ.	0.17	0.11	0.00	1.00
% Completed Post-secondary Education	0.04	0.06	0.00	0.72
Average number of Voters in a Polling Place	1,380	1,334	28	14,397
Average number of Voters in a Municipality	13,656	17,685	305	198,129
Total number of observations in sample (N)				
Voters		57,259,005		
Polling Stations		172,414		
polling places		41,490		
Distinguished municipalities		3,692		

Data from TSE for the Brazilian 2008, 2012 and 2016 elections. The sample consists of municipalities in which the incumbent mayor run for re-election, polling stations that appear in both first and re-election races datasets, and municipal schools used as polling places with Prova Brasil data in both electoral cycles, in order to observe principals' selection method. Characteristics of polling stations and voters, and electoral outcomes in the incumbents re-election race, 2012 and 2016.

Tabela 2 – Voters characteristics and electoral outcomes by polling place, control and treatment groups.

Polling Places in	Schools (1)	Non-schools (2)	Control (3)	Treat. (4)	Diff. (4) - (3)
Average Voters' Characteristics					
Males	0.49 0.06	0.50 (0.06)	0.49 (0.06)	0.49 (0.06)	0.00210
Voters age $\leq 24$ years	0.20 0.16	0.19 (0.14)	0.20 (0.15)	0.22 (0.16)	0.02370
$25 \leq$ Voters age $\leq 44$ years	0.43 0.16	0.42 (0.14)	0.43 (0.15)	0.43 (0.15)	0.00669
$45 \leq$ Voters age $\leq 69$ years	0.30 0.13	0.31 (0.13)	0.31 (0.13)	0.28 (0.12)	-0.02630
Voters age $\geq 70$ years	0.07 0.05	0.07 (0.05)	0.07 (0.05)	0.07 (0.05)	-0.00409
Illiterates	0.07 0.07	0.09 (0.08)	0.07 (0.07)	0.11 (0.09)	0.03285
Uncompleted Primary Education	0.52 0.15	0.55 (0.16)	0.52 (0.15)	0.58 (0.13)	0.05460
Comp. Primary & Unc. Secondary	0.25 0.1	0.22 (0.10)	0.24 (0.10)	0.20 (0.10)	-0.04067
Comp. Secondary & Unc. Post-sec.	0.13 0.09	0.12 (0.10)	0.13 (0.09)	0.10 (0.08)	-0.03507
Comp. Post-secondary Education	0.03 0.04	0.03 (0.05)	0.03 (0.04)	0.02 (0.03)	-0.01165**
Electoral Outcomes					
Incumbent vote share in first elec.	0.47 0.11	0.48 (0,12)	0.47 (0,12)	0.49 (0,10)	0.01710
Incumbent vote share in re-election	0.40 0.16	0.42 (0,16)	0.41 (0,16)	0.42 (0,14)	0,01143*
Voters turnout in first election	0.85 0.06	0.85 (0,07)	0.85 (0,06)	0.85 (0,07)	0,00092*
Voters turnout in re-election race	0.83 0.06	0.84 (0,07)	0.84 (0,06)	0.83 (0,07)	-0.00326
Number of polling stations (in th.)	126.3	46.1	168.9	3.5	
Number of voters (in millions)	43.6	13.8	56.3	1.1	

Data from TSE for the Brazilian 2008, 2012 and 2016 elections. Voters' characteristics and electoral outcomes in the incumbent first race, 2008 and 2012. Treatment group are polling stations reallocated to municipal school with appointed principals. Control group are polling stations reallocated to other places or not reallocated at all. Other places consists of: non-school, private schools, federal schools, state schools, municipal schools with not appointed principals. The significance of differences in control and treatment groups comes from the treatment coefficient in an auxiliary regression with municipality and electoral cycle fixed effects, weight for number of registered voters at a polling station, and cluster at polling place level. Control of differences in voters characteristics also added for differences in electoral outcomes. Standard Deviation in parenthesis. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .



Tabela 3 – Polling Stations location change matrix

Reallocated to		Location in first election (2008/2012)				
		Non-school location	Other adm. school	Municipal School with		
				not Appointed Princ.	Appointed Principal	
Location in re-election race (2012/2016)	Municipal	Appointed Principal	2631	596	23	290
	school w/	not Appointed Princ.	1162	266	49	28
	Other administration school		4659	594	241	341
	Non-school location		-	1602	271	729
		No change in location				
		37623	70020	16921	34368	

Data from TSE for the Brazilian 2008, 2012 and 2016 municipal elections. Polling stations reallocation within the electoral cycle, from 2008 to 2012 and from 2012 to 2016. Non-school locations are any other places to house polling stations, e.g. churches, private clubs. First elections are the races incumbent mayors got first elected. Other administration schools are school of state, federal, or private administration. Reallocation from non-school locations to other non-school locations is not observed.

Tabela 4 – OLS - Polling Station Reallocation

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.: Incumbent's $\Delta$ vote share at the polling station within the electoral cycle						
Reallocated	-0.00509*** (0.00187)	-0.00505*** (0.00186)	-0.00554*** (0.00194)	-0.00543*** (0.00194)	-0.00622** (0.00257)	-0.00447* (0.00263)
Reallocated*Municipal School					0.00214 (0.00371)	-0.00722 (0.00600)
Reallocated*Mun. School *Appointed Principal						0.02340** (0.01060)
Municipal School				-0.00394*** (0.00150)	-0.00390*** (0.00122)	-0.00396** (0.00200)
School with Appointed Principal				0.00043 (0.00161)		0.00070 (0.00235)
Municipal School*Appointed Principal						-0.00044 (0.00322)
Reallocated*School with Appointed Principal						-0.01230 (0.00858)
Electoral Cycle FE	X	X	X	X	X	X
Municipality FE	X	X	X	X	X	X
Control for $\Delta$ Voters' Characteristics		X	X	X	X	X
Weight for the number of registered voters			X	X	X	X
Mean Dep. Variable	-0.063	-0.063	-0.063	-0.063	-0.063	-0.063
Number of Clusters	41490	41490	41490	41490	41490	41490
Number of Municipalities	3692	3692	3692	3692	3692	3692
Observations	172,414	172,414	172,414	172,414	172,414	172,414
R-squared	0.734	0.737	0.748	0.748	0.748	0.748

Electoral data at the polling station level from TSE. Municipal elections of 2008, 2012 and 2016. Dependent variable measured as the difference in incumbent's vote share between the re-election and first races. School data obtained from the INEP School Census and Principal Questionnaire of Prova Brasil for the years of 2011 and 2015. Reallocation of polling stations from non-school to non-school places not observed. Controls include the difference in voters' characteristics as gender, age and marital statuses, number of registered voters. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

Tabela 5 – OLS - Heterogeneity of location in first election

	(1)
Dep. Var.: Incumbent's $\Delta$ vote share at the polling station within the electoral cycle	
Polling station reallocated from:	
other place to Municipal Schools*Appointed Principal	0.0274*** (0.0101)
Municipal School*Appointed Principal to other place	-0.0144*** (0.0047)
Mun. School*App. Principal to Mun. School*App. Principal	0.0110 (0.0116)
Polling station in Mun. School*Appointed Principal not reallocated	-0.0008 (0.0032)
Municipal School	-0.0037* (0.0020)
School with Appointed Principal	0.0009 (0.0023)
Reallocated*Municipal School	-0.0113** (0.0055)
Reallocated*School with Appointed Principal	-0.0160* (0.0082)
Electoral Cycle FE	X
Municipality FE	X
Control for $\Delta$ Voters' Characteristics	X
Weight for the number of registered voters	X
Mean Dep. Variable	-0.063
Number of Clusters	41,490
Number of Municipalities	3,692
Observations	172,414
R-squared	0.748

Electoral data at the polling station level from TSE. Omitted categories are polling stations located in polling places other than municipal schools with appointed principals that weren't reallocated within the electoral cycle or were reallocated to other polling places of same kind. Elections of 2008, 2012 and 2016. OLS regressions for the electoral cycles of 2008-2012 and 2012-2016. Dependent variable measured as the difference of incumbent's vote share between the re-election and first races. Data on schools obtained from the INEP School Census and Principal Questionnaire of *Prova Brasil* for the years of 2011 and 2015. Controls include the difference in voters' characteristics as gender, age and marital statuses, and number of registered voters. Reallocation of polling stations from non-school to non-school locations not observed. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

Tabela 6 – OLS - Robustness to Voters' turnout

	(1)	(2)	(3)
Dep. Var.: Voters' $\Delta$ turnout at the polling station within the electoral cycle			
Reallocated	-0.00147*** (0.00039)	-0.00091* (0.00047)	-0.00094* (0.00051)
Reallocated*Municipal School		-0.00155* (0.00080)	-0.00085 (0.00124)
Reallocated*Mun. School*Appointed Principal			-0.00117 (0.00197)
Municipal School		0.00088*** (0.00023)	0.00127*** (0.00034)
School with Appointed Principal			-0.00070* (0.00040)
Municipal School*Appointed Principal			-0.0000 (0.00058)
Reallocated*School with Appointed Principal			0.00022 (0.00138)
Electoral Cycle FE	X	X	X
Municipality FE	X	X	X
Control for $\Delta$ Voters' Characteristics	X	X	X
Weight for number of registered voters	X	X	X
Mean Dep. Variable	-0.014	-0.014	-0.014
Number of Clusters	41,490	41,490	41,490
Number of Municipalities	3,692	3,692	3,692
Observations	172,414	172,414	172,414
R-squared	0.651	0.651	0.651

Electoral data at the polling station level from TSE. Elections of 2008, 2012 and 2016. OLS regressions for the electoral cycles of 2008-2012 and 2012-2016. Data on schools obtained from the INEP School Census and Principal Questionnaire of Prova Brasil for the years of 2011 and 2015. Controls include the difference in voters' characteristics as gender, age and marital statues, and number of registered voters. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

Tabela 7 – OLS - Robustness to mean-reverting process

	(1)	(2)	(3)
Dep. Var.: Incumbent's vote share at the polling station in the re-election race			
Reallocated	-0.00356** (0.00168)	-0.00461** (0.00227)	-0.00290 (0.00239)
Reallocated*Municipal School		0.00305 (0.00312)	-0.00388 (0.00454)
Reallocated*Mun. School *Appointed Principal			0.0195** (0.00848)
Municipal School		-0.00320*** (0.00104)	-0.00287* (0.00168)
School with Appointed Principal			-0.00039 (0.00203)
Municipal School*Appointed Principal			-0.00019 (0.00275)
Reallocated*School with Appointed Principal			-0.0119* (0.00702)
Incumbent vote share in the first election	0.349*** (0.00701)	0.349*** (0.00702)	0.349*** (0.00701)
Electoral Cycle FE	X	X	X
Municipality FE	X	X	X
Control for $\Delta$ Voters' Characteristics	X	X	X
Weight for the number of registered voters	X	X	X
Mean Dep. Variable	0.409	0.409	0.409
Number of Clusters	41,490	41,490	41,490
Number of Municipalities	3,692	3,692	3,692
Observations	172,414	172,414	172,414
R-squared	0.811	0.811	0.812

Electoral data at the polling station level from TSE. Elections of 2008, 2012 and 2016. OLS regressions for the electoral cycles of 2008-2012 and 2012-2016. First election races are the 2008 and 2012, and re-election races are the 2012 and 2016 respectively to the 2008-2012 and 2012-2016 electoral cycles. Data on schools obtained from the INEP School Census and Principal Questionnaire of Prova Brasil for the years of 2011 and 2015. Reallocation of polling stations from non-school units to non-school units not observed. Controls include the difference in voters' characteristics as gender, age and marital statuses, and number of registered voters. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

Tabela 8 – OLS - Robustness to Differences in Voters' characteristics over time

	(1)	(2)	(3)	(4)	(5)
Dep. Var.: $\Delta$ Characteristic (%) at the polling station within the electoral cycle	Males	Age $\leq$ 24	25 $\leq$ Age $\leq$ 44	45 $\leq$ Age $\leq$ 69	Age $\geq$ 70
Reallocated*Mun. School*Appointed Principal	0.00061 (0.00113)	-0.0123* (0.00694)	0.00613 (0.00701)	0.00558* (0.00313)	0.00063 (0.00150)
Reallocated*Municipal School	0.00099 (0.00069)	0.00945** (0.00441)	-0.00876* (0.00458)	-0.00140 (0.00202)	0.00071 (0.00081)
Reallocated	-0.00026 (0.00028)	-0.00321 (0.00216)	0.00400* (0.00210)	-0.00032 (0.00096)	-0.00047 (0.00039)
Municipal School	-0.00177*** (0.00019)	-0.0186*** (0.00150)	0.0134*** (0.00158)	0.00576*** (0.00067)	-0.00053** (0.00024)
School with Appointed Principal	0.00000 (0.00021)	0.00644*** (0.00164)	-0.00598*** (0.00175)	-0.00000 (0.00088)	-0.00039 (0.00032)
Municipal School*Appointed Principal	0.00043 (0.00031)	-0.00063 (0.00235)	0.00120 (0.00248)	-0.00114 (0.00116)	0.00058 (0.00042)
Reallocated*School with Appointed Principal	-0.00048 (0.00083)	0.00727 (0.00514)	-0.00134 (0.00501)	-0.00483** (0.00226)	-0.00110 (0.00123)
Electoral Cycle FE	X	X	X	X	X
Municipality FE	X	X	X	X	X
Weight for the number of registered voters	X	X	X	X	X
Mean Dep. Variable	-0.0023	-0.0406	-0.0005	0.0289	0.0122
Number of Clusters	41,490	41,490	41,490	41,490	41,490
Number of Municipalities	3,692	3,692	3,692	3,692	3,692
Observations	172,414	172,414	172,414	172,414	172,414
R-squared	0.057	0.050	0.024	0.066	0.283

Electoral data at the polling station level from TSE. Elections of 2008, 2012 and 2016. OLS regressions for the electoral cycles of 2008-2012 and 2012-2016. Data on schools obtained from the INEP School Census and Principal Questionnaire of Prova Brasil for the years of 2011 and 2015. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

Tabela 9 – OLS - Robustness to Differences in Voters' characteristics over time cont.

	(6)	(7)	(8)	(9)	(10)
Dep. Var.: $\Delta$ Characteristic (%) at the polling station within the electoral cycle	Illiterates	Unc. Primary Education	Comp. Primary & Unc. Secondary	Comp. Secondary & Unc. Post-sec.	Completed Post-sec.
Reallocated*Mun. School*App. Principal	0.00044 (0.00098)	-0.00212 (0.00335)	-0.00464 (0.00366)	0.00477 (0.00295)	0.00146 (0.00451)
Reallocated*Municipal School	0.00068 (0.00064)	0.00463** (0.00208)	-0.00386** (0.00159)	-0.00140 (0.00179)	-0.00000 (0.00151)
Reallocated	0.00035 (0.00030)	-0.00115 (0.00080)	0.00067 (0.00081)	-0.00076 (0.00095)	0.00088 (0.00075)
Municipal School	0.00000 (0.00015)	0.00276*** (0.00053)	0.00332*** (0.00054)	-0.00057 (0.00058)	-0.00564*** (0.00045)
School with Appointed Principal	-0.00017 (0.00019)	-0.00244*** (0.00073)	0.00197** (0.00079)	0.00296*** (0.00082)	-0.00232*** (0.00070)
Municipal School*Appointed Principal	0.00050* (0.00028)	0.00433*** (0.00095)	-0.00387*** (0.00101)	-0.00514*** (0.00106)	0.00418*** (0.00089)
Reallocated*Appointed Principal	-0.00114* (0.00065)	-0.00080 (0.00255)	0.00628* (0.00323)	-0.00290 (0.00234)	-0.00135 (0.00424)
Electoral Cycle FE	X	X	X	X	X
Municipality FE	X	X	X	X	X
Weight for number of registered voters	X	X	X	X	X
Mean Dep. Variable	-0.0077	-0.0468	0.0018	0.0394	0.0136
Number of Clusters	41,490	41,490	41,490	41,490	41,490
Number of Municipalities	3,692	3,692	3,692	3,692	3,692
Observations	172,414	172,414	172,414	172,414	172,414
R-squared	0.383	0.584	0.530	0.731	0.607

Electoral data at the polling station level from TSE. Elections of 2008, 2012 and 2016. OLS regressions for the electoral cycles of 2008-2012 and 2012-2016. Data on schools obtained from the INEP School Census and Principal Questionnaire of Prova Brasil for the years of 2011 and 2015. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

Tabela 10 – OLS - Placebo test for polling stations reallocated to state schools

	(1)	(2)	(3)
Dep. Var.: Incumbent's $\Delta$ vote share at the polling station within the electoral cycle			
Reallocated	-0.00433** (0.00176)	-0.00268 (0.00187)	-0.00397* (0.00228)
Reallocated*State School		-0.00546 (0.00388)	-0.00239 (0.00534)
Reallocated*State School *Appointed Principal			-0.0155 (0.0101)
State School	-0.00192 (0.00132)	-0.00757 (0.00463)	-0.00390** (0.00161)
School with Appointed Principal	-0.00237* (0.00121)		-0.00503*** (0.00139)
State School*Appointed Principal			0.00908*** (0.00296)
Reallocated*School with Appointed Principal			0.00412 (0.00385)
Electoral Cycle FE	X	X	X
Municipality FE	X	X	X
Control for Voters' Characteristics	X	X	X
Weight for number of registered voters	X	X	X
Mean Dep. Variable	-0.063	-0.063	-0.063
Number of Clusters	51,781	51,781	51,781
Number of Municipalities	3,680	3,680	3,680
Observations	180,684	180,684	180,684
R-squared	0.729	0.729	0.729

Electoral data at the polling station level from TSE. Elections of 2008, 2012 and 2016. OLS regressions for the electoral cycles of 2008-2012 and 2012-2016. Dep. variable measured as the difference of incumbent's vote share between election the first and re-election races. Data on schools obtained from the INEP School Census and Principal Questionnaire of Prova Brasil for the years of 2011 and 2015. Only state schools with Prova Brasil data were included in the sample. Controls include the difference in voters' characteristics as gender, age and marital statues, and number of registered voters. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.



# APÊNDICE A – Summary Statistics for the sample adding municipal schools without Prova Brasil data

Data on the selection method of principals is necessary to identify those appointed by incumbents. However, I only observe it for schools that take the Prova Brasil exam. Because of that, I drop 23,659 observations of polling stations located in municipal schools without Prova Brasil data. Table 11 presents polling stations' characteristics, electoral outcomes, and voters' characteristics for the sample adding polling stations located in municipal schools without Prova Brasil data. In comparison with the sample summary statistics presented in Table 1, adding polling stations located in municipal schools without Prova Brasil data does not seem to significantly change the sample.

Tabela 11 – Summary Statistics for the sample adding municipal schools without Prova Brasil data

	Mean	Std. Dev.	Min	Max
Polling Station characteristics				
% Located in Schools	0.79	0.41	0.00	1.00
% Located in Municipal Schools	0.40	0.49	0.00	1.00
% Located in Mun. Schools with Appointed Principal	0.19	0.40	0.00	1.00
% Reallocated between the first and re-election races	0.09	0.28	0.00	1.00
% Reallocated to Mun. Schools with App. Principal	0.02	0.14	0.00	1.00
Average number of Polling Stations in a polling place	4	3	1	47
Average number of Polling Stations in a Municipality	47	54	1	715
% From the 2008-2012 electoral cycle	0.39	0.49	0.00	1.00
% From the 2012-2016 electoral cycle	0.61	0.49	0.00	1.00
Electoral outcomes at the polling station level				
Voters' Turnout	0.84	0.06	0.06	1.00
Incumbent's Vote Share	0.41	0.16	0.00	0.99
Voters characteristics at the polling station level				
% Males	0.49	0.05	0.00	1.00
% Voters with age $\leq 24$ years	0.16	0.12	0.00	0.94
% $25 \leq$ Voters with age $\leq 44$ years	0.43	0.15	0.00	1.00
% $45 \leq$ Voters with age $\leq 69$ years	0.33	0.13	0.00	0.92
% Voters with age $\geq 70$ years	0.08	0.06	0.00	1.00
% Illiterates	0.07	0.07	0.00	0.91
% Uncompleted Primary Education	0.49	0.15	0.00	1.00
% Completed Primary & Uncomp. Secondary Educ.	0.24	0.09	0.00	0.71
% Completed Secondary & Uncomp. Post-sec. Educ.	0.16	0.11	0.00	1.00
% Completed Post-secondary Education	0.04	0.06	0.00	0.83
Average number of Voters in a Polling Place	1,142	1,254	1	14,397
Average number of Voters in a Municipality	14,926	18,700	305	223,118
Total number of observations in sample (N)				
Voters	64,120,841			
Polling Stations	196,073			
polling places	54,894			
Distinguished municipalities	3,697			

Data from TSE for the Brazilian 2008, 2012 and 2016 elections. The sample consists of municipalities in which the incumbent mayor run for re-election, polling stations that appear in both first and re-election races datasets. Characteristics of polling stations and voters, and electoral outcomes in the incumbents' re-election race, 2012 and 2016

## APÊNDICE B – Comparison of voters' characteristics and electoral outcomes in municipal schools with and without Prova Brasil data

There is a sample selection concerning the necessity to access principals' selection method through Prova Brasil data. Table 12 presents average voters' characteristics and electoral outcomes in the first election, 2008/2012, for municipal schools with or without Prova Brasil data (columns 1 and 2, respectively). The last column presents differences between the groups. Polling stations located in municipal schools with Prova Brasil data correspond to about two thirds of all the polling stations located in municipal schools. We can see that there are significant differences in the average electoral outcomes and voters' characteristics between the groups. Voters are, on average, younger, more educated and with lower turnout rates in polling stations located in municipal schools with Prova Brasil data, and incumbent's have smaller vote share in those localities.

Tabela 12 – Voters characteristics and electoral outcomes for municipal schools with and without Prova Brasil data at the polling station level

Polling Station location:	Municipal schools with Prova Brasil data (1)	Municipal schools without Prova Brasil data (2)	Diff. (1) - (2)
Average Voters' Characteristics			
Males	0.49 (0,05)	0.51 (0,05)	-0,0179***
Voters age $\leq$ 24 years	0.22 (0,16)	0.22 (0,14)	-0,0048
25 $\leq$ Voters age $\leq$ 44 years	0.44 (0,15)	0.42 (0,12)	0,0187***
45 $\leq$ Voters age $\leq$ 69 years	0.28 (0,13)	0.29 (0,11)	-0,0076***
Voters age $\geq$ 70 years	0.06 (0,05)	0.07 (0,05)	-0,0063
Illiterates	0.09 (0,08)	0.12 (0,09)	-0,0347***
Uncompleted Primary Education	0.55 (0,14)	0.60 (0,14)	-0,0569***
Comp. Primary & Unc. Secondary	0.23 (0,10)	0.18 (0,10)	0,0479***
Comp. Secondary & Unc. Post-sec.	0.12 (0,09)	0.08 (0,08)	0,0368***
Comp. Post-secondary Education	0.02 (0,03)	0.01 (0,03)	0,0070**
Electoral Outcomes			
Incumbent vote share in first elec.	0.47 (0,12)	0.48 (0,13)	-0,00471**
Incumbent vote share in re-election	0.41 (0,16)	0.41 (0,17)	-0,00756***
Voters turnout in first election	0.85 (0,06)	0.85 (0,07)	-0,00496***
Voters turnout in re-election race	0.83 (0,06)	0.84 (0,07)	-0,00685***
Number of polling stations (in th.)	51.7	23.7	
Number of voters (in millions)	17.6	6.7	

Data from TSE for the Brazilian 2008, 2012 and 2016 elections. Voters' characteristics and electoral outcomes from the incumbent first race, 2008 and 2012. Municipal schools only take Prova Brasil if have at least 20 students enrolled in 4th or 8th grades. The significance of differences in control and treatment groups comes from the treatment coefficient in an auxiliary regression with municipality and electoral cycle fixed effects, weight for number of voters registered in a polling station, and cluster at polling place level. Control of differences in voters characteristics also added for differences in electoral outcomes. Standard Deviation in parenthesis. \*\*\* p <0.01, \*\* p <0.05, \* p <0.1.

# APÊNDICE C – Polling Station reallocation matrix for each electoral cycle

This section presents polling station reallocation matrix for each electoral cycle, 2008-2012 and 2012-2016, in Tables 13 and 14, respectively. We can note a pattern in the proportion of polling stations reallocated to each polling place type, and not reallocated for both electoral cycles.

Tabela 13 – Polling Station location change matrix for the electoral cycle 2008-2012

Reallocated to			Location in first election (2008)			
			Non-school location	Other adm. school	Municipal School with	
					not Appointed Princ.	Appointed Principal
Location in re-election race (2012)	Municipal school w/	Appointed Principal not Appointed Princ.	1426	237	7	96
	Other administration school	2958	190	100	94	
	Non-school location	-	515	104	244	
				15124	27196	6469

Data from TSE for the Brazilian 2008 and 2012 municipal elections. Change of polling stations location in elections from 2008 to 2012. First elections are the races incumbent mayors got first elected. Reallocation from non-school locations to other non-school is not observed.

Tabela 14 – Polling Station location change matrix for the electoral cycle 2012-2016

Reallocated to		Location in first election (2012)			
		Non-school location	Other adm. school	Municipal School with	
				not Appointed Princ.	Appointed Principal
Location in re-election race (2016)	Municipal	1205	359	16	194
	Appointed Principal	557	158	25	19
	school w/ not Appointed Princ.	1701	404	141	247
	Other administration school	-	1087	167	485
		No change in location			
		22499	42824	10452	21862

Data from TSE for the Brazilian 2012 and 2016 municipal elections. Change of polling stations location in elections from 2012 to 2016. First elections are the races incumbent mayors got first elected. Reallocation from non-school locations to other non-school is not observed.

# APÊNDICE D – OLS - Polling Station Re- allocation for the sample adding municipals schools without Prova Brasil data

Table 15 presents the main results of Table 4 adding polling stations located in municipal schools without Prova Brasil data. The results of polling station reallocation are also significant and of similar magnitude.

Tabela 15 – OLS Polling Station Reallocation for sample adding municipal schools without Prova Brasil data

	(1)	(2)	(3)	(5)
Dep. Var.: Incumbent's $\Delta$ vote share at the polling station within the electoral cycle				
Reallocated	-0.00367** (0.00160)	-0.00358** (0.00159)	-0.00395** (0.00166)	-0.00673*** (0.00241)
Reallocated*Municipal School				0.00624* (0.00319)
Municipal School				-0.00250** (0.00108)
Electoral Cycle FE	X	X	X	X
Municipality FE	X	X	X	X
Control for $\Delta$ Voters' Characteristics		X	X	X
Weight for number of registered voters			X	X
Mean Dep. Variable	-0.063	-0.063	-0.063	-0.063
Number of Clusters	54894	54894	54894	54894
Number of Municipalities	3697	3697	3697	3697
Observations	196,073	196,073	196,073	196,073
R-squared	0.710	0.713	0.730	0.730

Electoral data at polling station level from TSE. Elections of 2008, 2012 and 2016. Dep. variable measured as the difference of incumbent's vote share between the first and re-election races. Data on school obtained from the INEP School Census and Principal Questionnaire of Prova Brasil for the years of 2011 and 2015. Reallocation of polling stations from non-school to non-school locations is not observed. Controls include the difference in voters' characteristics as gender, age and marital statuses, and number of registered voter. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

# APÊNDICE E – OLS - Heterogeneity of location in first election and mean reverting process robustness

Table 16 presents a robustness test concerning mean-reverting processes for the results of Table 5. We can see that the reallocation of polling stations from other polling places to municipal schools with appointed principal is also significant and of similar magnitude, as well as the reallocation of polling stations from municipal schools with appointed principals to other polling places.



Tabela 16 – OLS - Heterogeneity of locations and mean reverting process robustness

	(1)
Dep. Var.: Incumbent's vote share at the polling station in the re-election race (2012/2016)	
Polling station reallocated from:	
other place to Municipal Schools*Appointed Principal	0.0221*** (0.00798)
Municipal School*Appointed Principal to other place	-0.00816** (0.00402)
Mun. School*App. Principal to Mun. School*App. Principal	0.0142 (0.00976)
Polling station in Mun. School*Appointed Principal not reallocated	-0.00040 (0.00275)
Municipal School	-0.00273 (0.00167)
School with Appointed Principal	-0.00027 (0.00202)
Reallocated*Municipal School	-0.00655* (0.00394)
Reallocated*School with Appointed Principal	-0.0144** (0.00663)
Incumbent vote share in the first election (2008/2012)	0.349*** (0.00701)
Electoral Cycle FE	X
Municipality FE	X
Control for $\Delta$ Voters' Characteristics	X
Weight for number of registered voters	X
Mean Dep. Variable	0.409
Number of Clusters	41490
Number of Municipalities	3692
Observations	172,414
R-squared	0.811

Electoral data at the polling station level from TSE. Omitted categories are polling stations in locations other than municipal schools with appointed principals not reallocated or reallocated to polling places of the same kind. Elections of 2008, 2012 and 2016. Data on schools obtained from the INEP School Census and Principal Questionnaire of Prova Brazil for the years of 2011 and 2015. Reallocation of polling stations from non-school to non-school locations not observed. Controls include the difference in voters' characteristics as gender, age and marital statues, and number of registered voter. Cluster at the polling place level. Robust standard errors in parenthesis. \*\*\* p <0.01, \*\* p <0.05, \* p <0.1.