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Political competition and candidate selection in Brazilian municipalities.

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Abstract

This paper investigates the relationship between political competition and the quality of candidates and elected politicians. We use the effective number of candidates for measuring electoral competition, and the level of education for measuring the quality of politicians. By employing an instrumental variable approach, we find that greater electoral competition increases the proportion of elected mayors, mayoral candidates, elected councilors and council candidates that are college educated. In contrast, it decreases the participation and the performance of women in politics.

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1. Introduction

The statement that market competition improves consumer welfare is one of the most important principles of microeconomic theory. In recent years, there has been growing interest in understanding whether this also extends to the political environment. Tradicional models of political economy predict that electoral competition increases political accountability. According to Stigler (1972), political competition can potentially be as beneficial as economic competition, especially in terms of provision of public goods. One of the underlying mechanisms supporting this reasoning is that it increases the average quality of candidates and elected politicians, as argued by Besley et al. (2010). They also show that political competition tends to enhance the electoral relevance of swing voters, who are primarily concerned by the actual performance of politicians rather than ideological issues.

Regarding the empirical literature, there are mixed results. In a paper focusing on Flemish municipalities, Ashworth et al. (2006) finds that electoral competition has a positive effect on the efficiency of municipal policy. Similar findings have been documented for Italy (Galasso and Nannicini, 2011) and for Germany (Becker et al., 2009). However, Cleary (2007) finds no relationship between electoral competition and the provision of public goods in Mexican municipalities. Instead, he shows actually that voter turnout improves the quality of local governments. In a study of Peruvian local politics, Pique (2019) shows that higher mayoral wages enhances political competition by increasing the number of candidates, thus having a negative impact on government performance. He demonstrates that this result is driven by increased fragmentation, opposition, and turnover.

Elections are one of the fundamental tools of a democracy. Despite this, elections alone may not be sufficient for the progress of a society. It is a fact that its benefits are limited by existing obstacles, such as clientelism and corruption. The effectiveness of elections varies according to the institutional framework; therefore, it is also necessary to establish political institutions that enforce a system of checks and balances in order to ensure its legitimacy.

In Brazil, previous research indicates that political competition, at the municipality level, is associated with positive results. Arvate (2013) finds that an increase in the effective number of mayoral candidates improves the provision of public goods, namely the number of student enrollments, teachers, and free immunizations. In a paper that focuses particularly on the impact on fiscal spending, Chamon et al. (2019) argues that competition induces more investment and decreases current expenditures.

Besides the contradictory results in the literature, the evidence suggests that in Brazil political competition can be beneficial. We investigate whether political competition improves the quality of candidates and elected officials, given that this is one of the most crucial mechanisms behind the reported results. Politician quality is measured in terms of level of education. Since the level of competition in elections can also be influenced by the quality of the candidates, this endogeneity problem is addressed by employing an instrumental variable approach. To construct the instruments, we use the population rule that establishes the number of seats for municipal councilors. A larger number of seats implies a larger number of parties competing in the elections. Consequently, there is a larger number of mayoral candidates, implying greater competition.

This research is particularly relevant because much effort has been made in trying to understand whether increased competition improves the quality of government. Furthermore, we add to the literature by exploring a specific mechanism that underlies this association. Increased competition can be beneficial to a society in at least two ways: (*i*) it motivates the incumbent politician to perform better since he/she does not want to leave office, and (*ii*) it improves the quality of candidates since parties will have to choose their candidates better in a more competitive environment in order to succeed. We focus on the latter.

Our results indicate that political competition increases the proportion of elected mayors, mayoral candidates, elected councilors and council candidates that are college educated. We also find that increased competition reduces the participation and the performance of women in politics: they are less likely to run for office as well as to win elections. This result is consistent with a recent literature on gender and competition, which points to a tendency of men to have a better response to greater competition. For a review of this literature, see Niederle and Vesterlund (2011).

Along the same lines, De Paola and Scoppa (2011) investigated whether political competition improves the quality of elected officials at the level of local governments in Italy. By using different measures of political competition they have found positive results. Gavoille and Verschelde (2017) show that French deputies elected in more competitive districts exhibit greater productivity. Therefore, as documented by Jones and Olken (2005) individuals certainly matter for economic development, and that is why we need to elect the best ones.

This note is organized as follows: after the introduction, section 2 describes the empirical strategy and the data used; section 3 presents the results, and section 4 concludes the research.

2. Empirical Strategy

2.1 Data Sources

We use the electoral data from five municipal elections held in 2000 to 2016. Information on the elections results and candidate characteristics come from the Superior Electoral Court (*Superior Tribunal Eleitoral*); municipal controls come from the Brazilian censuses conducted by the Brazilian Institute of Geography and Statistics (*IBGE*). For both the elections held in 2000 and 2004, we use municipal controls from the 2000 census, while the data from the 2010 census is used for the 2008, 2012, and 2016 elections. The control variables used are: *per capita* montly income, percentage of population with secondary-level of education, municipal unemployment rate, and the percentage of males within the population. We use regional fixed-effects dummies to capture unobserved regional heterogeneity, with the southeast designated as the baseline. We also use election fixed-effects (not reported) to control for possible trend changes of the outcome variables over time.

Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Obs.
Effective number of candidates	2.181	0.567	1.000	7.748	24416
College educated elected mayor	0.447	0.288	0	1	24416
College educated mayoral candidates	0.438	0.341	0	1	24416
College educated elected councilors	0.186	0.166	0	1	24416
College educated council candidates	0.132	0.088	0	0.611	24416
Male mayor	0.909	0.288	0	1	24416
Male mayoral candidates	0.893	0.195	0	1	24416
Male councilors	0.871	0.111	0.222	1	24416
Male council candidates	0.753	0.086	0.481	1	24416
Male population	0.506	0.015	0.454	0.811	24416
Per capita monthly income	704.356	402.024	76.501	6197.673	24416
Population with secondary school	0.398	0.100	0.111	0.784	24416
Unemployment rate	0.086	0.055	0.001	0.580	24416
North	0.081	0.273	0	1	24416
Northeast	0.312	0.463	0	1	24416
Midwest	0.084	0.277	0	1	24416
Southeast	0.312	0.463	0	1	24416
South	0.210	0.408	0	1	24416

Sources: Superior Electoral Court (Superior Tribunal Eleitoral; 2000, 2004, 2008, 2012, and 2016). Brazilian censuses from the Brazilian Institute of Geography and Statistics (IBGE; 2000, and 2010).

It is not an easy task to find variables that accurately represent what it means to be a quality politician in practical terms. It is known that the level of education is a key determinant of productivity in the labor market, as extensively documented in the economic literature. Assuming that political skills are related to labor market skills, we use the level of education as a proxy for evaluating the quality of politicians. [4]

Table 1 shows some descriptive statistics for the variables used in this paper. The effective number of candidates, which is the measure of political competition that we have chosen, is computed by using the following formula: $N = 1/\sum_{i=1}^{n} c_i^2$ where n is the number of candidates and c_i^2 is the square of each candidate's share of the votes. The idea behind this measure is to count the number of candidates while considering their relative strength in the election.

[4] Other studies also consider education as a proxy for the quality of politicians, such as Ferraz and Finan (2009), De Paola and Scoppa (2011), and Baltrunaite et al. (2014)

The main four outcome variables used for measuring the quality of politicians are: *college educated elected mayor*, which is a dummy variable that assumes a value of one if the elected mayor in that municipality has at least a college degree; *college educated mayoral candidates*; *college educated elected councilors*; and *college educated council candidates*, which are the share of mayoral candidates, the share of elected councilors for the municipal legislative branch, and the share of council candidates that have a college degree, respectively.

In addition to these measures of the politicians' level of education, we will also test whether political competition affects women's participation in politics. We created a dummy variable, *male mayor*, which indicates whether the mayor elected in that municipality is a man. The variable *male mayoral candidates* is the share of male mayoral candidates; *male councilors* is the share of elected councilors that are male; and *male council candidates* is the share of male council candidates. As can be seen from the descriptive statistics, women are notably underrepresented in Brazilian politics — about 91% of the mayors in Brazil are male.

2.2 Identification: instrumental variables

We want to assess the impact of electoral competition on the quality of the candidates and elected politicians. To this end, we implement the following two-stage least squares (TSLS) model:

$$Competition_{it} = \gamma_0 + \gamma_1 Z_{it} + X'_{it}\zeta + \mu_t + \eta_r + \epsilon_{1it} \tag{1}$$

$$Q_{it} = \beta_0 + \beta_1 Competition_{it} + X'_{it}\lambda + \mu_t + \eta_r + \epsilon_{2it} \tag{2}$$

where Q_{it} is the outcome of interest in the politicians of a municipality i for the election t. Here, we use the level of education and gender for the candidates and elected politicians. $Competition_{it}$ is the effective number of candidates, which is the inverse of the Herfindal-Hischman Index (HHI). X'_{it} is a vector of municipal characteristics, Z_{it} is the instrumental variable, μ_t is a vector of election fixed-effects dummies, η_r is a vector of regional fixed-effects dummies, and ϵ_{1it} and ϵ_{2it} are the error terms for equations 1 and 2, respectively. β_1 is the coefficient of interest. All of these variables are more precisely defined in the previous subsection.

We adopt an instrumental variables framework because the relationship between candidate quality and political competition is certainly endogenous. Just as political competition can determine the quality of candidates, the quality of candidates can affect, at least in part, the degree of competition. This approach can also correct for possible omitted variable bias.

For creating an IV candidate, we exploit the rule that establishes the number of seats in the municipal legislative branch, which is based on the size of the municipal population[5]. In accordance with Arvate (2013), we build two dummy variables. The first, *medium municipality*, has a value equal to one if the municipality has between 11 and 30 councilor seats, and the second, *larger municipality*, has a value equal to one if the municipality has 31 or more councilor seats. The idea behind this choice of instrument is as follows: the greater the number of seats in the municipal legislative, the greater the number of parties competing in the elections. In addition, the office of mayor is the natural career progression for a councilor, thus a larger number of councilors implies more competition for the mayor's seat.

For an instrument to be considered valid, it must satisfy two traditional criteria: relevance and exclusion restriction. The former requires that the instrument has an effect on the competition variable. The latter requires that the instrument has an influence on the variable of interest (politician quality) only through its effect on the competition variable, after controling for municipal característics (i.e., $E(Z_{it}\epsilon_{it}|X'_{it}) = 0$). As will be discussed in the following section, we are confident that these criteria have been met.

3. Results

3.1 OLS estimates

First, we use a simple OLS model to analyze whether political competition is related to the quality of candidates and elected politicians. The following model is estimated:

$$Q_{it} = \beta_0 + \beta_1 Competition_{it} + X'_{it}\lambda + \mu_t + \eta_r + \epsilon_{it} \tag{3}$$

[5] Article 29, paragraph IV of the federal constitution.

where Q_{it} is the quality of candidates or elected politicians in the municipality i at the election t, $Competition_{it}$ is the effective number of candidates, X'_{it} is a vector of control variables at the local level, μ_t is a vector of election fixed-effects dummies, η_r is a vector of regional fixed-effects dummies, and ϵ_{it} is an error term.

From table A2, we can see that political competition, as measured by the effective number of candidates, is unrelated to the probability of having an elected mayor that has a college degree. However, the share of mayoral candidates, elected councilors, and council candidates that have college degree are positively related to political competition. The coefficients are statistically significant, but rather small in magnitude. An increase of one effective candidate (which is quite a substantial increase in competition) increases by 1.0, 1.1, and 0.2 percentage points the share of mayoral candidates, councilors, and council candidates that have a college degree, respectively. These results are negligible in terms of practicality.

Regarding the control variables, we can see that the quality of politicians increases with the education and income of the population, and decreases with the share of the population living in rural areas. Regional fixed-effects are statistically significant; futhermore, the results (not reported) show that politicians' education is higher both in the Northeast and Southeast, than it is in the South, Midwest, and North. Election fixed-effects shows a positive trend of the level of politicians' education over time.

In testing for robustsness, we have estimated alternative methods to OLS. To account for the fact that the variable in column 1 is binary, we have used a Probit model in contrast to the Linear Probability model presented in table A2. Additionaly, we have estimated a Beta Regression model[6] to adress the fact that the variables 2, 3 and 4 are proportions. These results, as can be seen in table A4, are similar to the OLS results.

Table A3 presents the results from OLS estimations investigating the relationship between political competition and the politicians' gender. Increasing the level of competition by one effective candidate reduces by 1.5 percentage points, both the chance of electing a male mayor and the proportion of male mayoral candidates. The results for councilors (column 3) and council candidates (column 4) are opposite: the former is positive and the latter is negative. All these coefficients are quite small in magnitude and thus negligible in practical terms.

Once again, we have used alternative methods to OLS as robustness tests. For the binary outcome (column 1) we have estimated Probit models. For all the others, which are proportions, we have estimated Beta Regression models. As shown in Table A5, the results are essentially the same, except for the variable in column 3, which in this table is not statistically significant. However, the coefficient is almost zero in both tables.

The correlations shown in tables A2 and A3 are most lileky biased. Our independent variable representing political competition is not exogenously determined. Let's suppose that in a given municipality there is already a high-quality candidate running for mayor; this may discourage potential competitors and, as a result, reduce the level of competition in the race. This generates a downward bias in the relationship between political competition and the quality of candidates, since the quality of candidates reduces competition. In the next section, we propose a strategy in order to overcome this concerns.

3.2 TSLS estimates

An instrumental variables approach is employed to overcome the endogeneity problem in the relationship between political competition and the quality of candidates. The two-equation model represented by equations 1 and 2 is used to estimate the results presented in tables 2 and 3.

The results in Table 2 refer to the effect of competition on politicians' level of education. Panel B shows the results from the first-stage regressions, where both the instruments used significantly affect political competition. The F-statistic of 251.36 is considerably above the minimum threshold of 10 suggested by Staiger and Stock (1994), as well as the threshold of 104.7 recommended by Lee et al. (2021). This suggests that the relevance criteria is satisfied, due to the fact that the instruments are strongly correlated with the political competition variable. We are also confident that the exclusion restriction criteria is satisfied, because there is no apparent reason to suspect that the instruments directly affect the quality of elected politicians. In other words, only increasing the number of councilor seats in the legislative branch does not directly affect the quality of politicians.

Panel A shows the results from the second-stage regressions. A one unit increase in the effective number of candidates increases the chance that a municipality elects a college educated mayor by 64 percentage points. Similar effects are observed as well in the other three outcome variables, which represent the proportions of mayoral candidates, elected councilors, and council candidates that have a

[6]For more details, see Ferrari and Cribari-Neto (2004)

college degree, respectively. These results support our earlier assumption that the OLS estimates are downward biased, since the coefficients of the TSLS estimates are much larger.

In Table 3 the effect of electoral competition on politicians' gender is presented. We find a significant effect of political competition increasing the probability of electing a male mayor, as well as the proportions of male mayoral candidates, elected councilors, and council candidates. Increasing competition by one effective candidate increases the chance of electing a male mayor by almost 6 p.p.; the fraction of male mayoral candidates by almost 7 p.p.; the fraction of male councilors by 11 p.p.; and the fraction of male council candidates by only 1.2 p.p.

Taking into account that the variables in columns (1) of tables 2 and 3 are dummies, we have also used an IV-Probit estimator as robustness tests. The results (not reported) do not change our main conclusions.

Table 2: TSLS estimates: political competition and education of politicians.

Education	Mayor	Mayoral candidates	Councilors	Council candidates
	(1)	(2)	(3)	(4)
Panel A:TSLS				
Competition	0.643***	0.575***	0.404***	0.204***
	(0.000)	(0.000)	(0.000)	(0.000)
% pop. with	0.437***	0.393***	0.303***	0.327***
secondary education	(0.000)	(0.000)	(0.000)	(0.000)
% rural population	-0.027	-0.029	-0.026**	-0.038***
	(0.309)	(0.142)	(0.020)	(0.000)
Per capita montly	0.006***	0.005***	0.006***	0.004***
income/100	(0.003)	(0.003)	(0.000)	(0.000)
Regional fixed effects	yes	yes	yes	yes
Election fixed effects	yes	yes	yes	yes
Observations	24,164	24,164	24,164	24,164
Panel B: first stage				
	Competition			
Medium size municipality	0.179***			
	(0.042)			
Larger size municipality	0.265***			
	(0.008)			
% pop. with	0.446***			
secondary education	(0.073)			
% rural population	-0.099***			
	(0.024)			
Per capita montly	-0.002			
income/100	(0.002)			
Regional fixed effects	yes			
Election fixed effects	yes			
F-statistic	251.36			
(p-value)	(0.000)			
R-squared	0.020			

Notes: in Panel A, the first dependent variable is a dummy indicating if the mayor has college degree. The other three are, respectively, the share of mayoral candidates, councilors and council candidates that have college degree. Standard erros (corrected for heteroscedasticity and clusterized at the municipality level) are reported in parenteses. The symbols *, **, *** indicate, respectively, 1, 5, and 10% the statistical significance level.

Table 3: TSLS estimates: political competition and politicians' gender.

Gender	Male mayor	Male mayoral candidates	Male councilors	Male council candidates
	(1)	(2)	(3)	(4)
Panel A:TSLS				
Competition	0.059**	0.068***	0.110***	0.012***
	(0.025)	(0.016)	(0.010)	(0.004)
% pop. with	-0.015	-0.021	0.022*	-0.057***
secondary education	(0.040)	(0.022)	(0.012)	(0.007)
% rural population	0.061***	0.036***	0.018***	0.032***
	(0.014)	(0.008)	(0.005)	(0.002)
Per capita montly	0.001	0.001**	-0.001***	-0.001***
income/100	(0.001)	(0.000)	(0.000)	(0.000)
% male population	-0.363**	-0.378***	-0.217***	-0.053**
	(0.143)	(0.101)	(0.000)	(0.027)
Region fixed effects	yes	yes	yes	yes
Election fixed effects	yes	yes	yes	yes
Observations	24,164	24,164	24,164	24,164
Panel B: first stage				
	Competition			
Medium size municipality	0.182***			
	(0.000)			
Larger size municipality	0.273***			
	(0.000)			
% pop. with	0.453***			
secondary education	(0.064)			
% rural population	-0.110***			
	(0.024)			
Per capita montly	-0.001			
income/100	(0.001)			
% male population	0.566*			
	(0.289)			
Region fixed effects	yes			
Election fixed effects	yes			
F-statistic	249.83			
(p-value)	(0.000)			
R-squared	0.020			

Notes: in Panel A, the first dependent variable is a dummy indicating if the mayor is male. The other three are, respectively, the share of mayoral candidates, councilors and council candidates that are male. Standard erros (corrected for heteroscedasticity and clusterized at the municipality level) are reported in parenteses. The symbols *, **, *** indicate, respectively, 1, 5, and 10% the statistical significance level.

4. Concluding remarks

One of the most studied questions in political economy and science is what are the consequences of political competition for society. Some studies have documented that more competition implies a better quality of government. This paper analyzes one of the possible mechanisms behind this relationship. By exploiting the context of Brazilian local politics, we investigate whether greater political competition improves the quality of candidates and elected officials.

The data was gathered from five municipal elections that took place between 2000 and 2016. Political competition was measured by the effective number of candidates in mayoral elections. The quality of politician was measured in terms of level of education. To disentangle the direction of causality in this relationship, we employed a Two-Stage Least Squares estimator. The instruments used were derived from the population rule that determines the number of councilor seats in the municipal legislative branch.

First, we showed estimates using OLS, suggesting that there is a positive but rather small correlation between political competition and the quality of politicians. However, the bias-corrected results obtained using TSLS estimates, show a strong and positive effect of political competition on the quality of candidates and elected officials. A comparison of these results indicates that there is a downward bias in this relationship, as expected.

Additionally, this paper also documents that political competition reduces the participation as well as the performance of women in politics. Increased political competition reduces the number of female candidates and female elected politicians. Previous studies have shown that women cosnsistenlty perform worse than men in competitive environments. This is attributed to differences in overconfidence, among other things.

It is not possible to know whether our results are driven by the voters' perception of the candidates, or by the candidates' reaction to increased competition. Nevertheless, this research contributes to the literature by providing evidence that there are benefits of competition, since it improves the quality of politicians. This is perhaps one of the main mechanisms of why political competition has been associated with a higher quality of government. On the other hand, it increases the existing gender gap in Brazilian politics.

Finally, we expect future research to address two main questions raised in this paper: are politicians with higher levels of education in fact better politicians? Why do women tend to participate less the more competitive the elections? Clarifying these issues is fundamental in order to have a greater understanding of how these mechanisms actually work.

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