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**Evaluating the 58th Amendment: City Council Seats & Political
Representation in Brazil's Municipalities**

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Resumo do trabalho:

Este trabalho avalia os impactos da Emenda Constitucional Nº 58 na Competição e Representação Política nos municípios Brasileiros. A Emenda, publicada em 2009, produziu um aumento considerável no número de vagas para vereadores nas câmaras municipais. Depois de uma exposição sobre a história da Emenda, os objetivos ostensivos da Emenda são avaliados usando os métodos de econometrics. Resultados preliminares indicam que a Emenda foi eficaz em trazer mais candidatos ao processo político, mas não demonstrou se os novos candidatos servem populações marginais. As vagas adicionais criaram aumento no número de partidos nos governos municipais e aumentou a inclusão de candidatos com menos escolaridade. Porém, a Emenda não parece ter ajudado muito as candidatas mulheres ou os que tem um nível de bens inferior.

This paper evaluates the impacts that Brazil's 58th Amendment had on municipal political competition and representation. The Amendment, passed in 2009, provided for a dramatic increase in the number of seats in municipal legislatures. After discussing the history of the Amendment, the congressional record is reviewed and Parliamentary claims regarding political representation are evaluated using econometric methods. Preliminary results indicate that the Amendment was effective in bringing more candidates into the political process, but there is still a question of whether the new candidates serve underrepresented populations. The additional seat availability increases the number of parties in government and increases inclusion of candidates with significantly lower educational attainment. However, it does not seem to increase female representation nor the participation of low-asset candidates.

Palavras-chave: representation, political competition, party politics, electoral rules, district magnitude, local government, program evaluation, econometrics, city council

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Introduction

Scholarship on representation in the Brazilian House of Deputies has consistently identified party fragmentation as a salient feature of the House that handicaps good legislation. At the same time, public discourse and policy have placed diversification of individual legislators high on the agenda². One institutional feature that is thought to affect both goals is the district magnitude, or the number of legislative seats in a district.

The institutional rules of municipal legislatures in Brazil are strikingly similar to the rules used at the national level. In 2009, a constitutional amendment was passed that enables the study of how a change in district magnitude affects party fragmentation and descriptive representation in the municipalities. This paper discusses the history of the 58th amendment and evaluates its effects.

The results indicate that the amendment enlarged the number of parties in municipal governments, and it dramatically increased the number of candidates participating in elections. A change in seats is estimated to cause a minor drop in the average education level of the candidate pool, a small *increase* in the wealth of losing (but not winning) candidates, and a very small increase in the proportion of women elected.

History of the 58th Amendment

The number of city council seats has varied significantly over time from 1988 to 2012, with large change episodes occurring in 2004 and in 2012. Figure 1 shows this pattern in Brazil's roughly 5,500 municipalities, as well as how the number of seats in each municipality are related to population. The large changes are evident with municipalities losing seats between 2000 and 2004, maintaining the same number of seats from 2004 to 2008, and then a large increase in seats in 2012. These large fluctuations were the results of deliberate policy changes over the past 15 years, the details of which are explained in this section.

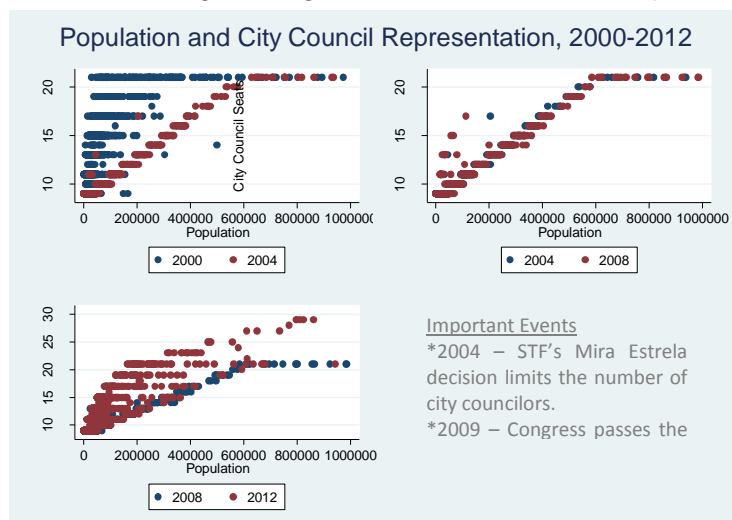


Figure 1: Population and City Council Seats, 2000 - 2012

² Attributes discussed include class (Mendonça, 2014), and gender (TSE adverts in the 2014 cycle)

The 1988 Constitution established a permissible range for the size of city councils.

Article 29, IV declared:

Art 29. IV – Number of City Councilors proportional to the population of the Municipality, observing the following limits

- a) A minimum of 9 and maximum of 21 in Municipalities with up to one million inhabitants*
- b) A minimum of 30 and maximum of 41 in Municipalities with more than one million and less than five million inhabitants*
- c) A minimum of 42 and a maximum of 55 in Municipalities with more than five million inhabitants.*

Municipalities found the language of “proportionality” sufficiently vague, and a controversy surrounding the exact meaning of the word eventually emerged. Throughout the 1990s and until 2002, “it was the Electoral Court’s (TSE) understanding that that Constitution did not establish arithmetic criteria for the calculation of the proportionality, leaving the Municipality with the autonomy to set it, as long as it complied with the limits in Article 29, part IV.³” This approach resulted in a situation where the number of council seats bore little relationship to population. Some municipalities had too few seats given their population (e.g. Sumaré with 13 seats for 168,000 people), and some municipalities had too many seats (e.g. São Manuel with 21 seats for 38,000 people). This all changed in May 2004 with the Supreme Court’s ruling in the Mira Estrela case.

Mira Estrela is a tiny municipality of three thousand inhabitants in the northwest of São Paulo state. It had established the size of its city council at 11 seats through an Organic Law, using the procedure laid out by the constitution. The choice of 11 seats was not well received by São Paulo’s Public Ministry, who interpreted the law to be unconstitutional. It argued that such a small municipality should have nine seats to meet the “proportionality” standard in Art 29, Part IV of the constitution. It sued Mira Estrela, and the case eventually ended up in the Supreme Court (STF). The lead Justice assigned to the Mira Estrela case was Maurício Corrêa. Justice Corrêa and the majority of his colleagues ruled that the concept of proportionality was “empty” without an established arithmetic rule, and they directed the TSE to implement one for the September 2004 municipal elections. In their decision, they defined a rule using the following reasoning: From the fact that municipalities with one million have 21 representatives, this implies one representative per 47,619 inhabitants. But since the 1988 constitution requires at least 9 representatives per municipality, apply this number to any municipalities with fewer than 47,619 inhabitants, and add one more representative for each increment of 47,619 people. This formula generates a piecewise representation profile that rises quickly to the maximum of 21, and then flattens out at

³ Page 378 of Recurso Extraordinário 197.917-8 São Paulo, Voto do Relator Ministro Maurício Corrêa

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$47,619 + (11 \times 47,619) = 571,428$ inhabitants until 1 million inhabitants. Municipalities above one million, of which there are fewer than ten, receive a slightly different treatment. After 16 years of confusion, the Mira Estrela case finally established clear guidance on the number of seats in the municipal legislature.

The practical result of the Mira Estrela case was a sizeable reduction in the number of city council seats from around 60,000 to 50,000 in the entire country. Perhaps predictably, it also engendered angry responses from the political establishment. Many politicians felt that their legislative powers had been usurped by an activist Supreme Court, and an amendment was immediately introduced to reestablish the number of municipal legislature seats. The amendment took several years to work its way through the process and was ratified as the 58th Amendment on September 23 of 2009.

The 58th amendment is composed of three articles. The first article modified Article 29, Part IV of the 1988 constitution, dramatically increasing the maximum permissible number of representatives above what had been the Mira Estrela rule. This section clarified the number of maximum permissible representatives for 23 separate population segments, maintaining the Constitution's intention of proportionality to population. The language for municipalities with up to 1,050,000 inhabitants was as follows:

Art. 29, IV: For the Composition of Municipal Legislatures, the following limits will be observed:

- a) 9 councilors, in municipalities up until 15,000 inhabitants;*
- b) 11 councilors, in municipalities of more than 15,000 and up until 30,000 inhabitants;*
- c) 13 councilors, in municipalities of more than 30,000 and up until 50,000 inhabitants;*
- d) 15 councilors, in municipalities of more than 50,000 and up until 80,000 inhabitants;*
- e) 17 councilors, in municipalities of more than 80,000 and up until 120,000 inhabitants;*
- f) 19 councilors, in municipalities of more than 120,000 and up until 160,000 inhabitants;*
- g) 21 councilors, in municipalities of more than 160,000 and up until 300,000 inhabitants;*
- h) 23 councilors, in municipalities of more than 300,000 and up until 450,000 inhabitants;*
- i) 25 councilors, in municipalities of more than 450,000 and up until 600,000 inhabitants;*
- j) 27 councilors, in municipalities of more than 600,000 and up until 750,000 inhabitants;*
- k) 29 councilors, in municipalities of more than 750,000 and up until 900,000 inhabitants;*
- l) 31 councilors, in municipalities of more than 900,000 and up until 1,500,000 inhabitants;*

The differences between the Mira Estrela Formula and the EC58 formula are shown in Figure 2⁴.

⁴ Neither the Mira Estrela rule, nor the EC58 formula are continuous, but they are presented that way here for illustration.

The Amendment's second article tightened legislative budget caps, which were added to the constitution in 2000 as Article 29-A. The original language of the 58th Amendment's second article severely reduced the legislative budget ceiling (i.e. in half) for many municipalities. It was passed in the first round of

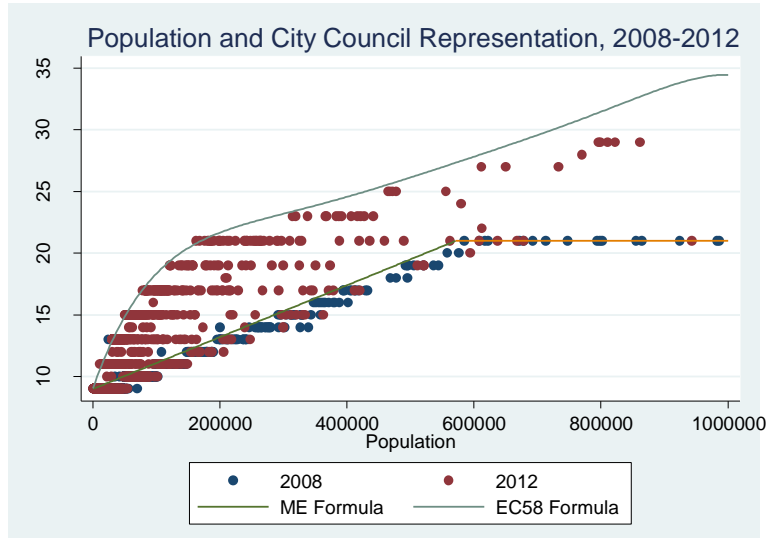


Figure 2: Population and Seats, 2008 - 2012, with Maximum Seat Formulas

voting by the House of Representatives and by the Senate, but the Senate eventually passed the current, less restrictive, budget ceiling as a side-Amendment and the House adopted it in the final voting⁵.

The third article made the 58th Amendment (passed in September of 2009) retroactive to the 2008 municipal elections. This provision added to the already significant acrimony between the Legislative and Judiciary branches. Were the law to be applied retroactively, it would alter the electoral formulas. It would vacate the seats of some legislators who had already been acting for 9 months, and it would install many unsuccessful candidates that had already been declared alternates. In short, the law would precipitate a sizeable mid-term shuffling of the city councils. To forestall such instability, the Attorney General (Procurador da República), and the National Bar Association (OAB) initiated a determination of constitutionality for the third article in the 58th Amendment. Their argument was based on the fact that the 58th amendment conflicted with Article 16 of the original constitution from 1988, which stipulates that, "Any law that alters the electoral process may only enter into force one year after its publication." Legislators argued that increasing the number of seats was not the same as altering the electoral process, but the Supreme Court found the retroactivity clause to be unconstitutional, and placed an injunction on municipalities seating additional councilors until 2013. Article 1 of the 58th Amendment thereby entered into force with the 2012 municipal elections, while Article 2 became valid as of January 1, 2010.

⁵ The effects of this article are addressed in a separate research paper.

Inclusion of Parties in Government

“Cities that today have 9 councilors, in our original proposal, were cut to 7 councilors. But in discussion with our colleagues, we came to the conclusion that the proposal would not pass. Why? We know that many congressmen advocate for more representation, saying what? When we talk about a maximum of 7 councilors, that would restrict the number of parties to 2 or perhaps 3.”

-Mr. Vitor Penido, Federal Deputy & Co-Sponsor of PEC 333

During debate of the Amendment on May 28, 2008 (p 23021)

“It’s an illusion to say that going from 7 to 9 councilors in the smallest cities is going to increase the number of parties. We have weak mechanisms of representative democracy in this country, because we haven’t made the necessary political reforms, so clientelism and abuse of economic power in elections continue.”

-Mr. Chico Alencar, Federal Deputy

During debate of the Amendment on May 28, 2008 (p 23037)

Mr. Penido’s and Mr. Alencar’s comments touch on a popular theme in Political Science over the last half century: how the electoral rules, and especially the number of seats in a district (district magnitude), restrict the number of viable parties in that district. In the case of Brazilian municipalities, there is only one district, so the number of seats in the legislature is equal to the district magnitude. The political science literature finds a strong relationship between district magnitude and the number of parties in a district. Early formulation of this idea focused on the tendency of single member districts to have a two party system (Duverger, 1963), and later work generalized the relation to multi-seat districts (Cox, 1997). The literature specifies two possible causal connections between the district magnitude and the number of viable parties. The “mechanical” effect results from the fact that electoral rules spread seats to more parties as the district magnitude increases. The “psychological effect,” occurs as a result of strategic behavior by political elites and voters, who invest their resources in their preferred candidates who are “on the bubble” in order to avoid wasting votes. A smaller number of available seats in a district incentivizes elites and voters to concentrate their resources among a smaller number of “electable” candidates.

The size of the mechanical and psychological effects are thought to diminish at an increasing rate as district magnitude rises (Taagepera & Shugart, 1989)(Cox, 1997). This is why Duverger’s law is so evident in single member districts. At magnitudes greater than five, the psychological effect should be severely inhibited, since elites and voters often don’t have the information required to know who is on the bubble, and where they should concentrate their resources. Given that the district magnitude in Brazilian Municipal Legislatures is a minimum of nine seats, it’s possible that the Duverger effect might not even exist in City Council elections⁶.

⁶ Future: I would like to estimate the size of the separate effects

Furthermore, while Mr. Penido’s statement is similar to “Duverger’s hypothesis,” it is not the same thing. Duverger’s hypothesis is a relation between the district magnitude (or number of seats in a single district) and the number of viable parties. The relationship that Mr. Penido invokes is between the number of seats and the number of *elected* parties. Between this fact, and diminishing marginal effect of district magnitude, it’s worthwhile to evaluate whether we see a Duverger-like relationship in Brazilian Municipal Legislatures. To do this, the evaluation focuses on how the policy affects the number of parties in government. To be more precise, how the number of seats affects the number of parties that have a member elected to at least one seat in the municipal legislature.

The question of whether more parties in government is good or bad has been the basis of a considerable debate in political science (Powell, 2000)(Riker, 1982). One school of thought, the “Proportional Representation advocates,” sees the inclusion of most politically relevant parties in government as necessary to accommodate their views in legislation. Another school, “majoritarians,” points to the political deadlock that emerges from including too many disparate views in the legislative process. While the research presented here does not make a judgment in favor of or against either position, the debate with respect to Brazilian municipal legislatures is informed by the fundamental fact of whether the number of parties in government was (or was not) affected by the amendment, which is an empirical relationship.

Descriptive Relationship

An examination of the bivariate relationship in Figure 3 between the number of seats and the number of parties in government is informative. The first notable fact is that there is clearly a positive relationship between seats and number of parties. By comparing the 2008 plot to the 2012 plot, we are able to see that there was a significant increase in seats (some of the density has moved to the right), and that many (but not all) municipalities moved to an odd number of seats per the 2009 amendment.

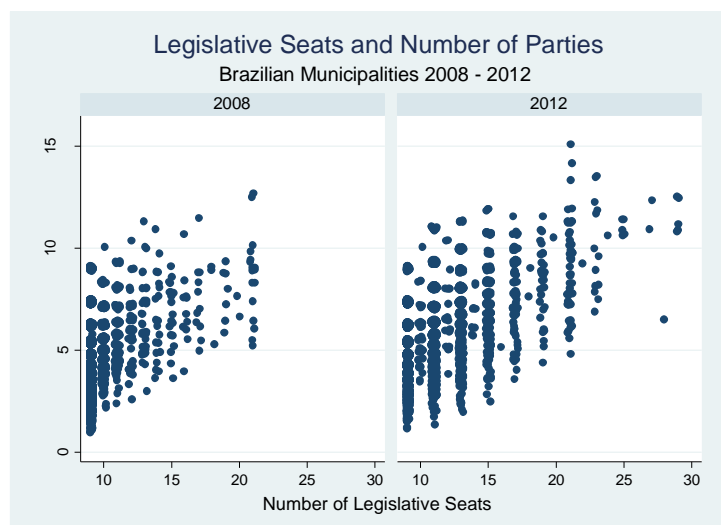


Figure 3: Legislative Seats and Number of Parties

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A bivariate relationship is not evidence of a causal relationship between seats and number of parties. For that, we examine the question using a research design combined with a multivariate model⁷.

Model and Estimation

The number of parties elected to government in a municipality may be a function of the size of the legislature, but it also might be a function of the municipal population, which is closely correlated with legislature size. Accordingly, it will be necessary to try to separate these effects. Additionally, more parties might be expected to participate and succeed in municipalities with higher budgetary resources that can be disbursed to constituents. One might imagine that there are unobservable factors in municipalities that are fairly stable over our study period (i.e. 4 years), such as the past party history within the municipality. Finally, there might be a trend of increasing or decreasing municipal party concentration. Given these factors, a model to estimate the number of parties in municipal government is:

$$P_{mt} = \sum_{k=0}^K \gamma_k \text{Seats}_{mt} \text{Pop}_{mt}^k + \mathbf{X}_{mt} \boldsymbol{\beta} + \delta_t + \alpha_m + u_{mt} \quad (1-1)$$

Observations are indexed by municipality, m , and election year t . The effect of Seats is allowed to vary with population in a flexible manner by using a polynomial of order K . Control variables included in \mathbf{X}_{mt} are the Number of Parties Participating in the Election, all the population terms ($\sum_{k=1}^K \pi_k \text{Pop}_{mt}^k$). Municipal Budgetary Resource may also be included in \mathbf{X}_{mt} . α_m contains slowly changing municipal-level variables (i.e. political culture, party relationships, demographics). δ_t captures the nationwide trend in the number of parties competing.

To estimate equation 1-1, various formulations are possible. A baseline estimate selects $K=0$ so that there are no interactions between seats and population. Another estimate chooses $K=3$ to allow the effect of seats to vary flexibly across different sized municipalities. For each of the choices of K , the municipal budgetary resource variable is included to check whether it has a significant effect.

Each of the models is estimated with municipal fixed effects to purge slow-moving heterogeneity among municipalities. Still, it is possible that the number of seats in a municipality could be associated with unobserved (time-variant) effects since the number of seats is determined by each municipal legislature. To address this concern, the baseline model is additionally estimated using an instrument for the number of seats.

⁷ See (Angrist & Pischke, 2010) for a discussion of the importance of research design in econometrics.

The instrument for seats is the constitutionally mandated maximum number of seats. In 2008, that number was based on the 2004 Mira-Estrela decision, and in 2012 it was based on the 58th Amendment, which was passed in 2009. Thus, there is significant variation in the instrument over time for many municipalities.

In the models with K=0, the marginal effect of seats is simply γ_0 , and the number of seats necessary to increase the number of elected parties by one is $\frac{1}{\gamma_0}$. In the models with K=3, one can calculate the marginal effect using the derivative of 1-1 with respect to seats:

$$\frac{\partial \text{Parties}}{\partial \text{Seats}} = \gamma_0 + \gamma_1 * \text{Pop} + \gamma_2 \text{Pop}^2 + \gamma_3 \text{Pop}^3 \quad (1-2)$$

Using equation 1-2, we can plot the effect as a function of population to determine whether the effect varies significantly across different sized municipalities.

Results

The estimated results are presented in Table 1. Equations 1, 2, 5, and 6 are estimated using K=0. Equations 5 and 6 are the IV variants of equations 1 and 2, respectively. Equations 3 and 4 are estimated with K=3. The marginal effect of seats is stable across all models. A general estimate of the effect is approximately 0.4 parties per additional seat added to the legislature. This corresponds with $1/0.4 = 2.5$ additional seats required to add one party to municipal legislature. There is evidence that municipalities with larger budgets have slightly less fractionalized legislatures. For a 10% larger budget, the number of parties in government is reduced by approximately between 3.5% and 4%⁸.

The Effect of Seats on Number of Parties in Government, 2008 - 2012						
	(1)	(2)	(3)	(4)	(5)	(6)
seats	0.386	0.381	0.397	0.401	0.395	0.401
	(29.18)	(26.47)	(15.06)	(13.56)	(27.22)	(24.23)
number of parties in election	0.126	0.126	0.126	0.126	0.125	0.124
	(15.50)	(13.46)	(15.49)	(13.43)	(16.45)	(14.09)
population	0.00275	0.00881	0.0370	0.0608	0.00120	0.00545
	(0.26)	(0.75)	(2.30)	(3.31)	(0.14)	(0.57)
population^2	-8.44E-07	-6.06E-06	-1.45E-04	-2.08E-04	3.28E-07	-3.54E-06
	(-0.07)	(-0.45)	(-2.64)	(-3.46)	(0.03)	(-0.33)
2008.year (reference)	0	0	0	0	0	0
2012.year	0.222	0.343	0.221	0.364	0.216	0.339
	(9.54)	(5.40)	(9.44)	(5.70)	(8.63)	(5.30)

⁸ Inclusion of the budget variable doesn't significantly affect the seats estimate. This isn't too surprising because budgets are mostly determined by a formula that is comprised of population and GDP, both of which are controlled for in these models.

In_munibudget		-0.345		-0.405		-0.372
		(-2.44)		(-2.83)		(-2.63)
seats*population			-5.03E-04	-7.59E-04		
			(-1.03)	(-1.47)		
seats*population^2			2.68E-06	3.83E-06		
			(1.47)	(1.96)		
seats*population^3			-2.60e-09	-3.73e-09		
			(-1.62)	(-2.14)		
population^3			1.25E-07	1.72E-07		
			(2.71)	(3.48)		
constant	0.558	6.209	-0.000979	6.284	0.522	6.576
	(2.26)	(2.65)	(-0.00)	(2.68)	(2.53)	(2.82)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Seats Instrumented	No	No	No	No	Yes	Yes
Robust SEs	Yes	Yes	Yes	Yes	Yes	Yes
N	10986	9514	10986	9514	10986	9514
Values in the table are coefficients and t-statistics.						

Table 1: The Effect of Seats on Number of Parties in Government, 2008-2012

Figure 4 plots equation 1-2, using the model where $K=3$ ⁹. The figure shows the marginal effect of an additional seat on the number of parties in government. Although the effect appears to vary a bit, we can say with confidence that it remains between 0.35 and 0.5 for municipalities under 200k inhabitants. There are fewer municipalities above 200k, so the estimates for them are less precise. In general, it appears that for most municipalities, 2 to 3 new seats is sufficient for a new party to gain access to a legislative seat.

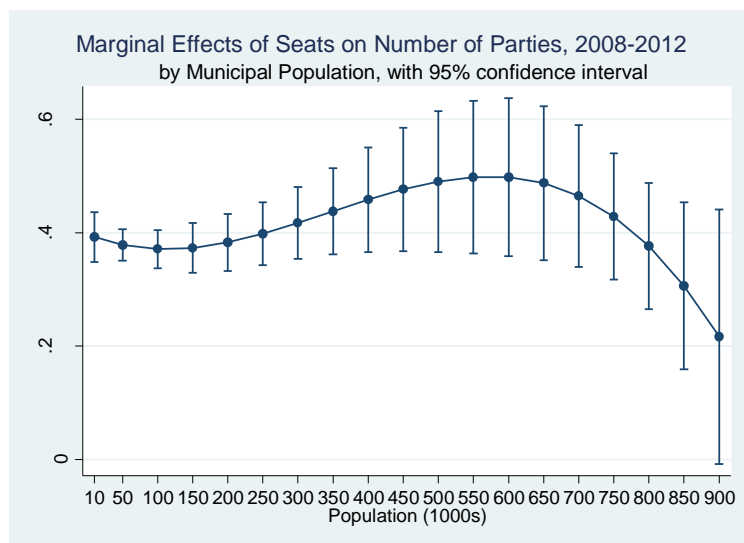


Figure 4: Marginal Effects of Seats on Number of Parties, 2008-2012

Inclusion of “Less Advantaged” Candidates

“What we must discuss, here and now, is whether this amendment creates proportional representation; if we are giving the people the right to have their representative.”

-Mr. Mário Heringer

Federal Deputy from Minas Gerais & Co-Sponsor of PEC 333/2004¹⁰

In Reference to the Text of the 58th Amendment during debate on May 28, 2008 (p 23032)

⁹ Equation 3 in the above results table.

¹⁰ The constitutional amendment project, PEC 333, eventually became the 58th Amendment.

“Many medium sized cities lost their representation [with the Mira Estrela decision]. Many neighborhoods and many social classes lost their representation. Now, upon readjusting the number of councilors, we return to equilibrium.”

-Mr. Alfredo Kaefer, Federal Deputy (PSDB-PR)

During debate of the Amendment on May 28, 2008 (p 23046)

Number of Candidates

City council elections in Brazil often feature hundreds of candidates. Figure 5 shows that there is a tight relationship, especially in recent years, between the number of seats and the number of candidates in an election. The electoral context faced by council candidates and parties takes

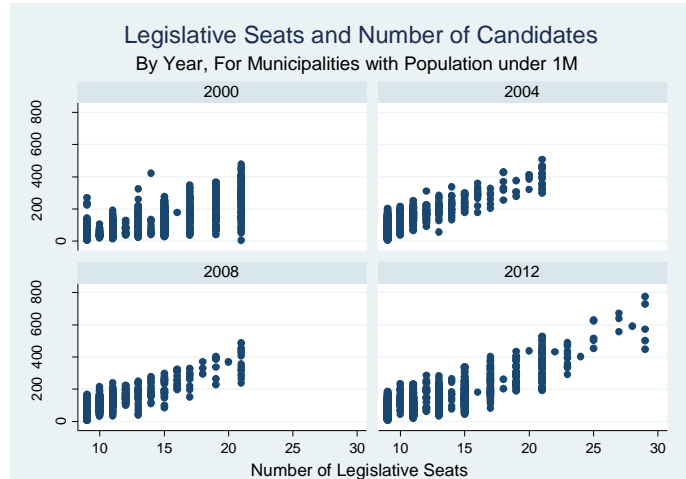


Figure 5: Legislative Seats and Number of Candidates

center stage in answering the questions posed in this paper. I examine the municipal electoral rules in Brazil, which are a primary driver of the connection between number of seats and the number of candidates.

The Electoral Rules

Brazilian municipal elections occur every four years, with the most recent contest in 2012. Mayors and Vice-Mayors run on the same ticket and city councilors run individually, but all candidates are associated with a party. There are no districts within a municipality, which means all candidates technically run “at-large.” Many council candidates, however, tend to have a geographical base of support within the municipality. Voters may choose one Mayor/Vice-Mayor ticket, and they may pick one city councilor. Alternatively, the voter may choose to vote for a party rather than an individual candidate in any of the two elections. The winner of the mayoral race is the ticket with the most votes (plurality), unless the municipality has more than 200,000 inhabitants. In that case, there is a second round run-off with the top two vote-getters from the first round.

The winners of a city council election are determined using an “open-list proportional representation” scheme, with an electoral quota and the d’Hondt formula. Seats are awarded to parties, who then assign the seats to candidates in order of the candidates’ individual vote totals. More specifically, the total number of votes credited to Party j is: $P_j = L_j + \sum_i C_{i,j}$, where L_j is the number of generic votes for Party j , and $C_{i,j}$ is the number

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of votes for candidate i in Party j . All the valid votes in the election are the sum of party votes, or $V = \sum_j^N P_j$, and S is the total number of seats available.

Seats are first awarded by “quotient” and then by “leftovers.” The electoral quotient is the number of valid votes divided by the number of seats to be awarded, or $Q_e = \frac{V}{S}$. A party quotient, Q_j , is calculated to determine the number of times a Party’s vote total has exceeded the quotient, so $Q_j = \frac{P_j}{Q_e}$. Seats are awarded to Party j based on the number of times a party’s votes obtains the electoral quotient, so that $S_j = \text{floor}(Q_j)$. If a Party wins two seats, then the two candidates in Party j with the highest and second highest number of votes ($C_{i,j}$) will assume those seats.

In the case that the quotient method doesn’t award all available seats, “leftover” seats are awarded to parties that have already obtained at least one seat by quotient. Each leftover seat is awarded based on the party that would have the highest number of votes per seat for the next awarded seat. Operationally, the seat is awarded to Party j where $\max_j \left(\frac{P_j}{S_{j+1}} \right)$. If more than one seat is available, S_j is augmented by one for the party winning the previous leftover seat, and the process continues until all seats are assigned.

Parties may also form electoral coalitions, for which they are required to register with the Electoral Court (TSE). A coalition formed for the mayoral race limits the types of coalitions that may be formed for the city council races. A city council electoral coalition may only be formed amongst parties that are allied in a mayoral coalition, so they are effectively “sub-coalitions.” Coalitions are then treated as parties in the foregoing discussion. They are awarded council seats, and then assign those seats to the highest vote-getting candidates in their coalition. It’s very common for parties to run as part of electoral coalitions. In 2008, 89.8% of municipal-parties were members of an electoral coalition, and 93.5% of municipal-parties joined an electoral coalition in 2012.

Parties and coalitions benefit from candidates who don’t have a chance of winning. Additional votes for non-viable candidates, are put into service of the party to achieve the electoral quotient. To prevent parties or coalitions from running massive lists, there is a cap on the size of the list (i.e. the number of candidates in a party). Each party is permitted to run a list that is 1.5 times the total number of seats in the legislature, so that $\max(Z) = 1.5*S$. The maximum permitted list length for a coalition is two times the number of available council seats, so that $\max(Z) = 2*S$.

Given the incentives imposed by the electoral system, one would expect that many parties/coalitions will try to maximize their electoral chances by running the maximum

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permissible number of candidates¹¹. Thus, an increase in seats will lead to a corresponding increase in candidates fielded by parties and coalitions.

Models & Estimation

Equation 2-1 is a simple relationship between seats and number of candidates, after the effect of population and population squared has been partialled out. Equation 2-2 includes interactions between population and seats to understand how the effect of a change in seats is differs across populations. Equation 2-3 attempts to understand how the effect of a change in seats interacts with the number of stand-alone parties and electoral coalitions.

$$C_{mt} = \gamma_0 \text{Seats}_{mt} + \gamma_1 \text{Pop}_{mt} + \gamma_2 \text{Pop}_{mt}^2 + \delta_t + \alpha_m + u_{mt} \quad (2-1)$$

$$C_{mt} = \sum_{k=0}^K \gamma_k \text{Seats}_{mt} * \text{Pop}_{mt}^k + \mathbf{X}_{mt}\boldsymbol{\beta} + \delta_t + \alpha_m + u_{mt} \quad (2-2)$$

$$C_{mt} = \gamma_0 \text{Seats}_{mt} + \gamma_1 \text{Seats}_{mt} * \text{SoloParties}_{mt} + \gamma_2 \text{Seats}_{mt} * \text{Coalitions}_{mt} + \mathbf{X}_{mt}\boldsymbol{\beta} + \delta_t + \alpha_m + u_{mt} \quad (2-3)$$

The controls included in \mathbf{X}_{mt} for equation 2-2 are the individual population terms, $\sum_{k=0}^K \gamma_k \text{Pop}_{mt}^k$. The controls included in \mathbf{X}_{mt} for equation 2-2 include the number of parties that are going-it-alone (soloparties), and the number of coalitions in a municipality. An additional model is also estimated including the growth rate and its square to test the notion that economic conditions influence the number of candidates standing for election.

The equations are all estimated using municipal fixed effects, α_m and a time parameter for 2012, δ_t . As discussed above, it is possible that the number of seats is endogenous because it is a policy selected by the municipality, so the model is additionally estimated using an instrument for seats on top of the municipal fixed effect. The instrument is the maximum constitutionally permissible number of seats, according to either the Mira Estrela decision (in 2008) or the 58th Amendment (in 2012). Where the equations are estimated using IV (2SLS), the first stage equations are¹²:

$$\text{Seats}_{mt} = \gamma_0 \text{Seats_IV}_{mt} + \gamma_1 \text{Pop}_{mt} + \gamma_2 \text{Pop}_{mt}^2 + \delta_t + \alpha_m + u_{mt} \quad (2-1b)$$

$$\text{Seats}_{mt} = \sum_{k=0}^K \gamma_k \text{Seats_IV}_{mt} * \text{Pop}_{mt}^k + \mathbf{X}_{mt}\boldsymbol{\beta} + \delta_t + \alpha_m + u_{mt} \quad (2-2b)$$

$$\text{Seats}_{mt} = \gamma_0 \text{Seats_IV}_{mt} + \gamma_1 \text{Seats_IV}_{mt} * \text{SoloParties}_{mt} + \gamma_2 \text{Seats_IV}_{mt} * \text{Coalitions}_{mt} + \mathbf{X}_{mt}\boldsymbol{\beta} + \delta_t + \alpha_m + u_{mt} \quad (2-3b)$$

¹¹ There are reasons to think that not all parties will follow this strategy. One reason is intra-party competition, where adding new candidates could pull votes away from incumbent party candidates. Another scenario is where a party only has only a few candidates who can achieve the quota alone.

¹² The interactions using the instrument in the first stage means that equations 2-2b and 2-3b can not be automatically estimated with commercial software. I have estimated the IV equations manually using 2SLS, and the standard errors are currently uncorrected.

Results

The estimated results for equations 2-1, 2-2, and 2-3 are presented in Table 2. The estimates are organized so that the instrumented estimate follows the non-instrumented estimate. For example, model (1) in the table below corresponds to equation 2-1, and model (2) corresponds to the instrumented version of equation 2-1.

In models (1) and (2), the effect of an additional seat, across all municipalities, is between 11 and 15 additional candidates. However, if we allow the size of the effect to vary with population, as we do in models (3) and (4), we see considerable variation in the effect size. Model (3) estimates that the marginal effect of seats as a function of population equals: $4.115 + 0.0752 * \text{Pop} - 4.82E-05 * \text{Pop}^2$. Figure 6 charts the effect for municipal populations less than 1 million. The effect is approximately 8 new candidates per seat for municipalities of 50 thousand people, 12 new candidates in municipalities of 100k, and 21 new candidates per seat in municipalities of 300k.

Models (5)-(8) attempt to test the hypothesis that the number of candidates varies closely with number of seats because of the electoral rules described above. If parties or coalitions are already running the maximum size list, then an expansion of seats should also expand the number of candidates

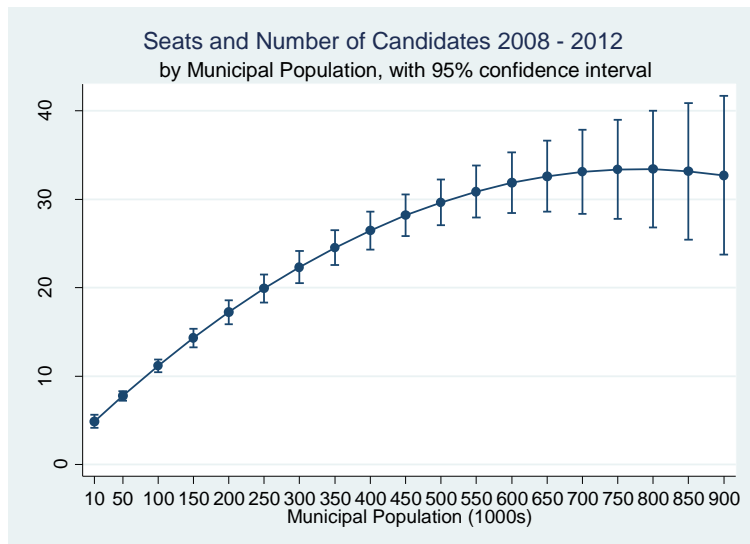


Figure 6: Seats and Number of Candidates, 2008-2012, by population

by $1.5 * \text{Seats}$ per party, and

by $2.0 * \text{Seats}$ per coalition. Models (5)-(8) estimate the effect of 1 Seats*Parties to be between 1.3 and 1.5 (very close to 1.5), and they estimate 1 Seats*Coalitions as between 1.96 and 2.45. This is close to 2.0 that one would expect due to the electoral laws, but it also raises the question of how the estimates can be larger than 2.0, and why there is a fairly large difference in the instrumented model. The effect can be larger than 2.0 if many coalitions were not previously at their maximum permissible limit¹³.

¹³ For discussion.

Number of City Council Candidates, 2008 - 2012								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
seats	11.59	14.38	4.115	4.839	-4.114	-5.91	-4.13	-5.915
	(26.36)	(58.20)	(9.61)	(6.99)	(-7.96)	(-7.05)	(-7.99)	(-7.07)
pop (1000)	0.00529	-0.509	-1.011	-1.303	0.0863	-0.324	0.0820	-0.325
	(0.01)	(-3.43)	(-3.11)	(-2.99)	(0.50)	(-1.40)	(0.48)	(-1.40)
pop^2	5.74E-04	9.74E-04	6.68E-04	6.75E-04	-1.49E-04	3.03E-04	-1.46E-04	3.03E-04
	(0.55)	(5.50)	(1.25)	(0.84)	(-0.64)	(0.89)	(-0.63)	(0.89)
2008.year (reference)	0	0	0	0	0	0	0	0
2012.year	6.082	3.547	8.342	6.833	7.539	6.734	7.560	6.747
	(19.97)	(8.98)	(33.06)	(24.77)	(42.93)	(35.76)	(42.76)	(35.59)
seats*pop			0.0752	0.0886				
			(11.12)	(8.46)				
seats*pop^2			-4.82E-05	-5.60E-05				
			(-4.34)	(-3.10)				
soloparties					-6.994	-8.895	-6.987	-8.888
					(-6.81)	(-6.46)	(-6.81)	(-6.46)
seats*soloparties					1.321	1.496	1.320	1.495
					(12.83)	(10.47)	(12.85)	(10.47)
coalitions					-9.659	-14.45	-9.659	-14.44
					(-10.58)	(-9.21)	(-10.58)	(-9.20)
seats*coalitions					1.960	2.447	1.960	2.446
					(20.93)	(14.97)	(20.93)	(14.96)
growthrate							1.414	0.494
							(1.97)	(0.60)
growthrate^2							-0.123	0.0327
							(-0.94)	(0.30)
constant	-54.22	-68.10	21.78	19.69	55.62	82.78	55.55	82.73
	(-5.58)	(-19.95)	(2.89)	(2.01)	(8.30)	(8.26)	(8.29)	(8.25)
Muni Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument for Seats	No	Yes	No	Yes	No	Yes	No	Yes
Robust SEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	10996	10996	10996	10996	10996	10996	10995	10995
Table contains coefficients and t statistics in parentheses. Models are (1) Base (2) IV (3) Baselnt (4) IVInt (5) BaselntP (6) IVIntP (7) BaselntPG (8) IVIntPG.								

Table 2: The Effect of Seats on Number of City Council Candidates, 2008 – 2012

Candidate Education, Wealth, and Gender

Greater degrees of proportional representation have been linked to higher levels of female representation in closed-list proportional representation systems (Norris, 2004). In closed list PR, progressive party leaders are able to nominate “under-represented” groups, and place them high on the party list, thereby greatly increasing their chances of election. Even in open-list PR systems, greater degrees of proportionality might aid in higher election rates of under-represented groups. Matland and Brown list at least three plausible means by which higher district magnitude could affect female representation in

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open list systems (Matland & Brown, 1992). First, women are more recognizable which can aid their ability to differentiate themselves in a larger field of candidates. Second, multi-member districts have higher turnover. In electoral systems where incumbency is a major advantage, past discrimination has more momentum, so under-representation lingers in the political system even as society reduces prejudice. The higher turnover in multi-member districts helps the under-represented groups to catch-up faster. Finally, there tends to be less negative campaigning in higher-magnitude districts. To the extent that under-represented groups prefer to highlight their strengths and have limited experience in negative campaigning, they will do better in higher magnitude settings. While Matland and Brown discuss these mechanisms with respect to gender, it may also exist with respect to socio-economic position (e.g. Education and Wealth).

The number of seats can affect the candidates' wealth in both directions. More seats might mean that each individual seat requires fewer resources to get elected. In open-PR systems where candidates can spend a good deal of their own money, this might reduce the cost of an election and reduce the need for wealthy candidates. On the other hand, we've seen that more seats tends to increase the number of candidates drastically. This could increase the cost of a campaign since it will require more resources for a candidate to stand out from the crowd.

Likelihood of Adoption

The 58th Amendment leaves the choice to increase local representation to the municipalities, so we must ask if aspects of a municipality are associated with a higher chance of policy adoption. A linear probability model of adoption was run on average candidate education, wealth, and gender for 2008 (prior to the adoption). Additional controls were included for population deciles, and state dummies. Conditional on population and state-level fixed effects, education, wealth, and gender are not found to be statistically nor economically important in predicting the decision to adopt an increase in seats. The primary driver of policy adoption was the population decile dummies, with larger municipalities more likely to adopt a change in seats.

Candidate Education

Education is measured using the Electoral Court's scale, which ranges between 1 and 8. 1 corresponds to illiteracy, and 2 means the candidate is able to read and write. Scores of 3 and 4 mean some primary school, and primary school completed, respectively. 5 and 6 indicate some high school and high school completed. Scores of 7 and 8 represent some university and university completed.

Pop Quintile	mean(edu)
1	4.54
2	4.75
3	4.96
4	5.26
5	5.72

Table 3: Population and Education

The expected education of municipal council candidates increases with population. For example, the smallest municipalities, those in the first quantile of population, have a mean educational achievement of 4.5, which means the average candidate hasn't completed primary school. The largest municipalities have an average candidate education of 5.72, which is almost an average educational attainment of high school completed.

To examine whether an increase in legislative seats had an effect on the educational attainment of candidates, model the educational attainment as:

$$\text{Edu}_{\text{cmt}} = \gamma_1 \text{Seats} + X_{\text{cmt}}\beta + X_{\text{mt}}\pi + \alpha_m + \delta_t + u_{\text{cmt}} \quad (3-1)$$

Observations are indexed by candidate (c), municipality (m), and election year (t). X variables indexed by candidate are Age and Gender (female indicator). Although these variables are indexed by t, no attempt has been made to link individual candidates over time. X variables indexed by municipality are population decile dummies. α_m contains slow moving variables that affect education levels of legislators, like average municipal education level, parental educational attainment, geographical representation patterns, infrastructure, and level of economic development. δ_t captures national education trends over the four year time period. The parameter of interest, the effect of a change of seats on the education level of the candidates, is γ_1 .

This model is estimated using fixed effects at the municipal level (within estimator), and is additionally estimated using an instrument for the number of seats. This is done for the entire population, and then for subpopulations of candidates that won, and for those that lost. Assuming the new candidates are additional names that are expected to finish at the bottom, then a difference in γ_1 for candidates who won and those who lost helps us identify the location of the causal mechanism. If the parameter for the losers is higher, then the mechanism is in the nomination process (determined by party leaders). If the parameter for the winners is higher, then then mechanism is in relatively stronger in the election (determined by the voters). The results are presented in Table 4.

Education of Brazilian Municipal Council Candidates, 2008-2012						
	(1)	(2)	(3)	(4)	(5)	(6)
seats	-0.0353	-0.0538	-0.0270	-0.0338	-0.0340	-0.0519
	(-15.53)	(-23.66)	(-6.24)	(-5.30)	(-14.11)	(-20.21)
age	-0.0274	-0.0275	-0.0437	-0.0437	-0.0252	-0.0252
	(-88.93)	(-156.10)	(-70.44)	(-85.64)	(-82.24)	(-128.93)
female	0.501	0.500	1.108	1.108	0.520	0.519

	(70.29)	(116.23)	(66.57)	(73.78)	(71.35)	(109.77)
Population deciles	coefficients not shown					
2008.year (reference)	0	0	0	0	0	0
2012.year	0.156	0.189	0.234	0.242	0.146	0.180
	(25.22)	(33.25)	(23.30)	(19.72)	(20.59)	(27.24)
constant	6.743	6.902	7.455	7.511	6.596	6.750
	(90.92)	(108.60)	(73.34)	(62.76)	(73.37)	(89.02)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Instrumented	No	Yes	No	Yes	No	Yes
Robust Ses	Yes	No	Yes	No	Yes	No
Population	All	All	Won	Won	Lost	Lost
N	768111	768111	107085	107085	606935	606935
Table shows coefficients and t-statistics in parenthesis. Models (2), (4), and (6) are instrumented. Models (1) & (2) are using the whole population. Models (3) & (4) are only among winners, and Models (5) and (6) is among losers.						

Table 4: Education of Brazilian Municipal Council Candidates, 2008-2012

Table 4 shows that between 2008 and 2012, the candidate pool candidates had between a 0.15 and 0.25 point increase in educational attainment. This is roughly equivalent to between a half and whole grade level of additional schooling. The coefficient on the female indicator is especially conspicuous, being a half a point higher for all candidates and a full point higher for female candidates. Without knowing the underlying distribution of education among men and women, we can't say whether this effect is due to women needing extra education to compete or simply the fact that women have more education in the general population. An additional municipal council seat is associated with a reduction in candidate educational attainment by 0.02 to 0.05 points. For a municipality that adds three seats, this might amount to a reduction of 0.06 to 0.15 points. The magnitude of the effect of the amendment on educational attainment is small, but it is not negligible.

Candidate Wealth

Candidate wealth is influenced by individual factors (education, age, previous occupation, gender), and it is also influenced by municipal-level variables such as the wealth of the city and the expense of a campaign. Campaign expense is a function of slow-moving variables such as the geography of the municipality (diffuse populations are more expensive to reach), and the cost of the media-market. But the expense is also influenced by time-variant factors such as the number of candidates in a race, and population growth. Given these considerations, a model of city councilor wealth with the goal of identifying the effect of council size, might be:

$$\text{Wealth}_{imt} = \gamma_0 \text{Seats}_{mt} + \gamma_1 \text{NC}_{mt} + X_{mt} \pi_w + X_{it} \beta_w + \alpha_m + \delta_t + C + u_{imt} \quad (4-1)$$

[DRAFT]

Observations are indexed by individual candidate (i), municipality (m), and election (t). The parameters of interest are γ_0 and γ_1 . In equation 4-1, γ_0 is the effect seats has on candidate wealth that does not operate through the change in the number of candidates (NC), which is estimated by γ_1 . Municipal level, time-variant factors affecting wealth (Lagged Cumulative Economic Growth Rate, Population and its square) are contained in X_{mt} . Individual level factors such as education, age, and gender are contained in X_{it} . Municipal level fixed effects, α_m , should contains many of the factors identified above, such as geographical extent, media market cost, and the wealth level of a city. Time fixed effects are included in δ_t , and C is a constant to ensure $E[\text{Wealth}|\text{RHS}] = 0$. u_{imt} is an error term, and includes the candidate's previous occupation¹⁴ and all other factors not identified in the model. The results are presented in Table 5.

Declared Wealth of Brazilian Municipal Council Candidates, 2008-2012						
	(1)	(2)	(3)	(4)	(5)	(6)
seats	0.0169	0.0494	-0.00911	0.0000616	0.00939	0.0408
	(2.26)	(9.66)	(-1.25)	(0.01)	(1.20)	(6.66)
number of candidates	-2.41E-04	-1.20E-03	6.87E-04	3.92E-04	9.64E-05	-8.13E-04
	(-0.57)	(-7.01)	(1.66)	(1.02)	(0.21)	(-4.08)
LAvgGDPrate	0.0693	0.0677	0.112	0.112	0.106	0.0990
	(1.11)	(1.72)	(1.24)	(1.35)	(1.45)	(2.04)
edu	0.142	0.142	0.0893	0.0893	0.136	0.136
	(72.80)	(110.17)	(28.15)	(31.52)	(65.06)	(91.05)
age	0.0433	0.0433	0.0402	0.0402	0.0444	0.0444
	(149.79)	(204.39)	(73.75)	(82.53)	(142.51)	(183.46)
female	-0.401	-0.400	-0.252	-0.252	-0.346	-0.345
	(-54.35)	(-74.51)	(-15.66)	(-17.33)	(-44.35)	(-57.25)
population deciles	coefficients not shown					
2008.year	0	0	0	0	0	0
2012.year	0.475	0.453	0.475	0.470	0.475	0.452
	(46.05)	(71.46)	(44.69)	(42.45)	(39.26)	(58.82)
constant	7.635	7.446	8.652	8.593	7.517	7.338
	(63.06)	(103.81)	(74.89)	(73.17)	(56.08)	(82.48)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Instrumented	No	Yes	No	Yes	No	Yes
Robust Ses	Yes	No	Yes	No	Yes	No
Population	All	All	Won	Won	Lost	Lost
N	485403	485403	87499	87499	370530	370530
Dependent variable is Ln(Wealth). Table shows coefficients and t-statistics in parenthesis. Models (2), (4), and (6) are instrumented. Models (1) & (2) are using the whole population. Models (3) & (4) are only among winners, and Models (5) and (6) is among losers						

Table 5: Declared Wealth of Brazilian Municipal Council Candidates, 2008-2012

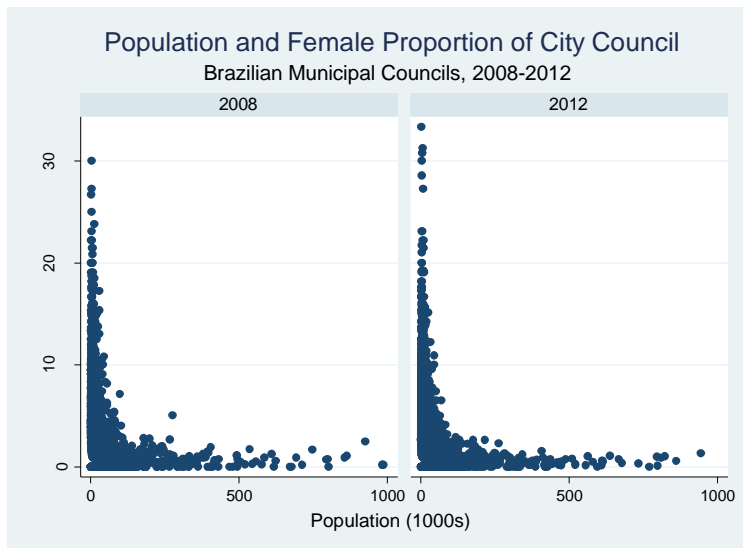
¹⁴ There is some data on this, 244 categories, and 1/8 fall into "other" category. For now, the current assumption is that candidate occupation is not correlated with factors in model.

The instrumented models in Table 5 do appear to be significantly different from the non-instrumented models. The effect of seats on the wealth of the candidate pool, assuming the instrument is valid, is approximately zero for the winners and 4% among the losers. In other words, an expansion of one seat is not associated with a change in the wealth of winning candidates, but it is associated with a slightly wealthier “bench,” of candidates.

Many of the other estimated parameters are intrinsically interesting. All candidates had approximately $100(\exp(.47)-1) = 60\%$ higher declared wealth in 2012 than in 2008. Female candidates had about $100(\exp(.4)-1) = 49\%$ less wealth than similar male candidates, though this difference is muted among female candidates that won compared to those who lost. Higher levels of education are associated with higher levels of wealth, as is age. And a higher previous 4 year average economic growth rate is associated with higher wealth.

Candidate Gender

Female representation is an issue that has gained space in Brazil’s public debate in recent years. The Electoral Court (TSE) has recently seen this issue of great enough import that it has spent its own resources on promoting the acceptance of female candidates. One might be tempted to assume that a lack of female representation is



associated with rural or traditional values. However, Figure 7 shows otherwise. The municipalities that have the highest levels of female participation on their city councils are the smallest (often rural) cities.

Figure 7: Population and Female Percentage of City Council

[DRAFT]

There was a marked increase in the number of female city council candidates from 2008 to 2012. Much of this was caused by an adoption of a gender quota during this time period. Figure 8 shows this pattern, as most municipalities moved from fielding fewer female candidates than the gender quota (vertical line at 0.3) to the right of the quota by 2012 when the law went into effect. The proportion of females winning, however, did not move so dramatically.

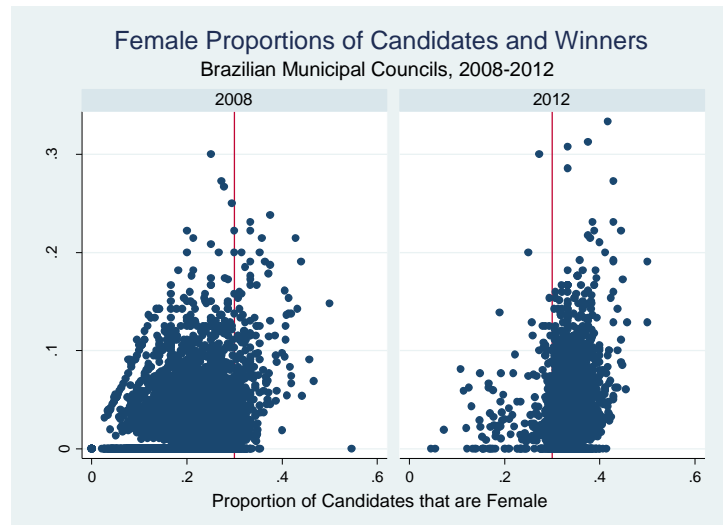


Figure 8: Female Proportions of Candidates and Winners

The model used for the percent of females elected to the city council is a function of the number of female candidates (NCF) (to contend with the coinciding gender quota change), the number of city council seats, the number of candidates, and the average municipal level of education, age, and wealth of all candidates. The same averages are calculated for only women candidates. The size of the municipality is included as decile dummy variables. A time dummy is used for 2012 and municipal fixed effects are included. As such,

$$\text{PctWinnersFemale}_{mt} = \gamma_0 \text{Seats}_{mt} + \gamma_1 \text{NCF}_{mt} + X_{mt} \beta + \alpha_m + \delta_t + u_{mt} \quad (5-1)$$

The model is estimated using without instrumenting for seats (1), and instrumenting for seats (2). In both cases, we see that an additional seat has a positive, but very small, effect on the percent of women winning election. To be more specific, an additional seat is associated with a 0.3% increase in women sitting on the city council. Thus, this policy appears to be relatively ineffective as a tool to increase female participation in government. The quota, on the other hand, potentially has a sizeable effect, though it is just short of statistical significance. Female candidates appear to do better in municipalities that are relatively richer, less educated, and older. Characteristics that appear to help the female candidates are wealth, education, and being younger :/

Percent of Election Winners that are Females		
	(1)	(2)
seats	0.305	0.375
	(13.40)	(9.76)
percent of candidates that are female	4.477	5.220
	(1.47)	(1.96)
number of candidates (ln)	-3.668	-3.833
	(-17.05)	(-19.61)
wealth (ln)	-0.203	-0.207
	(-2.68)	(-2.63)
edu	-0.560	-0.526
	(-3.53)	(-3.74)
age	0.0719	0.0715
	(2.34)	(2.68)
average wealth for female candidates (ln)	0.213	0.214
	(4.36)	(4.72)
average education for female candidates	2.031	1.966
	(6.16)	(7.03)
average age for female candidates	-0.152	-0.151
	(-2.78)	(-3.19)
population deciles	Coefficients not shown	
2008.year (reference)	0	0
2012.year	-0.780	-0.874
	(-6.41)	(-7.57)
constant	13.11	12.96
	(6.02)	(6.74)
Fixed Effects	Yes	Yes
Instrumented	No	Yes
Robust Ses	Yes	No
N	10841	10841
Dependent variable is percentage of winners that are female, so a coefficient of 3 means the marginal effect is 3 percentage points. Table contains coefficients and t-statistics in parenthesis. Model (1) is without instrument, and model (2) is with the seats instrument.		

Table 6: Percent of Election Winners that are Females

Works Cited

- Angrist, J., & Pischke, J.-S. (2010). The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics. *Journal of Economic Perspectives*, 3–30.
- Cox, G. W. (1997). *Making votes count: strategic coordination in the world's electoral systems*. Cambridge, U.K.; New York: Cambridge University Press.
- Duverger, M. (1963). *Political Parties* (2nd English Edition edition.). John Wiley & Sons.
- Matland, R. E., & Brown, D. D. (1992). District Magnitude's Effect on Female Representation in U. S. State Legislatures. *Legislative Studies Quarterly*, 17(4), 469. doi:10.2307/439862
- Mendonça, R. (2014, June 22). Os ricos estão sendo afastados da política, afirma pesquisador. *Folha de São Paulo*. São Paulo. Retrieved from <http://www1.folha.uol.com.br/poder/2014/06/1474254-os-ricos-estao-sendo-afastados-da-politica-afirma-pesquisador.shtml>
- Norris, P. (2004). *Electoral engineering voting rules and political behavior*. Princeton, N.J.: Princeton University Press.
- Powell, G. B. (2000). *Elections as Instruments of Democracy: Majoritarian and Proportional Visions*. New Haven, CT: Yale University Press.
- Rae, D. W. (1967). *Political Consequences of Electoral Laws* (Revised edition.). New Haven: Yale University Press.
- Riker, W. H. (1982). *Liberalism Against Populism: A Confrontation Between the Theory of Democracy and the Theory of Social Choice*. Prospect Heights, Ill.: Waveland Pr Inc.
- Taagepera, R., & Shugart, M. S. (1989). *Seats and votes: The effects and determinants of electoral systems*. New Haven: Yale University Press.