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RESEARCH ARTICLE

The Effects of Educated Leaders on Policy and Politics: Quasi-Experimental Evidence from Brazil[*]

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Abstract

We examine whether and how the educational background of political leaders matters for policy choices and outcomes. Using data on municipalities in Brazil from 2000–2008, we estimate the effects of electing a more educated leader in a regression-discontinuity design whereby policy inputs and outcomes in municipalities where a highly educated candidate barely won the election are compared with those of municipalities where a highly educated candidate barely lost. Our results indicate that highly educated mayors make different choices regarding the allocation of public funds and inputs in critical sectors when compared to non-highly educated mayors, yet they do not produce better indicators on a variety of measurable outcomes. Furthermore, our estimates suggest a negative impact of educated mayors on local economic growth and children's health. We additionally document the existence of heterogeneity in the effects of highly educated leaders along political ideology and age of the candidate. Lastly, highly educated leaders are not more likely to be reelected, suggesting that they are not perceived as better politicians.

Keywords: Political economy, local elections, education, health.
JEL codes: D70, H19, H41, H50, O10.

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1. Introduction

Recent research in political economy emphasizes the role of political institutions in shaping the quality of political leadership. Using data on over 1,400 world leaders for 197 nations between 1848 and 2004, Besley and Reynal-Querol (2011) provide robust evidence that democracies tend to select more highly educated leaders. Focusing on municipalities in Brazil, Ferraz and Finan (2011) find that higher salaries attract more educated politicians. Also for Brazil, Brollo et al. (2013) show that larger federal transfers to local governments decrease the schooling level of candidates in mayoral elections. Unfortunately, despite this emphasis on how institutions shape political selection, we have little direct evidence on the extent to which leaders' educational background is an important driver of policy and other outcomes.

The educational background of individuals plays a crucial role in the labor and other markets. There is a large body of evidence in labor economics finding a consistent sharp increase in wages and employment caused by obtaining a college degree (Willis and Rosen, 1979; Card, 2001; Heckman et al., 2003, 2018). This literature is closely related to studies investigating the role of various skills on educational choices and labor and non-labor market outcomes, showing that in general highly skilled individuals enroll in and graduate from college and enjoy better outcomes as adults (Heckman et al., 2006; Rodríguez et al., 2015). In the political domain, Jokela et al. (2023) show that parties nominate highly skilled individuals to compete in local electoral races, and furthermore that voters confirm parties' behavior by electing the highest skilled candidates. This evidence suggests that leaders' skills are valuable attributes for voters and consequently for parties, and motivates the investigation of the role of highly skilled and educated leaders on policy choices and outcomes that directly impact citizens' wellbeing.

In this paper, we examine whether and how electing a highly educated leader matters for policy inputs and outcomes in Brazilian municipalities. To identify these effects, we need to address two important empirical challenges. First, political selection is not a random process and hence the educational background of political leaders is likely to be correlated with unobserved drivers of policy inputs and outcomes. Second, political leaders may influence these variables not just by affecting the size and composition of public spending, but also the effectiveness with which public resources are used. This latter channel has been difficult to capture in quantitative analyses.

We tackle the first of these challenges by exploiting the random variation associated with close elections in a regression discontinuity (RD) design (Lee, 2008; Ferreira and Gyourko, 2014). In particular, we compare policy inputs and outcomes in municipalities where a highly educated candidate barely won the election with those of municipalities where a highly educated candidate barely lost. To go beyond effects on the size and composition of public expenditure, we devote special attention to education and health provision—two important public goods that account for over half of total spending by local governments on average. We set out to identify the impact of electing a highly educated mayor on: (1) the sectoral allocation of local public spending; and (2) a wide range of inputs and outcomes in the health and education sectors.

We link and exploit four unusually rich, publicly available sets of data. The first data set contains the biographical and electoral records on the mayors and their opponents in the 2000, 2004 and 2008 municipal elections, including schooling and share of votes. The second set of data comprises yearly information on the size and composition of municipal public spending, as well as on key economic and demographic indicators for each municipality over the years 2000 to 2008. The third data set, also spanning the 2000–2008 period, is an annual census of educational establishments with detailed information on a wide range of educational inputs and outcomes at the school level. Finally, the fourth database is a comprehensive set of administrative yearly indicators on health inputs and outcomes for each municipality.

Our RD estimates provide evidence that highly educated mayors matter for a subset of observable policy inputs. Municipalities in which a highly educated mayor was elected by a narrow margin tend to allocate a larger share of total public spending to planning activities while devoting relatively less resources to transportation. We also find some evidence that public primary schools in municipalities led by highly educated mayors offer smaller class sizes and employ a higher share of teachers holding a secondary education degree, relative to municipalities with non-highly educated mayors. This latter effect appears to come at the expense of a reduction in the share of teachers with primary education as final schooling attainment.

When it comes to (short-run) policy outcomes, our RD estimates show that highly educated leaders do not perform better than their non-highly educated counterparts. Moreover, highly educated mayors reduce local GDP per capita growth in the final year of their term, and increase the incidence of young children presenting diarrhea.

We also investigate heterogeneity in the effects of electing a highly educated mayor. We focus on leaders' political ideology and age, as dimensions of heterogeneity. We find that the effects of highly educated leaders on budget allocation and input choices vary considerably among left-wing, right-wing, young, and older groups of candidates. Additionally, highly educated leaders in the left attain better educational outcomes than their non-highly educated counterparts. Effects on health outcomes are also heterogeneous, with highly educated leaders in the left-wing and older groups displaying worse indicators of children's health, while highly educated leaders in the right-wing and young groups reduce the proportion of malnourished young children compared to non-highly educated mayors.

We make sense of our policy results as follows. The RD estimate on close elections uses data on highly and non-highly educated candidates that are voted very similarly; hence, that are comparably valued by the electorate. Candidates with a higher education degree acquire important skills in college, some of which are likely to be of use for holding office. Non-highly educated contestants, in turn, must possess other skills, not acquired in college, but that are also functional for leading a municipality. As the evidence shows (Jokela et al., 2023), voters value candidates' skills, regardless of whether those skills stem from college experience. Consequently, our RD estimate is likely to be comparing two sets of highly skilled candidates: one group that acquired some of their skills in college, and another whose stock of skills come from other life experiences. This interpretation of the RD estimate sheds important light on our empirical results, where we find some differences on management choices—a result consistent with previous evidence on the preference of college educated leaders for management activities (Merilainen, 2022; Tigre and Melo, 2022)—, and a lack of a college degree advantage on policy outcomes.

Importantly, our RD estimate is policy relevant. In actual (close) elections, when choosing between highly and non-highly educated candidates, citizens not only regard the educational background of the candidates, but they consider the whole "package", which includes all of the attributes that make the candidate pertinent for holding office—e.g., education, experience, gender, skills, etc. Our RD estimate identifies exactly that, i.e. the average effect of electing a highly educated candidate, with all the attributes that come with a typical highly educated candidate, relative to electing a non-highly educated candidate, that comes with a number of attributes that are correlated with the decision of not obtaining a college degree. Furthermore, this interpretation of the RD estimate in close elections applies to the study of other attributes of candidates, as well (e.g., Brollo and Troiano, 2016).

With the policy effects documented, we turn our attention to whether highly educated leaders matter for political outcomes. In particular, we examine the role of higher education in driving the magnitude of the incumbent effect—a measure of reelection success. In doing so, we exploit, once more, the random variation associated with close elections to mitigate concerns about the potential bias due to unobservable differences across candidates. Given the absence of a positive effect of educated leaders on policy outcomes, this analysis arguably allows us to shed some light on the extent to which higher education is an important driver of political skills. In line with existing evidence from Brazil and other Latin American countries (Klasnja and Titiunik, 2017; Avis et al., 2020), we find that incumbent mayors are not more likely to win the subsequent election. More importantly, we find that this effect does not differ among highly and non-highly educated leaders, suggesting that voters do not perceive highly educated individuals as better politicians (Tigre and Melo, 2022).

We contribute to a growing literature on estimating the impacts of leaders' attributes on policy inputs and outcomes. Besley et al. (2011) is perhaps our closest predecessor. Using data on national leaders from 1875–2004, Besley et al. (2011) exploit random leadership transitions due to natural death or terminal illness to examine the effects of leaders' attributes on economic growth, and find some evidence that highly educated leaders induce better economic performance.[1] They do not, however, examine the effects of leaders' educational background on policy inputs and outcomes, nor do they look at whether educated leaders are better able to succeed in their own political career.[2] A related strand of work focuses on the impacts of other characteristics of political leaders, including Pande (2003), Chattopadhyay and Duflo (2004), Clots-Figueras (2011, 2012), Ferreira and Gyourko (2014), Brollo and Troiano (2016), and Prakash et al. (2019).[3]

In important work, Ferraz and Finan (2011), Brollo et al. (2013), and Gagliarducci and Nannicini (2013) examine how political institutions affect both political selection and a more limited set of policy inputs and outcomes.[4] However, institutions may plausibly affect policy inputs and outcomes through channels other than the qualifications of political leaders. The research design we adopt and the longitudinal data we use make it possible to shed more light on the effects of leaders' educational background on a wide array of policy inputs and outcomes. We also add to this literature by providing evidence on whether (and how) the educational background of political leaders matters for electoral outcomes.

The paper proceeds as follows. Section 2 provides institutional background. Section 3 describes the data we employ. Section 4 presents the identification strategy we use to address our research questions. Section 5 examines the effects of electing an educated leader on policy inputs and outcomes, as well as the incumbency advantage of educated mayors. Section 6 concludes the paper.

2. Background

2.1. Local governments

Brazil has a highly decentralized system of government. Municipalities receive large sums of public resources in the form of intergovernmental transfers and are responsible for an important share of public goods provision, notably education and culture, health and sanitation, social assistance, and local infrastructure.[5] While these transfers are partially tied to the provision of specific public goods and services, municipal governments have wide discretion in their allocation, both within and across functional areas (Brollo et al., 2013).

Municipal governments in Brazil are run by an elected mayor and an elected city council. Mayors are directly elected by voters (with plurality rule) for a four-year term. Elections are typically held in

[1] Exploiting a similar research design, Jones and Olken (2005) show that political leaders' matter for economic growth, but do not focus on the role of their educational background. See, also, Easterly and Pennings (2020), and Ottinger and Voigtlander (2020).

[2] A related study looking at the relationship between the educational background of the leader and policy is Lahoti and Sahoo (2020). These authors show that educated members of the legislative assembly in Indian states are able to produce better educational outcomes for their constituents, but only in states with high levels of development. Merilainen (2022), in turn, shows that local politicians that hold a highly education diploma in Finland spend more in public goods and services, without compromising fiscal sustainability.

[3] Our paper is also related to the literature on the effects of private sector top managers on firm outcomes, including Bertrand and Schoar (2003), and Bastos and Monteiro (2011).

[4] See, also, Pique (2019).

[5] Municipalities receive about $35 billion per year, which represents 15% of the total federal revenue. The bulk of fiscal revenue available to local governments comes from intergovernmental transfers. Only a small share comes from local taxes.

October, with mayors taking office in January of the subsequent year. Since 2000, mayoral term limits have been extended from one to two terms.

2.2. Education and health provision

Both public and private sectors take part in the provision of education. About 80% of the students are enrolled in public schools. These schools are funded by the public budget and are administered at three different levels: municipal, state, and federal. Municipal governments are mainly responsible for the provision of pre-school and primary education, while states are increasingly responsible for the provision of secondary education.[6][7] The role of the federal government is mainly redistributive and complementary. Key responsibilities of local governments in this sector include: building schools, providing adequate infrastructure, supplying transportation and school meals, training teachers, and paying salaries.[8]

The Unified Health System (*Sistema Único de Saúde*) was created in 1988. In addition to unifying the public health care system, this reform decentralized its management to the state and municipal level. The system aims at implementing the national policy of universal coverage and equitable access to integral health care, prioritizing preventive activities and assuring community participation. Decentralization is the main mechanism to achieve these goals. It includes transfers of funds and power to the states and municipalities to allow them to formulate their own health policies based upon the nationwide health agenda. The final goal of decentralization is to fully empower municipalities with regard to the elaboration and implementation of health policies, the allocation of resources, and the evaluation of public and private provision.

3. Data and Descriptive Statistics

We combine various publicly available data sets to perform our empirical analysis. First, we use data from the Brazilian Electoral Court (*Tribunal Superior Eleitoral*) on the biographical and electoral records of all mayoral candidates in the 2000, 2004, and 2008 municipal elections.[9] Second, we obtain yearly data on the size and composition of municipal public expenditure from the National Treasury (*Tesouro Nacional*) through the FINBRA data set. Information on local GDP and population come from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*). Microdata on inputs and outcomes of Brazilian public primary schools come from the School Census (*Censo Escolar*). Finally, yearly data on health and sanitation provision come from different surveys conducted by the Ministry of Health, available online through the DATASUS database (*Banco de Dados do Sistema Único de Saúde*). All data other than electoral records are collected for the years 2000–2008.[10] Microdata on schools are aggregated at the municipality-year level. Our policy analysis sample is at the municipality-electoral year level, where we match election results with policy inputs and outcomes averaged over the corresponding four-year mayoral period. The analysis sample we use to test the incumbency effect is at the candidate-electoral year level.

Table 1 reports summary statistics for the 2000 and 2004 municipal elections. The upper panel displays the frequency of electoral races according to the level of education of the two most voted

[6] Primary education in Brazil comprises grades 1–8, for children 6–14 years old.

[7] In 2005, the share of students enrolled in public municipal primary schools was 53.64%. In the case of secondary education, state schools represented 85% of total enrollment.

[8] Ferraz et al. (2012) provide several anecdotes on the direct involvement of mayors in the management of the municipal educational system.

[9] We also use data from the 1996 municipal election to verify whether incumbent mayors are eligible to run for reelection in 2004.

[10] See Appendix A for a more detailed description of the data sets we use.

candidates. Most electoral races confront either: two candidates without higher education (41% in 2000, and 37% in 2004), or a highly educated candidate with a non-highly educated candidate (42% in 2000, and 45% in 2004). Races between two highly educated candidates account for less than a fifth of all races (17% in 2000, and 18% in 2004). The middle panel reports the percentage of candidates with higher education in each election year. Highly educated candidates account for 40% of all candidates in 2000, and for 42% in 2004. They also account for 40% among the two most voted candidates in both 2000 and 2004, and are somewhat less represented among elected mayors (36% in 2000, and 37% in 2004). The lower panel displays the proportion of elections in which a highly educated candidate wins the race, among the elections in which only one of the two most voted candidates has a college degree. Highly educated candidates win 51% of these elections in both 2000 and 2004.

Table 1: *Election characteristics and dynamics*

	2000	2004
Type of election by two most voted candidates' education (%)		
non-highly educated vs. non-highly educated	41.25	37.37
highly educated vs. non-highly educated	41.56	44.63
highly educated vs. highly educated	17.19	17.99
Candidates with higher education (%)		
among total candidates	39.78	42.16
among 1st and 2nd places	37.96	40.31
among mayors elected	35.68	37.34
Highly educated candidate victories (%)		
among 1st and 2nd places in highly educated vs. non-highly educated elections	50.94	50.63

Notes: Summary statistics for 2000 and 2004 elections. A candidate is classified as highly educated if she holds a college degree.

The sample we use in our empirical analysis includes municipalities in election years 2000 and 2004, where the two most voted candidates confront a highly educated candidate with a non-highly educated candidate, and for which there are no missing observations in each of the outcomes we study. Table 2 displays summary statistics for three different samples of municipalities: municipalities in elections with highly educated candidates, municipalities in elections without highly educated candidates, and municipalities included in the sample we use in the empirical analysis. The sum of the races with highly educated candidates and the races without highly educated candidates gives the total number of races in years 2000 and 2004, which is 10,343. Most of the races (7,110) include at least one highly educated candidate. The analysis sample uses 3,480 elections. Municipalities with highly educated candidates are on average larger, richer, less agriculture intensive, and more service and industry intensive than municipalities without highly educated candidates. They are also characterized by smaller amounts of municipal public spending per capita relative to municipalities without highly educated candidates. The characteristics of municipalities in the analysis sample lay in between the characteristics of municipalities with at least one highly educated candidate and those of municipalities without highly educated candidates.

Table 2: *Municipality characteristics*

	elections with highly educated candidates		elections without highly educated candidates		analysis sample	
	avg	std dev	avg	std dev	avg	std dev
population	43,546	238,817	10,544	14,472	24,421	51,625
GDP (R$1,000)	401,051	3,935,359	49,058	151,465	162,320	572,337
GDP per capita (R$)	6,032	7,317	4,753	5,843	5,650	6,235
agriculture (% of GDP)	22.17	15.96	30.34	15.82	24.21	15.95
services (% of GDP)	55.07	14.39	53.61	14.15	54.63	14.69
industry (% of GDP)	16.66	13.67	11.93	10.13	15.62	13.47
public expenditure per capita (R$)	662	691	728	1,184	655	402
observations	7,110		3,233		3,480	

Notes: Summary statistics for three different samples: municipalities with at least one highly educated candidate, municipalities without highly educated candidates, and municipalities included in the sample we use in the empirical analysis. The latter includes municipalities where the two most voted candidates confront a highly educated candidate with a non-highly educated candidate, and for which there are no missing observations in the outcomes we study. Elections in years 2000 and 2004 are considered.

4. Research Design

We are interested in testing whether electing a highly educated political leader (in lieu of a non-highly educated leader) matters for public policy and for the leader's own political success. For the first question, we aim at estimating the causal effect of electing a highly educated mayor on observable policy inputs and outcomes at the municipal level during the corresponding mayoral term. For the second question, we seek to estimate whether highly educated leaders have an advantage (relative to non-highly educated leaders) in getting themselves reelected.

We consider that a candidate is highly educated if she has completed a college degree. This assumption is justified by a large body of evidence in labor economics suggesting that workers with and without a college degree are imperfectly substitutable, while workers within each of these groups are relatively close substitutes (e.g. Katz and Murphy, 1992; Goldin and Katz, 2008; Ottaviano and Peri, 2012).

4.1. Do educated leaders matter for public policy?

The election of a highly educated mayor is likely to depend on a host of unobserved factors—e.g. the pool of potential candidates, the resources available to political campaigns, and voters' preferences—which may be correlated with observed policy decisions and outcomes. For this reason, a naive comparison between outcomes in municipalities with and without a highly educated mayor is likely to yield biased estimates of the true causal effects of electing a highly educated leader. To mitigate these potential biases, we adopt a sharp regression discontinuity design, and exploit the random variation associated to close elections. The intuition behind this approach is that, provided that there is some unpredictable random component of the vote, a close election approximates a (local) randomized experiment (Lee, 2008). Hence, municipalities under these circumstances are comparable and treatment effects can be consistently estimated.

Our RD design compares municipalities where a highly educated candidate barely won the election with municipalities where a highly educated candidate barely lost. To illustrate our research design, we adopt the potential outcomes framework commonly employed in the program evaluation literature. Let $\{(Y_i(1), Y_i(0), X_i)' : i = 1, 2, \ldots, n\}$ be a random sample of municipalities from $(Y(1), Y(0), X)'$, where $Y(1)$ and $Y(0)$ are the potential outcomes with and without treatment (i.e. electing a highly educated mayor), respectively. The treatment assignment rule is $D_i = \mathbb{1}(X_i \geq \bar{x})$, where X_i is the so called running variable (in our case, the highly educated candidate's margin of victory relative to the non-highly educated candidate), and $\bar{x}$ is the cutoff point (in our case, $\bar{x} = 0$). We cannot observe both $Y_i(1)$ and $Y_i(0)$ at the same time for a given municipality i, but instead we observe $Y_i = D_iY_i(1) + (1 - D_i)Y_i(0)$. We are interested in estimating the average treatment effect at the threshold, given by

$$\tau = E[Y_i(1) - Y_i(0)|X_i = \bar{x}],$$

which is nonparametrically identified under mild continuity conditions (Hahn et al., 2001). Specifically,

$$\tau = \mu_+ - \mu_-$$

with $\mu_+ = \lim_{x \downarrow \bar{x}} \mu(x)$, $\mu_- = \lim_{x \uparrow \bar{x}} \mu(x)$, $\mu(x) = E[Y_i|X_i = x]$.

Following Hahn et al. (2001), Porter (2003), and Cattaneo et al. (2020), we estimate τ using a kernel-based local polynomial regression on either side of the threshold. The local polynomial RD estimator is thus given by,

$$\hat{\tau}(h_n) \quad = \quad \hat{\mu}_+(h_n) - \hat{\mu}_-(h_n),$$

where,

$$(\hat{\mu}_+(h_n), \hat{\beta}_+(h_n))' = arg \min_{(\mu,\beta)' \in \mathbb{R}^2} \sum_{i=i}^{n} \mathbb{1}(X_i \geq \bar{x})(Y_i - \mu - \sum_{l=1}^{p} \beta_l (X_i - \bar{x})^l)^2 K_{h_n}(X_i - \bar{x})$$

$$(\hat{\mu}_-(h_n), \hat{\beta}_-(h_n))' = arg \min_{(\mu,\beta)' \in \mathbb{R}^2} \sum_{i=i}^{n} \mathbb{1}(X_i < \bar{x})(Y_i - \mu - \sum_{l=1}^{p} \beta_l (X_i - \bar{x})^l)^2 K_{h_n}(X_i - \bar{x}),$$

with $K_{h_n}(u) = K(u/h_n)/h_n$, $K(\cdot)$ a kernel function, and h_n a positive bandwidth sequence. Scalar p denotes the order of the polynomial. In practice, we use a triangular kernel, and $p = 1, 2$. We choose the bandwidth and compute robust standard errors following Calonico et al. (2014). We also incorporate covariates following Calonico et al. (2019).

4.2. Do educated leaders get reelected more frequently?

We examine whether highly educated political leaders have an advantage in getting themselves reelected relative to non-highly educated leaders. We adopt an RD approach very similar to the one presented above, but at the candidate level. Underlying this analysis is the hypothesis that there are attributes of an incumbent mayor (e.g. political skills and experience) that may make reelection more likely. Having a college degree may then plausibly influence these political skills and hence impact electoral outcomes.

Our RD design identifies the incumbency advantage by comparing the electoral outcome (i.e. elected/not elected) in period $t + 1$ of candidates that barely won the election in period t (i.e. incumbents) with the electoral outcome in period $t + 1$ of candidates that barely lost the election in t (i.e. non-incumbents). We estimate this incumbency advantage separately for highly educated candidates and non-highly educated candidates, and compare the estimates.

5. Results

To estimate the effects of highly educated leaders on public policy, we use data on elections in which, among the two most voted candidates, only one has a college degree. Our data span two electoral periods (2001–2004 and 2005–2008), and we use the pooled sample of elections in the estimation analysis.

In the estimation of the incumbency advantage, we use a balanced panel on the two most voted candidates in the 2000 and 2004 elections (period t), and exclude information from municipalities in which, due to binding term limits, the incumbent mayor is not eligible for reelection.[11] We measure electoral outcomes in the 2004 and 2008 elections (period $t+1$). We estimate the incumbency advantage using a sample including all elections in period t, and a sample including only elections confronting a highly educated candidate with a non-highly educated candidate among the two most voted candidates in period t. The former sample allows us to estimate the incumbency advantage in all elections, while the latter allows us to estimate the incumbency advantage in a sample similar to the one we use to estimate the effects of highly educated mayors on public policy.

We internally validate our research designs, and conclude that they are internally valid. Tables B.1 and B.2 in Appendix B, and Figures C.1 and C.2 in Appendix C show the results of our tests of: 1) manipulation of the running variable at the cutoff, and 2) discontinuity of predetermined variables at the cutoff (Imbens and Lemieux, 2008).

5.1. The effects of educated leaders on public policy

We use the RD designs described above to test whether educated leaders have a differential effect on a number of local policy inputs and outcomes. We first examine the effects of educated leaders on the size and composition of local public expenditure, as well as on economic performance. Then, motivated by the importance of the education and health sectors on local public expenditure, we analyze the effects of educated leaders on various educational inputs and outcomes, as well as on sanitation and health related inputs and outcomes.

We use data from the electoral cycles of 2001–2004 and 2005–2008, and for each variable we test the effect of educated leaders on its average value over the electoral cycle and on its value in the last year of the electoral cycle. We distinguish between the average effect in the electoral cycle and the effect in the last year because policy decisions in the final year of the electoral cycle may be motivated by the mayor's willingness to remind voters of her performance ahead of the upcoming election. The final year's effect may thus be different from the effect observed in other years. In each regression, we include state and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and shares of the services, industry and agriculture sectors measured one year before the elected candidate takes office).

Table 3 reports the effects of electing a highly educated leader on local public expenditure and economic performance.[12] For each variable, column (1) displays the mean and standard deviation (in parentheses), and column (2) indicates the number of observations included in the local linear regressions, which are chosen according to the optimal bandwidth suggested by Calonico et al. (2014). Column (3) displays the estimates and standard errors (in parentheses) of the effect of electing a highly educated candidate on the corresponding variable's average over the electoral cycle. Column (4) does analogously for the variable's value in the last year of the electoral cycle.[13] The top panel examines educated mayors' effects on the size of the municipal expenditure, and on the composition of such expenditure, where mayors distribute the local budget among eight categories: education and culture, health and sanitation, planning, social security, transportation, legislation, security, and other expenditures. As can be observed in column (1), education and health are the sectors with the largest spending, together accounting for over 50% of total municipal spending.

The RD results shown in the top panel of Table 3 indicate no significant effect of highly educated leaders on the size of local public expenditure. Nevertheless, distinctions emerge in the composition

[11] As we noted above, since 2000 mayors in Brazil can be reelected for one subsequent term.

[12] Figure C.3 in Appendix C shows these results graphically.

[13] The mean, standard deviation, and observations shown in columns (1) and (2) include all four years in the electoral cycle.

effects of such expenditure. Leaders with higher education tend to allocate a larger portion of the budget to planning activities and reduce allocations to transportation. Our estimates indicate a one-to-one relationship between the increased funding for planning activities and reduced transportation expenses. This pattern holds true for both the entire electoral cycle (column (3)) and the final year within the cycle (column (4)). The preference of college educated political leaders for management/planning activities has already been documented in other contexts (Merilainen, 2022).

The bottom panel of Table 3 displays the effects of highly educated leaders on economic performance, as measured by local GDP and GDP per capita. In contrast to Besley et al. (2011), we find that educated leaders hinder economic progress in the final year of the political cycle. Specifically, electing a leader with higher education decreases the local GDP per capita by 5% in that period, relative to electing a non-highly educated mayor.

Taken together, our results suggest that the expenditure composition of municipal funds chosen by educated leaders is not efficient, as it results in a reduction of the GDP per capita relative to the spending choices of non-highly educated mayors, especially in the final year in office.

Table 3: *Effects on public expenditure and economic performance*

Dependent variable			RD estimate	
	avg	obs	all years	final year
	(1)	(2)	(3)	(4)
Size and composition of public expenditure				
log public expenditure per capita	6.703	2,929	0.000	-0.042
	(0.516)		(0.023)	(0.036)
education and culture (share)	0.313	2,981	0.000	0.001
	(0.067)		(0.004)	(0.006)
health and sanitation (share)	0.219	3,114	0.000	0.000
	(0.053)		(0.004)	(0.005)
planning (share)	0.190	2,379	0.009*	0.014*
	(0.064)		(0.006)	(0.008)
social security (share)	0.058	2,681	-0.001	-0.005*
	(0.029)		(0.002)	(0.003)
transportation (share)	0.052	2,640	-0.009***	-0.014***
	(0.050)		(0.003)	(0.004)
legislation (share)	0.036	3,108	-0.001	-0.001
	(0.015)		(0.001)	(0.001)
security (share)	0.002	2,403	0.000	0.000
	(0.005)		(0.000)	(0.001)
other expenditures (share)	0.129	2,620	0.004	0.012
	(0.053)		(0.005)	(0.009)
Economic performance				
log GDP	11.150	2,776	0.000	-0.004
	(1.233)		(0.014)	(0.019)
log GDP per capita	8.636	2,890	-0.010	-0.049*
	(0.751)		(0.018)	(0.033)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on public expenditure and economic performance. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years (column (3)) and the value in the last year (column (4)) of the electoral cycle. State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Even in the absence of a different spending size in education/culture and health/sanitation between highly and non-highly educated mayors, there may still be differences in the allocation of resources within each of the corresponding budgetary items, with the corresponding potential implications on outcomes. Table 4 provides evidence on the effects of electing a highly educated leader on educational inputs and outcomes in municipal primary schools.[14] The top panel in Table 4 examines educational inputs such as class size, school infrastructure (presence of teachers' room, library, sciences lab, computer lab, and number of computers per student), and teachers' level of education. The bottom panel examines outcomes such as enrollment, and age-grade distortion and dropout rates. Column (1) reveals some interesting stylized facts about the provision of municipal primary education. Class size in the average school is relatively large (over 27 pupils), a significant share of municipal schools lack basic infrastructure items, and the proportion of teachers without a college degree is relatively high (about one half in the average school). The average age-grade distortion rate is also high (21%).

When it comes to the impacts of interest, the point estimates in Table 4 provide evidence that highly educated leaders tend to lower the average class size by 0.9 students, and cause a 5% increase of secondary educated teachers in the average school. This increase seems to come at the expense of a reduction in the share of primary educated teachers. Nonetheless, no effect on educational outcomes is found. These results are in line with available evidence from India reported in Lahoti and Sahoo (2020), that show that on average educated state leaders do not impact educational outcomes.

[14] Plots in Figures C.4 in Appendix C complement the statistical analyses of Table 4.

Table 4: *Effects on education*

Dependent variable			RD estimate	
	avg	obs	all years	final year
	(1)	(2)	(3)	(4)
Education inputs				
class size 1st–8th grades	27.618	2,626	-0.875*	-0.720
	(12.565)		(0.668)	(0.592)
teachers' room	0.415	2,787	-0.009	-0.014
	(0.347)		(0.022)	(0.023)
library	0.298	2,882	-0.011	0.016
	(0.307)		(0.02)	(0.023)
sciences lab	0.031	3,395	0.003	-0.006
	(0.106)		(0.010)	(0.012)
computer lab	0.140	2,730	-0.023	-0.026
	(0.240)		(0.018)	(0.024)
computers per student	0.011	2,756	-0.001	0.001
	(0.018)		(0.001)	(0.002)
share of teachers with primary education	0.017	2,547	-0.002	-0.004*
	(0.044)		(0.003)	(0.003)
share of teachers with secondary education	0.503	2,454	0.023*	0.018
	(0.273)		(0.017)	(0.019)
share of teachers with higher education	0.499	2,529	-0.021	-0.018
	(0.285)		(0.017)	(0.020)
Education outcomes				
log enrollment 1st–8th grades	7.062	2,480	-0.018	-0.001
	(1.289)		(0.050)	(0.042)
age-grade distortion 1st–8th grades	0.207	2,739	-0.002	0.002
	(0.165)		(0.009)	(0.007)
dropout rate 1st-8th grades	0.080	2,640	0.002	0.001
	(0.062)		(0.003)	(0.003)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on educational inputs and outcomes. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years (column (3)) and the value in the last year (column (4)) of the electoral cycle. State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table 5 reports estimates on a set of measurable inputs and outcomes in health and sanitation, a sector to which municipalities in our sample allocate over a fifth of total municipal spending.[15] The top panel shows effects on sanitation variables such as households' source of water and destination of their trash, and on health inputs such as the proportion of children and pregnant women with immunization up to date, and share of pregnant women that are monitored by the public health system. The bottom panel shows effects on health outcomes, including the proportion of low-weight births, malnourished children, and children with diarrhea and respiratory infection. We find no significant impact of highly educated leaders on sanitation and health inputs. When it comes to health outcomes, we only find a significant increase of 8% in the share of children younger than 2 years old that present diarrhea.

[15]Figure C.5 in Appendix C shows related graphical analyses.

Table 5: *Effects on health and sanitation*

Dependent variable			RD estimate	
	avg	obs	all years	final year
	(1)	(2)	(3)	(4)
Health inputs and sanitation				
water supply: well[a]	0.287	2692	-0.001	0.003
	(0.223)		(0.019)	(0.019)
water supply: public system[a]	0.620	2,738	0.002	0.002
	(0.252)		(0.020)	(0.020)
trash destination: thrown open[a]	0.155	2,787	0.006	0.010
	(0.182)		(0.010)	(0.009)
trash destination: collected[a]	0.591	2,723	-0.011	-0.010
	(0.268)		(0.019)	(0.016)
trash destination: burned or buried[a]	0.230	2,794	-0.004	0.000
	(0.181)		(0.015)	(0.015)
children <1 years old with immunization (share)	0.920	2,735	0.002	0.001
	(0.124)		(0.012)	(0.005)
children 1–2 years old with immunization (share)	0.893	2,484	-0.026	0.008
	(1.664)		(0.046)	(0.013)
monitored pregnant women (share)	0.950	2,733	-0.002	0.000
	(0.112)		(0.011)	(0.003)
pregnant women with immunization (share)	0.888	2,753	-0.004	-0.003
	(0.132)		(0.011)	(0.006)
Health outcomes				
live births <2500g (share)	0.096	2,533	0.003	0.006
	(0.048)		(0.004)	(0.007)
malnourished children <1 years old (share)	0.026	2,433	-0.001	0.000
	(0.026)		(0.002)	(0.002)
malnourished children 1–2 years old (share)	0.051	2,442	0.000	0.002
	(0.055)		(0.003)	(0.003)
children <2 years old with diarrhea (share)	0.049	2,306	0.004*	0.004
	(0.033)		(0.002)	(0.003)
children <2 years old with IRA[b] (share)	0.050	2,884	-0.001	-0.005
	(0.055)		(0.005)	(0.005)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on health and sanitation. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years (column (3)) and the value in the last year (column (4)) of the electoral cycle. State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). (a) Constructed in the following way: number of households reporting this variable divided by the total number of families. (b) IRA stands for *Infecção Respiratória Aguda* (Acute Respiratory Infection). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

To sum up, we find that educated leaders do not impact the size of public expenditure, but have different preferences in the distribution of such expenditure. In particular, educated leaders allocate a higher share of the municipal budget to planning activities, and less to transportation. More importantly, this expenditure allocation is inefficient, as it reduces the local GDP per capita in the final year of the electoral cycle when compared to the expenditure choices of non-highly educated leaders. Within the education sector, mayors with a higher education degree allocate funds so that schools have lower class sizes and a more qualified staff of teachers. However, these input efforts do not translate into improved educational outcomes. In the health sector, highly educated leaders do not differ in their choices of inputs compared to non-highly educated mayors, and consequently they do not achieve consistently better outcomes.[16]

5.2. Heterogeneous effects: candidate's political ideology and age

We now turn our attention to heterogeneity in the treatment effects of electing a highly educated mayor along two key dimensions: political ideology and age.

For political ideology, we ask whether the effects we find above vary by the political ideology of the party to which the candidate belongs. We focus on left-wing parties and on right-wing parties.[17] Parties in the center of the political spectrum are not included in this analysis. In practice, we run our nonparametric RD regressions conditioning on the political ideology of the elected candidate. This exercise is analogous to interacting the treatment dummy with political ideology dummies in a parametric framework.

For age, we group candidates into a "young" group of politicians 45 years old or younger, and an "older" group of politicians older than 45 years old. We then conduct our nonparametric RD regressions conditioning on each of these groups.

Tables B.6–B.8 in Appendix B display the heterogeneity on candidates' political ideology results. Within the group of candidates in the left, highly educated candidates differ with non-highly educated candidates in the allocation of municipal funds, yet they do not yield distinct economic outcomes. In municipalities led by educated mayors, schools experience a reduced proportion of age-grade distorted students. In the health and sanitation sector, input choices are different between highly educated and non-highly educated mayors; and in terms of outcomes, there is an increase in the number of underweight newborns and young children suffering from diarrhea when educated mayors hold office.

Among the candidates in the right-wing group, educated candidates allocate a smaller portion of public funds to transportation activities, decrease class sizes and increase the number of computers per student in schools. Nevertheless, they do not attain different economic nor educational outcomes relative to non-highly educated candidates. On the other hand, in the health and sanitation sector, educated candidates invest in inputs that result in a lower prevalence of malnourished young children.

Tables B.9–B.11 in Appendix B display the heterogeneity on the age of the candidate results. Within the group of young candidates, highly educated mayors exhibit significant differences in their preferences for resource allocation and input choices in all the domains we study, relative to non-highly educated mayors. Importantly, in the health sector, they demonstrate considerable dedication to children's immunization, leading to a lower prevalence of malnourished young children.

Among the candidates older than 45 years old, there are only a few differences in the allocation of resources and the choice of inputs between highly educated and non-highly educated mayors. Specifically, candidates with higher education prefer to allocate fewer funds to transportation activities and to reduce the share of highly educated teachers in public schools, relative to non-highly educated candidates. In terms of outcomes, educated mayors increase the proportion of malnourished children.

In summary, heterogeneity in the effects of highly educated mayors on policy inputs and outcomes is important. Treatment effects on funds allocation and input choices in all sectors vary considerably among left-wing, right-wing, young, and older groups of candidates. Despite not finding significant heterogeneity in the effects of educated mayors on economic performance outcomes, in education our esti-

[16] As a robustness exercise, we perform our RD analyses using local quadratic regressions in lieu of local linear regressions. Tables B.3–B.5 in Appendix B show the corresponding estimated effects. Our conclusions remain unchanged.

[17] We include the following parties in left-wing group: Partido Democratico Trabalhista (PDT), Partido Popular Socialista (PPS), Partido Socialista Brasileiro (PSB), Partido da Social Democracia Brasileira (PSDB), Partido dos Trabalhadores (PT), and Partido Verde (PV). Likewise, we include the following parties in the right-wing group: Partido da Frente Liberal (PFL), Progressistas (PP), Partido Social Cristao (PSC), Partido Social Democratico (PSD), and Partido Social Liberal (PSL).

mates show that within the left-wing group, highly educated candidates are able to reduce the incidence of age-grade distorted students when compared to their non-highly educated counterparts. Treatment effects on health outcomes are also heterogeneous, with highly educated candidates in the left-wing and older groups displaying worse indicators of children's health, while highly educated mayors in the right-wing and young groups reduce the proportion of malnourished young children.

5.3. The incumbency advantage of educated leaders

We now examine the differential incumbency advantage of highly educated and non-highly educated leaders. To do so, we apply the RD approach described in Section 4 to our candidate level data.

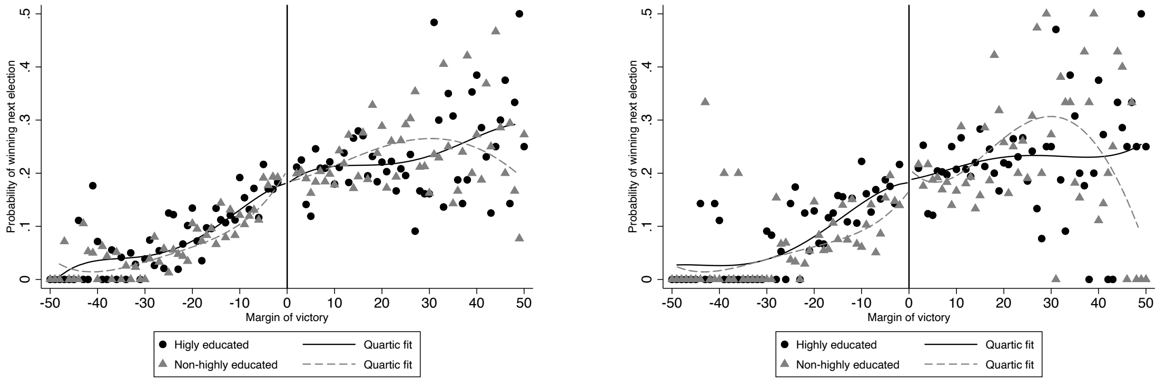
We define the incumbency advantage as the probability of winning the next election for the incumbent candidate. Our RD approach consistently estimates this incumbency advantage by comparing the electoral outcome of candidates that barely won the preceding election with the electoral outcome of candidates that barely lost the preceding election.

We measure electoral outcomes in the 2004 and 2008 elections (period $t + 1$), using two main samples: all elections in 2000 and 2004 (period t), and elections in 2000 and 2004 where the two most voted candidates differ by whether they are highly/non-highly educated. For each main sample, we estimate the incumbency advantage using all candidates, a subsample of only highly educated candidates, and a subsample of only non-highly educated candidates. The comparison of the estimates in the latter two subsamples gives us the differential incumbency effect of highly educated leaders relative to non-highly educated leaders. State and period fixed effects, as well as candidate characteristics (age, gender, marital status, occupation, and political party) are included in all regressions.

Figure 1 displays a graphical analysis of the incumbency data. It plots the probability of winning the next election ($t + 1$) by the relative margin of victory in the precedent election (t), distinguishing by whether the candidate is highly educated or non-highly educated. Panel A uses data for first- and second-placed candidates from all elections in t, while Panel B uses data for first- and second-placed candidates from elections in t where the candidates differ by whether they are highly/non-highly educated. Dots (triangles) represent means in 2 percentage point bins for highly (non-highly) educated candidates, and the solid (dashed) lines are quartic polynomial fits of the data for highly (non-highly) educated candidates in each side of the threshold. There is a positive relation between the margin of victory in the preceding election and the probability of winning the next election, for both highly and non-highly educated candidates, and in each of the main samples. Nevertheless, and consistent with existing evidence from Brazil, incumbents do not enjoy much of an incumbency advantage (Klasnja and Titiunik, 2017; Avis et al., 2020). In particular, having won the preceding election by 50 p.p. only gives the incumbent at most a 50% chance of winning the next election. When it comes to our parameter of interest, the incumbent effect at the threshold seems to be either very small or nonexistent. Panel A shows that the incumbent effect for highly educated candidates is very close to zero, while the incumbent effect for non-highly educated leaders is negative and small. Panel B shows similar results for races confronting highly and non-highly educated candidates in t. The incumbent effect is zero for highly educated candidates, and positive and small for non-highly educated candidates.

Figure 1: *Highly educated and non-highly educated candidate probability of winning next election*

A. All elections in t B. Highly educated. vs. non-highly educated elections in t



Notes: Probability of winning next election ($t + 1$) by relative margin of victory in the current election (t), distinguishing by whether the candidate is highly educated or non-highly educated. Panel A uses data for first- and second-placed candidates from all elections in t. Panel B uses data for first- and second-placed candidates from elections in t where the first- and second-placed candidates differ by whether they are highly educated or non-highly educated. Dots and triangles represent means in 2 percentage points bins. Solid and dashed lines are quartic polynomial fits of the data.

The graphical analysis is confirmed by the regression analysis presented in Table 6. The top panel uses data for first- and second-placed candidates from all elections in t, while the bottom panel uses data for first- and second-placed candidates from elections in t where the candidates differ by whether they are highly/non-highly educated. In each panel, the effect of incumbency is tested in three different subsamples: all candidates, highly educated candidates, and non-highly educated candidates. Column (1) reports the number of observations included in the RD regressions, where the bandwidth is selected following the optimal procedure by Calonico et al. (2014). Columns (2) and (3) display the estimates and 95% confidence intervals (in square brackets) of local polynomial regressions of order 1 and 2, respectively, testing the effect of being the incumbent candidate on the likelihood of winning the next election.[18] Results show that the overall incumbent effect (i.e. all candidates) is very small and not statistically different from zero, in each of the main samples. Point estimates range from -0.6 p.p. to 3.3 p.p.. When we look at the incumbent effect by whether the candidate is highly/non-highly educated, we also find small point estimates that are not statistically different from zero, in each of the main samples. Highly educated candidates' incumbent effect is mostly negative, and ranges from -0.02 p.p. to 1.1 p.p.. Similarly, non-highly educated candidates' incumbent effect ranges from -0.9 p.p. to 4.3 p.p.. Most importantly, highly educated candidates' confidence intervals overlap with non-highly educated candidates' confidence intervals. We thus conclude that highly educated candidates have an incumbent effect of zero, that is not different from the incumbent effect of non-highly educated candidates.

[18]The number of observations reported in column (1) of Table 6 correspond to those used in the local linear regressions.

Table 6: *Incumbent effect*

Dependent variable: elected in $t+1$	obs	RD estimate	
	(1)	(2)	(3)
All elections in t			
all candidates	10,682	-0.006	-0.006
		[-0.041, 0.029]	[-0.045, 0.033]
highly educated candidates	4,299	-0.002	-0.005
		[-0.056, 0.053]	[-0.064, 0.055]
non-highly educated candidates	6,141	-0.009	-0.010
		[-0.056, 0.038]	[-0.061, 0.042]
Highly educated vs. non-highly educated in t			
all candidates	4,304	0.025	0.033
		[-0.031, 0.081]	[-0.034, 0.100]
highly educated candidates	2,421	-0.002	0.011
		[-0.076, 0.072]	[-0.083, 0.104]
non-highly educated candidates	2,041	0.040	0.043
		[-0.040, 0.121]	[-0.048, 0.133]
Polynomial order		One	Two

Notes: Data for 2004 and 2008 elections are used for the dependent variable. State and period fixed effects, as well as candidate characteristics (age, gender, marital status, occupation, and political party) are included in the regressions. The top panel uses data for first- and second-placed candidates from all elections in t. The bottom panel uses data for first- and second-placed candidates from elections in t where the first- and second-placed candidates differ by whether they are highly educated or non-highly educated. *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

6. Conclusions

We have examined whether and how educated political leaders make different policy input decisions and produce different policy outcomes relative to non-educated leaders in municipalities in Brazil. To identify these effects, we have compared policy inputs and outcomes in municipalities where a highly educated candidate barely won the election with those of municipalities where a highly educated candidate barely lost.

Our results provide evidence that electing a highly educated leader matters for a subset of observable policy inputs. Municipalities in which a highly educated mayor was (quasi-) randomly elected tend to allocate a larger share of total public spending to planning activities and devote relatively less resources to transportation. We also provide some evidence that public primary schools in municipalities led by highly educated leaders employ a higher share of secondary educated teachers.

As regards (short-run) policy outcomes, our RD estimates show no systematic advantage of highly educated leaders. Moreover, we find that municipalities led by a highly educated mayor appear to grow relatively less and present a higher incidence of young children with diarrhea when compared to municipalities with non-highly educated mayors. We have additionally documented the existence of heterogeneous effects along political ideology and age of the candidate.

We have also examined the role of higher education in driving the magnitude of the incumbent effect—a measure of reelection success. In line with existing evidence from Brazil and other countries, we show that incumbent mayors are not more likely to win the subsequent election. More importantly, we find that the magnitude of this effect does not vary by whether the leader holds a higher education degree or not.

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A. Data

The empirical analysis in this paper uses the following sets of data:

1. *Mayoral candidates and votes.* We use data from the Brazilian Electoral Court (*Tribunal Superior Eleitoral*) on the biographical and electoral records of the mayors and their opponents in the 2000, 2004, and 2008 municipal elections, including their level of education, occupation, and vote share. We also use data from the 1996 municipal election to verify if incumbent mayors are eligible to run for reelection in 2004.

2. *Local public spending, income, and population.* Yearly data on the size and composition of municipal public expenditure come from the National Treasury (*Tesouro Nacional*) through the FINBRA data set. For each year in the period 2000–2008, this data set contains information on municipal spending by category. Yearly data on municipal GDP and its composition, and on local population come from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*).

3. *Educational inputs and outcomes.* Information on inputs and outcomes of Brazilian public primary schools come from the School Census (*Censo Escolar*) for the years 2000–2008. This is a compulsory administrative census conducted yearly by the Brazilian Ministry of Education in conjunction with the state level education departments. Befitting its name, this data set gathers information on all public and private schools in Brazil. It comprises annual data on enrollment, and educational inputs and outcomes at the school level. An important feature of these data is the high reliability of the information. Indeed, inspections are carried out every year on a random sample of centers to ensure that the information is accurately reported. We restrict our attention to municipal primary schools (1st–8th grades), the main segment of public education under direct control of local governments. Using these micro data, we construct indicators on a wide range of educational inputs at the municipal level: average class size; share of schools with a teachers' room, a library, sciences and computer laboratories; average number of computers per student; and indicators of teachers' qualifications. We are also able to compute the age-grade distortion and the retention rates, two outcome indicators that are widely used by the Ministry of Education.[19]

4. *Health and sanitation inputs and outcomes.* Data on health and sanitation provision come from different surveys conducted by the Ministry of Health, available online through the DATASUS database (*Banco de Dados do Sistema Único de Saúde*). We collected a set of yearly inputs and outcomes at the municipal level for the period 2000–2008. Input indicators include measures of water supply, trash destination, immunization rates, and share of pregnant women that are monitored by the public health system. For health outcomes, we obtained information on live births, malnutrition, and children with diarrhea and acute respiratory infection. These data are first collected by municipalities on a monthly basis, and then sent to their corresponding state secretaries. Subsequently, they are consolidated at the national level by the Ministry of Health.

[19]The Brazilian educational system sets at seven years old the ideal age for first grade in primary school, eight years old for second grade, and so on. Consequently, for an ideal age i for attending a particular grade, a student is classified as age-grade distorted in year t if she is $i+2$ or more years old (or, equivalently, if she was born before year $t-(i+1)$) (Soares and Sátiro, 2008).

B. Additional Tables

Table B.1: *Discontinuity test for municipality baseline characteristics*

Dependent variable	avg	obs	RD estimate	
	(1)	(2)	(3)	(4)
log public expenditure per capita	6.374	2,876	0.047	0.059
	(0.517)		(0.050)	(0.063)
education and culture (share of expenditure)	0.320	3,282	-0.006	-0.005
	(0.083)		(0.007)	(0.009)
health and sanitation (share of expenditure)	0.198	2,581	0.004	-0.002
	(0.071)		(0.007)	(0.009)
planning (share of expenditure)	0.187	2,761	0.002	0.007
	(0.085)		(0.009)	(0.011)
social security (share of expenditure)	0.060	3,305	0.000	-0.002
	(0.039)		(0.003)	(0.004)
transportation (share of expenditure)	0.058	2,996	-0.005	-0.001
	(0.059)		(0.005)	(0.007)
legislation (share of expenditure)	0.040	3,293	-0.003*	-0.001
	(0.026)		(0.002)	(0.002)
security (share of expenditure)	0.002	3,261	0.001*	0.001**
	(0.004)		(0.000)	(0.001)
other expenditures (share of expenditure)	0.135	2,450	0.002	0.000
	(0.107)		(0.012)	(0.013)
log GDP	10.836	2,981	0.082	0.061
	(1.255)		(0.112)	(0.128)
log GDP per capita	8.336	2,985	0.071	0.102
	(0.772)		(0.070)	(0.093)
agriculture (share of GDP)	0.245	3,109	-0.029**	-0.032**
	(0.159)		(0.014)	(0.018)
industry (share of GDP)	0.155	2,500	0.034***	0.042***
	(0.132)		(0.013)	(0.015)
services (share of GDP)	0.545	2,653	-0.007	-0.014
	(0.145)		(0.014)	(0.017)
taxes (share of GDP)	0.055	3,223	0.004*	0.005
	(0.038)		(0.003)	(0.004)
log population	9.413	3,289	0.031	-0.034
	(1.001)		(0.081)	(0.111)
log population density	3.204	3,218	0.139*	0.140
	(1.281)		(0.107)	(0.148)
class size 1st–4th grades	33.242	2,092	3.909*	4.397*
	(24.197)		(2.686)	(3.063)
class size 5th–8th grades	28.265	2,484	0.703	0.267
	(8.281)		(0.979)	(1.099)
class size 1st–8th grades	32.026	2,482	2.271	3.235
	(25.718)		(2.032)	(2.699)
teachers' room	0.385	2,978	0.005	0.028
	(0.372)		(0.034)	(0.045)
library	0.325	2,148	0.056*	0.077*
	(0.394)		(0.041)	(0.048)
sciences lab	0.052	3,056	-0.009	-0.003
	(0.190)		(0.019)	(0.023)
computer lab	0.129	2,951	0.021	0.027
	(0.283)		(0.027)	(0.034)
computers per student	0.006	2,594	0.001	0.001
	(0.013)		(0.001)	(0.001)
share of teachers with primary education	0.049	2,626	-0.007	-0.014

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Table B.1 – continued from previous page

Dependent variable	avg	obs	RD estimate	
	(1)	(2)	(3)	(4)
	(0.120)		(0.011)	(0.014)
share of teachers with secondary education	0.624	3,233	-0.004	0.007
	(0.268)		(0.022)	(0.027)
share of teachers with higher education	0.346	2,984	0.004	-0.009
	(0.286)		(0.025)	(0.031)
log enrollment 1st–4th grades	6.870	2,770	-0.013	-0.072
	(1.186)		(0.110)	(0.137)
log enrollment 5th–8th grades	6.194	2,577	0.156	0.126
	(1.223)		(0.139)	(0.154)
log enrollment 1st–8th grades	7.144	2,770	-0.049	-0.099
	(1.218)		(0.113)	(0.139)
age-grade distortion 1st–4th grades	0.196	2,495	-0.003	-0.009
	(0.163)		(0.017)	(0.019)
age-grade distortion 5th–8th grades	0.402	2,938	0.020	0.003
	(0.219)		(0.024)	(0.029)
age-grade distortion 1st–8th grades	0.233	2,515	-0.007	-0.014
	(0.175)		(0.018)	(0.021)
retention rate 1st grade	0.163	2,808	-0.008	-0.007
	(0.112)		(0.010)	(0.011)
retention rate 2st grade	0.146	2,533	-0.002	-0.002
	(0.091)		(0.009)	(0.010)
retention rate 3st grade	0.104	2,596	-0.003	-0.002
	(0.076)		(0.007)	(0.008)
retention rate 4st grade	0.098	2,427	-0.003	-0.005
	(0.067)		(0.007)	(0.007)
retention rate 5st grade	0.137	2,735	-0.013*	-0.014*
	(0.089)		(0.008)	(0.009)
retention rate 6st grade	0.113	3,167	-0.010*	-0.011*
	(0.078)		(0.006)	(0.007)
retention rate 7st grade	0.086	2,620	-0.009*	-0.011*
	(0.067)		(0.006)	(0.007)
retention rate 8st grade	0.075	2,660	0.000	-0.001
	(0.064)		(0.006)	(0.006)
retention rate 1st–4th grades	0.132	2,541	-0.003	-0.004
	(0.076)		(0.007)	(0.008)
retention rate 5th–8th grades	0.108	2,832	-0.010**	-0.010*
	(0.065)		(0.006)	(0.007)
retention rate 1st–8th grades	0.125	2,571	-0.006	-0.007
	(0.063)		(0.006)	(0.006)
dropout rate 1st grade	0.092	2,732	0.002	-0.002
	(0.096)		(0.009)	(0.011)
dropout rate 2nd grade	0.067	2,754	0.003	-0.001
	(0.077)		(0.007)	(0.009)
dropout rate 3rd grade	0.069	2,789	-0.001	-0.009
	(0.078)		(0.007)	(0.009)
dropout rate 4th grade	0.069	2,765	-0.001	-0.004
	(0.073)		(0.007)	(0.008)
dropout rate 5th grade	0.134	2,761	-0.006	-0.024**
	(0.107)		(0.010)	(0.013)
dropout rate 6th grade	0.116	2,845	-0.001	-0.002
	(0.087)		(0.008)	(0.009)
dropout rate 7th grade	0.117	2,930	0.006	0.001
	(0.090)		(0.008)	(0.010)
dropout rate 8th grade	0.114	3,051	0.002	-0.008

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Table B.1 – continued from previous page

Dependent variable	avg	obs	RD estimate	
	(1)	(2)	(3)	(4)
	(0.084)		(0.007)	(0.009)
dropout rate 1st–4th grades	0.076	2,738	0.001	-0.004
	(0.080)		(0.008)	(0.009)
dropout rate 5th–8th grades	0.124	2,861	-0.001	-0.013
	(0.085)		(0.008)	(0.010)
dropout rate 1st–8th grades	0.099	2,884	0.001	-0.006
	(0.075)		(0.007)	(0.009)
water supply: well[a]	0.302	3,045	-0.005	-0.003
	(0.240)		(0.022)	(0.028)
water supply: public system[a]	0.613	3,108	0.013	0.013
	(0.269)		(0.025)	(0.031)
trash destination: thrown open[a]	0.199	2,996	-0.008	-0.013
	(0.211)		(0.019)	(0.024)
trash destination: collected[a]	0.566	2,794	0.027	0.027
	(0.286)		(0.028)	(0.033)
trash destination: burned or buried[a]	0.235	2,687	-0.019	-0.019
	(0.187)		(0.019)	(0.020)
live births $<$2500g (share)	0.095	2,816	0.007	0.009
	(0.074)		(0.006)	(0.008)
children $<$1 years old with immunization (share)	0.908	2,754	0.003	0.002
	(0.115)		(0.010)	(0.012)
malnourished children $<$1 years old (share)	0.040	2,625	-0.004	-0.003
	(0.042)		(0.004)	(0.005)
children 1-2 years old with immunization (share)	0.864	2,533	0.033**	0.038*
	(0.299)		(0.018)	(0.028)
malnourished children 1-2 years old (share)	0.077	2,841	-0.012*	-0.009
	(0.079)		(0.007)	(0.009)
children $<$2 years old with diarrhea (share)	0.060	2,111	0.005	0.005
	(0.046)		(0.005)	(0.005)
children $<$2 years old with IRA[b] (share)	0.060	2,392	0.003	0.004
	(0.067)		(0.008)	(0.008)
monitored pregnant women (share)	0.961	2,505	0.000	-0.001
	(0.068)		(0.007)	(0.007)
pregnant women with immunization (share)	0.868	2,770	0.007	0.006
	(0.127)		(0.012)	(0.014)
Polynomial order			One	Two

Notes: Estimates of nonparametric RD regressions testing the balance of municipality baseline characteristics. Data for years 2000 and 2004 are used. Column (1) shows the mean and standard deviation (in parentheses) of the corresponding dependent variable. Column (2) reports the number of observations included in the regressions. The bandwidth is selected following the optimal procedure by Calonico et al. (2014). Columns (3) and (4) display the estimates and standard errors (in parentheses) of nonparametric local polynomial regressions of order 1 and 2, respectively, testing the effect of electing a highly educated candidate on the corresponding dependent variable. Columns (1) and (2)'s statistics correspond to the linear version of the regressions. The mean, standard deviation, and number of observations corresponding to the local polynomial regressions of order 2 are omitted. (a) Constructed in the following way: number of households reporting this variable divided by the total number of families. (b) IRA stands for *Infecção Respiratória Aguda* (Acute Respiratory Infection). * Significant at the 90% level. ** Significant at the 95% level. *** Significant at the 99% level.

Table B.2: *Discontinuity test for candidate characteristics*

Type of election:	**All elections in** t				**Highly educated vs. non-highly educated in** t			
Dependent variable	avg	obs	RD estimate		avg	obs	RD estimate	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
age	48.191	9,220	1.008**	0.977**	48.308	4,092	1.344**	1.364**
	(9.827)		(0.490)	(0.526)	(9.719)		(0.739)	(0.800)
male	0.923	10,322	-0.004	-0.007	0.919	4,244	-0.005	-0.002
	(0.266)		(0.012)	(0.013)	(0.273)		(0.020)	(0.024)
married	0.815	9,538	0.029*	0.030*	0.816	4,482	-0.014	-0.017
	(0.388)		(0.018)	(0.021)	(0.387)		(0.027)	(0.031)
divorced	0.039	12,502	0.000	-0.001	0.042	5,354	0.004	0.001
	(0.195)		(0.008)	(0.010)	(0.200)		(0.012)	(0.017)
separated	0.037	9,400	-0.004	-0.004	0.038	4,002	0.003	0.003
	(0.188)		(0.009)	(0.011)	(0.191)		(0.015)	(0.016)
widowed	0.016	10,640	-0.003	-0.004	0.014	4,620	0.004	-0.010
	(0.125)		(0.006)	(0.007)	(0.119)		(0.008)	(0.010)
single	0.094	8,962	-0.019*	-0.018	0.091	3,884	0.016	0.023
	(0.292)		(0.014)	(0.014)	(0.287)		(0.021)	(0.024)
agricultural entrepreneur	0.165	10,460	0.019	0.023	0.137	4,038	0.010	0.009
	(0.372)		(0.017)	(0.020)	(0.344)		(0.028)	(0.031)
physician	0.098	9,182	-0.035***	-0.043***	0.120	4,694	-0.035*	-0.067**
	(0.297)		(0.015)	(0.017)	(0.324)		(0.022)	(0.030)
entrepreneur	0.063	11,178	-0.001	-0.004	0.066	4,510	-0.020	-0.020
	(0.243)		(0.011)	(0.013)	(0.249)		(0.018)	(0.019)
lawyer	0.051	9,210	0.011	0.011	0.062	4,276	0.006	0.004
	(0.219)		(0.010)	(0.012)	(0.242)		(0.017)	(0.021)
teacher	0.045	11,298	0.003	0.000	0.058	5,094	0.006	-0.006
	(0.208)		(0.010)	(0.012)	(0.234)		(0.016)	(0.021)
manager	0.029	9,870	-0.001	-0.001	0.028	3,938	0.005	0.010
	(0.167)		(0.009)	(0.008)	(0.166)		(0.014)	(0.016)
political party: left-wing	0.340	11,184	-0.005	0.002	0.341	4,314	0.028	0.025
	(0.474)		(0.021)	(0.026)	(0.474)		(0.035)	(0.040)
political party: center	0.351	12,872	-0.002	-0.008	0.359	3,996	-0.061**	-0.076**
	(0.477)		(0.019)	(0.026)	(0.480)		(0.036)	(0.043)
political party: right-wing	0.288	11,710	0.013	0.009	0.284	4,870	0.019	0.039
	(0.453)		(0.020)	(0.024)	(0.451)		(0.031)	(0.041)
Polynomial order			One	Two			One	Two

Notes: Estimates of nonparametric RD regressions testing the balance of candidate characteristics. Data on the two most voted candidates in 2000 and 2004 elections (t) are used, excluding information from municipalities in which, due to binding term limits, the elected candidate is not eligible for reelection in the next election ($t + 1$). The left panel (columns (1)–(4)) uses data for first- and second-placed candidates from all elections in t. The right panel (columns (5)–(8)) uses data for first- and second-placed candidates from elections in t where the first- and second-placed candidates differ by whether they are highly educated or non-highly educated. Columns (1) and (5) show the mean and standard deviation (in parentheses) of the corresponding dependent variable. Columns (2) and (6) report the number of observations included in the regressions. The bandwidth is selected following the optimal procedure by Calonico et al. (2014). Columns (3) and (4), and (7) and (8) display the estimates and standard errors (in parentheses) of nonparametric local polynomial regressions of order 1 and 2, respectively, testing the effect of being the incumbent candidate (i.e. having been elected in t) on the corresponding dependent variable. The statistics in columns (1) and (2), and (5) and (6) correspond to the linear version of the regressions. The mean, standard deviation, and number of observations corresponding to the local polynomial regressions of order 2 are omitted. * Significant at the 90% level. ** Significant at the 95% level. *** Significant at the 99% level.

Table B.3: *Effects on public expenditure and economic performance - local quadratic regressions*

Dependent variable			RD estimate	
	avg	obs	all years	final year
	(1)	(2)	(3)	(4)
Size and composition of public expenditure				
log public expenditure per capita	6.701	3,169	0.008	-0.042
	(0.515)		(0.030)	(0.045)
education and culture (share)	0.314	3,478	0.001	0.001
	(0.068)		(0.005)	(0.007)
health and sanitation (share)	0.219	3,046	-0.006	-0.006
	(0.053)		(0.005)	(0.007)
planning (share)	0.190	2,832	0.019***	0.017*
	(0.064)		(0.008)	(0.009)
social security (share)	0.059	3,555	-0.001	-0.007*
	(0.030)		(0.003)	(0.004)
transportation (share)	0.052	2,905	-0.012***	-0.018***
	(0.050)		(0.004)	(0.006)
legislation (share)	0.036	3,368	-0.001	-0.002
	(0.015)		(0.001)	(0.002)
security (share)	0.002	3,105	0.001	0.000
	(0.004)		(0.001)	(0.001)
other expenditures (share)	0.129	3,507	0.004	0.013
	(0.053)		(0.005)	(0.011)
Economic performance				
log GDP	11.148	3,200	0.006	0.003
	(1.238)		(0.017)	(0.024)
log GDP per capita	8.622	3,665	-0.008	-0.041
	(0.750)		(0.021)	(0.039)

Notes: Estimates of local quadratic RD regressions testing the effect of electing a highly educated candidate on public expenditure and economic performance. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years (column (3)) and the value in the last year (column (4)) of the electoral cycle. State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table B.4: *Effects on education - local quadratic regressions*

Dependent variable			RD estimate	
	avg	obs	all years	final year
	(1)	(2)	(3)	(4)
Education inputs				
class size 1st–8th grades	27.897	3,435	-0.900	-0.823
	(12.955)		(0.789)	(0.694)
teachers' room	0.412	3,551	-0.005	-0.013
	(0.346)		(0.024)	(0.027)
library	0.296	3,511	-0.009	-0.010
	(0.307)		(0.024)	(0.032)
sciences lab	0.030	3,766	0.007	-0.007
	(0.104)		(0.012)	(0.016)
computer lab	0.139	2,920	-0.040	-0.039
	(0.240)		(0.024)	(0.032)
computers per student	0.011	3,431	-0.001	0.001
	(0.018)		(0.002)	(0.002)
share of teachers with primary education	0.017	3,115	-0.004	-0.004*
	(0.045)		(0.004)	(0.003)
share of teachers with secondary education	0.510	3,544	0.025*	0.023
	(0.276)		(0.018)	(0.022)
share of teachers with higher education	0.492	3,343	-0.028*	-0.025
	(0.286)		(0.019)	(0.024)
Education outcomes				
log enrollment 1st–8th grades	7.082	3,429	-0.018	-0.013
	(1.284)		(0.054)	(0.050)
age-grade distortion 1st–8th grades	0.207	3,035	-0.005	0.001
	(0.165)		(0.011)	(0.008)
dropout rate 1st-8th grades	0.081	3,631	0.002	0.001
	(0.062)		(0.003)	(0.004)

Notes: Estimates of local quadratic RD regressions testing the effect of electing a highly educated candidate on educational inputs and outcomes. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years (column (3)) and the value in the last year (column (4)) of the electoral cycle. State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table B.5: *Effects on health and sanitation - local quadratic regressions*

Dependent variable			RD estimate	
	avg	obs	all years	final year
	(1)	(2)	(3)	(4)
Health inputs and sanitation				
water supply: well[a]	0.288	3,134	-0.005	-0.002
	(0.224)		(0.023)	(0.023)
water supply: public system[a]	0.620	3,279	0.003	0.007
	(0.252)		(0.024)	(0.025)
trash destination: thrown open[a]	0.157	3,303	0.003	0.004
	(0.185)		(0.012)	(0.011)
trash destination: collected[a]	0.590	3,345	-0.011	-0.006
	(0.268)		(0.023)	(0.021)
trash destination: burned or buried[a]	0.228	3,319	-0.003	0.001
	(0.181)		(0.018)	(0.018)
children <1 years old with immunization (share)	0.920	3,838	0.004	0.002
	(0.123)		(0.012)	(0.007)
children 1–2 years old with immunization (share)	0.889	2,660	0.101	0.002
	(1.609)		(0.086)	(0.015)
monitored pregnant women (share)	0.950	3,329	-0.003	0.002
	(0.112)		(0.013)	(0.004)
pregnant women with immunization (share)	0.888	3,321	-0.005	0.001
	(0.131)		(0.014)	(0.007)
Health outcomes				
live births <2500g (share)	0.096	2,857	0.007	0.013
	(0.048)		(0.005)	(0.009)
malnourished children <1 years old (share)	0.026	2,866	-0.002	-0.001
	(0.026)		(0.002)	(0.002)
malnourished children 1–2 years old (share)	0.051	2,927	-0.001	0.000
	(0.055)		(0.004)	(0.004)
children <2 years old with diarrhea (share)	0.049	2,794	0.005	0.005*
	(0.033)		(0.003)	(0.003)
children <2 years old with IRA[b] (share)	0.050	3,229	0.001	-0.005
	(0.055)		(0.006)	(0.006)

Notes: Estimates of local quadratic RD regressions testing the effect of electing a highly educated candidate on health and sanitation. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years (column (3)) and the value in the last year (column (4)) of the electoral cycle. State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). (a) Constructed in the following way: number of households reporting this variable divided by the total number of families. (b) IRA stands for *Infecção Respiratória Aguda* (Acute Respiratory Infection). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table B.6: *Effects on public expenditure and economic performance by candidate's political ideology*

Dependent variable			RD estimate	
	avg	obs	left	right
	(1)	(2)	(3)	(4)
Size and composition of public expenditure				
log public expenditure per capita	6.732	2,810	0.039	0.030
	(0.507)		(0.041)	(0.047)
education and culture (share)	0.311	2,437	-0.003	0.002
	(0.066)		(0.008)	(0.009)
health and sanitation (share)	0.222	2,878	-0.004	0.004
	(0.053)		(0.007)	(0.008)
planning (share)	0.194	2,316	0.010	0.012
	(0.065)		(0.010)	(0.011)
social security (share)	0.060	2,450	0.002)	0.000
	(0.028)		(0.004)	(0.004)
transportation (share)	0.047	2,712	-0.006	-0.014**
	(0.047)		(0.005)	(0.007)
legislation (share)	0.036	3,150	0.000	0.001
	(0.015)		(0.002)	(0.002)
security (share)	0.002	2,426	0.001	-0.001
	(0.005)		(0.001)	(0.001)
other expenditures (share)	0.130	3,297	0.008*	-0.002
	(0.052)		(0.006)	(0.009)
Economic performance				
log GDP	11.309	2,561	-0.009	0.032
	(1.310)		(0.023)	(0.028)
log GDP per capita	8.709	2,539	-0.022	0.040
	(0.743)		(0.045)	(0.030)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on public expenditure and economic performance. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years of the electoral cycle for left wing candidates (column (3)) and right wing candidates (column (4)). State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table B.7: *Effects on education by candidate's political ideology*

Dependent variable			RD estimate	
	avg	obs	left	right
	(1)	(2)	(3)	(4)
Education inputs				
class size 1st–8th grades	27.055	2,768	-0.392	-2.915**
	(9.133)		(1.041)	(1.316)
teachers' room	0.458	2,847	-0.011	0.045
	(0.352)		(0.035)	(0.043)
library	0.315	2,952	-0.008	0.038
	(0.303)		(0.033)	(0.036)
sciences lab	0.031	2,847	0.016	0.017
	(0.111)		(0.019)	(0.026)
computer lab	0.155	2,784	-0.007	0.001
	(0.247)		(0.03)	(0.031)
computers per student	0.012	2,528	-0.004	0.005*
	(0.019)		(0.003)	(0.003)
share of teachers with primary education	0.015	2,745	-0.003	0.001
	(0.040)		(0.006)	(0.006)
share of teachers with secondary education	0.455	3,204	0.010	0.015
	(0.261)		(0.024)	(0.030)
share of teachers with higher education	0.554	2,339	-0.036	-0.015
	(0.273)		(0.029)	(0.032)
Education outcomes				
log enrollment 1st–8th grades	7.160	2,225	-0.010	-0.009
	(1.297)		(0.089)	(0.075)
age-grade distortion 1st–8th grades	0.192	2,320	-0.024*	0.010
	(0.156)		(0.016)	(0.015)
dropout rate 1st-8th grades	0.075	2,766	-0.003	-0.003
	(0.058)		(0.005)	(0.006)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on educational inputs and outcomes. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years of the electoral cycle for left wing candidates (column (3)) and right wing candidates (column (4)). State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table B.8: *Effects on health and sanitation by candidate's political ideology*

Dependent variable			RD estimate	
	avg	obs	left	right
	(1)	(2)	(3)	(4)
Health inputs and sanitation				
water supply: well[a]	0.277	2,526	0.036	-0.057*
	(0.219)		(0.031)	(0.034)
water supply: public system[a]	0.635	2,392	-0.020	0.017
	(0.25)		(0.035)	(0.035)
trash destination: thrown open[a]	0.135	2,852	0.009	-0.012
	(0.168)		(0.013)	(0.019)
trash destination: collected[a]	0.620	2,295	-0.051*	-0.005
	(0.262)		(0.033)	(0.033)
trash destination: burned or buried[a]	0.223	2,639	0.016	0.006
	(0.184)		(0.026)	(0.028)
children <1 years old with immunization (share)	0.933	2,306	0.026*	0.006
	(0.112)		(0.019)	(0.018)
children 1–2 years old with immunization (share)	0.964	2,469	-0.125	0.024
	(2.824)		(0.143)	(0.024)
monitored pregnant women (share)	0.956	2,389	0.015	-0.003
	(0.098)		(0.015)	(0.016)
pregnant women with immunization (share)	0.901	2,561	0.014	0.004
	(0.120)		(0.016)	(0.018)
Health outcomes				
live births <2500g (share)	0.099	2,258	0.011*	-0.002
	(0.052)		(0.007)	(0.006)
malnourished children <1 years old (share)	0.025	2,377	0.000	-0.004*
	(0.025)		(0.003)	(0.003)
malnourished children 1–2 years old (share)	0.048	2,738	0.005	-0.002
	(0.052)		(0.005)	(0.006)
children <2 years old with diarrhea (share)	0.048	2,822	0.008***	0.002
	(0.033)		(0.004)	(0.004)
children <2 years old with IRA[b] (share)	0.050	2,678	0.000	-0.002
	(0.054)		(0.008)	(0.008)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on health and sanitation. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years of the electoral cycle for left wing candidates (column (3)) and right wing candidates (column (4)). State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). (a) Constructed in the following way: number of households reporting this variable divided by the total number of families. (b) IRA stands for *Infecção Respiratória Aguda* (Acute Respiratory Infection). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table B.9: *Effects on public expenditure and economic performance by candidate's age*

Dependent variable			RD estimate	
	avg	obs	young	older
	(1)	(2)	(3)	(4)
Size and composition of public expenditure				
log public expenditure per capita	6.745	2,945	0.003	0.003
	(0.526)		(0.040)	(0.031)
education and culture (share)	0.312	2,745	0.010*	-0.004
	(0.068)		(0.007)	(0.006)
health and sanitation (share)	0.217	2,615	-0.002	-0.005
	(0.049)		(0.007)	(0.006)
planning (share)	0.189	3,030	0.004	0.006
	(0.062)		(0.008)	(0.007)
social security (share)	0.058	2,495	-0.009**	0.004
	(0.03)		(0.004)	(0.003)
transportation (share)	0.057	2,901	-0.013**	-0.011***
	(0.055)		(0.006)	(0.004)
legislation (share)	0.036	2,731	-0.003*	0.000
	(0.014)		(0.002)	(0.002)
security (share)	0.002	3,110	0.001	0.000
	(0.004)		(0.001)	(0.001)
other expenditures (share)	0.129	2,822	0.012*	-0.002
	(0.053)		(0.008)	(0.006)
Economic performance				
log GDP	11.005	2,890	0.012	-0.014
	(1.168)		(0.020)	(0.019)
log GDP per capita	8.630	2,849	-0.012	-0.019
	(0.725)		(0.023)	(0.029)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on public expenditure and economic performance. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years of the electoral cycle for candidates 45 years old and younger (column (3)) and candidates older than 45 years old (column (4)). State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

Table B.10: *Effects on education by candidate's age*

Dependent variable			RD estimate	
	avg	obs	young	older
	(1)	(2)	(3)	(4)
Education inputs				
class size 1st–8th grades	26.813	2,557	-1.467*	-0.512
	(11.119)		(1.078)	(1.018)
teachers' room	0.402	2,857	-0.024	-0.002
	(0.345)		(0.034)	(0.025)
library	0.293	2,686	-0.026	-0.009
	(0.309)		(0.033)	(0.026)
sciences lab	0.032	2,729	0.019	-0.004
	(0.107)		(0.021)	(0.014)
computer lab	0.139	2,648	-0.021	-0.031
	(0.242)		(0.03)	(0.024)
computers per student	0.012	2,683	-0.002	-0.001
	(0.021)		(0.003)	(0.001)
share of teachers with primary education	0.019	2,925	-0.004	-0.001
	(0.052)		(0.006)	(0.004)
share of teachers with secondary education	0.509	2,847	0.003	0.038
	(0.275)		(0.025)	(0.022)
share of teachers with higher education	0.487	3,100	0.015	-0.043*
	(0.286)		(0.023)	(0.024)
Education outcomes				
log enrollment 1st–8th grades	6.922	2,881	0.064	-0.075
	(1.359)		(0.082)	(0.060)
age-grade distortion 1st–8th grades	0.206	2,866	-0.008	0.000
	(0.166)		(0.014)	(0.011)
dropout rate 1st-8th grades	0.080	2,738	0.003	0.002
	(0.063)		(0.005)	(0.004)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on educational inputs and outcomes. Data for the 2001–2004 and 2005–2008 electoral cycles are used.Dependent variables capture the average in all four years of the electoral cycle for candidates 45 years old and younger (column (3)) and candidates older than 45 years old (column (4)). State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

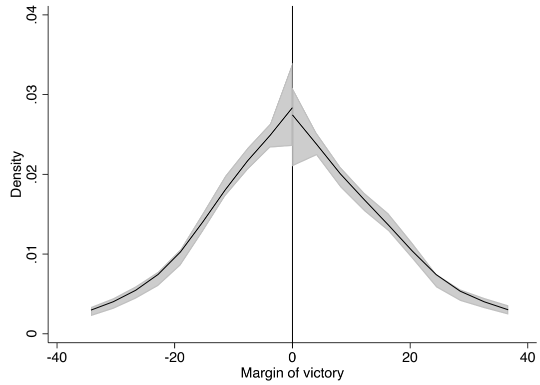
Table B.11: *Effects on health and sanitation by candidate's age*

Dependent variable			RD estimate	
	avg	obs	young	older
	(1)	(2)	(3)	(4)
Health inputs and sanitation				
water supply: well[a]	0.298	2,708	-0.019	0.015
	(0.226)		(0.030)	(0.024)
water supply: public system[a]	0.609	2,813	0.006	-0.008
	(0.251)		(0.031)	(0.027)
trash destination: thrown open[a]	0.158	2,903	0.001	0.013
	(0.177)		(0.014)	(0.013)
trash destination: collected[a]	0.577	2,722	-0.005	-0.020
	(0.264)		(0.031)	(0.024)
trash destination: burned or buried[a]	0.242	2,766	-0.013	0.011
	(0.186)		(0.025)	(0.020)
children <1 years old with immunization (share)	0.920	2,495	0.035*	-0.018
	(0.125)		(0.022)	(0.014)
children 1–2 years old with immunization (share)	0.857	2,533	0.055**	-0.072
	(0.145)		(0.025)	(0.065)
monitored pregnant women (share)	0.951	2,890	0.013	-0.013
	(0.115)		(0.017)	(0.015)
pregnant women with immunization (share)	0.889	2,981	0.007	-0.016
	(0.133)		(0.018)	(0.016)
Health outcomes				
live births <2500g (share)	0.095	3,223	0.003	0.001
	(0.047)		(0.006)	(0.006)
malnourished children <1 years old (share)	0.026	2,098	-0.009***	0.003
	(0.028)		(0.003)	(0.002)
malnourished children 1–2 years old (share)	0.049	2,487	-0.012***	0.009*
	(0.054)		(0.005)	(0.005)
children <2 years old with diarrhea (share)	0.050	2,933	0.003	0.005
	(0.034)		(0.004)	(0.003)
children <2 years old with IRA[b] (share)	0.050	2,691	-0.004	0.002
	(0.055)		(0.007)	(0.007)

Notes: Estimates of local linear RD regressions testing the effect of electing a highly educated candidate on health and sanitation. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in all four years of the electoral cycle for candidates 45 years old and younger (column (3)) and candidates older than 45 years old (column (4)). State and period fixed effects, as well as baseline municipal controls (GDP per capita, population, and share of services, industry and agriculture sectors) are included in the regressions. For brevity, the average and the number of observations only in the RD sample for all years are shown in columns (1) and (2). (a) Constructed in the following way: number of households reporting this variable divided by the total number of families. (b) IRA stands for *Infecção Respiratória Aguda* (Acute Respiratory Infection). *, **, *** denote statistical significance at the 90%, 95%, and 99% levels, respectively.

C. Additional Figures

Figure C.1: *Continuity test of the density of the relative margin of victory of highly educated candidates*

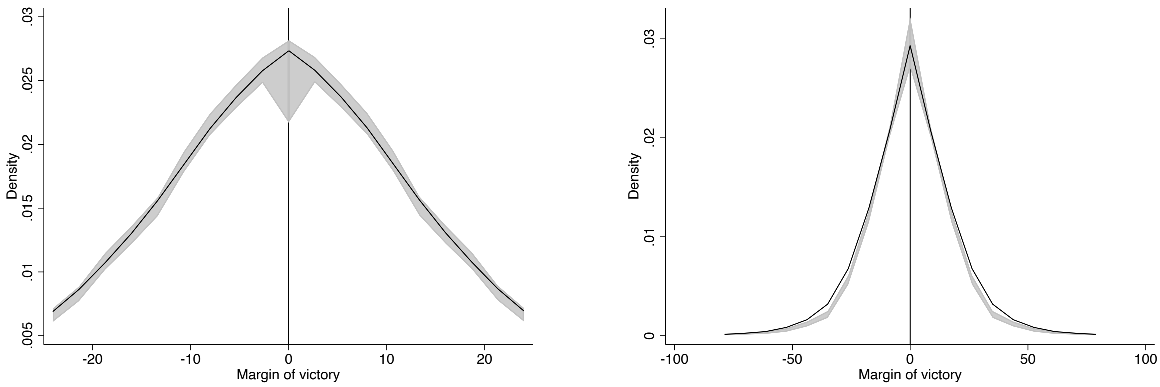


Notes: Test of continuity of the density of the relative margin of victory of highly educated candidates. Data for 2000 and 2004 elections, where the first- and second-placed candidates differ in whether they are highly educated or non-highly educated are used. Density at both sides of the threshold are nonparametrically estimated following Cattaneo et al. (2018) and Cattaneo et al. (2019).

Figure C.2: *Continuity tests of the density of the relative margin of victory of incumbent candidates*

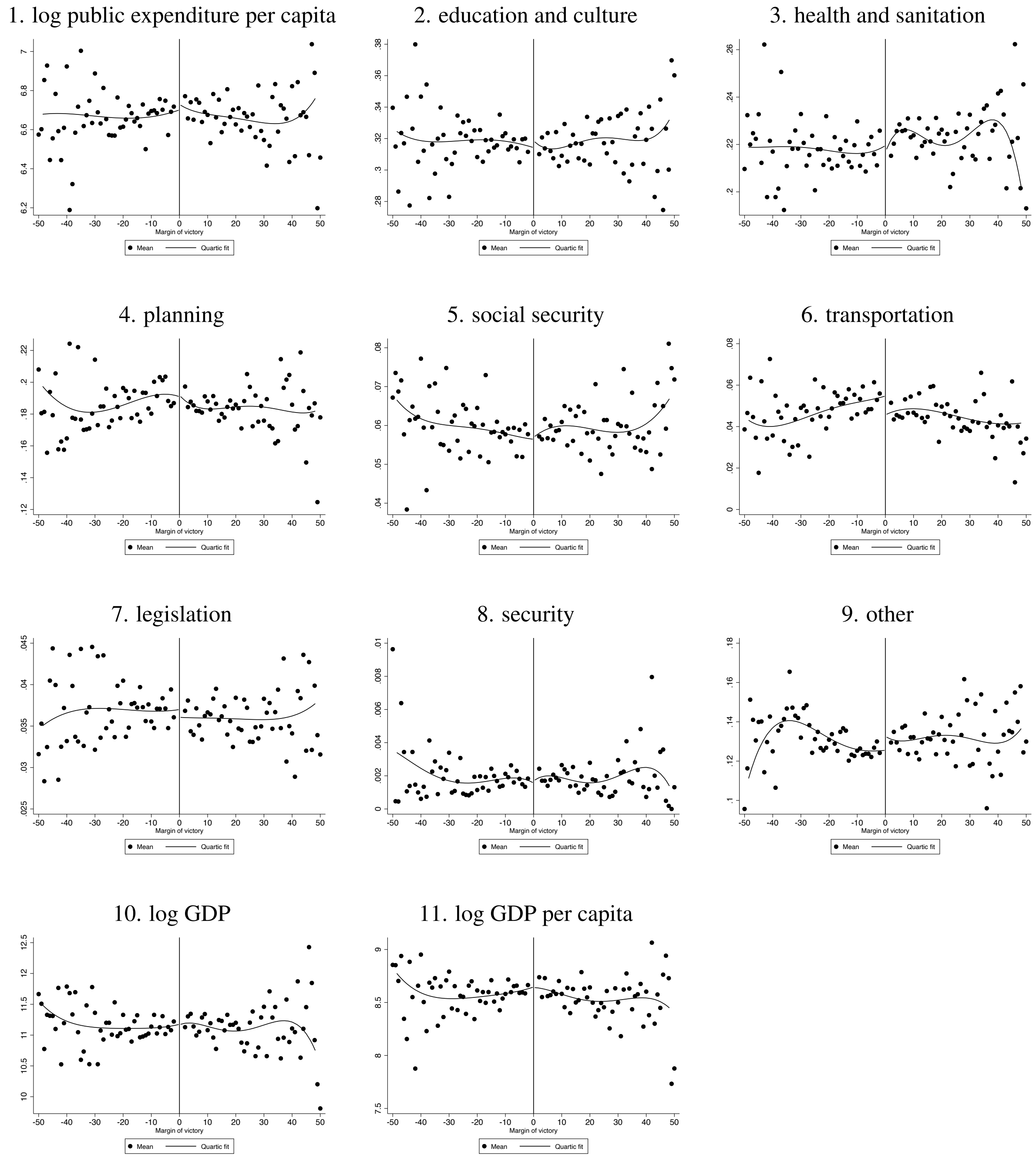
A. All elections in t

B. Highly educated. vs. non-highly educated elections in t



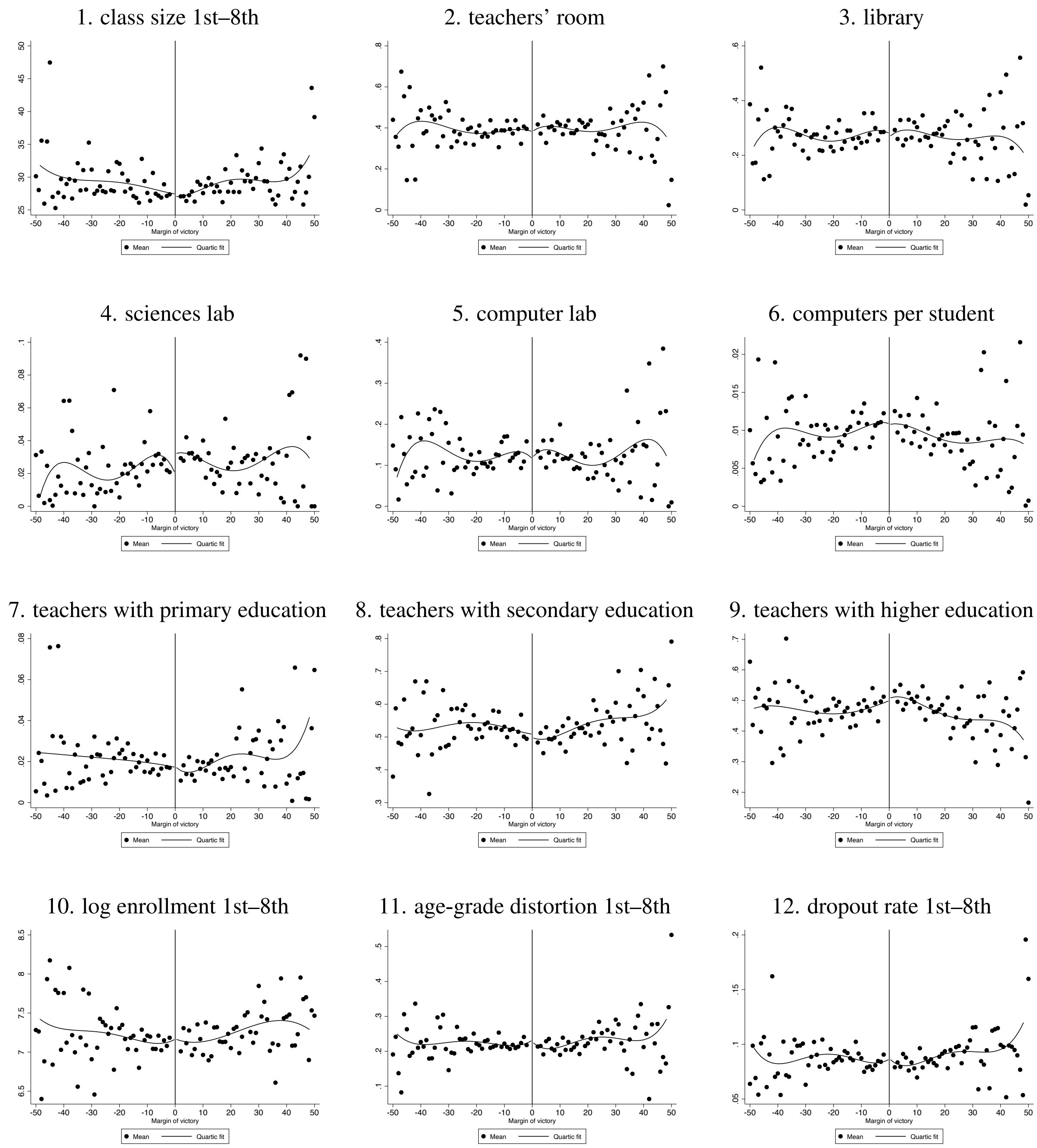
Notes: Test of continuity of the density of the relative margin of victory in period t of incumbent candidates in period $t+1$. Data on the two most voted candidates in 2000 and 2004 elections (t) are used, excluding information from municipalities in which, due to binding term limits, the elected candidate is not eligible for reelection in the next election ($t+1$). Panel A uses data for first- and second-placed candidates from all elections in t. Panel B uses data for first- and second-placed candidates from elections in t where the first- and second-placed candidates differ by whether they are highly educated or non-highly educated. Density at both sides of the threshold are nonparametrically estimated following Cattaneo et al. (2018) and Cattaneo et al. (2019).

Figure C.3: *Effect on public expenditure and economic performance*



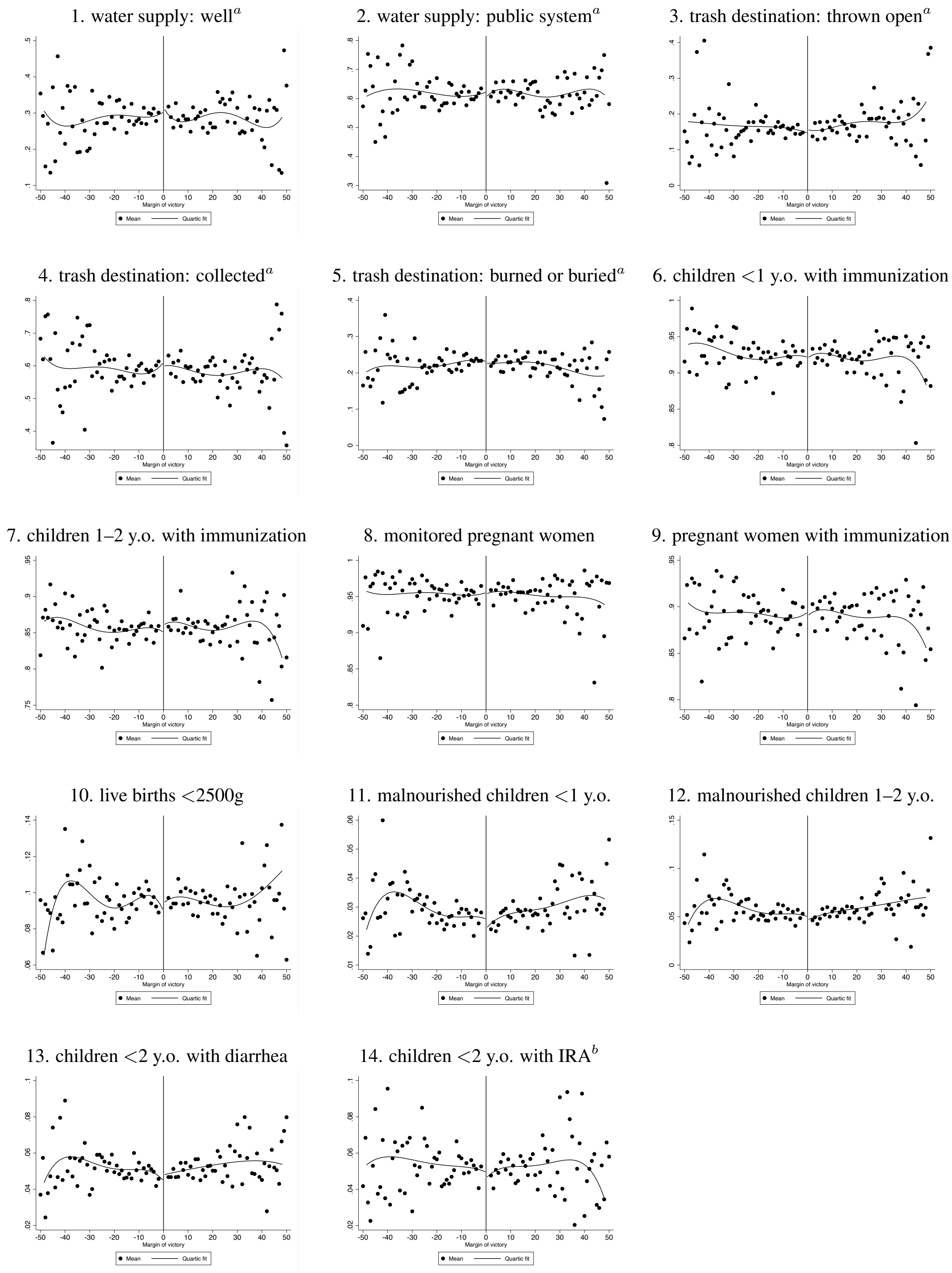
Notes: Effect of electing a highly educated candidate on public expenditure and economic performance. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in the electoral cycle. Dots represent means in 2 percentage points bins. Solid lines are quartic polynomial fits of the data.

Figure C.4: *Effect on education*



Notes: Effect of electing a highly educated candidate on educational inputs and outcomes. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in the electoral cycle. Dots represent means in 2 percentage points bins. Solid lines are quartic polynomial fits of the data.

Figure C.5: *Effect on health and sanitation*



Notes: Effect of electing a highly educated candidate on health and sanitation. Data for the 2001–2004 and 2005–2008 electoral cycles are used. Dependent variables capture the average in the electoral cycle. Dots represent means in 2 percentage points bins. Solid lines are quartic polynomial fits of the data. (a) Constructed in the following way: number of households reporting this variable divided by the total number of families. (b) IRA stands for *Infecção Respiratória Aguda* (Acute Respiratory Infection).