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Incumbency Effects in Brazilian Mayoral Elections: A Regression Discontinuity Design

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February 2012

Working Paper No. 12/284

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ISSN 1473-625X

CMPO Working Paper Series No. 12/284

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Abstract

I use a regression discontinuity design to study incumbency effects in Brazilian mayoral elections. For mayors elected in 1996 I find no evidence of an incumbency effect on the probability of being elected in 2000. For the 2000-2004 electoral cycle I also find no effect except for races where the mayor elected in 2000 belonged to the a party in the center-right coalition and the runner-up belonged to a party in the center-left coalition. In these races I find an incumbency disadvantage. For mayors elected in 2004 I find a strong incumbency advantage in the 2008 election across all races. I also show some novel incumbency effects. Winning a mayoral election does not have a positive effect on the future prospects of a politician's career at the state, national or local level. Losing a mayoral election increases the probability of a politician switching parties.

Keywords: Incumbency Advantage, Political Careers, Regression Discontinuity Design, Mayors, Brazil.

JEL Classification: D70, D72, J00.

Electronic version: **www.bristol.ac.uk/cmpo/publications/papers/2012/wp284.pdf**

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There has been a recent surge on research regarding Mayoral elections in Brazil. Papers such as Ferraz and Finan (2008), Ferraz and Finan (2011), Brollo et al. (2010), and Brollo and Nannicini (2010), have looked at whether corruption, access to information, or federal transfers affect the electoral outcomes in Brazilian mayoral elections. None of these papers, however, have asked what is the benchmark incumbency advantage (or disadvantage) for Brazilian mayors. In this paper I use data from the last three electoral cycles (1996-2008) and I implement a regression discontinuity design to estimate individual incumbency effects in Brazilian Mayoral elections.

I find no incumbency effect on reelection probabilities in the 1996-2000 electoral cycle. Slightly less than 30% of both winners and runners-up from the 1996 election win in the 2000 election. The results for the 2000-2004 electoral cycle are similar to those in the 1996-2000 cycle except for a subset of municipalities where the incumbent belonged to the center-right coalition and the runner-up belonged to the center-left coalition; in these races I find evidence of an incumbency *disadvantage*. In contrast to the other two cycles, the results for the 2004-2008 electoral cycle show a clear incumbency *advantage*. Around 41% of mayors elected in 2004 are reelected in 2008, whereas around 27% of the runners-up from the 2004 election win in 2008. The results for the 2004-2008 electoral cycle are robust to all types of races.

Determining whether Brazilian politicians have an incumbency disadvantage is a contribution to the study of Brazilian Politics but not only. The sign of Brazil's incumbency effect on election probabilities is key to the discussion initiated by Uppal (2008) and Miguel and Zaidi (2003). These two papers find evidence of an incumbency disadvantage in India and Ghana respectively. These results have been interpreted as support to the hypothesis that incumbency disadvantage may be a feature of developing countries. My results go against this hypothesis.

The reelection rates for Brazilian Mayors dwarfs in comparison to the reelection rates estimated for the US. Papers such as Ferejohn (1977), Collie (1981), Cox and Katz (1996), Ansolabehere et al. (2000), Ferreira and Gyourko (2009), and others consistently estimate high reelection rates and a clear incumbency advantage for mayors and other politicians. The reasons for this difference in reelection rates are also an interesting area for future research. One probable reason described here is that Brazilian municipalities depend on transfers from the central government for more than 60% of their budget. Other reasons may be the institutional setup of elections themselves. One example is given by Carey et al. (2000), who show that in the US state legislatures incumbents with a four-years term (the Brazilian case) are not as safe as incumbents with the usual two-years term.

Two studies have so far attempted to estimate incumbency effects in Brazil. Both Titiunik (2009) and Brambor and Ceneviva (2011) find evidence that suggests an incumbency *disadvantage* for Brazilian Mayors. My results are in contrast with theirs. This is mainly due to sample restrictions in both studies.

Brambor and Ceneviva (2011) restrict their analysis to pairs of politicians that appear repeatedly in different electoral cycles. By doing so they can difference out individual fixed effect. Such approach, however, only estimates the effect of incumbency in a self selected subsample - those municipalities where both the winner and the runner-up choose to run again. One of my results is that in close elections, less than 50% of the runners-up run again. Those that choose to run again are not a random sample of all runners-up. The runners-up that choose to run again increase their voting share on average and are more likely to win (conditional on running) than the incumbent. This self selection is probably due to unobserved factors (to the researcher) that indicate to the runner-up that he will do well if he runs again. Such a restriction on the sample generates a downwards bias on the estimated incumbency

effect on reelection probabilities.

The main reason Titiunik (2009) finds a negative incumbency effect is that her data set only covers the 2000-2004 electoral cycle. She looks at party incumbency advantage of the three major political parties at the time: PSDB, PMDB, and PFL. All of these parties belonged to the center-right coalition led by the PSDB, who controlled the presidency in 2000 but lost it in 2002 to a center-left coalition led by the PT. Her results are consistent to what I find when I restrict the 2000-2004 sample to municipalities where the incumbent belonged to the PSDB led coalition and the runner-up belonged to the PT led coalition, that's where my estimates indicate an incumbency disadvantage. These elections, however, are a small part of the data. The majority of the data consists of elections where both winners and runners-up belonged to parties in the PSDB led coalition in 2000.

Another difference with Titiunik (2009) is that I look at *individual* incumbency advantage, whereas as Titiunik (2009) looks at *party* incumbency advantage. Parties tend to be weak in Brazil and politicians follow individualistic campaign strategies (see Samuel (2002) and Desposato (2006)). One of my results is that around 30% of candidates for mayor who choose to run for reelection run under a different party.

Using the individual and not the party as the unit of analysis allows us to look at other incumbency effects such whether incumbency changes the probability of retirement from politics or the decision to run for reelection. Gordon et al. (2007) have addressed these questions theoretically and have shown that the choice of whether to run again is key to understanding incumbency effects.

I focus on the winner and the runner-up of a given mayoral election and then check how they fare four years later. My variable of interest is not the probability of winning conditional on running, or the vote share, but the unconditional probability of winning in the next election.

I also use the regression discontinuity design to estimate other causal incumbency effects. Winning a mayoral election increases the probability of running for mayor again: between 60 and 70% of mayors run for reelection, whereas around 50% of runner-ups run again (in close elections). I find no incumbency effect on the probability of running in the next local election: the runners-up who do not run for mayor choose to run for either the local council or as deputy mayors. I also find that winning mayoral elections has no effect on the probability of a political career at the state or federal level (less than 4% of incumbents or runners-up ever win a state or federal position). Finally, I find that around 30% of the politicians who run for mayor in two consecutive elections run again under a different label (winning mayors are slightly less likely to switch parties than the runners-up).

REGRESSION DISCONTINUITY DESIGN

The recent literature has shown that the regression discontinuity design is well adapted to estimating causal incumbency effects (see Lee (2008)). The idea is that by restricting the sample to close elections, electoral results behave as quasi-experiments. The intuition being that close elections may easily go either way for reasons outside the control of politicians and individual voters, for example: changes in turnout due to weather and holidays, or errors in the counting of votes.

More formally, the defining characteristic of a regression discontinuity design is that the probability of receiving treatment changes discontinuously as a function of one or more underlying variables. The treatment, call it T, is known to depend in a deterministic way on an observable variable, v, known as the forcing variable, $T = f(v)$, where v takes on a continuum of values. But there exists a known point, v_0, where the function, $f(v)$, is discontinuous. The main identifying assumption of the design is that the relation between any confounding factor and v must be

continuous at the cutoff v_0. If that is the case, the only variable that is different near both sides of the cutoff is the treatment status. As a result, the discontinuity in the outcome variable is identified as being caused only by the variation in treatment status. One main caveat of the design is that it can only claim to identify a causal relation locally, i.e. at the cutoff. For a detailed review of the implementation of regression discontinuity designs see Lee and Lemieux (2009).

In this paper, the forcing variable is the difference in votes (in percentage terms) between winner and runner-up. The treatment is being elected Mayor. If the difference in votes is positive the politician receives treatment. By focusing on close elections we can interpret the assignment of treatment as if it were randomized. We can test whether the 'randomization' worked well by testing whether the observable variables are well balanced on both sides of the cutoff. The identifying assumption is that the unobservable variables are also well balanced around the cutoff.

The discontinuity at the cutoff can in practice be estimated in a number of ways. Asymptotically, all methods should produce the same estimates. The simplest approach compares the average outcomes in a small neighborhood on either side of the treatment cutoff. Due to the large number of observations, this is a viable approach here. An equivalent but more efficient method is to estimate two functions: one with observations to the left of the cutoff and one with observations to the right. This method uses all the data available, including data away from the cutoff. The precision of the polynomial estimates depend on how much flexibility we allow the functional form to have. The results I find with the local average method are consistent with the discontinuity estimated with various polynomial specifications. Another popular method is to estimate the function using non-parametric techniques. The results using local-linear regressions (the method suggested in Hahn et al. (2001)) are consistent with the results shown here and are available on request.

Recently, Caughey and Sekhon (2012) have pointed out that for the US House, very close elections (a difference in vote share of less than 5%) do not pass the balance tests that assure us that we can interpret them as quasi-experiments. The tests I perform here show that even for very close elections, the sample for Brazilian mayoral elections is balanced. I show my main results and balance tests comparing local averages for elections that were won by at most a 2% difference in vote share between the winner and the runner-up. The results are robust to intervals of other sizes such 1% or 3%.

DATA

Electoral data and information about candidates characteristics was obtained from the National Electoral Office (*Tribunal Superior Eleitoral*). The data set comprises all elections held in Brazil from 1996 to 2008. Candidate information includes vote share, party affiliation, age, education, marital status, and gender. For the 2004 election I also have the reported campaign cost for each candidate. I have used the candidate's name, social security number (*cpf*), and date of birth to match the same individual in different elections. This allows us to track their political career. In particular we can check whether becoming mayor has an effect on a political career at the state or federal level.

There are 5,565 municipalities in Brazil. Around 50 of these municipalities were created during the sample period; their exclusion would not influence the results. For all municipalities with less than 200,000 inhabitants the election for mayor is decided by simple majority rule. For municipalities above 200,000 inhabitants if neither candidate reaches 50% of the votes there is a runoff between the first and second place candidates. I restrict the analysis to the municipalities where the decision was made through a simple majority rule. Due to this restriction and to some missing data

the baseline sample does not include all municipalities. The baseline sample with the smallest number of municipalities is the 1996 election with 5377 municipalities. All other electoral years have more that 5,500 municipalities included in the baseline sample.

A law that allowed mayors to seek reelection for one extra term was approved in 1997. All mayors elected in 1996 were allowed to seek reelection in 2000. From 2000 onwards we must restrict the analysis to municipalities where the term limit is not binding. For example, the baseline sample for the analysis of the 2000-2004 electoral cycle is 5522 municipalities. Once we exclude the municipalities where the incumbent mayor faces a term limit in 2004, the sample drops to 3553 municipalities.

The two methods I use to estimate the discontinuity have different implications to the relevant sample. The polynomial method uses all available data (after the restriction discussed above) to estimate the function and the discontinuity. The local-averages method restricts the sample further. I compare winners and runners-up in municipalities where the difference in vote share between the two was less than 2%. This implies that in the 1996 election,, for example, the local averages on both sides of the cutoff are estimated with data from 551 municipalities.

The unit of analysis is the individual candidate, but the inclusion of a winner and a runner-up in the working sample is determined by whether the election in a given municipality was a close election or not. By construction, the sample is perfectly balanced for all municipality level variables. Also by construction the density of the forcing variables will be identical on both sides of the cutoff. The balance tests to check the validity of the design must focus on politicians' characteristics: age, education, gender, marital status, political party, and for the 2004 election campaign costs. We must check whether the average of each of these variables is not statistically different on both sides of the cutoff. There are missing values for some of these

variables, an additional balance test is to check whether the number of missing variables is also similar on both sides of the cutoff.

I present the summary statistics for each electoral cycle in the Appendix, Tables 7, 11, and 15. For each variable I report the average value for the incumbent and the runner-up. In these tables I include all the data available. In Table 7 we can see that the average reelection rate for all incumbents elected in 1996 is 36%. For the runners-up it is 15%. Most of the other averages are not dissimilar to Table 1 below, where I restrict the sample to a 2% window for the regression discontinuity design. Discussing the descriptive statistics in Tables 7, 11, and 15 is not to dissimilar from discussing the regression discontinuity results. For this reason I have placed the summary statistics tables in the Appendix and I discuss in detail the other variables in Tables 1, 3, and 5 below.

THE 1996-2000 ELECTORAL CYCLE

In Table 1 I present the main results of the regression discontinuity design for the electoral cycle 1996-2000. I restrict the sample to candidates who either won or lost the election for mayor with a difference of less than 2% of the votes in the 1996 election. The sample includes 551 municipalities, so that we have 551 winners and 551 runners-up. In row 1 we can see the unconditional probability of winning. On average 29% of the incumbents (those who became mayors in 1996) win reelection and 27% of runners-up in the 1996 election become mayors in 2000. In column 3 I report the standard errors (clustered by municipality) showing that the difference between these two averages is not statistically significant. There is no evidence of an incumbency advantage or disadvantage in the 1996-2000 electoral cycle. In Table 8 in the Appendix I estimate the same discontinuity with a polynomial on each side of the cutoff. The polynomial method consistently estimates no discontinuity for

different polynomial degrees.

Table 1: Winners and runners-up from the 1996 election - 2% window - local averages

	mean		Test Diff=0	sample size	
	winner	runner-up	SE	winner	runner-up
Elected Mayor in 2000	0.29	0.27	(0.03)	551	551
Education	0.61	0.59	(0.03)	392	390
Married	0.98	1.01	(0.03)	390	391
Age	46.5	46.7	(0.61)	498	498
Gender	0.06	0.03	(0.01)*	393	393
President's party(PSDB)	0.14	0.14	(0.02)	551	551
President's Coalition	0.77	0.77	(0.03)	551	551
Ran for Mayor in 2000	0.62	0.45	(0.03)***	551	551
Ran in 2000(mayor, ver., d-m)	0.62	0.61	(0.03)	551	551
Won 98-02-06 (state or national)	0.03	0.04	(0.01)	551	551
Party Switch in 2000	0.27	0.34	(0.03)**	344	336
Diff in Vote(%) 00-96	-0.31	2.16	(1.14)**	340	246
Prob(win 00| running)	0.46	0.61	(0.05)***	340	246

Note: This sample comprises 1102 politicians who participated in the 1996 mayoral election and either won or were the runner up. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

From rows 2 to 7 in Table 1 I report the balance tests of other covariates. These results and those in rows 8 to 13 are robust to estimating the discontinuities with the polynomial method. I show the polynomial estimates in the Appendix, Table 9.

In row 2 we can see that both winners and runners-up have the same average level of education; around 60% has at least a high-school degree. There is a considerable number of candidates with missing information on education. In columns 5 and 6 I report the number of observations. We can see that missing information is not systematically related to the politician being the winner or the runner-up. In row 3 we can see that both winners and runners-up have on average the same civil status (the variable takes value 1 if married, 0 if single, 2 if divorced, and 3 if a widower).

In row 4 I report the average age. Both winners and runners-up have the same average age of 46. Row 5 shows there is a statistically different fraction of women among winners and runners-up. I don't take this as a threat to the validity of the design for two reasons. First, the fraction of women is small, 6% of the incumbents and 3% of the runners-up; all results would hold if we excluded from the sample the municipalities with women candidates. Second, the variable 'gender' is balanced in the other two electoral cycles, which suggests that the statistical difference in row 3 may be due to sample variability and is not a robust statistic.

In row 6 and 7 I report two important balance tests. In row 6 we can see that the winners are as likely as the runners-up to belong to the President's party, the PSDB. In row 7 I present the balance test for the variable 'President's Coalition', which takes value 1 if the politicians belongs to either of the following parties: PMDB, PFL, PSDB, PP, PTB, or PPS. The balance tests from rows 2 to 7 give us confidence that the restricted sample is balanced and that we can interpret close mayoral elections in Brazil as quasi-experiments.

The results in Table 1 are consistent with a 1% widow and a 3% window. These results are available on request. In the Appendix, Table 10, I show the same results for a 5% window. As we increase the window, we include in the sample mayors that have won with a comfortable margin in 1996. With a 5% window the treatment and control samples are not balanced in a critical variable, the President's party(PSDB). The winners are more likely to be from the President's party than the runners-up; this difference is statistically significant. This is an indication that the winning candidates of this extended sample may not be comparable to the runners-up. Of course, as we expand the sample and include mayors that have won with a comfortable margin in 1996 we observe that the 1996 winners are more likely to win the election in 2000 than the 1996 runners-up. This is the case in Table 10 in the Appendix for a 5%

window and for larger windows.

In rows 8 to 10 I study other potential incumbency effects. In row 8 we can see that 62% of incumbents choose to run for reelection, whereas only 45% of runners-up choose to run for mayor again. A clear incumbency effect is that becoming a mayor causes the politician to run for mayor again. In row 9 we can see that some of the runners-up that choose not to run for mayor, run for other local offices instead, either deputy-mayor or local councillor (*vereador*). On average 60% of both winners and runners-up continue with their political career. This is an interesting result that shows that there is no incumbency effects on continuing a political career. Becoming a mayor causes the politician to run again for mayor instead of looking for another local office, but does not increase the likelihood of pursuing a political career. In row 10 we can see that becoming a mayor does not influence the chances of a political stint at the state or national level either. Around 3% of winners and 4% of runners-up go on to win state or national offices. This difference is not statistically significant.

Finally from rows 11 to 13 I report results conditional on running again. In row 11 we can see that 34% of runners-up that choose to run again (either for mayor, deputy mayor, or local council) do so under a different party. The incumbents are less likely to switch party but around 27% still do. The difference is statistically significant. One of the incumbency effects in Brazil is to make it more likely that a politician stays in the same party.

Rows 12 and 13 illustrate the selection that occurs when politicians chose whether to run again. Incumbent mayors that run for reelection observe little change on their vote share, whereas runners-up that choose to run again increase their vote share by 2% on average. This result, together with the result in row 8 - that shows us that runners-up are less likely to run again than incumbents - suggest that the runners-up that choose to run again are those that are likely to do well. This is reflected

in their probability of winning conditional on running. In row 13 we can see that around 46% of incumbents that run again win, whereas 61% of runners-up that run again win. If we disconsider this selection and restrict our attention to incumbents and runners-up who choose to run again, we would generate a negative bias on the estimates of incumbency effects on reelection probabilities.

Table 2: Winners and runners-up from the 1996 election - 2% window - local averages

	Proportion elected in 2000		Test Diff=0	sample size	
Sample restriction	winner	runner-up	SE	winner	runner-up
Winner and runner-up in President's Coalition	0.31	0.28	(0.03)	315	315
Winner in Coalition Runner-up not in Coalition	0.24	0.33	(0.04)	107	107
Winner not in Coalition Runner-up in Coalition	0.27	0.21	(0.05)	107	107

Note: This sample comprises 1102 politicians who participated in the 1996 mayoral election and either won or were the runner up. Row 1 restricts the sample to the 315 municipalities where both the winner and the runner-up in the 1996 election were from parties belonging to the President's ruling coalition: PMDB, PFL, PSDB, PP, PTB, or PPS. Row 2 restricts the sample to the 107 municipalities where the winner in the 1996 election was from parties in the coalition and the runner-up was from opposition parties. Row 3 restricts the sample to 107 municipalities where the winner was not from a party in the President's coalition but where the runner-up was. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

In Table 2 I break down the results according to the type of electoral race. In row 1 I focus on municipalities where both winner and runner-up in the 1996 election belonged to a party in the ruling coalition led by the PSDB, who held the Presidency between 1994 and 2002. The majority of the races are of this type: 315 out of 551. In row 2 I focus on races where the winner belonged to the ruling coalition and the runner-up did not. In row 3 I focus on the races where the runner-up belonged to the ruling coalition and the winner did not. In none of these cases the difference between reelection rates is statistically significant.

THE 2000-2004 ELECTORAL CYCLE

In Table 3 I present the main results of the regression discontinuity design for the electoral cycle 2000-2004. The main reason the sample is smaller than the 1996-2000 cycle is because in many municipalities a mayor elected in 1996 and reelected in 2000 faced a term limit in 2004. Rows 2 to 7 in Table 3 reassure us that the sample is indeed balanced and that we can interpret close mayoral elections in 2000 as a quasi-experiment.

The point estimates in row 1 suggest an incumbency disadvantage. Whereas 31% of incumbents win reelection, 37% of runners-up in 2000 are elected in 2004. With the local-averages method, the difference is not statistically significant. The results with the polynomial method suggest that the estimate is statistically significant (see Table 12 in the Appendix). Other indication of this incumbency disadvantage can be seen row 9 and 10. Runners-up are more likely to stay in politics than incumbents and more likely to win a state or national office in their future career. The results in rows 11 to 13 are similar to those in Table 1 for the 1996-2000 cycle. The results in Table 4 are robust to polynomial estimates and are available in the Appendix, Table 13.

This apparent incumbency disadvantage is not robust to all types of political races, however. In Table 4 we can see that there is no incumbency disadvantage if we restrict the sample to races in 2000 where both winner and runner-up belonged to the then ruling PSDB presidential coalition - the majority of the races. The election rate in 2004 was 33% for both winners and runners-up in this type of race. We only observe a clear incumbency disadvantage for races where the winning mayor in the 2000 election belonged to the PSDB presidential coalition and the runner-up did not. In this type of race the election rate in 2004 for the runner-up was 51%, whereas the election rate in 2004 for the winner was 21%. The estimates in Table 4 are based on

Table 3: Winners and runners-up from the 2000 election - 2% window - local averages

	mean		Test Diff=0	sample size	
	winner	runner-up	SE	winner	runner-up
Elected Mayor in 2004	0.31	0.37	(0.02)	385	385
Education	0.69	0.71	(0.02)	379	380
Married	1.05	1.04	(0.03)	384	381
Age	48.8	47.4	(0.69)	384	385
Gender	0.08	0.06	(0.02)	385	385
President's party 2000(PSDB)	0.14	0.16	(0.02)	385	385
President's Coalition 2000	0.77	0.81	(0.03)	385	385
Ran for Mayor in 2004	0.62	0.58	(0.04)	385	385
Ran in 2004(mayor, ver., d-m)	0.63	0.69	(0.03)*	385	385
Won 02-06 (state or national)	0.00	0.02	(0.01)**	385	385
Party Switch in 2004	0.31	0.41	(0.04)**	241	265
Diff in Vote(%) 04-00	0.49	2.82	(1.20)*	240	222
Prob(win 04| running)	0.50	0.63	(0.06)**	240	223

Note: This sample comprises 770 politicians who participated in the 2000 mayoral election and either won or were the runner up. The sample consists of 385 municipalities where a two-year term limit for mayors was not binding. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 4: Winners and runners-up from the 2000 election - 2% window - local averages

	Proportion elected in 2004		Test Diff=0	sample size	
Sample restriction	winner	runner-up	SE	winner	runner-up
Winner and runner-up in 2000 PSDB coalition	0.33	0.33	(0.05)	229	229
Winner in coalition Runner-up not in coalition	0.21	0.51	(0.10)***	66	66
Winner not in coalition Runner-up in coalition	0.35	0.37	(0.09)	83	83

Note: This sample comprises 770 politicians who participated in the 2000 mayoral election and either won or were the runner up. Row 1 restricts the sample to the 229 municipalities where both the winner and the runner-up in the 2000 election were from parties belonging to the President's ruling coalition: PMDB, PFL, PSDB, PP, PTB, or PPS. Row 2 restricts the sample to the 66 municipalities where the winner in the 2000 election was from parties in the coalition and the runner-up was from opposition parties. Row 3 restricts the sample to 83 municipalities where the runner-up in the 2000 election was from a party in the President's ruling coalition but the winner was not. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

few observations, but the estimates are robust to a larger 5% window (see Table 14 in the Appendix).

From Table 4 we can conclude that the estimated incumbency disadvantage in Table 5 is driven by those municipalities where the winner in the 2000 election belonged to the then ruling PSDB presidential coalition and where the runner-up did not. Once we exclude these municipalities the results are in line with what we found for the 1996-2000 electoral cycle, that is, no evidence of an incumbency effect on reelection probabilities.

We do find a clear and statistically robust incumbency disadvantage in Table 4, row 2. In 2002 the PSDB lost the presidency to the opposition candidate from the PT (Lula). Mayors who belonged to parties in the PSDB presidential coalition lost support from the central government when the time came to seek reelection. The

new presidential coalition led by the PT may have been able to influence these close elections through mechanisms such as coattail effects from Lula's popularity or the lost capacity for the parties in the PSDB coalition to raise campaign money. The clearest mechanism, however, seems to be the one suggested by Brollo and Nannicini (2010). Their evidence suggests that the federal government is able to starve of funds the municipalities where the incumbent belongs to the opposition.

The largest share of the municipal budget is made of federal transfers (65% on average). The remaining is divided between state funds (30%) and locally raised revenues from property taxes, fines, as service taxes (5%). A small share of federal transfers are discretionary (the largest share is linked to population variables and total national tax revenue). The discretionary transfers consist of amendments to the federal budget proposed by legislators. The President is not required by law to implement the approved amendments. Brollo and Nannicini (2010) show that mayors who do not belong to a party in the presidential coalition are less likely to receive discretionary funds from the central government.

The results in Table 4 suggest that the mechanism described in Brollo and Nannicini (2010) may play an important part in explaining the incumbency effects in the 2000-2004 electoral cycle. We only observe signs of an incumbency disadvantage in the municipalities where incumbent mayors belonged to parties in the opposition (row 2). We observe no incumbency advantage where the incumbents belonged to the ruling coalition (row 3). Had the other mechanisms I mentioned, coattail effects from Lula's popularity and difficulty in raising campaign funds, played an important role we would have expected a positive incumbency effect in row 3.

THE 2004-2008 ELECTORAL CYCLE

In Table 5 I present the results for the 2004-2008 electoral cycle. In contrast to the

results of both previous cycles we observe a clear incumbency advantage. In row 1 we can see that around 41% of winners in the 2004 election are reelected in 2008 whereas only 27% or runners-up are elected mayor in 2008. This results is statistically significant and is robust to the polynomial method as we can see in Table 16 in the Appendix. Rows 2 to 8 again reassure us that we can interpret close elections in this sample as quasi-experiments. In row 6 we can seen that the average campaign expenditure among incumbents is not statistically different to the expenditure by the runners-up in 2004. These results are also robust to the polynomial method (see the Appendix Table 17).

Table 5: Winners and runners-up from the 2004 election - 2% window - local averages

	mean		Test Diff=0	sample size	
	winner	runner-up	SE	winner	runner-up
Elected Mayor in 2008	0.41	0.27	(0.04)***	488	488
Education	0.72	0.73	(0.03)	447	445
Married	1.00	1.01	(0.03)	445	443
Age	47.3	47.8	(0.63)	446	447
Gender	0.06	0.07	(0.02)	446	445
Declared campaign cost	182,615	197,911	(23,925)	448	448
President's party (PT)	0.07	0.09	(0.02)	448	448
President's Coalition	0.48	0.49	(0.04)	448	448
Ran for Mayor in 2008	0.70	0.53	(0.03)***	448	448
Ran in 2008(mayor, ver., d-m)	0.71	0.67	(0.03)	448	448
Party Switch in 2008	0.28	0.34	(0.03)*	319	302
Diff in Vote(%) 04-08	4.80	-0.20	(1.46)***	313	237
Prob(win 08| running)	0.59	0.50	(0.05)*	313	237

Note: This sample comprises 896 politicians who participated in the 2000 mayoral election and either won or were the runner up. The sample consists of 488 municipalities where a two-year term limit for mayors was not binding. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

The results in row 9 and 10 are similar to those for the 1996-2000 cycle. Incum-

bents are more likely to run for mayor, but runners-up are as likely to run again in the next local election as incumbents. The difference is that runners-up are more likely to run for either local council or as deputy-mayor. In the 1996-2000 cycle around 60% of candidates for mayors in close elections chose to run again. In the 2004-2008 cycle this average is higher: 70%. The result in row 11 is similar to all other electoral cycles: runners-up are slightly more likely to switch parties (conditional on running) than incumbents.

There is a stark difference between the results in rows 12 and 13 in Table 5 and the results in the previous electoral cycles. In the 2004-2008 electoral cycle, conditional on running, incumbents increase their votes share whereas the runners-up see little change in theirs. Moreover, the probability of winning conditional on running is higher for incumbents than for runners-up.

In Table 6 we can see that the incumbency advantage is found in every type of race. In particular, there is an incumbency advantage even in the races where the incumbent mayor belonged to the opposition and the runner-up belonged to a party in the presidential ruling coalition led by the PT (row 3). The presidential coalition led by the PT included the following parties: PMDB, PT, PSB, PDT, PL, PTB, PV, and PC do B.

The mechanism suggested by Brollo and Nannicini (2010), which looks like a good candidate to explain the results in the 2000-2004 electoral cycle, seems to have little effect in the 2004-2008 electoral cycle. This may not be surprising as the mayors elected in 2004 were already under a federal government led by the PT. Their candidacy and vote share in 2004 were conditional on the President being Lula from the PT.

Two other potential mechanisms to explain the incumbency advantage found in the 2004-2008 electoral cycle may be Lula's high popularity and/or the highest level

Table 6: Winners and runners-up from the 2004 election - 2% window - local averages

	Proportion elected in 2004		Test Diff=0	sample size	
Sample restriction	winner	runner-up	SE	winner	runner-up
Winner and runner-up in President's coalition	0.44	0.19	(0.08)***	86	86
Winner in coalition Runner-up not in coalition	0.43	0.27	(0.07)**	130	130
Winner not coalition Runner-up in coalition	0.41	0.28	(0.07)*	133	133

Note: This sample comprises 976 politicians who participated in the 2004 mayoral election and either won or were the runner up. Row 1 restricts the sample to the 86 municipalities where both the winner and the runner-up in the 2004 election were from parties belonging to the President's ruling coalition: PT, PMDB, PSB, PDT, PL, PTB, PV, PC do B. Row 2 restricts the sample to the 130 municipalities where the winner in the 2004 election was from parties in the coalition and the runner-up was from parties in the opposition. Row 3 restricts the sample to 133 municipalities where the winner was not from a party in the President's coalition and the runner-up was from a party in the President's coalition. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

of economic growth since the 70's. Economic growth has not only an impact on job creation and other direct effects, but also on tax revenues. And as the tax revenue grows, so does the amount that is transferred to municipalities from the central government. Most of the transferred amount is constitutionally mandated as a share of total revenues. So mayors that serve through a period on increasing national tax revenues will see their budget increase regardless of the policies they implement at the municipality level. The evidence in Sakurai and Menezes-Filho (2008), supports this interpretation. Their findings suggest that mayors who spend more during their term in office increase their probability of reelection.

DISCUSSION

Brazilian mayors have little power to raise revenue on their own (on average 5%

of revenues are locally raised). The largest share of the municipal budget is made of federal transfers (65% on average). The constitution mandates that a share of national revenue be transferred to municipalities. If the economy grows nationally all municipalities benefit from higher transfers. The results I presented here suggest that the ability of mayors to be reelected depends on how the Brazilian economy fares (as suggested by the results for the 2004-2008 electoral cycle), and on how mayors are connected to the central government (as suggested by the results in the 2000-2004 electoral cycle). The evidence in Ames (1994) suggests that mayors are able to influence the presidential vote in their municipality. One would only expect that the central government would try and influence local politics as well.

Other potential mechanisms that may explain incumbency effects on reelection probabilities are popularity coattail effects, the funneling of state funds for electoral purposes, media control (see Boas and Hidalgo (2011)), and so on. Identifying what other mechanisms have an impact on incumbency effects is an important avenue for future research.

The results presented here are also a contribution to the study of political careers in Brazil. We've seen that no more than 4% of candidates for mayors go on to a state or federal office. We've also seen that around 60 to 70% of politicians who run for mayor will be present in the next local election whether they win or lose. Those who become mayors will run for reelection, those that lost may either run for mayor again, or for the local council, or as deputy-mayor. Finally, we've seen that around 30% of politicians who run for mayor again switch parties before the next local elections. Candidates who become mayors are slightly less likely to switch than runners-up.

The best summary for the results regarding the 1996-2000 electoral cycle is that close elections are close elections. Mayors have little direct control over the size of

their budget. The same President and coalition stayed in power. The President was moderately popular and governed during a period of moderate economic growth. Without major changes at the federal level between 1996 and 2000 it is only normal to expect that both incumbents and runners-up in close elections in 1996 would have similar chances of being elected in 2000.

During the 2000-2004 electoral cycle there is a major political change. The PSDB loses the presidency to the PT. President Lula takes power in January 2003. This political change may explain the incumbency disadvantage in municipalities where the incumbent belonged to the opposition (a party in the PSDB coalition) and the runner-up belonged to the PT coalition that came to power in 2002. A possible mechanism through which the central government may have been able to influence the 2004 local elections was proposed by Brollo and Nannicini (2010). Their results suggest that the central government is able to starve of funds the municipalities that are held by mayors who belong to the opposition. Our results for the 2000-2004 electoral cycle support this interpretation because we only observe an incumbency disadvantage in the municipalities where the incumbents belonged to the opposition and the runners-up belonged to the presidential coalition. We observe no incumbency advantage in the sample of municipalities where the incumbents belonged to the presidential coalition and the runners-up belonged to the opposition.

In the 2004 and 2008 cycle there is a clear incumbency advantage throughout, even where the incumbent belonged to the opposition and the runner-up belonged to the ruling coalition. The mechanism of starving of funds the municipalities in the hands of the opposition seems to have little effect in the 2004-2008 electoral cycle. A possible mechanism to explain the incumbency advantage in 2008 was the rapid economic growth during the period coupled with its effect of increasing central government revenue, which automatically increases central government transfers to

all municipalities.

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A APPENDIX

Table 7: Winners and runners-up from the 1996 election - Summary Statistics - All sample

	mean		Test Diff=0	sample size	
	winner	runner-up	SE	winner	runner-up
Elected Mayor in 2000	0.36	0.15	(0.01)***	5374	5221
Education	0.63	0.61	(0.01)*	3637	3517
Married	0.98	0.99	(0.01)	3621	3500
Age	46.3	46.8	(0.20)**	4762	4439
Gender	0.05	0.06	(0.00)**	3651	3533
President's party(PSDB)	0.17	0.14	(0.01)***	5374	5221
President's Coalition	0.78	0.76	(0.01)**	5374	5221
Ran for Mayor in 2000	0.64	0.30	(0.01)***	5374	5221
Ran in 2000(mayor, ver., d-m)	0.64	0.50	(0.01)***	5374	5221
Won 98-02-06 (state or national)	0.03	0.03	(0.00)	5374	5221
Party Switch in 2000	0.29	0.37	(0.01)***	3431	2616
Diff in Vote(%) 00-96	-4.61	3.60	(0.45)***	3402	1576
Prob(win 00| running)	0.58	0.49	(0.02)***	3402	1576

Note: This sample comprises 10598 politicians who participated in the 1996 mayoral election and either won or were the runner up. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 8: Election probabilities regressed on vote share - 1996-2000 - Polynomials

Method	Jump at 50%	SE
3-degree polynomials	0.01	(0.02)
4-degree polynomials	-0.00	(0.03)
5-degree polynomials	-0.01	(0.03)
6-degree polynomials	-0.00	(0.04)

Note: This sample comprises 10430 politicians who participated in the 1996 mayoral election and either won or were the runner up. The dependent variable takes value 1 if the politician ran for reelection in 2000 and won, and takes the value 0 if the politician did not run or ran and lost in the 2000 election. The forcing variable is *Vote margin* - the difference of votes in percentage terms between the winner and the runner up. The discontinuity is estimated at *Vote margin* = 0. Row 1 shows the results for a 3-degree polynomial on each side of the cutoff. Row 2 to 4 shows the results for a 4-degree polynomial, a 5-degree polynomial, and a 6 degree polynomial respectively. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 9: Balance test for Mayors elected in 1996 - Polynomial (4)

Method	Jump at 50%	SE	No. Observations
Elected Mayor in 2000	-0.00	(0.03)	10444
Education	0.02	(0.03)	7046
Married	0.03	(0.03)	7014
Age	-0.24	(0.57)	9075
Gender	0.03	(0.01)**	7076
President's party(PSDB)	0.01	(0.02)	10444
President's Coalition	0.00	(0.02)	10444
Ran for Mayor in 2000	0.15	(0.03)***	10444
Ran in 2000(mayor, ver., d-m)	0.00	(0.03)	10444
Won 98-02-06 (state or national)	-0.01	(0.01)	10444
Party Switch in 2000	-0.08	(0.03)**	5984
Diff in Vote(%) 00-96	-1.42	(1.15)	4915
Prob(win 00| running)	-0.14	(0.05)***	4915

Note: This sample comprises 10444 politicians who participated in the 1996 mayoral election and either won or were the runner up. The forcing variable is *Vote margin* - the difference of votes in percentage terms between the winner and the runner up. The discontinuity is estimated at *Vote margin* = 0 with a 4-degree polynomial on each side of the cutoff. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 10: Winners and runners-up from the 1996 election - 5% window

	mean		Test Diff=0	sample size	
	winner	runner-up	SE	winner	runner-up
Elected Mayor in 2000	0.31	0.24	(0.02)***	1345	1345
Education	0.63	0.61	(0.02)	945	943
Married	0.99	0.97	(0.02)	940	939
Age	45.4	45.8	(0.46)	945	946
Gender	0.05	0.04	(0.01)	948	949
President's party(PSDB)	0.16	0.13	(0.01)*	1345	1345
President's Coalition	0.76	0.76	(0.02)	1345	1345
Ran for Mayor in 2000	0.63	0.42	(0.02)***	1345	1345
Ran in 2000(mayor, ver., d-m)	0.63	0.58	(0.02)***	1345	1345
Won 98-02-06 (state or national)	0.03	0.03	(0.01)	1345	1345
Party Switch in 2000	0.27	0.35	(0.02)***	848	782
Diff in Vote(%) 00-96	-0.00	2.47	(0.76)***	837	567
Prob(win 00| running)	0.49	0.57	(0.03)**	837	567

Note: This sample comprises 2690 politicians who participated in the 1996 mayoral election and either won or were the runner up. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 11: Winners and runners-up from the 2000 election - Summary Statistics- All sample

	mean		Test Diff=0	sample size	
	winner	runner-up	SE	winner	runner-up
Elected Mayor in 2004	0.38	0.21	(0.01)***	3553	3482
Education	0.69	0.69	(0.01)	3517	3437
Married	1.02	1.03	(0.01)	3536	3451
Age	47.3	48.3	(0.22)***	3551	3480
Gender	0.06	0.07	(0.01)*	3552	3481
President's party 2000(PSDB)	0.16	0.15	(0.01)	3553	3482
President's Coalition 2000	0.78	0.78	(0.01)	3553	3482
Ran for Mayor in 2004	0.67	0.43	(0.01)***	3553	3482
Ran in 2004(mayor, ver., d-m)	0.67	0.57	(0.01)***	3553	3482
Won 02-06 (state or national)	0.01	0.02	(0.00)***	3553	3482
Party Switch in 2004	0.31	0.44	(0.01)***	2381	1992
Diff in Vote(%) 04-00	-5.71	3.48	(0.48)***	2335	1468
Prob(win 04| running)	0.58	0.49	(0.06)**	2335	1470

Note: This sample comprises 7,035 politicians who participated in the 2000 mayoral election and either won or were the runner up. The sample consists of municipalities where a two-year term limit for mayors was not binding. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 12: Election probabilities regressed on vote share - 2000-2004 - Polynomials

Method	Jump at 50%	SE
3-degree polynomials	-0.08	(0.03)**
4-degree polynomials	-0.09	(0.04)**
5-degree polynomials	-0.09	(0.04)**
6-degree polynomials	-0.08	(0.05)*

Note: This sample comprises 6964 politicians who participated in the 2000 mayoral election and either won or were the runner up. This samples does not include municipalities where the incumbent Mayor in 2004 faced a two-term limit. The dependent variable takes value 1 if the politician ran for reelection in 2004 and won, and takes the value 0 if the politician did not run or ran and lost in the 2004 election. The forcing variable is *Vote margin* - the difference of votes in percentage terms between the winner and the runner up. The discontinuity is estimated at *Vote margin* = 0. Row 1 shows the results for a 3-degree polynomial on each side of the cutoff. Row 2 to 4 shows the results for a 4-degree polynomial, a 5-degree polynomial, and a 6 degree polynomial respectively. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 13: Balance test for Mayors elected in 2000 - Polynomial (4)

Method	Jump at 50%	SE	No. Observations
Elected Mayor in 2004	-0.09	(0.04)**	6964
Education	-0.02	(0.03)	6884
Married	0.04	(0.03)	6916
Age	1.46	(0.64)**	6960
Gender	0.00	(0.02)	6962
Presidents's party 2000(PSDB)	-0.03	(0.03)	6964
Presidents's Coalition in 2000	-0.03	(0.03)	6964
Ran for Mayor in 2004	0.03	(0.03)	6964
Ran in 2004(mayor, ver., d-m)	-0.05	(0.03)	6964
Won 02-06 (state or national)	-0.03	(0.01)***	6964
Party Switch in 2004	-0.07	(0.04)*	4328
Diff in Vote(%) 04-00	-2.48	(1.16)**	3759
Prob(win 04| running)	-0.18	(0.05)***	3761

Note: This sample comprises 6964 politicians who participated in the 2000 mayoral election and either won or were the runner up. This samples does not include municipalities where the incumbent Mayor in 2004 faced a two-term limit. The forcing variable is *Vote margin* - the difference of votes in percentage terms between the winner and the runner up. The discontinuity is estimated at *Vote margin* = 0 with a 4-degree polynomial on each side of the cutoff. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 14: Winners and runners-up from the 2000 election - 5% window - local averages

	Proportion elected in 2004		Test Diff=0	sample size	
Sample restriction	winner	runner-up	SE	winner	runner-up
Winner and runner-up in 2000 PSDB coalition	0.30	0.31	(0.03)	546	546
Winner in coalition Runner-up not in coalition	0.28	0.40	(0.06)*	161	161
Winner not in coalition Runner-up in coalition	0.33	0.31	(0.06)	185	185

Note: This sample comprises 770 politicians who participated in the 2000 mayoral election and either won or were the runner up. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.Row 1 restricts the sample to the 229 municipalities where both the winner and the runner-up in the 2000 election were from parties belonging to the President's ruling coalition: PMDB, PFL, PSDB, PP, PTB, or PPS. Row 2 restricts the sample to the 66 municipalities where the winner in the 2000 election was from parties in the coalition and the runner-up was from opposition parties. Row 3 restricts the sample to 83 municipalities where the runner-up in the 2000 election was from a party in the President's ruling coalition but the winner was not.

Table 15: Winners and runners-up from the 2004 election - Summary Statistics - All sample

	mean		Test Diff=0	sample size	
	winner	runner-up	SE	winner	runner-up
Elected Mayor in 2008	0.51	0.13	(0.01)***	4128	4042
Education	0.74	0.72	(0.01)***	4094	4001
Married	0.99	1.01	(0.01)	4093	4012
Age	46.4	47.8	(0.21)***	4093	4123
Gender	0.08	0.10	(0.01)***	4099	4019
Declared campaign cost	202,566	193,342	(9,867)	4128	4042
President's party (PT)	0.08	0.08	(0.01)	4128	4042
President's Coalition	0.52	0.52	(0.01)	4128	4042
Ran for Mayor in 2008	0.76	0.34	(0.01)***	4128	4042
Ran in 2008(mayor, ver., v-m)	0.76	0.53	(0.01)***	4128	4042
Party Switch in 2008	0.31	0.39	(0.01)***	3149	2153
Diff in Vote(%) 04-08	-0.74	0.15	(0.60)***	3125	1353
Prob(win 08| running)	0.67	0.40	(0.01)***	3122	1352

Note: This sample comprises 8,170 politicians who participated in the 2000 mayoral election and either won or were the runner up. The sample consists of municipalities where a two-year term limit for mayors was not binding. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 16: Election probabilities regressed on vote share - 2004-2008 - Polynomials

Method	Jump at 50%	SE
3-degree polynomials	0.13	(0.03)***
4-degree polynomials	0.10	(0.03)***
5-degree polynomials	0.09	(0.04)**
6-degree polynomials	0.08	(0.04)*

Note: This sample comprises 8092 politicians who participated in the 2004 mayoral election and either won or were the runner up. This samples does not include municipalities where the incumbent Mayor faced a two-term limit in 2008 . The dependent variable takes value 1 if the politician ran for reelection in 2008 and won, and takes the value 0 if the politician did not run or ran and lost in the 2008 election. The forcing variable is *Vote margin* - the difference of votes in percentage terms between the winner and the runner up. The discontinuity is estimated at *Vote margin* = 0. Row 1 shows the results for a 3-degree polynomial on each side of the cutoff. Row 2 to 4 shows the results for a 4-degree polynomial, a 5-degree polynomial, and a 6 degree polynomial respectively. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.

Table 17: Balance test for Mayors elected in 2004 - Polynomial (4)

Method	Jump at 50%	SE	No. Observations
Elected Mayor in 2008	0.10	(0.03)***	8092
Education	0.00	(0.02)	8017
Married	-0.15	(0.03)	8027
Age	0.28	(0.56)	8084
Gender	0.00	(0.02)	8040
Declared campaign cost	-7,430	(23,510)	8092
President's Party (PT)	0.01	(0.02)	8092
President's Coalition	-0.01	(0.03)	8092
Ran for Mayor in 2008	0.17	(0.03)***	8092
Ran in 2008(mayor, ver., d-m)	0.04	(0.03)	8092
Party Switch in 2008	-0.06	(0.03)*	5243
Diff in Vote(%) 04-08	3.06	(1.40)**	4420
Prob(win 08| running)	-0.00	(0.05)	4416

Note: Total sample 8090; This sample comprises 8092 politicians who participated in the 2004 mayoral election and either won or were the runner up. This samples does not include municipalities where the incumbent Mayor faced a two-term limit in 2008. The forcing variable is *Vote margin* - the difference of votes in percentage terms between the winner and the runner up. The discontinuity is estimated at *Vote margin* $= 0$ with a 4-degree polynomial on each side of the cutoff. Standard errors are clustered at the municipality level. Standard errors are clustered at the municipality level. $^{*}p \leq .10$, $^{**}p \leq .05$, $^{***}p \leq .01$.